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Volume 42 Number 3

August (Suppl 1)

2026

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Relation between Organizational Reputation and Nursing Staff Retention

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Abstract

Background: Organizational reputation is a valuable intangible asset that is considered a core factor of organizational success, attracting competent human resources, and enhancing relationships with nursing staff. **Aim:** To assess the relation between organizational reputation and nursing staff retention. **Design:** Descriptive-correlational research design was used. **Setting and subjects:** All head nurses (n = 45) and a convenience sampling of nurses (n = 286) working at Tanta International Teaching Hospital. **Tools:** Two tools were used, Nursing Staff Perception regarding Organizational Reputation Questionnaire and Nursing Staff Retention Scale. **Results:** More than half (59.4%) of nursing staff had a positive perception of organizational reputation, while more than one third (40.6%) had a negative perception. About 38.6% of them had a high level of retention while, 35.6% and 25.8% of them had a low and moderate level respectively. **Conclusion:** There was a significant positive association between organizational reputation and nursing staff retention. **Recommendations:** Hospital management need to adopt strategies continuous educational programs and workshops. They also establish a supportive work environment that is empowering, promoting autonomy and attraction and retention of nurses.

Key words*:* Nursing Staff, Organizational Reputation, Retention.

Introduction

The nursing profession constitutes the largest segment of the healthcare workforce and plays a vital role in health service delivery worldwide. Nurses are the cornerstone of healthcare organizations, contributing significantly to hospital success and positive patient outcomes. Maintaining a favorable organizational reputation is essential for attracting and retaining qualified nursing staff, who represent a healthcare organization's most valuable asset **(GabAllah, Shokier, & Mostafa, 2026).**

Organizational reputation refers to stakeholders' overall perceptions of an organization's past actions and future prospects. It is a valuable intangible asset that reflects the organization's standing among internal and external stakeholders and is closely associated with trust, image, prestige, and identity **(Pedersen, Andersen, Gregersen, & Salomonsen, 2025).** A positive organizational reputation enhances staff loyalty, organizational commitment, trust, professional identification, and performance while reducing operational costs and turnover **(Poeira & Nunes, 2025).**

Organizational reputation comprises five dimensions: work environment, social responsibility, creativity, service quality, and vision and leadership. The work environment includes systems that support professional nursing practice. Social responsibility reflects organizational commitment to stakeholders and society **(Rosa, Capolupo, & Marolla, 2025).**

Creativity involves generating innovative ideas that improve nursing effectiveness. Service quality refers to the provision of care that increases the likelihood of desired health outcomes and aligns with professional standards. Vision and leadership encompass future organizational goals and leaders' ability to inspire and guide employees toward high-quality performance **(Mostafa & Mostafa, 2024; Saleh, Abdelwahid, Elsabahy, Eltahan, & Ata, 2025; Mostafa, 2023).**

A positive organizational reputation contributes to organizational sustainability and competitive advantage while influencing nurses' decisions to remain with their employers **(Felion Morgan, Johnson, & Rainbow, 2025).**

Nurse retention, defined as the ability of healthcare organizations to retain qualified nurses over time, is critical for maintaining service quality, productivity, and organizational performance **(Karimah & Holipah, 2025).** Retention is increasingly recognized

as a strategic leadership priority that requires supportive leadership, staff well-being, inclusivity, innovation, and opportunities for participation in decision-making **(Knight, 2026).**

Three key dimensions of nurse retention are compensation and recognition, relationship with supervisor, and job satisfaction. Compensation and recognition involve fair rewards and acknowledgment of nurses' contributions, with salary remaining the most valued form of recognition among nurses. Relationship with supervisor reflects the quality of interactions between nurses and managers, emphasizing mutual trust, respect, and organizational support. Job satisfaction refers to the extent to which nurses experience positive feelings toward their work and remains a major determinant of retention **(Muhula et al., 2025; Fan, Akkadechanunt, & Sirakamon, 2025).**

Significance of the study

A positive organizational reputation is a key determinant of organizational success, contributing to increased financial performance, attraction of qualified healthcare professionals, acquisition of new clients, and stronger relationships with nursing staff. Conversely, a poor reputation can undermine an organization's competitiveness, market position, stakeholder trust and loyalty, and operational legitimacy. A favorable organizational reputation enhances nurses' job satisfaction, organizational loyalty, and positive perceptions of the quality of services provided by the organization. However, when an organization's reputation fails to align with the evolving expectations of its internal and external stakeholders, organizational effectiveness may decline **(Pamungkas & Sulistyo, 2020).** Therefore, the present study aims to examine the relationship between organizational reputation and nurses' retention.

Aim of the study:

To assess the relation between organizational reputation and nursing staff retention.

Research questions: -

-What are the levels of nursing staff perception regarding organizational reputation and their retention?

-What is the relation between organizational reputation and nursing staff retention?

Research design:

A descriptive correlational research design was used.

Setting:

The present study was conducted at Tanta International Teaching Hospital, which is affiliated to the Ministry of Higher Education and

Scientific Research.

Subjects:

All head nurses (n = 45) and a convenience sample of nurses (n = 286) who had at least one year of work experience and agreed to participate in the study were included.

Tools of Data Collection

Two tools were used:

Tool I: Nursing Staff Perception regarding Organizational Reputation Questionnaire

This tool was developed by the researcher guided by **Del-Castillo-Feito, Blanco-González, & Delgado-Alemany (2020)** and **Zaki, Khaled, Saad, Elsaiad, & Samir (2023).** It was used to assess nursing staff perception of organizational reputation. The tool consisted of two parts as follows:

Part I: Personal data of the nursing staff, including department, age, sex, marital status, educational qualification, years of experience, and participation in hospital activities.

Part (2): Nursing staff perception regarding organizational reputation Scale. The scale comprised 32 items categorized into five dimensions: work environment (6 items), social responsibility (6 items), creativity (7 items), quality of service (8 items), and vision and leadership (5 items).

Nursing staff responses were measured on a five points Likert Scale ranging from (1 to 5) as strongly disagree = 1, disagree = 2, neutral =3, agree = 4 and strongly agree = 5. The total scores are calculated by statistical cut-off points (60%) and summing scores of all categories. The total scores represent varying levels: positive organizational reputation level ≥ 60% and negative organizational reputation level < 60%.

Tool II: Nursing Staff Retention Scale. This tool was modified by the researcher based on **Abdallah and Mostafa (2021)** and **Kim, Milliman, & Lucas (2020).** It was used to assess nursing staff retention. The scale comprised 34 items categorized into three dimensions: compensation and recognition (7 items), relationship with supervisor/manager (11 items) and job satisfaction (16 items).

Nursing staff responses were measured on a five points Likert Scale ranging from (1 to 5) as strongly disagree = 1, disagree = 2, neutral =3, agree = 4 and strongly agree = 5. The total scores are calculated by statistical cut off points (60%) and summing scores of all categories. The total scores represent varying levels: high level ≥75%, moderate level 60% - < 75% and low level of nursing staff

retention <60%.

Method

-Official permission was obtained from the Dean of the Faculty of Nursing, Tanta University, and submitted to the Director of the Tanta International Teaching Hospital to conduct the study.

- **Ethical consideration:**

a) Approval was obtained from the Scientific Research Ethics Committee of the Faculty of Nursing, Tanta University, prior to conducting the study (Code No. 342-12-2023).

b) Informed consent was obtained from all nursing staff after they were provided with a clear explanation of the study's purpose and procedures.

c)Participants were informed that they had the right to withdraw from the study at any time without any consequences.

d) The nature of the study did not cause any harm or pain for the entire sample.

e) Confidentiality for data and privacy for studied nursing staff was considered. A code number was used instead of names.

-The study tools were presented to a jury of five expertise in the area of specialty to check content validity of each tool. The experts' responses were rated using a four-point Likert scale ranging from 1 to 4, where 1 = not relevant, 2 = slightly relevant, 3 = relevant, and 4 = highly relevant

- Based on the experts' feedback, the necessary modifications were made, including clarification of items, deletion of some items, addition of new items, and simplification of work-related terminology. The face validity index was 96.81% for Tool I and 97.06% for Tool II.

- A pilot study was carried out on a sample (10%) of nurses (n=34) nursing staff, to check and ensure the clarity of the tools, identify obstacles and problems that may be encountered during data collection. The pilot was excluded from the total study subjects.

-Reliability of tools was tested using Cronbach's Alpha Coefficient test. Reliability of tool (I) was 0.826 and tool (II) was 0.831.

- The researcher met nursing staff at the waiting area of their department, explained the aim of the study and the questionnaires was self-fulfilled by nursing staff.

- Data were collected from nursing staff during working hours. The researcher personally distributed the questionnaires and collected them upon completion. Participants were provided with the necessary instructions and clarification when required. Data collection was conducted over a six-month period, from January 26, 2025, to July 26, 2025. The estimated time required to

complete the questionnaire ranged from 20 to 30 minutes.

Results

Table (1): Illustrates distribution of nurses and head nurses' personal data. The highest proportion (27.3%) of nurses worked in medical department, while the lowest percentage (6.0%) of them worked in Burn department.

Regarding age, the mean age of nurses was 32.9 ± 8.4 years, with ages ranging from 22 to 56 years. Less than half (45.5%) of them were aged between 20 and 30 years and 36.0% aged 31–40 years. The majority (80.4%) of them were female and nearly two-thirds (63.6%) were married. In relation to educational qualifications, nearly to half (48.3%) of them had technical nursing institute. 35.7% of them had 5–10 years of experience. More than half (54.9%) of them reported no participating in hospital activities.

Regarding head nurses, the highest proportion (26.7%) of head nurses worked in medical department, while the lowest percentage (4.4%) of them worked in Burn department.

Regarding age, the mean age of head nurses was 42.3 ± 9.1 years, with ages ranging from 28 to 58 years. More than one third (40.0%) of them were aged from 31 to 40 years and 33.3% aged 41–50 years. All head nurses were female and the majority (80.0%) of them were married. In relation to educational qualifications, 40.0% had technical nursing institute. Nearly half (44.5%) of them had 10–20 years of experience. Two-thirds (66.7%) of them reported participating in hospital activities.

Figure (1): **Illustrates overall levels of nursing staff perception regarding organizational reputation.** As evident from the figure, more than half (59.4%) of nursing staff had a positive perception of organizational reputation, while more than one third (40.6%) of them had a negative perception.

Table (2): Presents the mean scores and ranking of nursing staff perceptions regarding the dimensions of organizational reputation. As shown in the table, the highest mean percentage score was recorded for quality of service with mean scores 63.93%, followed by work environment with mean scores 60.97%, then vision and leadership with mean scores 58.33%, followed by social responsibility with mean scores 57.17%. Finally, creativity had the least mean scores 53.07%.

Figure (2): Demonstrates overall levels of nursing staff retention. It was observed that more than one third (38.6%, 35.6%) of nursing staff

had a high and low level of retention respectively, while, only more than one quarter of (25.8%) of them had a moderate level of.

Table (3): Shows mean scores and ranking of nursing staff retention dimensions. As shown in the table, the highest mean percent score was observed in relationship with supervisor/manager with mean scores 71.50%, followed by compensation and recognition with mean scores 59.00%. Finally, job satisfaction had the least mean scores 50.0%.

Table (4): **Clarifies correlation between organizational reputation and nursing staff retention.** As shown in the table, there was a positive statistically significant correlation between overall and all dimensions of organizational reputation and nursing staff retention at ($p < 0.001$).

Table (1): Distribution nurses and head nurses' personal data

Personal data	Staff nurses (n=286)		Head nurses (n=45)	
	No.	%	No.	%
Department				
Medical	78	27.3	12	26.7
Orthopedic	43	15.0	7	15.6
Cardiac ICU	35	12.2	5	11.1
Medical ICU	52	18.2	8	17.8
Oncology	35	12.2	5	11.1
Burn Unit	17	6.0	2	4.4
Pediatric Surgery	26	9.1	6	13.3
Age				
20–30	130	45.5	5	11.1
31–40	103	36.0	18	40.0
41–50	43	15.0	15	33.3
Above 50	10	3.5	7	15.6
Mean±SD	32.9± 8.4		42.3 ± 9.1	
Min. – Max.	22 – 56		28 – 58	
Sex				
Male	56	19.6	0	0
Female	230	80.4	45	100
Marital status				
Married	182	63.6	36	80.0
Unmarried	104	36.4	9	20.0
Qualification				
Nursing Diploma	69	24.1	3	6.7
Technical nursing institute	138	48.3	18	40.0
Bachelor of nursing	36	12.6	12	26.7
Post graduated studies	43	15.0	12	26.7
Years of experience				
Less than 5 years	98	34.3	2	4.4
From 5 to 10 years	102	35.7	10	22.2
From 10 to 20 years	61	21.3	20	44.5
More than 20 years	25	8.7	13	28.9
Participation in activities in the hospital				
No	157	54.9	15	33.3
Yes	129	45.1	30	66.7

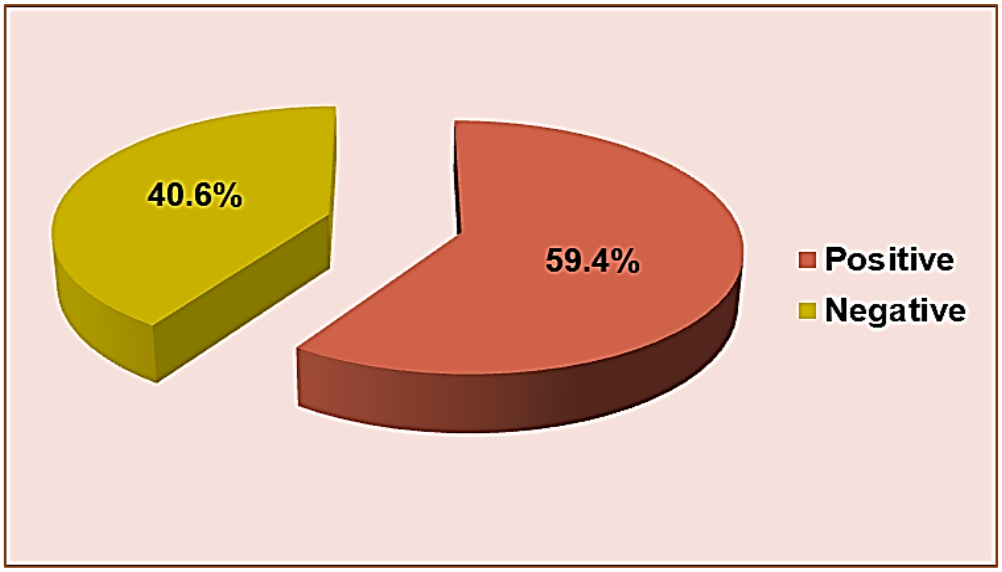

Figure (1): Overall levels of nursing staff perception regarding organizational reputation

Table (2): Mean scores and ranking of nursing staff perceptions regarding the dimensions of organizational reputation (n=331)

Organizational reputation dimensions	Total Scores		Average Score (1–5)	Mean percent Score	Rank
	Min. – Max.	Mean ± SD	Mean ± SD		
Work environment	6 -17	13.31 ± 1.99	2.22 ± 0.33	60.97	2
Social responsibility	7- 18	12.86 ± 2.21	2.14 ± 0.37	57.17	4
Creativity	9 – 20	14.43 ± 2.47	2.06 ± 0.35	53.07	5
Quality of service	8 – 24	18.22 ± 2.14	2.28 ± 0.27	63.93	1
Vision and leadership	6 - 14	10.83 ± 1.91	2.17 ± 0.38	58.33	3
Overall	33 - 93	69.65 ± 10.72	2.18 ± 0.34	58.90	

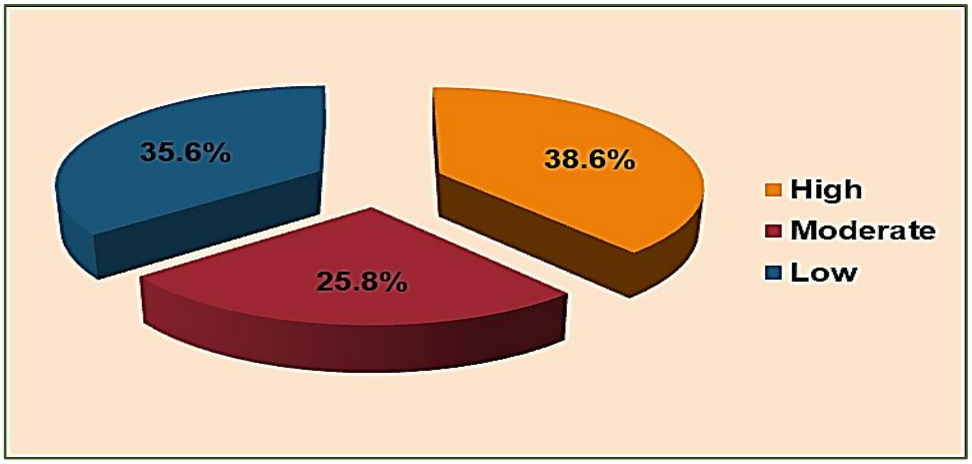

Figure (2): Overall levels of nursing staff retention (n = 331)

Table (3): Mean scores and ranking of nursing staff retention dimensions (n = 331)

Nursing staff retention dimensions	Total Scores		Average Score (1–5)	Mean percent Score	Rank
	Min. – Max.	Mean ± SD	Mean ± SD		
Compensation and recognition	7 -20	15.25 ± 3.45	2.18 ± 0.49	59.0	2
Relationship with supervisor/manager	14- 33	26.75 ± 4.20	2.43 ± 0.38	71.5	1
Job satisfaction	17 – 45	32.00 ± 5.60	2.00 ± 0.35	50.0	3
Overall	37 - 99	74.00 ± 13.25	2.18 ± 0.39	59.0	

Table (4): Correlation between organizational reputation and nursing staff retention (n=331)

Nursing staff retention			Organizational reputation				
		Work environment	Social responsibility	Creativity	Quality of service	Vision and leadership	Overall
Compensation and recognition	**r**	0.31*	0.28*	0.34*	0.36*	0.29*	0.38*
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Relationship with supervisor/manager	**r**	0.35*	0.30*	0.32*	0.37*	0.33*	0.41*
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Job satisfaction	**r**	0.39*	0.34*	0.36*	0.42*	0.37*	0.45*
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Overall	**r**	0.41*	0.36*	0.38*	0 .44*	0.40*	0.47*
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

***: Statistically significant at p ≤ 0.05**

Discussion

Organizational reputation has received considerable attention across disciplines because of its influence on organizational resources, strategic success, and long-term sustainability. In healthcare settings, a positive organizational reputation enhances nurses' pride, trust, sense of belonging, and intention to remain with the organization. Nurses who perceive their organization as reputable are more likely to exhibit stronger organizational commitment and higher retention rates **(Ali, 2025).**

Nursing staff perception regarding organizational reputation

The current study found that more than half of the nursing staff had a positive perception of organizational reputation. This finding may be explained by the hospital's ability to maintain a favorable internal image through quality services, trust in organizational performance, clear organizational goals, and practices that promote nurses' pride and sense of belonging. Furthermore, nurses' perceptions of organizational reputation may be influenced by their daily work experiences, including leadership support, teamwork, ethical climate, service quality, and opportunities for professional development.

In the same context, a study conducted by **Ali (2025)** who reported that more than half of nursing personnel demonstrated a moderate level of organizational reputation. Similarly, **Elsayed Hagrass and Kassem (2024)** reported that the total mean score of organizational reputation reflected a positive perception among the studied staff nurses.

In contrast, the present findings are not consistent with the results reported by **Hossny et al. (2023)** which revealed that a positive organizational climate was lacking among most of nurses due to absence of a supportive organizational climate and reduce their sense of trust, pride, and attachment to the workplace.

Regarding organizational reputation dimensions, the current study indicated that more than sixty percent of nursing staff reported a positive perception of the work environment dimension. This finding may be attributed to a relatively supportive work climate, fair treatment, teamwork, and positive relationships between nurses and supervisors. Additionally, nurses may perceive the work environment favorably when they receive adequate

organizational support, experience effective communication, and feel respected and secure in their jobs.

Consistent with this finding, **Ali (2025)** stated that nurses who perceived their workplace as reputable and supportive were more likely to experience job satisfaction and demonstrate stronger intentions to remain within the organization.

The current study revealed that more than half of nursing staff reported a positive perception of the social responsibility dimension. This finding may be attributed to the hospital's commitment to ethical practices, patient welfare, and community responsibilities. Nurses may perceive this dimension positively when they observe respect for patients' rights, provision of safe and ethical care, adherence to professional values, and contributions to addressing community health needs.

In this context, **Thuy and Bui (2024)** found that social responsibility practices had a significant impact on nurses' job performance as socially responsible hospitals not only focus on serving the community but also support and value their nursing staff, which may strengthen nurses' positive perceptions regarding the social responsibility dimension of organizational reputation.

The present study revealed that more than half of the nursing staff reported a positive perception of the creativity dimension. This finding may be attributed to the hospital's support for innovation, problem-solving, and continuous improvement in healthcare services. It may also reflect opportunities for nurses to share ideas, participate in decision-making, and adopt new approaches that enhance patient care and work performance. Furthermore, positive perceptions of creativity may be fostered by support for professional development, the use of modern technologies, and a flexible work environment that encourages learning and adaptation to healthcare challenges.

This finding is supported by **Saleh, Abdelwahid, Elsabahy, Eltahan, & Ata, (2025)** who reported that fostering a supportive environment and employing visionary leadership can empower nurses to be more creative, leading to enhanced problem-solving, improved processes, and better overall performance within healthcare organizations. They emphasized that when nurses perceive strong organizational support, they feel more valued and are more likely to engage in creative behaviors.

The present study revealed that more than sixty percent of the nursing staff reported a positive perception of the quality-of-service dimension. This finding may be attributed to acceptable standards of nursing care, effective patient interactions, the availability of essential resources, and nurses' perceptions that services are delivered in a manner that meets patients' needs. Furthermore, when nurses observe that care is timely, safe, and well-coordinated, they are more likely to evaluate the quality-of-service dimension of organizational reputation positively.

In this regard, **Elsayed, Hagrass, and Kassem (2024)** found that the quality-of-services dimension achieved the highest mean score among all organizational reputation dimensions. This agreement may indicate that healthcare employees often judge organizational reputation primarily through the quality and effectiveness of the services delivered to patients.

The present study revealed that more than half of the nursing staff reported a positive perception of the vision and leadership dimension. This finding may be attributed to supportive leadership practices that provide clear organizational direction, encourage staff participation, and effectively communicate goals. It may also reflect nurses' confidence in management's ability to make sound decisions, address challenges, and maintain organizational stability. Furthermore, positive perceptions of this dimension may be fostered when leaders demonstrate transparency, motivation, and a commitment to improving healthcare quality and supporting staff professional development.

Consistent with this finding, **Hammad (2023)** who revealed that the highest mean score was for leadership and vision because the workers perceive their leaders as a model for them to manage the organization and progress toward its vision.

Nursing staff retention

The present study revealed that more than one-third of the nursing staff had high levels of retention. This finding may be attributed to the combined influence of organizational and personal factors affecting nurses' intentions to remain with or leave their workplace. High retention levels may be associated with satisfaction with organizational reputation, supportive leadership, a stable work environment, job security, and positive interpersonal relationships.

The present finding is in agreement with the study conducted by **AbdELhay, Taha, El-Sayed, Helaly, & AbdELhay (2025)** which reported that more than one-third of nurses demonstrated a high level of retention. This indicates that nursing staff retention is influenced by multiple organizational and personal factors rather than being consistently high or low among all nurses.

Regarding nursing staff retention dimensions, the present study indicated that over one-third of nursing staff reported low level of compensation and recognition. This may be explained by sensitivity of compensation and recognition as key retention factors, as they reflect how far the organization values nurses' workload, responsibilities, and contributions to patient care. It may also indicate dissatisfaction with salary structure, financial incentives, benefits, and organizational practices related to appreciation and reward systems.

In the same line, **Alhusban, Mrayyan, and Bani Hani (2026)** who reported that the total mean score of the recognition and reward subscale indicated an unsatisfactory level, further supporting the current study results regarding the perceived inadequacy of compensation and recognition systems among nursing staff.

The current study revealed that more than one-third of the nursing staff reported high level of relationship with their supervisor/manager. This finding reflects the importance of managerial support as a key determinant of retention. It may be attributed to the role of nurse managers and supervisors in providing daily guidance, resolving work-related issues, organizing duties, offering constructive feedback, and fostering a supportive work environment. Positive nurse–supervisor relationships increase nurses' perceptions of being valued, fairly treated, emotionally supported, and psychologically secure, thereby strengthening their intention to remain in the organization.

In this regard, **Yue et al. (2024)** reported that nurses' willingness to continue working was positively correlated with hospital-related factors, and that nursing manager support was a significant predictor of nurses' intention to stay. This supports the current finding, as it confirms that the relationship with nurse managers is a critical dimension influencing nursing staff retention.

The present study indicated that over one-third of the nursing staff reported low level of job satisfaction. This may be explained by variation in nurses' experiences within the same organization, where some nurses feel satisfied due to positive relationships, supportive supervision, job security, and a sense of professional belonging, while others experience dissatisfaction due to heavy workload, work-related stress, limited incentives, inadequate recognition, and lack of career advancement opportunities.

In this concern, a study performed by **Aljawarneh et al., (2025)** who showed that about two fifths of nurses reported a high intention to leave, and job satisfaction was a significant predictor of intention to leave. This supports the present finding because low job satisfaction among a considerable proportion of nurses reduces retention and increase the possibility of leaving the job.

Correlation between organizational reputation and nursing staff retention

The current study highlighted a positive statistically significant correlation between overall organizational reputation and nursing staff retention. This may be explained by the fact that organizational reputation serves as a psychological and professional attraction factor for nurses. When nurses perceive their hospital as reputable, service-oriented, supportive, socially responsible, and well-led, they are more likely to experience pride, job satisfaction, and emotional attachment to the organization, which enhances their willingness to remain in their positions. In addition, perceptions of high-quality care delivery contribute to feelings of value, commitment, and satisfaction, further strengthening retention.

The present study finding aligns with the results of **Mozolová, Tupá, and Kordoš (2026)** who reported that job satisfaction significantly predicted nurses' intention to stay, and that work engagement partially mediated this relationship. Similarly, **Ali (2025)** found that nurses perceiving their workplace as reputable and supportive was more likely to experience higher job satisfaction and stronger retention intentions.

Conclusion

According to the current study, more than half of the nursing staff had a positive perception of organizational reputation. In addition, more than one-third of them demonstrated a high level of retention, while approximately one-

third reported a low level of retention. Furthermore, a highly statistically significant positive correlation was found between overall organizational reputation and nursing staff retention.

Recommendations

In light of the findings of the present study, it was recommended that

For hospital management:

- Enhance nursing staff perceptions of organizational reputation through regular scientific workshops and seminars focusing on the work environment, social responsibility, and creativity, quality of service, and vision and leadership.
- Establish a supportive environment that encourages creative thinking, innovation, and risk-taking among nursing staff.
- Ensure fair compensation systems, effective recognition practices, and adequate staffing levels to promote a positive work environment and organizational culture.

For head nurses

-Foster a supportive work environment for promoting trust and collaboration.

-Encourage nurses to participate in decision-making processes and quality improvement initiatives to enhance their organizational commitment.

-Provide continuous feedback, coaching, and recognition to motivate nursing staff and support their professional growth.

For nurses

-Actively engage in continuing education programs and training activities to enhance professional knowledge and skills.

-Participate in organizational quality improvement initiatives for strengthening the hospital's reputation.

-Demonstrate social responsibility through adherence to ethical standards, teamwork, and patient-centered care practices.

For further research:

-Assess the impact of organizational reputation on other organizational outcomes such as job satisfaction, turnover intention, productivity, and quality of patient care.

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Self-Care and Self-Efficacy among Patients with Hemodialysis

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Abstract

Background: End stage renal disease is one of the most serious health conditions worldwide that require continuous hemodialysis. It needs the higher self-efficacy from the patients to be self-dependent in caring of themselves. **Aim of the study:** assess self-care and self-efficacy among patients with hemodialysis. **Design:** A descriptive cross-sectional design was used. **Setting:** Hemodialysis units in hospitals from Egypt and Saudi Arabia. **Subjects:** A total of 213 patients were included in the study from the previous setting. **Tools**: Two tools were used. **Tool I:** Self-Care of Patients with Hemodialysis Scale. **Tool II:** Chronic Kidney Disease Self-Efficacy (CKD-SE) Scale. **Results:** More than three quarters (76.1%) of the studied hemodialysis patients had high self-care level and about half (49.3%) of them had high self-efficacy. **Conclusion and recommendations:** There were a highly statistically significant correlation between total self-efficacy score and total self-care among hemodialysis patients. So that, it is recommended to establish regular educational sessions and workshops for patients addressing self-care practices, dietary management, medication adherence, and vascular access care.

***Keywords*:** End stage renal disease, Hemodialysis, Self-care, Self-efficacy

Introduction

Hemodialysis is a vital treatment for adults facing end-stage renal disease (ESRD), a condition that affects millions on a global scale. Chronic kidney disease (CKD), which can advance to ESRD, is thought to affect over 10% of the general population, which is more than 800 million people. The number is even greater for adults, especially older people and those who also have diabetes and high blood pressure (**Chu et al., 2024, Ozsahin, Emegano, Bader, Duwa, & Ozsahin,2024)**.

The mortality rate among patients receiving kidney replacement therapy (KRT) was 1.6 times higher in the United States (157.3 deaths per 1,000 patient-years) compared to Europe (98.7 deaths per 1,000 patient-years). Additionally, the kidney transplantation rate in the United States (77.0 per million population) was nearly twice that in Europe (41.6 per million population). Despite this higher transplantation rate, the proportion of patients living with a functioning kidney transplant was lower in the United States (32%) compared to Europe (47%) **(Oberbauer, Heaf, Jager, & Hecking, 2023).**

In Egypt, a study conducted in Luxor Governorate 2026 and revealed that 1,056 of neighbors and community members were living with end stage renal disease (ESRD), representing a prevalence of 483 patients per million. The primary drivers of kidney failure were hypertension (38.4%), followed by the regional challenge of urinary stones (13.9%) and diabetes (12.8%) **(Hamed, Hassan, Sadek, Mohamed & Abdelhady, 2026).**

Similarly, in Saudi Arabia, 2025, a study conducted in all 13 administrative areas in the country, which are Albaha, Aljouf, Almadina, Alqasim, Asir, Eastern Region, Hail, Jazan, Makkah, Najran, Northern Borders, Riyadh, and Tabouk revealed that the overall prevalence of chronic kidney disease (CKD) was 4.76%, with most having CKD in stage 3 (3.5%). The prevalence of CKD was higher among males compared to females (5.83% vs. 3.88%) and increased significantly with age, being 0.45% among participants aged 18–29 years and reaching 50.94% among participants aged 90 years or older **(Alshehri, et al., 2025).**

Hemodialysis patients frequently experience multiple complications, including cardiovascular disease, infections, anemia, bone disorders, and dialysis-related symptoms such as fatigue and muscle cramps. Complications significantly impact

patients' ability to perform daily activities and engage in self-management behaviors. So, those patients are in strong need to learn how to perform self-care and in need in strong self-efficacy to perform self-care (**(Ameh, Ekrikpo, Bello, & Okpechi, 2023).**

Self-care means that patients take an active role in their care as they actively participating in their treatment by adhering to prescribed regimens, monitoring symptoms, and making lifestyle adjustments. High self-efficacy is essential for successful self-care. Research findings had proven the role of self - efficacy in enhancing self-care as supported by Ausanee & Jane, 2018 who find that that higher self-efficacy in hemodialysis patients correlates with better adherence to treatment protocols and improved health-related quality of life (**Ausanee & Jane, 2018; Kumar, 2023).**

Self-efficacy plays a pivotal role in the self-management of chronic diseases, including end-stage renal disease (ESRD). In hemodialysis patients, higher self-efficacy is associated with better adherence to treatment protocols, improved health-related quality of life (HRQoL), and enhanced self-care behaviors **(Oberbauer et al, 2023).**

Community health nurses (CHNs) have very important role in improving self-confidence in hemodialysis patients. They teach patients about their disease, assist them in changing their habits, and give them ongoing encouragement, which all help patients take control of their health. By building strong relationships with their patients, community health nurses can really boost patients' ability to care for themselves (**(Özdemir & Olgun, 2025).**

Community health nurses play a big part in helping patients become more independent by teaching them and giving them support so they can stick to important self-care habits. These habits improve their health and lower the chance of problems, include watching how much fluid they drink and limiting certain things in their diet, especially sodium, potassium, and phosphorus, to avoid problems that could lead to serious issues (**Hamza & Hasanen, 2022)**.

Also, community health nurse has a critical role in adherence to prescribed medicines, like phosphate binders and high blood pressure drugs, is very important for handling other health issues. Keeping the vascular access clean and reporting any signs of infection or clotting right away can stop

serious problems linked to dialysis access. CHN can encourage elderly patients to do regular exercises as suggested by doctors, helps the heart and overall health. Getting psychological and emotional support, whether through therapy, support groups, or classes, can help patients deal with their problems better and stick to their treatment**(Aitken et al., 2025)**.

Significance of the study

Hemodialysis (HD) stands as the most frequently used method of kidney replacement therapy worldwide, representing about 69% of all kidney replacement therapies and 89% of all dialysis procedures(**Bello et al., 2022) .** People who are receiving hemodialysis for end-stage renal disease (ESRD) often have a high risk of death and experience many problems. **(Lin & Chu, 2022)**. In the United States, the mortality rate for dialysis patients between 66 and 74 years old is more than ten times higher than for the general population (**Bello et al., 2022)**.

Typical problems that hemodialysis patients might face involve heart and blood vessel diseases, infections, anemia, bone and mineral issues, and symptoms linked to dialysis like tiredness and muscle cramps. Intradialytic hypotension, which means a drop in blood pressure with symptoms during dialysis, happens in about 15% to 50% of sessions (**Alasfar et al., 2024; Hamrahian, Vilayet, Herberth, Fülöp, 2023).**

Hemodialysis patients may find it harder to do their usual daily activities and take on more responsibility for their own care. Good self-care is very important for reducing these negative results. When people feel abler to handle their own care, they usually do better at practicing self-care **(Moreels et al., 2023) .** Thus, this study aimed to assess self-care and self-efficacy among patients with hemodialysis.

Aim of the study: assess self-care and self-efficacy among patients with hemodialysis.

Study Questions

1-What are the levels of self-care among patients with hemodialysis?

2-What are the levels of self-efficacy among patients with hemodialysis?

Subjects and method

Subjects

Study design: A descriptive cross-sectional research design was utilized for this study**.**

Study settings: The study was conducted in hemodialysis units in hospitals from Egypt and Saudi Arabia. In Saudi Arabia, in King Khalid Hospital, King Abdullah

Kidney Center and Diaverum in Hail, Saudi Arabia affiliated to Ministry of Health. In Egypt, it was conducted in Tanta University Hospitals affiliated to Ministry of Higher Education and Scientific Researcher which included Tanta University Educational Hospital, and the New Renal Hospital.

Study subjects: -

The study population consisted of all patients (213) patients were receiving regular hemodialysis at the aforementioned settings during the period of the study.

Tools of the study

Two tools were used by the researcher to collect the necessary data.

Tool I: Self-Care of Patients with Hemodialysis Scale

This tool was originally developed by (**Song et al., 2009**). It consisted of three parts:

Part 1: Socio-demographic characteristics of the studied patients:

This part included data about age, sex, marital status, educational level, occupation, residence area, number of rooms, number of family members, crowning index, and family income, weigh, height, and body mass index (BMI).

Part 2: Medical history of the studied patients: -

The medical history of the studied patients included their history of other chronic diseases, duration of these diseases, current medications, and duration of being under the hemodialysis.

Part 3: Self-care scale of patients with hemodialysis: -

Self-care scale was developed by **(Song, 2009)** and was used by **(Li, Jiang, & Lin, 2014)** in their study and was adapted by the researcher in the current study. This scale contained of 20 items in four subscales. First, problem-solving subscale included (5) items as "Correcting the potential causes of out-of-range blood tests", second، Emotion management subscale included (4) items such as "relieving emotional distress through exercise", third، self-care sub scales included (7) items such as "Taking care of arterio-venous fistula" and finally medical partnership subscale included (4) items such as "Checking the parameters of the dialysis machine during dialysis".

Scoring system:

The items were scored in four-point Likert scale ranged from (1) for never, (2) for rarely, (3) for sometimes, and (4) for always. The score was ranged from 20 to 80. The higher score indicated better self-care management in patients.

The total score was calculated and converted into a percentage, then classified as follows:

-Higher self-care: ≥ 60% of the total score. (≥ 56 points)

-Low self-care: <60% of the total score. (<56 points)

Tool II: Chronic Kidney Disease Self-Efficacy (CKD-SE) Scale

It was developed by (**Lin et al., 2012)** and was adapted by the researcher to assess the patient's perceived self-efficacy in managing hemodialysis. It consisted of (25) items divided into four subscales. Autonomy subscale which was included (8) items such as "Feeling comfortable when contacting doctor at any time if have any questions about medication", self-integration subscale which was included (7) items such as "Managing diet in a variety of social situation in order not to increase the workload of the kidney", problem-solving subscale was included (6) items such as "Seeking out information that explains the symptoms and signs related to illness", and seeking social support subscales which included (4) items as "Finding help when under psychological stress". This scale was reflecting how patients feel about various CKD management activities, contributing to a comprehensive understanding of self-care and engagement with treatment.

Scoring System

The scale score ranged from 0 to 5; it was as follow (none of the time = 0, little of the time = 1, some of the time = 2, a good bit of the time = 3, most of the time = 4, and all of the time = 5). The score was calculated for each subscale. Then, total score was calculated for all subscales to calculate the total score and converted into percentages then, classified as follow:

-Low self-efficacy: < 30 % from the total score (< 37.5 points)

-Moderate self-efficacy: 30–70 % from the total score (37.5 – 87.5 points)

-High self-efficacy: > 70 % from the total score (> 87.5 points)

Method

Obtaining approval:

-An official permission was obtained from the Dean of Faculty of Nursing, Tanta University to the directors of the hospitals under the study, to obtain their permissions to collect data from selected settings.

-The directors of the selected hemodialysis units were informed about the objectives of the study to secure their cooperation in facilitating data collection.

Ethical considerations:

-The approved consent of the Scientific Research Ethical

Committee of the Faculty of Nursing, Tanta University, was obtained to conduct the study (**Ethical code: 643-5-2025).**

-An informed consent was obtained from the chosen patients to participate in this study after providing an appropriate explanation about the purpose and benefits of the study at the beginning of the questionnaire.

-Each participant was informed that he/she has the right to withdraw from the study at any time he/she wants.

-Nature of the study did not cause any harm or pain for the entire sample.

-Confidentiality and privacy were put into consideration regarding the data collected.

-Developing the study tools:

-The study tools (I and II) were adapted and translated into Arabic language by the researcher.

-The study tools were tested for its face and content validity by a jury of five experts in the field of community health nursing before conducting the study.

-Pilot study

-A pilot study was carried out by the researcher on 10% (n=21) of the subjects for testing the tools for its clarity, applicability and for identifying any obstacles that may be encountered with the researcher during data collection. Accordingly, the necessary modifications were done and those participants were excluded from the entire study.

-The study tools were tested for reliability by using suitable statistical test. Cronbach's alpha test was used, it was computed and it was found to be = (0.800) for all the study tools (for socio-demographic and medical history, it was found to be = 0.639 for self-care scale, it was found to be = 0.891, and for self-efficacy scale, it was found to be = 0.870).

-Data collection:

-The studied patients were interviewed by the researcher in suitable places at hemodialysis unit of the previous setting during hemodialysis session according to their schedules.

-The average number of the interviewed hemodialysis patients at Tanta University Educational Hospital, and the New Renal Hospital, Egypt was about 4-6 patients / day for two days a week.

-The duration of collecting data in Egypt last about three months from the end of July to the end of September, 2025.

-The average number of the interviewed hemodialysis patients at King Khalid Hospital, King Abdullah Kidney Center and Diaverum in Hail, Saudi Arabia was

about 3-6 patients / day for two days a week.

-The duration of collecting data in Saudi Arabia last about three months from the start of October to the end of December, 2025.

-Each hemodialysis patients were interviewed individually.

-The average time spent for collecting data from each patient was about from 25-35 minutes.

-The duration of the study was about 6 months starting from the end of July to the end of December 2025.

-Statistical analysis

The data were organized, tabulated and statistically analyzed using statistical package for social studies (SPSS) version 23. The mean, standard deviation and range were calculated for quantitative data. For categorical variables numbers and percent were calculated. Comparison was done using chi-square test (x2), when chi square isn't appropriate Fissure Exact test (FE) and Monto Carlo Exact test (MCET) were used Pearson's correlation coefficient (r) was used to identify correlation between variables. A significance was adopted at $P<0.05$ for interpretation of results of tests of significance (*). Also, highly significant was adopted at $P<0.01$ for interpretation of results of tests of significance (**)

Results

Table (1) : Shows the distribution of studied hemodialysis patients according to their socio-demographic characteristics. The table illustrates that about 62% & 25.3% of the studied hemodialysis patients their age ranged from (30-60) years and from (60-85) years respectively with a Mean± SD of 48.47 ± 15.045. More than half (59.2% & 51.6%) of them were male and Egyptians respectively. About two thirds (66.7%) of them were married. Regarding their education, 32.9% of them had secondary and university education, while only 16.0% of them were able to read and write and only 8.9%of them had basic education.

Furthermore, about one third (31.9%) of them were not working and 51.2% of them were living in urban areas. Also, 68.5% & 55.4% of the studied hemodialysis patients had $\leq$ 4 rooms and $\geq$ 5 family members respectively. Regarding crowding index, 83.6% of the studied hemodialysis patients had crowding index of < 2. Slightly less than half (48.3%) of the studied hemodialysis patients reported that their income was enough. Regarding their body mass index, more than two fifth (43.2%) of them had normal weight, while 37.6% of

them were overweight and 17.8% were obese.

Table (2): Shows the distribution of total scores of self-care subscales for the studied hemodialysis patients. The table illustrates that the total mean score for self-care sub-scale was (22.56 ± 3.81) with a range of (7 – 28), while the mean score problem solving sub scale was (15.48 ± 3.86) with a range of (5 – 20), for medical partnership was (14.58 ± 2.56) with a range of (4 – 16), and for emotion management sub-scale was (11.43 ± 3.31) with a range of (4 – 16).

Table (3): Presents the distribution of the studied hemodialysis patients according to their levels and total score of self-care. It elicits that about three quarters (76.1%) of the studied hemodialysis patients had high self-care. Meanwhile, the remaining (23.9%) of them had low self-care, with a Mean± SD (64.07 ± 11.34). The total mean score of self - care was (60.07± 11.34) with a range (20 – 80).

Table (4): Demonstrates means and standard deviations of total scores of chronic kidney disease self-efficacy subscales for the studied hemodialysis patients. The table illustrates that the total mean score for autonomy subscale was (31.48 ± 7.86) with a range of (0–40), while for self-integration subscale was (23.08 ± 7.65) with a range of (0 – 35), for problem solving sub scale was (19.79 ± 8.91) with a range of (0 – 30), and for seeking social support sub-scale was (12.41 ± 6.65) with a range of (0 – 20)

Table (5): Describes the distribution of the studied hemodialysis patients according to their levels and total score of self-efficacy. It elicits that about half (49.3%) of the studied hemodialysis patients had high self-efficacy followed by (48.8 %) of them had moderate self-efficacy and only (1.9%) of them had low self-efficacy. The total Mean ± SD of self – efficacy was (86.79 ± 25.99) with a range (0- 125)

Table (6) : Shows the correlation between total scores of self-care and total self-efficacy scales for the studied hemodialysis patients. It was observed that total self-efficacy score had a highly statistically significant positive correlation with total self-care score at (P=0.000). This means that, as the hemodialysis patient had higher self -efficacy score, he had the higher self-care score**.**

Table (1): Distribution of the studied hemodialysis patients according to their socio-demographic characteristics

Socio-demographic characteristics	The studied hemodialysis patients (n=213)	
	No	%
Age		
12 -	27	12.7
30 -	132	62.0
60 - 85	54	25.3
Mean ± SD	**48.47 ± 15.045**	
Range	**12 - 85**	
Sex		
Male	126	59.2
Female	87	40.8
Nationality		
Saudi Arabian	103	48.4
Egyptian	110	51.6
Marital status		
Single	35	16.4
Married	142	66.7
Divorce	12	5.6
Widow	24	11.3
Education		
Illiterate	20	9.3
Reads and writes	34	16.0
Basic education	19	8.9
Secondary education	70	32.9
University education	70	32.9

Table (1): Continue

Socio-demographic characteristics	The studied hemodialysis patients (n=213)	
	No	%
Occupation		
Professional work	19	8.9
Hand craft work	15	7.0
Employ	54	25.4
Freelance work	16	7.5
Not working	68	31.9
Housewife	41	19.2
Place of residence		
Rural	104	48.8
Urban	109	51.2
Number of house rooms		
≤ 4	146	68.5
> 4	67	31.5
- **Range**	**2 – 8**	
Number of family members		
< 5	95	44.6
≥ 5	118	55.4
- **Range**	**1 – 14**	
Crowding index		
< 2	178	83.6
≥ 2	35	16.4
Family monthly income		
Enough and save	34	16.0
Enough	103	48.3
Not enough	76	35.7
Body mass index		
Under weight (< 18.5)	3	1.4
Normal weight (18.5 – 24.9)	92	43.2
Overweight (≥ 25)	80	37.6
Obese (≥30)	38	17.8

Table (2): Mean and standard deviation of total scores of self-care subscales for the studied hemodialysis patients

Self-care subscales total scores	The studied hemodialysis patients(n=213)	
	Mean ± SD	Range
Medical partnership	14.58 ± 2.56	4 - 16
Problem solving sub scale	15.48 ± 3.86	5 – 20
Self-care sub-scale	22.56 ± 3.81	7 – 28
Emotion management sub-scale	11.43 ± 3.31	4 - 16

Table (3): Distribution of the studied hemodialysis patients according to their levels and total score of self-care

Levels and total score of self-care	The studied hemodialysis patients(n=213)	
	No	%
Low self-care	51	23.9
High self-care	162	76.1
Mean ± SD	64.07 ± 11.34	
Range	20 - 80	

Table (4): Means and standard deviations of total scores of chronic kidney disease self-efficacy subscales for the studied hemodialysis patients

Total scores of self-efficacy subscales	The studied hemodialysis patients (n=213)	
	Mean ± SD	Range
Autonomy subscale	31.48 ± 7.86	0 - 40
Self-integration subscale	23.08 ± 7.65	0 – 35
Problem solving sub scale	19.79 ± 8.91	0 – 30
Seeking social support sub-scale	12.41 ± 6.65	0 - 20

Table (5): Distribution of the studied hemodialysis patients according to their levels and total score of self-efficacy

Levels and total score of self-efficacy	The studied hemodialysis patients (n=213)	
	No	%
Low self-efficacy	4	1.9
Moderate self-efficacy	104	48.8
High self-efficacy	105	49.3
Mean ± SD	86.79 ± 25.99	
Range	0 - 125	

****. Correlation is significant at the 0.01 level (2-tailed).**

Table (6): Correlation between total score of self-care scale and total score of self-efficacy scale for the studied hemodialysis patients

Variables	Total self-care score	
Total self-efficacy score	r	p
	0.851	0.000**

Discussion

Patients undergoing hemodialysis experience significant physical, psychological, and social challenges due to the lifelong nature of end-stage renal disease (ESRD). Hemodialysis requires strict adherence to treatment schedules, dietary and fluid restrictions, medication regimens, vascular access care, and symptom monitoring **(Mehraeen, et al., 2025; Yasin)**.

As a result, effective self-care has become a fundamental component of disease management for this population. Evidence indicates that patients who actively engage in self-care behaviors demonstrate better treatment adherence, fewer complications, reduced hospitalization rates, and improved quality of life **(Mehraeen, et al., 2025; Yasin, Khraim, Santos, Forgrave & Hamad, 2024)**.

Self-efficacy, is an individual's belief in their ability to successfully perform behaviors necessary to achieve desired outcomes. Patients with higher levels of self-efficacy are more likely to adhere to dietary restrictions, regulate fluid intake, monitor symptoms, maintain vascular access care, and participate actively in decision-making regarding their health. Conversely, low self-efficacy is associated with poor treatment adherence, increased emotional distress, and poorer health outcomes (**Ernst et al., 2024; Mangolian Shahrbabaki et al., 2023).** So that, the aim of this study was to assess self-care and self-efficacy among patients with hemodialysis.

In relation to the distribution of the studied hemodialysis patients according to their levels of total score of self-care. The table elicits that about three quarters of the studied hemodialysis patients had high self-care. Meanwhile, the remaining of them had low self-care, with a mean± SD of 64.07 ± 11.34 with a range of 20 - 80 **(Table 3)**. This is in the line with **Parlk & Jung, (2025)** who conducted a study entitled: "Predictors of self-management behaviors among patients undergoing hemodialysis" at three tertiary-level hospitals in Korea. They reported that, the total mean score of self- care reported behaviors was 62.66 ± 10.52 with a range of 27 – 80. This may be attributed that, the awareness of hemodialysis patient about self-care and about the importance of following healthy behaviors practices.

This finding of the present study is in the opposite with a study conducted by **Hamza, Mohamed, Hassanen & Elmaghoury, (2021)**

who conducted a study entitled: "Self-care behavior for hemodialysis patients at Beni-Suef University Hospital", Egypt. They reported that 100.0 % of the studied hemodialysis patients had inadequate self-care for healthy behavior. Also, the study results are in contrast with **AL-Abedi1, et al. (2020)** who reported that 39.4 % of the patients with end stage renal disease were independent in self-care, while 59.0% of them were interdependent in self-care and only 1.6 % of them were dependent.

From the researcher's point of view, the differences between studies may be attributed to the difference in socio-demographic characteristics between our study and these studies, as in our study the highest proportion of the studied patients had secondary and university education and reported having enough family monthly income as shown in **(Table I)** and these variables may support patient ability for self-care and in following healthy behaviors. On the other hand, in these studies, the highest proportion of the studied hemodialysis patients were illiterate or able to read and write and their level of income was in sufficient, so their level of self-care was affected and they demonstrated low self-care.

Regarding Mean and standard deviation of total scores of self-care subscales for the studied hemodialysis patients**.** It was observed that the total mean score for self-care sub-scale was (22.56 ± 3.81)), while the mean score problem solving sub scale was (15.48 ± 3.86)), for medical partnership was (14.58 ± 2.56) and for emotion management sub-scale was (11.43 ± 3.31) **(Table 2)**. This result of the current study is in agreement with **Xia & Wang, (2024)** who conducted a study under the title of "Influence of teach-back strategy on hemodialysis-related knowledge level, self-efficacy and self-management in patients receiving maintenance hemodialysis" at Wuhan City, China. They revealed that the mean for total score of self-care activities was (17.91 ± 4.52), for problem solving was (14.80 ± 3.44), for partnership was (12.21 ± 2.64) and for emotion was (9.93 ± 2.28). From the researcher's point of view, these means considered to some extent high, this may be due to the awareness of the studied patients about necessity for performing self-care. Also, being underdialysis for long period help the patient to realize and to apply self-care.

Self-efficacy is recognized as a critical psychological determinant of successful self-management among patients undergoing hemodialysis. Furthermore, enhanced self-efficacy has been associated with improved health-related quality of life, reduced psychological distress, lower levels of depression and anxiety, and greater resilience in coping with the long-term burden of end-stage kidney disease. Conversely, low self-efficacy may contribute to poor treatment adherence, inadequate self-management behaviors, and unfavorable clinical outcomes. Therefore, strengthening self-efficacy through patient education, counseling, motivational interventions, and continuous nursing support has become an important component of comprehensive care for hemodialysis patients (**Alikari, Zyga, Sachlas, Stathoulis, & Panoutsopoulos, 2024; Kim & Evangelista, 2020; Li, Jiang, Lin & Hsue, 2021; Wang, Zhoo, Zhang, Chen, 2022).**

In relation to the distribution of the studied hemodialysis patients according to their levels of total score of self-efficacy. It was noted that about half of the studied hemodialysis patients had high and moderate self-efficacy respectively and only (1.9%) of them had low self-efficacy **(Table 5)**. This result of the current study is in accordance with a study conducted by **Rantepadang & Tombokan, (2024)** who undergone a study entitled "Self-efficacy and quality of life chronic kidney disease patients undergoing hemodialysis" at Prof Dr. R. D Kandou Hospital Manado. They explained that 66.0% of the studied participants fell into the high self-efficacy and 30.0% in the moderate level. Also, it was supported by a study conducted by **Oktarina & Sulistiawan, (2020)** under the tile of: "The self-efficacy in hemodialysis patients" at Raden Mattaher Hospital Jambi. They reported that, 56.5% of the studied patients had high self-efficacy. From the researcher point of view this may attributed that those patients who undergone hemodialysis often receive support, encouragement and motivation from their family members and from medical staff which help them often to have trust and confidence in their abilities to manage their health condition.

In the contrary, a study conducted by **Lai, et al. (2021)** under the title: "Factors influencing self-efficacy and self-management among patients with pre-end-stage renal disease (pre-ESRD)" at a regional

hospital in Taiwan. They revealed that the about three quarters (75.0%) of the studied participants had low self-efficacy while, only 25.0% of them had low self-efficacy. Furthermore, a study conducted by **Abd El Aziz & Abd El khalek, (2019)** under the title of: "Stressors, self-efficacy and level of hope for patients with chronic renal failure undergoing hemodialysis" at King Fahd unit for hemodialysis at, ELManial hospital, Cairo University. Also. They revealed that 45.0% of the studied patients had low self-efficacy, 45.6% had fair self-efficacy and only 9.4% of them had good self-efficacy. From the researcher point of view this may be attributed to lack of patient education about disease and lack of support and motivation given to patients that encourage them to have confidence in their abilities to care for themselves.

Concerning means and standard deviations of total scores of chronic kidney disease self-efficacy subscales for the studied hemodialysis patients. It was noticed that, the total mean score for autonomy subscale was (31.48 ± 7.86), while for self-integration subscale was (23.08 ± 7.65), for problem solving sub scale was (19.79 ± 8.91) and for seeking social support sub-scale was (12.41 ± 6.65) (**Table 4)**. This is in the line with a study conducted by **Abd el baky, Gamal, Aziz, Khalil, & Ahmed, (2024)** under the title of: "Fluid adherence and self-efficacy in patients undergoing hemodialysis: The effect nursing instruction". at Minia University, Minia City, Egypt. They illustrated that prior instruction the mean for Autonomy subscale was (29.2 ± 7.86), while for self-integration subscale was (25.85 ± 7.65) for problem solving sub scale was (23.56 ± 8.91) and for seeking social support sub-scale was (15.2 ± 6.65). From the researcher's point of view, the similarity between studies may be attributed that hemodialysis patients in those studies have share similar health condition. Also, may have similar abilities in caring for themselves.

Patients with higher levels of self-efficacy are more likely to demonstrate greater adherence to treatment recommendations, engage actively in self-care practices, and maintain better control of their health condition. This was approved by the present study as it was observed that total self-efficacy score had a highly statistically significant positive correlation with total self-care score **(Table 6)**. This finding of the present study is in the line with **Pakaya, Syam &**

Syahrul, (2021) who conducted a study evaluating correlation of self-efficacy and self-care of patients undergoing hemodialysis with their quality of life at Universitas Hasanuddin o Indonesia. they demonstrated that there was a strong positive correlation between self-efficacy and self-care of patient undergoing hemodialysis. From the researcher point of view, it is normally when the patient has confidence and trust in her ability, they have the motive and initiation to apply care for themselves (as self-efficacy increase, the self-care will intern increase.

Ultimately on-going education and training of hemodialysis patients about all aspect of care are very important to help hemodialysis patient to be self-dependent and to develop higher level of self-care. In addition, they need social and emotional support from family members, peers, and healthcare professionals to improve coping abilities and treatment adherence. However, self-efficacy had greater association to self-care as when the persons have confidence, trust and believes in their ability, they will perform better care and manage their health condition and intern achieve the desired health outcome

Conclusion and Recommendations

Conclusion: Based on the findings of the present study, it can be concluded that about three quarters of the studied hemodialysis patients had high self-care level. Meanwhile, the remaining of them had low self-care. Furthermore, half of them had high self-efficacy followed by more than one third of them had moderate self-efficacy. In addition, it was observed that total self-efficacy score had a highly statistically significant positive correlation with total self-care score at (P=0.000).

Recommendations

Based on the findings of the current study, the following recommendations are suggested:

-Encourage patients to actively participate in self-care activities, including adherence to prescribed medications, dietary and fluid restrictions, vascular access care, and attendance at scheduled dialysis sessions.

-Establish regular educational sessions and workshops for patients addressing self-care practices, dietary management, medication adherence, and vascular access care.

-Develop and distribute simple educational booklets, brochures, and audiovisual materials tailored to the needs of hemodialysis patients.

-Continuous education and counseling to hemodialysis patients

to strength self-efficacy and their confidence in managing their disease and treatment-related challenges.

-Promote the use of self-monitoring practices, such as recording weight changes, blood pressure, fluid intake, and symptoms between dialysis sessions.

-Encourage patients to seek social and emotional support from family members, peers, and healthcare professionals to improve coping abilities and treatment adherence.

-Provide psychological support services to help patients overcome barriers that may negatively affect self-efficacy and self-care performance.

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Effect of Multimedia Preoperative Nursing Intervention on Peristomal Skin Complications, Self-Efficacy and Body Image among Patients undergoing Colostomy

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Abstract:

Background*:* Colostomy is an artificial opening of the colon onto the abdominal surface. The person with an ostomy may point up on the negative aspects of the stoma rather than its function to the loss of self-image, acceptance of a new lifestyle, and ability to self-care. So, multimedia preoperative nursing intervention is crucial in decrease stoma skin complications, increase self-efficacy and decrease negative body image. **Aim:** To evaluate the effect of a multimedia preoperative nursing intervention on peristomal skin complications, self-efficacy, and body image among patients undergoing colostomy. **Design:** A quasi-experimental study design was utilized. **Setting:** Surgical department and surgical outpatient clinic of University Hospital (Emergency Hospital), Shebin El-Kom, Menoufia Governorate, Egypt. **Sample:** A purposive sample of 60 adult patients who undergoing colostomy. **Tools:** Four tools were used, **Tool (I);** Structured Interview Questionnaire, **Tool (II**); Peristomal Skin Assessment Sheet (DET), **Tool (III);** Stoma Self-Efficacy Scale, **Tool (IV)**; Body Image Scale. **Results:** Following the intervention, total mean scores of peristomal skin complications decreased to 7.63 ± 3.90 and 4.35 ± 3.30 at one and three months compared with 9.66 ± 3.96 at 10 days. Self-efficacy improved significantly at one and three months. The mean score of negative body image decreased to 62.03 ± 27.29 and 55.16 ± 18.05 at one and three months compared with 65.48 ± 16.00 at 10 days. **Conclusion:** Multimedia preoperative nursing intervention decreased peristomal skin complications, improved self-efficacy, and reduced negative body image among patients undergoing colostomy. **Recommendations**: A multimedia preoperative nursing intervention should be evolved and be available for each patient undergoing colostomy.

***Keywords*:** Body Image, Multimedia, Peristomal Skin Complications, Self-Efficacy.

Introduction

Colorectal cancer is among the most common and lethal cancers globally. It usually develops from the colon or rectum's epithelial lining through a series of genetic and epigenetic changes that turn healthy mucosa into invasive cancer **(Siegel, Giaquinto, Jemal & Miller, 2024; American Cancer of society, 2025)**.

Globally, colorectal cancer is the third most commonly diagnosed cancer and the second leading cause of cancer-related deaths. Its incidence is increasing, with estimates predicting that by 2030 there will be around 2.2 million new cases and nearly 1.1 million deaths globally. In developed countries, the disease is increasingly being diagnosed in individuals under the age of 50. This rising trend among younger people is believed to be linked to lifestyle factors, especially poor diet and obesity **(Birch et al., 2024; Al Kamzari & Constantinou, 2025)**.

Colostomy surgery is performed as part of a treatment for patients with various colorectal diseases, including bowel cancer, and traumatic injuries and inflammatory bowel disorders or a blocked bowel. There are approximately 700,000 stoma patients in Europe and approximately 1,000,000 in the USA **(Kluska, Tomasiuk, Mik-Wojtczak, &Kluska, 2025)**.

Despite its medical benefits, having a colostomy can create substantial physical, psychological, and social challenges. Individuals are required to adapt to stoma management, cope with changes in body appearance, and modify their daily routines, which may negatively influence their confidence in self-care and overall quality of life **(Ko, Wu & Lu, 2023; Juvik, Andersen, Indrebø, &Sandvoll, 2025)**.

Among these challenges, the incidence rate of ostomy complications varies between 3%–81%. Dermatitis around the stoma, skin irritation, peristomal hernia, and collapse of the stoma along with poor or absent mucocutaneous bonding are the most common complications of the stoma, which affects 20–40% of patients with ostomies, leading to infection risk and increased healthcare costs. Also about 8% of patients suffer from more than one ostomy complication **(Kluska et al., 2025)**.

Maintaining peristomal skin integrity is a critical component of postoperative care, skin irritation, infection, and leakage are negatively affect comfort, stoma management, and overall quality of life **(Brady et al., 2025)**.

Self-efficacy is decreased in patients after colostomy and is related to their perceived functional limitations caused by physical changes. According to Albert Bandura, self-efficacy is defined as a person's confidence in their ability to successfully perform specific tasks or handle particular situations. This belief plays an important role in shaping how individuals approach goals, manage tasks, and deal with life challenges **(Aker & Karazeybek, 2025)**.

Self-efficacy is a crucial element in achieving effective self-management, especially in chronic conditions such as colostomy. Studies indicate that individuals' beliefs in their own abilities significantly influence various aspects of their performance. Patients with higher levels of self-efficacy are generally more capable of coping with stress and more inclined to adopt behaviors that promote health and support the recovery process. Overall, self-efficacy is a fundamental component in the successful adaptation and management of chronic conditions like colostomy **(Aker&Karazeybek, 2025; Bozkul, Celik, &Arslan, 2024)**.

Body image disturbance is another major concern among colostomy patients. Physical alteration caused by a stoma may lead to feelings of shame, social withdrawal, and low self-esteem. Although a stoma is not typically classified as a chronic illness, patients require similar self-management skills to live effectively with it. Therefore, healthcare providers play a key role in educating patients, providing ongoing support, and promoting informed decision-making to enhance self-care and adaptation **(Persson & Hellström, 2024)**.

Nurses play a crucial role in the care of patients with a colostomy before and after surgery, as well as during follow-up visits. Preoperative care involves educating and preparing patients for the surgical procedure, strengthening their coping skills, and supporting their participation in decision-making. Postoperative nursing care includes managing postoperative discomfort, facilitating positive adjustment and coping, ensuring continuity of care through home and community services, and teaching patients how to properly care for the stoma and surrounding skin. These interventions also help maintain self-efficacy and promote a healthy body image during recovery **(Yu & Chen, 2025)**.

Nurses are the cornerstone among healthcare professionals and play an important role in improving the

knowledge and empowerment of patients in clinical conditions to decrease the stoma skin complications, improve self-efficacy and body image of colostomy patients. Accordingly, the nursing care of colostomy patients involves managing the pouching system, maintaining skin care, educating the patient, providing emotional support and teaching patients how to care for their stoma at home **(Kluska et al., 2025)**.

In recent years, multimedia interventions that use contextual content along with audio-visual tools such as videos, images, icons, and graphics have become important in improving patient education and care. They also help overcome time constraints during interactions between patients and healthcare providers. Furthermore, these multimedia strategies encourage patients to participate in group learning, enhance problem-solving abilities, modify their behaviors positively, and actively build their knowledge **(Mamashli, Ardebili, Ghezeljeh, Manafi & Bozorgnejad, 2025)**.

So, multimedia preoperative nursing interventions improve patient understanding and retention, reinforce spoken explanations, help individuals better comprehend diagnoses, helps individuals better comprehend diagnoses and empower patients to take charge of their health because it aligns with how process information, especially in stressful healthcare situations. The findings may guide hospitals and nursing institutions in developing effective, technology-based educational materials that improve both physical and psychosocial adaptation among colostomy patients **(Hutchinson et al., 2024)**.

Significance of the study

Colorectal cancer (CRC) is a major global public health concern, ranking third in incidence and fourth in cancer-related mortality worldwide. In Egypt, it is the seventh most common cancer, contributing about 3.47% of cases among males and 3% among females **(Elyamany et al., 2025)**.

Colostomy is a prevalent clinical condition associated with multidimensional complications, including impaired skin integrity, functional limitations, occupational challenges, and psychosocial distress **(Rajabi, Khatiban, Falahan & Soltanian, 2025)**.

According to data from around the world, almost 2 million people have stomas. Of these, 70,000 are Italian and 650,000 are European. In addition to the practical difficulties

associated with ostomy care and maintenance, the establishment of an ostomy, whether temporary or permanent, frequently results in major changes in a case's everyday life, including changes in self-efficacy, body image, social relationships, and emotional well-being. In order to reduce stoma skin issues, enhance self-efficacy, and improve body image. Worldwide data indicate that approximately 2 million people are living with a stoma, including about 650,000 in Europe and 70,000 in Italy **(Federazione delle, 2024)**.

An ostomy, whether temporary or permanent, often results in significant changes in patients' daily lives, including self-efficacy, body image, social interactions, emotional well-being, and challenges in ostomy care and management **(Gamze Bozkul & Arslan, 2024)**.

A preoperative multimedia nursing intervention is planned to help patients throughout hospitalization and after discharge by reducing stoma-related skin problems and improving self-efficacy as well as body image. Therefore, this study aimed to evaluate the effect of this intervention on peristomal skin complications, self-efficacy, and body image among patients undergoing colostomy.

Research hypotheses

-Stoma skin complications will be decreased in studied patients after implementing multimedia preoperative nursing intervention.

-Self-efficacy scores will be increased in studied patients after implementing multimedia preoperative nursing intervention.

-Negative body image will be decreased in studied patients after implementing multimedia preoperative nursing intervention.

Aim of the Study

This study was designed to evaluate the effect of multimedia preoperative nursing intervention on peristomal skin complications, self-efficacy and body image among patients undergoing colostomy**.**

Subjects and Method:

Research design: This research used a quasi-experimental research design

Setting: This study was conducted at the surgical department and outpatient clinic of (Emergency Hospital), Menoufia University Hospital in Shebin El-Kom, Menoufia Governorate, Egypt. The surgical department exists in the third floor of the Emergency Hospital, Menoufia University Hospital. It consists of two sections, one for males and the other for females. Outpatient clinics exist on

the first floor of Menoufia University Hospital.

Sample size:

A purposive sample of sixty patients was selected from the above chosen setting

According to this formula

$$\text{Unlimited population: } n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

$$\text{Finite population: } n' = \frac{n}{1+\frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Where

z is the z score

ε is the margin of error

n is the sample size

p̂ is the population proportion

N is the population size

z for a 95% confidence level is 1.96.

p̂ for the population proportion is 6.8%

.**ε** for the margin of error is 0.05, **N** for the population size

Study sample: A purposive sample of 60 adult patients with a stoma who fulfill the inclusion criteria was selected.

Inclusion criteria:

-Both male and female adult patient.

-Newly colostomies.

-Not suffering from other chronic illnesses such as hypertension or diabetes mellitus.

Exclusion criteria:

-Patient with a mental or psychological problem.

-Patient with any language barrier that prevented completion of questionnaires and following Instructions.

Tools of the study:

For this study four tools were used by the researcher for data collection.

Tool (I): Structured Interview questionnaire sheet: The researchers developed this tool to collect patients' socio-demographic and clinical data and it was divided into two parts.

Part one: Patients' Sociodemographic data: It included details such as the patient's age, sex, marital status, educational level, occupation, place of residence, and monthly income.

Part two:Clinical data: It covered the patient's present and past medical history, including colorectal conditions, previous hospitalizations, past surgical procedures, type of surgery performed, and type of stoma.

Tool (II): The peristomal skin assessment sheet (DET): This tool was adopted from **Martins et al. (2010) and Coloplast Professional , (2016)** and was designed to measure the severity of peristomal skin complications. It included three domains: discoloration (area and severity), erosion (area and severity), and tissue overgrowth

(area and severity), referred to as DET.

Scoring system:

Discoloration was assessed through three dimensions: the discoloration area (scored 0–3), the discoloration severity (scored 0–2), and the total discoloration score (0–5).

Erosion was evaluated using two components: the erosion distribution (0–3) and its severity (0–2), resulting in a total erosion score ranging from 0 to 5. tissue over growth was scores ranged from 0 to 3 and it's severity scores ranged from 0 to 2 with total score ranged from 0 to 5.

The total DET score ranged between 0 and 15, and severity was categorized into three levels as follows:

-Mild: DET score < 4

-Moderate: DET score ≥ 4 and < 7

-Severe: DET score ≥ 7

Tool (III): Stoma Self Efficacy Scale: developed by **Bekkers et al., 1996** and assessed by **Karacay et al., 2020**, and was used to assess stoma efficacy. It includes two subscales with a total of 22 items. Responses are measured using a 5-point Likert scale, ranging from 1 ("not at all confident"), 2 ("slightly confident"), 3 ("fairly confident"), 4 ("highly confident"), to 5 ("extremely confident").

Stoma Self-Efficacy Care: is measured by the first subscale's (first thirteen) items, while "Social Self-Efficacy" is measured by the second subscale's final nine items.

The scores on the scale range from 22, which is the lowest score to110 with higher scores indicating better self-efficacy levels. So the total score was classified as positive self-efficacy (>55) and negative self-efficacy (<55).

Tool (IV): Body image scale: Developed by **Hong et al., (2014)**, this scale was used to assess body image in patients with a stoma. It contains 15 items, each presenting two opposed ideas rated on a 7-point scale. The total score ranges from 15 to 105, where higher scores mean a more positive attitude to one's own body image. Positively phrased items (1, 2, 5, 6, 7, 11, 13, and 15) are calculated adversely, and item 9 is also calculated adversely in male participants. Body image outcomes are presented using item mean, standard deviation (SD), and reliability testing (R test).

Content validity

All tools were evaluated by five experts from the Medical-Surgical Nursing Department, Faculty of Nursing, Menoufia University to establish face and content validity. Appropriate revisions were carried

out to ensure their relevance and completeness.

Reliability: To ensure reliability and consistency, all tools were evaluated using the test–retest method and Cronbach's alpha coefficient. The peristomal skin assessment sheet demonstrated a Cronbach's alpha value of 0.884. The original Stoma Care Self-Efficacy and Social Self-Efficacy scales showed reliability coefficients of 0.94 and 0.95, respectively. The subscales of Stoma Care Self-Efficacy and Social Self-Efficacy recorded Cronbach's alpha values of 0.97 and 0.95, respectively. In addition, the Body Image Scale had a Cronbach's alpha of 0.884.

Ethical considerations: Ethical approval was obtained from the Ethical and Research Committee of the Faculty of Nursing, Menoufia University (Approval No. ERCNMA 1000/ 3/7/37/ 24). All participants were fully informed about the study purpose, procedures, and expected benefits, and written informed consent was obtained from each patient. They were assured that participation was voluntary, that refusal would not influence their care, and that they could withdraw at any time without any consequences. Confidentiality and anonymity were maintained by assigning codes to all data and storing documents securely in a locked cabinet. The study design and tools were not expected to cause any physical or psychological harm.

Pilot research: A pilot study was conducted on 10% of the total sample (six patients) to assess the feasibility, clarity, and applicability of the study tools. Based on the results, slight modifications were made, and these participants were excluded from the final study.

Procedure: A formal request was sent from the Dean of the Faculty of Nursing, Menoufia University to the Director of Menoufia University Hospital to obtain approval, after explaining the study purpose and data collection methods. Written authorization to conduct the study was then granted by the responsible authorities.

-Data collection took about 8 months from 1stAugast 2024 to 1st April 2025 at general surgical department and general surgical outpatients' clinic.

-Patients who met the inclusion criteria and agreed to take part in the study were interviewed individually by the researcher in the surgical ward.

-The study was conducted on four phases a) assessment, b) planning c) implementation and evaluation.

Assessment phase:

-The initial assessment was carried out by the researchers before surgery at surgical ward. Assessment took about 20-30 minutes for each patient.

-Each patient of the studied patients was interviewed individually by the researchers, for assessing sociodemographic and medical data using tool 1.

-Ten days Post colostomy, the researchers met all studied patients at the surgical outpatient clinic for assessing the peristomal skin assessment sheet (DET) (tool II)

Planning phase

-The researchers implemented four teaching sessions,

-An illustrative designed multimedia (A colored illustrative booklet, brochure, videos audio and demonstrations and return demonstration), was prepared by researchers based on recent literature review Wikipedia, 2023 & American Cancer Society, 2024.

Implementation phase:

-The researchers divided studied patients into six subgroups. Each sub group had ten patients and conducted four teaching sessions for each subgroup of studied patients before surgery each session took about 30-45 minutes

-The researchers learned the studied patients' stoma skin care at the preoperative period and the studied patients did return demonstration and re- demonstration to sure that patients performed it competently.

-The researchers summarized the collected information after each teaching session, and allowed the studied patients to ask any questions and answer them.

-All sessions were conducted at surgical wards using instructional booklet, brochure, videos, audio, lecture, discussion, demonstration and re-demonstration.

-At the first session the researchers gave verbal instructions about colostomy definition, causes, purpose, types and stoma complications.

-The prepared booklet, videos, audios, and brochure, were distributed by the researcher for every patient of studied patients at the first session on WhatsApp group and CD.

At the beginning of the second session, the researchers reviewed and reinforced the information from the previous session, then guided patients on how to perform stoma skin care by assuming a comfortable position and ensuring privacy. Appropriate positions included sitting, reclining, or standing.

-To detach the pouching system, non-sterile gloves should be used. The skin is gently pressed

downward while the wafer is carefully lifted, with an adhesive remover applied if needed. The used pouch and wafer are then disposed of in an odor-proof plastic bag, while the tail closure is retained for reuse.

-To clean the area, toilet tissue is first used to remove fecal matter from the stoma and surrounding skin, followed by washing with water and a soft cloth, with soap used optionally. The patient may bathe with the pouching system in place or after removing it. Any hair around the stoma area should be clipped or shaved as required. After cleansing, the area should be rinsed and thoroughly dried. Slight bleeding of the stoma during cleaning and drying is considered normal.

-To apply the wafer, a measuring guide or pattern is used to identify the stoma size, which is then marked on the back of the wafer and cut appropriately.

-The wafer opening may be cut approximately 1/16–1/8 inch larger than the stoma. Skin barrier paste is applied around the stoma or on the rim of the wafer opening and left to dry and set as directed by the manufacturer's guidelines. The backing paper is then removed, the opening is centered over the stoma, and the wafer is pressed onto the peristomal skin.

-The pouch is attached to the wafer flange according to the manufacturer's instructions, and the tail closure is secured to the pouch outlet. Waste materials are then discarded in a plastic bag and the drainable pouch should be cleaned using soap and water and may be reused several times if suitable.

-A commercially available deodorant product may be inserted into the pouch to help control odor. Gas can be released by opening the tail closure or by detaching part of the pouch flange. However, making a hole in the pouch to let gas out should be avoided.

-The studied patients were asked to perform stoma skin care daily and stoma pouch evacuation according to defecation.

-During the third session: the researchers refreshed the information received from the previous sessions, after that the researchers taught the studied patients how to apply stoma wound dressing.

-Wound Care after a colostomy was illustrated to minimize complications, such as the importance of keeping the wound clean and regular dressing on the wound and monitoring signs of infection (redness, swelling,

warmth, or discharge from the wound, fever or increased pain).

-Also during this session each sub group was instructed about the importance of following a well-balanced diet which is crucial for supporting patient conditions and overall well-being such as consuming plenty of fluids and foods rich in fiber such as vegetables and fruits, in addition to foods rich in antioxidants such as berries and tomatoes, but avoid eating foods containing a lot of fats and sugars.

-During the fourth session: Demonstration about stoma skin care and wound dressing were illustrated by the researcher and the patients were given feedback on how they performed stoma skin care and wound dressing.

-Then all studied patients returned-demonstrated the procedure and the researcher checked their knowledge related to colostomy definition, causes, purpose, types and about post-operative colostomy self-care and wound dressing.

-Follow the studied patients through outpatient clinic visits, and between the visits, the researcher made a group on the WhatsApp application to communicate with them and answer their questions.

-Evaluation phase "Post-test":

The researchers evaluated studied patients after10 days, 1 months and 3 months to evaluate the effect of applying multimedia preoperative nursing interventions all subjects were assessed for their stoma skin care, stoma wound dressing and complications, self -efficacy and body image, using tools two, three and four**.**

Statistical Methods:

SPSS program version 22 was used for numerical data that were collected, coded and computerized. Number and percentage expressed qualitative data while means ± SD expressed quantitative data. An independent t-test was used to evaluate the differences in mean scores of the studied patients at 10 days, 1 month, and 3 months following the intervention. Pearson's correlation coefficient (r) was employed to examine the relationship between the study variables. Microsoft Excel software was used for generating graphical presentations. Significance level was set at p value ≤ 0.05 for all significant tests**.**

Results

Table (1): A Socio-demographic characteristic of the studied patients clarifies that more than three quarters of the studied patients (80%) were males. Two thirds (66.7%) were married. Regarding

educational level, less than half (41.7%) had primary and secondary education. In relation to working, more than half (58.3%) had hard work. However, the monthly income of two thirds of them was not enough and less than two third (63.3%) were living in rural areas.

Figure (1): Distribution of studied patients according to age, this figure illustrates that more than half of the studied patients (58.3%) were between 31-50 years, 21.7% were between 18-30 years old and less than a quarter of the studied sample were between 51-65 years.

Table (2): Distribution of studied patients according to medical data demonstrates that more than two thirds of studied patients (73.3%) had a history of colon disease and more than three Quarters of them (83.3%) had a history of previous hospitalization. Concerning previous surgery, more than half (53.3%) had surgery before. Less than one quarter (20.0%) had orthopedic surgery. In relation to the type of the stoma, more than three quarters (76.7%) had a temporary stoma.

Table (3): Mean scores of peristomal skin complications of the studied patients at 10 days, 1 month and 3 months post-operative shows that there was a highly significant decrease in total mean scores of peristomal skin complication of the studied patients at 1 month and 3 months post-operative (7.63 ± 3.90 & 4.35 ± 3.30 respectively) compared to 10 days post-operative (9.66 ± 3.96).

Table (4): Distribution of studied patients according to severity of peristomal skin complication at 10 days, 1 month and 3 months post-operative demonstrates that, two thirds of studied patients (66.6%) complained of severe peristomal skin complications 10 days post-operative, that was significantly improved/decreased among 50% and 8.3% 1 month and 3 months post-operative.

Figure (2): Distribution of studied patients according to peristomal skin severity level at 10 days, 1 month and 3 months post-operative shows that, two thirds of studied patients (66.7%) complained of severe peristomal skin complications 10 days post-operative, which was significantly improved/decreased among 50% and 8.3% 1 month and 3 months post-operative.

Table (5): Distribution of studied patients according to level of stoma self-efficacy at 10 days, 1 month, and 3 months post-operative for the studied patients shows that, minority of studied patients (5.00%) had positive stoma self-efficacy 10

days post-operative, that was highly significantly increased among 30% and 100.0% 1 month and 3 months post-operative.

Table (6): Mean scores of stoma self-efficacy at 10 days, 1 month and 3 months post-operative for the studied patients clarifies that there was a highly significant increase in total mean scores of stomas self-efficacy among the studied patients at 1 month and 3 months post-operative (44.75 ± 9.00 & 91.06 ± 5.80 respectively) compared to 10 days post-operative (23.96 ± 9.40).

Figure (3): Distribution of studied patients according to level of stoma self-efficacy at 10 days, 1 month and 3 months post-operative illustrates that a minority of studied patients (5.00%) had positive stoma self-efficacy 10 days' post-operative, which was highly significantly increased among 30% and 100.0% 1 month and 3 months' post-operative.

Table (7): Total Mean scores of body image at 10 days, 1 month and 3months post-operative for the studied patients clarifies that there was a significant decrease in distorted\ negative body image of the studied patient at 1 month and 3 months post-operative (62.03±27.29 & 55.16± 18.05 respectively) compared to 10-day post-operative (65.48 ± 16.28).

Table (8): Relation between socio-demographic data of studied patients and peristomal skin complications and stoma self-efficacy demonstrates that, there was a highly significant relation between the studied patients' age, educational level, monthly income, type of the stoma and peristomal skin complications and a significant relation between age, monthly income, type of stoma, and stoma self-efficacy.

Figure (4): Pearson correlation between severity of peristomal skin complications and stoma self-efficacy among studied patients clarifies that, there was a significant negative correlation between the severity of peristomal skin complications and stoma self-efficacy among the studied patients.

Table (1): Socio-demographic characteristics of the studied patients (n=60)

Socio-demographic characteristics	No.(n=60)	%
Gender		
Male	48	80.0
Female	12	20.0
Marital status		
Married	40	66.7
Divorced	12	20.0
Widow	8	13.3
Educational level		
Illiterate	8	13.3
Read and write	20	33.3
Primary and secondary	25	41.7
University	7	11.7
Working		
Mild effort	20	33.3
Hard work	35	58.4
Not work	5	8.3
Residence		
Rural	38	63.3
Urban	22	36.7
Monthly income		
Enough	24	40.0
Not enough	36	60.0

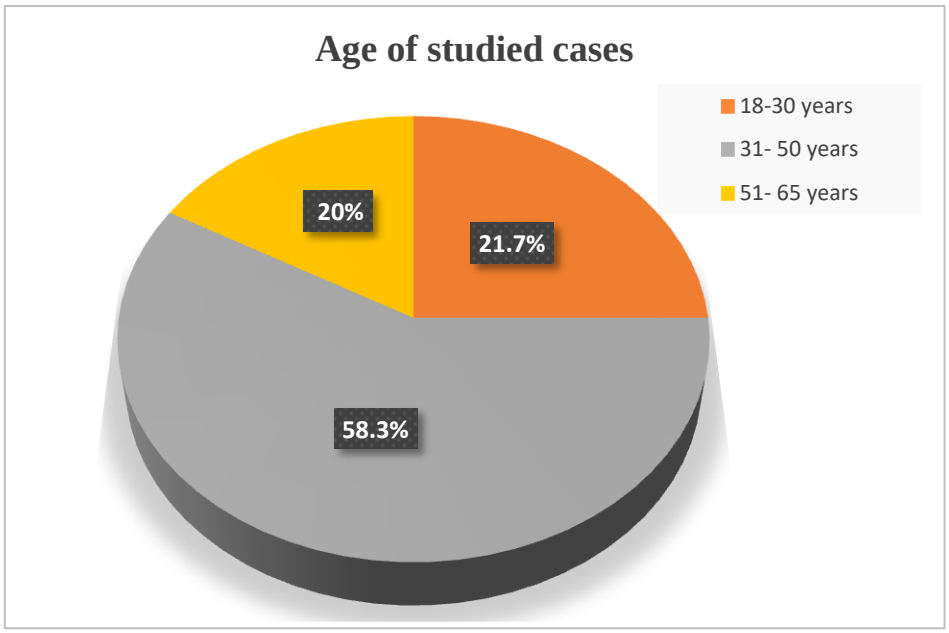

Figure (1): Distribution of studied patients according to age

Table (2): Distribution of studied patients according to medical data (n=60)

Medical data	No.(n=60)	%
History of medical disease (colon disease)		
Yes	44	73.3
No	16	26.7
Previous hospitalization		
Yes	50	83.3
No	10	16.7
Previous surgery		
Yes	32	53.3
No	28	46.7
Types of operation		
Cholecystectomy	5	8.3
Appendectomy	6	10.0
Tonsillectomy	4	6.7
Orthopedic surgery	12	20.0
Exploration	5	8.3
Types of the stoma		
Temporary	46	76.7
Permanent	14	23.3

Table (3): Mean scores of peristomal skin complications of the studied patients at 10 days, 1 month and 3 months post-operative

Items	10 days postoperative (M±SD)	1 month postoperative (M±SD)	3 months postoperative (M±SD)	ANOVA test	P- value
Discoloration area and severity	3.41 ± 1.61	2.65 ± 1.60	0.56 ± 1.58	20.167 HS	.000
Erosion area and severity	3.15 ± 1.84	2.58 ± 1.54	1.41 ± 1.41	18.002 HS	.000
Tissue overgrowth area and severity	3.11 ± 1.86	2.40 ± 1.59	1.40 ± 1.56	15.823 HS	.000
Total	9.66 ± 3.96	7.63 ± 3.90	4.35 ± 3.30	30.932 HS	.000

Note: (HS): Highly significant (p <0.001

Table (4): Distribution of studied patients according to severity of peristomal skin complication at 10 days, 1 month and 3 months post-operative (n=60)

Items	10 days postoperative		1 month postoperative		3 months postoperative		P- value
	No.	%	No.	%	No.	%	
Mild DET (< 4)	4	6.7%	10	16.7%	37	61.7%	.000
Moderate DET (4-6)	16	26.7%	20	33.3%	18	30.0%	
Severe DET (≥ 7)	40	66.6%	30	50.0%	5	8.3%	

NB: (HS): High Significant (P value)<(0.001) **DET:** Discoloration, Erosion, Tissue overgrowth

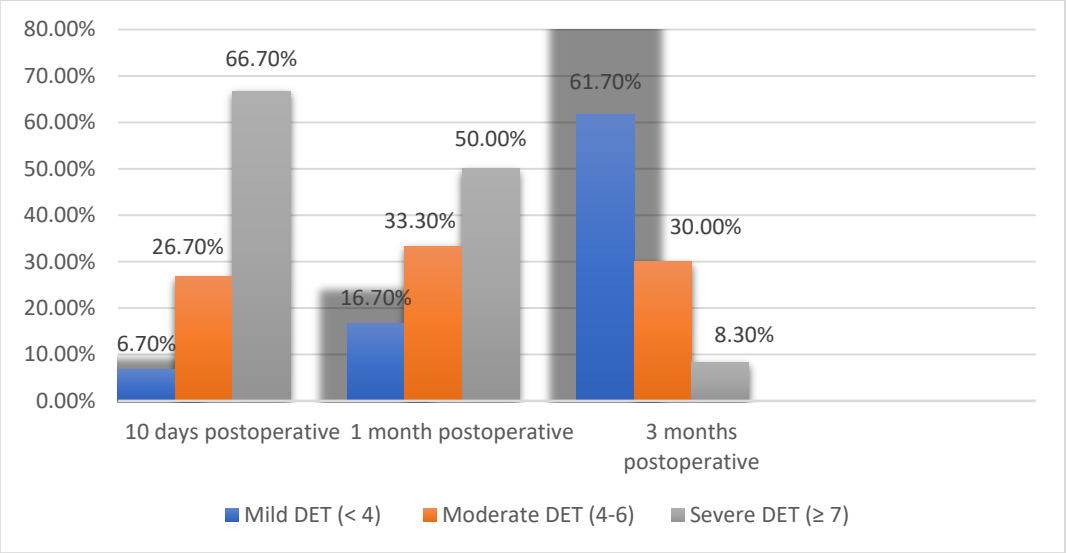

Figure (2): Distribution of studied patients according to peristomal skin severity level at 10 days, 1 month and 3 months post-operative (n=60)

Table (5): Distribution of studied patients according to level of stoma self-efficacy at 10 days, 1 month, and 3 months post-operative for the studied patients (n=60)

Items	10 days postoperative		1 month postoperative		3 months postoperative		P- value
	No.	%	No.	%	No.	%	
Positive self-efficacy (>55)	3	5.0%	18	30.0%	60	100.0%	.000 HS
Negative self-efficacy (≤ 55)	57	95.0%	42	70.0%	0	0.0%	

NB: (HS): High Significant (P value<0.001)

Table (6):- Mean scores of stoma self-efficacy at 10 days, 1 month and 3 months post-operative for the studied patients

Items	10 days postoperative (M±SD)	1 month postoperative (M±SD)	3 months postoperative (M±SD)	ANOVA test	P-value
Stoma Care Self-Efficacy	12.96 ± 3.47	21.53 ± 3.78	51.93 ± 4.58	15.235	.000 HS
Social Self-Efficacy	11.00 ± 7.47	22.85 ± 8.73	39.13 ± 3.15	25.760	.000 HS
Total	23.96 ± 9.40	44.75 ± 9.00	91.06 ± 5.80	10.554	.000 HS

Note: (HS): Highly significant (p <0.001)

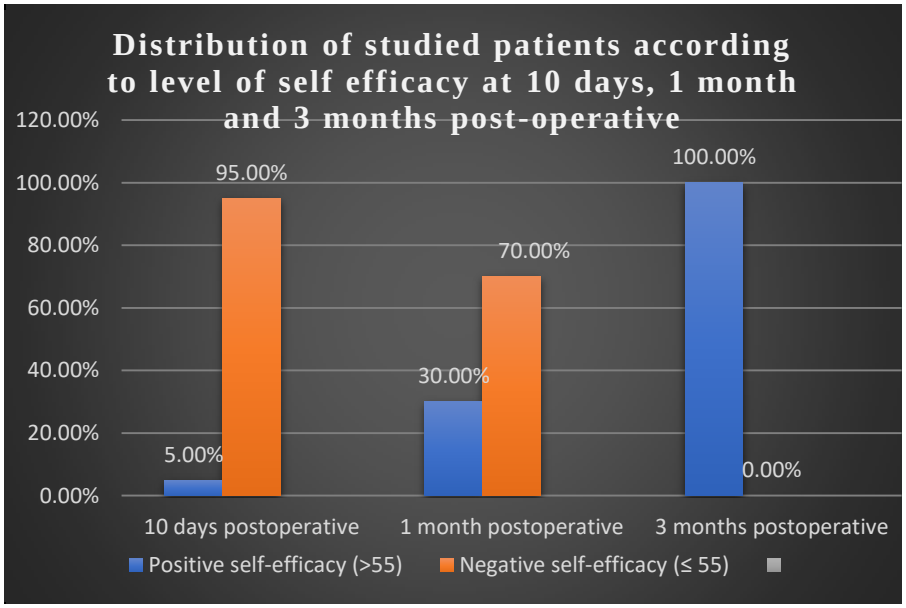

Figure (3): Distribution of studied patients according to level of stoma self-efficacy at 10 days, 1 month and 3 months post-operative (n=60)

Table (7): Total Mean scores of body image at 10 days, 1 month and 3months post-operative for the studied patients

Items	10 days postoperative (M±SD)	1months postoperative (M±SD)	3 months postoperative (M±SD)	ANOVA test	P-value
Body image	65.48 ± 16.28	62.03± 27.29	55.16±18.05	3.715	.010 S

Note: (S): Significant (p<0.05)

Table (8): Relation between socio-demographic data of studied patients and peristomal skin complications and stoma self-efficacy

	Severity of peristomal skin complications		stoma self-efficacy	
	r	P- value	r	P- value
Age	.653	.000 HS	-.383	.003 S
Educational level	-.634	.000 HS	.448	.000 S
Monthly income	-.441	.000 HS	.313	.015 S
Type of the stoma	.724	.000 HS	.332	.010 S

Note: (S): Highly Significant (P value<0.001), Significant (p<0.05)

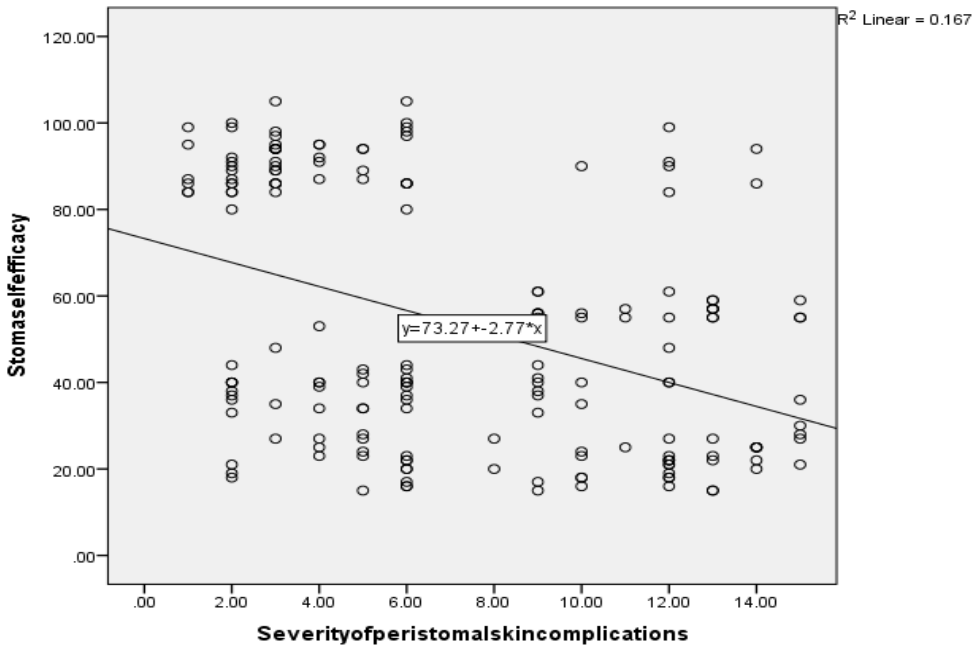

Figure (4): Pearson correlation between severity of peristomal skin complications and stoma self-efficacy among studied patients.

Discussion

Colostomy is a surgical intervention that involves creating an artificial opening, known as a stoma in the abdominal wall to divert fecal matter from the colon to the outside of the body. This procedure is often performed for patients with colorectal cancer, bowel obstruction, traumatic injury, or congenital abnormalities that prevent normal intestinal function. Colostomies may be classified as temporary or permanent based on the patient's condition and the underlying indication for surgery. Effective stoma care and continuous patient education are vital to prevent

complications such as infection, peristomal skin irritation, and stoma prolapse. In addition, psychological support is essential to help patients improve self-efficacy and adapt to body image changes after surgery **(Alwi & Ginting, 2025)**.

Concerning age: the findings of the present study indicate that more than half of the studied patients (58.3%) were in the 31–50 years' age group. This result was congruent with **(Rajabi et al., 2025)** who reported that the majority of the patients mean age 51.81 ± 10.36 years. Also with **(Faury et al., 2024)** who found that the majority of the studied patients were within the 32–50 years' age range. On the other hand, these findings are incompatible with **(Ngo et al., 2023)** who found that the average age of the participants was 57.9 ± 12.4 years, with over 75% of them being above 50 years old. From the researcher's perspective, this may be attributed to the fact that the sample met the study's inclusion criteria.

As regard to gender: the present study revealed that the majority of the participants (80%) were male. This finding was compatible with the study conducted by **(Ngo, et al., 2023)** who explained that more than two-thirds of the studied adults were men. In the same line with study conducted by **(Varghese, 2024)** who stated that more than half of the studied sample were males. In contrary to the current study finding, a study was done by **(Liao & Qin, 2024)** who reported that 56.7% of studied patient were females. From the researcher's point of view, these results may be attributed to the higher prevalence of smoking and frequent fast-food consumption among men, both of which are recognized risk factors for colorectal cancer.

In relation to marital status: this study demonstrated that nearly two-thirds of the studied patients (66.7%) were married. This finding was in contract with **(Fernandes & Brito, 2023)** who reported that more than two third of his participant were married. Also with **(Hegazy, Ali, Mahmoud, &Abou-Zeid, 2024)** who found that two-thirds of the participants in their study were married. This finding was supported by **(Rajabi et al., 2025)** who reported that the majority of studied patients (91.9%) were married. From the researcher point of view, in Egypt this age group of the existing study usually been married and especially more than half of the studied patients live in rural areas.

Regarding to the educational level: the present study indicated that less than half of the studied patients (41.7%) had primary and secondary education. This result was in accordance with **(Hegazy, et al., 2024)** who stated that all participants in their study had completed

secondary education. This result, however, was inconsistent with **(Bozkul, et al., 2024)** who found that the highest percentage of the sample were basic education. The same result was contradicted with **(Mohamed, Mahmoud & Ibrahim, 2022**) who revealed that the majority of the colostomy patients were just could read and write. From the researcher's opinion, this may be related to more than half of the studied group living in rural areas, which does not give attention to university education.

Concerning work: the present study indicated that over half of the participants (58.3%) had hard work while about one third had mildly effort. This finding was supported by **(Rajabi et al., 2025)** who reported that more than two third of the sample were hard worker. Also This result was also in agreement with **(Hegazy et al., 2024)** who revealed that the majority of the colostomy patients were working hard jobs. From researcher's point of view this finding is due to the majority of sample was male.

Regarding residence: the present study indicated that less than two third (63.3%) were living in rural areas. This result in the same line with **(Fernandes & Brito, 2023)** who revealed that more than half of the studied subjects were lived in rural areas. Also **(Ngo, et al., 2023)** found that about two-thirds of the studied adults were lived in rural areas. But the finding is against **(Constantin et al., 2025)** who revealed that about two thirds (64%) of the studied subject were lived in urban areas. From the researcher point of view colon cancer more common in rural areas.

Regarding monthly income: two thirds of studied patients had not enough income. This finding was supported by **(Habiba, Bedier & Ahmed, 2021)** who stated that most of the studied subjects had not enough income and did not cover their needs. In additional to **(Varghese, 2024)** who reported that more than half of the studied subject considered that their income was inadequate to meet their daily needs. From the researcher point of view this may be related to economic status in rural areas are weak and not enough.

In relation to medical data: about 73.3% of studied patients had a history of colon cancer areas. This result in line with **(Mohamed, Ahmed, Abdelall, 2024)** who found that more than two third of the studied patients had history of colon cancer. Also this finding was consistence with **(Erwin, 2025)** who reported that colostomy is indicated in disease conditions that require resection of the distal bowel, such as colorectal cancer. From the researcher point of view colon cancer is a recurrent disease.

Concerning type of the stoma: current study findings found that about 76.7% of studied patient has temporary stoma. This finding is consistent with **(Elsaid et al., 2024)** who stated that more than two third of their studied patients had temporary colostomy. Also, **(Rajabi et al., 2025)** found that most of their studied sample had a temporary colostomy. From the researcher point of view most patients after complete management returned to normal defecation pathway.

In relation to peristomal skin complications: the finding of this study reported that the total mean of peristomal skin complications decreased obviously in the studied patients. These findings were supported by **(Alenezi & Mansour, 2023)** who found that among the study group, there were a decrease in peristomal skin complications and significant increase of stoma skin complications in the control group with statistically significant difference between both groups regarding skin assessment around the stoma six weeks postoperatively. Moreover, these findings were in the same track with **(Stokes et al., 2025)** who stated that over two-thirds of the studied participants had peristomal skin complications that showed improvement after the intervention. Moreover, the present study findings were in agreement with **(Mohamed et al., 2022)** who reported highly statistically significant differences in peristomal skin complications before and after applying the self-care protocol ($P < 0.001$). These results confirmed the study hypothesis that stoma skin complications would be reduced among patients following the implementation of a multimedia preoperative nursing intervention.

Concerning self-efficacy: the findings of the present study revealed that patients who received multimedia preoperative nursing intervention showed that there was significantly improvement in stoma self-efficacy and a highly significant increase in total mean score of stoma self-efficacy. Also these finding was supported by **(Cheng, Meng, Yang & Zhang, 2025)** who revealed that strong evidence was found for the important role of giving knowledge to improve self-efficacy and adapting to a stoma. Also these results in the same line with **(Elsaid et al., 2024)** who reported that there was a significant statistical difference in all aspects of practice and self-efficacy after implementation of the structured educational program.

Moreover, these finding was in agreement with **(Pate, Powers, Coffman, & Morton, 2025)** who mentioned that, there was a significant increase in mean post-education stoma care self-efficacy and the increment continue until the

patient discharged from the hospital. Also **(Pandey & Dhungana, 2023)** who found that their descriptive cross sectional study that the lowest mean score was in take care of stoma when you are ill (38.94 ± 1.55). From the researcher's point of view, this may be because of **(Pandey & Dhungana, 2023)** study did not introduce intervention to the sample compared with the current study in which preoperative multimedia intervention was introduced to the studied patients.

Regarding body image: there was a significant decrease in a negative body image among studied patient. These findings were supported with **(Sun et al., 2024)** who stated that ostomy self-management training program has a high positive impact on the cancer patient's acceptance of their physical changes, psychological, social, and spiritual needs to let them living with a permanent ostomy. Also **(Radcliffe, 2024)** who revealed that there was significant improvement in psychological aspect including body image after effective nursing intervention These findings goes in distinguish with **(Muzii et al., 2024; Bagheri & Mazaheri, 2025)** who concluded that ostomy still has a largely negative impact on patients' quality of life. From the researcher point of view body image improved due to increasing dependency in performing stoma care and relieving bad odor and complication.

Regarding correlation between sociodemographic characteristics and severity of peristomal skin complications and stoma self-efficacy: this study revealed that there was a highly significant statistical difference between age, educational level, monthly income, type of the stoma and peristomal skin complications. Also there was a significant statistical difference between age, monthly income, type of the stoma and stoma self-efficacy. These findings were in accordance with (**Alenezi & Mansour, 2023)** who found that there was a highly significant statistical difference between age, sex, and educational level, type of work, monthly income and peristomal skin complications. These findings were in contrast with **(Liao & Qin, 2024)**, who found significant associations between self-efficacy, peristomal skin complications, age, and educational level, whereas no additional relationships were observed. From the researcher's point of view, the main factor that might partially account for this finding is the contents of the instructional phases, methods of implementing them and factors related to the patient himself. Certainly, the time and attention that the patient received.

Conclusion

The study's results demonstrated that after application multimedia preoperative nursing intervention, the studied patients had decreased in total mean of peristomal skin complications. Significantly improvement in stoma self-efficacy. Also, a significant decrease in a negative body image among studied patient. Highly significant statistical difference between age, educational level, monthly income, type of the stoma and peristomal skin complications. A significant statistical difference between age, monthly income, type of the stoma and stoma self-efficacy. In addition, preoperative multimedia nursing intervention ascertained its efficacy in decreasing stoma skin complications, enhancing self-efficacy and decrease negative body image of patients undergoing colostomy.

Recommendations

-Booklet about colon cancer disease, and treatment available as colostomy care.

-Future studies with constructed large sample size are necessary to attain generalization of the results.

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Influence of Nursing Supervisors' Emotional Intelligence on Nurses' Thriving

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Abstract

Background: Emotional intelligence is a key aspects of nursing supervisor's practices helping them to coordinate and facilitate nurses' behavior which in return induce nurses' thriving. **Aim:** This study aimed to assess influence of nursing supervisors' emotional intelligence on nurses' thriving. **Design:** A descriptive / correlational study design was used in the study. **Setting:** The study was conducted at all intensive care units in Tanta Main University Hospital. **Subjects:** The study contained all nursing staff (N=489) from the above described place. **Tools:** Two tools were used to collect the data: The nursing supervisors' emotional intelligence structured questionnaire and the nurses' thriving questionnaire. **Results:** The study's results revealed that 45.6% of the nurses had moderate level of perception regarding nursing supervisors' emotional intelligence. While 45.4% of the nurses had high level of nurses' thriving. **Conclusion:** There was a highly statistically significant positive correlation between nursing supervisors' emotional intelligence and nurses' thriving. **Recommendation:** The nursing supervisors prioritize and integrate emotional intelligence development into their clinical practices via training and interactive, practice-based activities. As well as, create more open and supportive working condition that encourage trust, empathy and improve nurses' vitality and learning concentration in working.

Keywords: Emotional Intelligent, Nursing Supervisors, Nurses' Thriving.

Introduction

Emotional Intelligence is an essential skill any healthcare organization looking for in their nurses especially nursing supervisors. Emotional intelligence helps nursing supervisors to assume new responsibilities, including managing and streamlining nurses' efforts in a positive way leading to increase nurses' thriving and motivation to establish and maintain a long-term positive competitive edge. Furthermore, emotional intelligence plays a crucial part in the nursing field to fulfill challenging goals and facilitate relationship between nurses **(Coronado-Maldonado & Benítez-Márquez, 2023)**.

Emotional intelligent can be defined as the capacity to identify, understand and manage our own emotions and those of others, encouraging nurses to work efficiently and supervising others **(Cheraghi, Parizad, Alinejad, Piran & Almasi, 2025).** So, nurses with elevated emotional intelligence tend to have a stronger awareness of their abilities, demonstrate increased self-assurance, master difficulties, drive effective solutions and preserve operational efficiency **(Mehralian, Bordbar, Bahmaei & Yusefi, 2025).**

Emotional intelligence consists of five dimension. First dimension is self-awareness by which nursing supervisors can effectively recognize emotions understand moods, and know how their feelings impact their behavior. Second dimension is self-regulation that includes recognizing, controlling and viewing the emotional weight as a tool to leverage for self-improvement. Third dimension is social skills, which include building rapport with others and mentoring them. Fourth dimension is empathy, that require nursing supervisors to be mindful and imagining themselves in another person's positions. Last dimension is motivation, the ambition or aspiration for achievements. So, emotional intelligence is expected to help nursing supervisor to maintain a state of equilibrium to be more comfortable during overcoming the challenges and making nurses more engaged and thriving at work place **(Bhore & Dhanawade, 2025).**

Nurses' thriving refers to the nurses' ability to develop, prosper, flourish and grow enthusiastically and expand actively to move forwards instead of just remaining static and keeping the current quo. Nurses with perceived thriving are reflecting a state of holistic well-being in which nurses experience both personal growth and professional fulfilments **(Manfreda, Kulichyova & Ting, 2025).** Nurses thriving at work have two dimension includes: vitality and

learning. Vitality is the mood and emotional sense that motivate and encourage nurses to become active and enthusiastic in their workplace, while learning is an accumulation of information and practical skills to build self-confidence and increase competences. **(Slåtten, Mutonyi & Lien, 2025).**

By prioritizing thriving, healthcare organizations can cultivate environments where nurses feel valued and empowered to excel. And they have a sense of growth and development that is changed through learning **(Wei, Ding & Sun, 2025).** Therefore, understanding the conceptual foundations of emotional intelligence, the role of nursing supervisors and practical strategies for fostering nurses' thriving is vital for advancing nursing supervision frameworks in alignment with modern healthcare demands **(Sadaf, Irshad & Haroon, 2025).**

Also, nurses need appropriate supervisor that will motivate them to work in the right way and make them feel thriving, as well as, a supervisor who is mentally aware, and emotionally stable play a significant role in nurses' thriving **(Alreshidi, 2022)**.

Significance of the study

Nurses are the cornerstone of the health sector. It's better that they be empowered in an effective manner causing thriving and better performance **(Dalab, 2024)**. Emotional intelligence serves as important aspects of nursing supervisor practices. Emotional intelligence enhances nursing supervisor professional competency and helps them to use their good feelings to inspire nurses and increase nurses' thriving and motivation **(Johnson, Searby& Alexander, 2025).**

Moreover, thriving nurses become more connected, attached, retained and thriving at workplace, as well as, they become energetic and vital to learn and acquire innovative to grow their abilities **(Ayed, 2025)**. So, Therefore, knowing and applying emotional intelligence will help nurses improve their perceptual and emotional response skills, which would improve their performance at work. **(Chauhan, Kaul & Maheshwari, 2022).**

Aim of the study:

The aim of the study was to:

Assess influence of nursing supervisors' emotional intelligence on nurses' thriving.

Research questions:

1-What are the levels of nursing supervisors' emotional intelligence?

2-What are the levels of nurses' thriving?

3-What is the relation between nursing supervisors' emotional intelligence and nurses' thriving?

Subjects and Method

Research design:

A descriptive correlational research design was used in the current study.

Setting:

The current research was implemented in Intensive Care Units at Tanta University Hospitals, including Cardiology, Neurology and Oncology ICUs, as well as Medical Hospital ICU and Pediatric Hospital ICU.

Subjects:

The research participants were consisted of all (N=489) nursing staff from the-above stated setting.

Tools of data collection:

In this study, two standardized tool were used.

Tool (I): Nursing Supervisors' Emotional Intelligence Questionnaire

It was designed by the investigator guided by related literatures (**Chauhan, Kaul, and Maheshwari, 2022; Rashad, Mostafa and Mostafa, 2022; Mohammed & Fekry 2018**). It consisted of two parts as follows:

Part I: Nurses' personal and work related characteristics. It included age, sex, marital status, nurse position, educational level, years of experience, the unit, and attending training courses about emotional intelligence.

Part II: Nurses' perception regarding nursing supervisors' emotional intelligence questionnaire.

It was used to asses nursing supervisors' emotional intelligence from the nurses' point of view. This tool consisted of 43 items categorized into five dimensions as follows:

Self-awareness dimension included 8 items, self-regulation dimension included 9 items, motivation dimension included 8 items, empathy included 8 items and social awareness dimension included 10 items.

Scoring system

Participants' responses were measured on a 5-point Likert Scale ranging from 1 to 5, where; 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, and 5= strongly agree. Total score was calculated and classified according to statistical cut -off point as follows:

-High level of nursing Supervisors' Emotional Intelligence >75 %.

-Moderate level of nursing Supervisors' Emotional intelligence 60- 75%.

-Low level nursing Supervisors' Emotional Intelligence > 60 %**.**

Tool (II): Nurses' thriving Questionnaire

It was designed by the investigator guided by related literatures **(Elsaeed, Eldeep & Elbus, 2023; Aly & Obied 2022).** It was used to assess nurses' thriving. It consisted of 20 items categorized into two dimensions as follows:

Vitality dimension included 10 items, and learning dimension included 10 items.

Scoring system

Nurses' responses was measured on a five points Likert Scale ranging from (1-5), strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). The total scores were statistically calculated by summing up and classified into levels according to cutoff point as following:

- High level of nurses' thriving >75 %
- Moderate level of Nurses' thriving 60- 75%
- Low level nurses' thriving <60 %.

Method

1. A formal approval was provided from the Dean of Faculty of Nursing to the authoritative staff at the main university hospitals in Tanta.
2. **Ethical considerations:**

- The Faculty of Nursing's Scientific Research Ethical Committee gave its clearance with code number447-4-2024.

-After introducing herself, the study's purpose and methodology were thoroughly explained to get their collaboration, acceptance, and informed consent.

3. Tools I and II was developed by the researcher and translated them into Arabic.
4. After supervisors made revisions, the tools were shown to five experts in the nursing administration specialty to verify the content and face validity, in addition to the questionnaire's clarity. Four professors and one associate professor from Tanta University's Faculty of Nursing were categorized as experts in nursing service administration. The experts were asked to evaluate each tool's component parts based on their applicability and relevance, on a 4-point Scale as follows:1=irrelevant 2=little relevant 3=relevant 4=strongly relevant.
5. The validity of tool I was 92.2% and tool II was 92.5%. Experts' opinions guided the essential adaptations and modifications.
6. Reliability of tools was tested using Cronbach Alpha Coefficient test. Reliability of tool (I) Nurses' perception of nursing supervisors' emotional intelligence was 0.933 and reliability of tool (II) Nurses' thriving was.901.
7. About (n= 49) nurses who constitute (10%) of nursing staff were participated in a pilot study, and were not included in the primary study sample when the data was being collected. The pilot study was made to check clearance, order of items, applicability, and significance of the questions, and to calculate the time required to complete the questionnaire. The tool was modified by the researcher in response to pilot study input.

8. Data collection phase: The researcher gathered the data from nursing personnel. In order to distribute the questionnaire, the researcher interacted with the respondents of nursing staff in several study regions during working hours. The subjects documented their responses in the presence of the researcher to ensure that every question was addressed. The data was obtained over period of six months started from 1/6/2025 until 30/11/2025.

9. The approximate time required to finish the questionnaire items from nursing staff was (20 -30) minutes.

Results:

Table (1): Illustrates distribution of the nurses according to their personal and work-related characteristics. In this table noticed that nearly half 41.3% of the nurses aged >30 with Mean ± SD 30.11 ± 8.42. High percent (77.3%) of them were female and more than half (59.1%) of them were married. Regarding years of experience more than half (57.9%) had <10 years of experience with Mean ± SD 9.08 ± 8.90. More than three quarter (77.1%) of nurses were staff nurses and nearly half (46.6%) of them graduated Bachelor of nursing. High percent (74.2%) of nurses not attended training courses about emotional intelligence. 22.1%, 20.9%, 20.7%, 18.6% and 17.8% of nurses worked in oncological, cardiac, pediatric, medical and neurological ICUs respectively.

Figure (1): Shows levels of the nurses' perception regarding overall levels of nursing supervisors' emotional intelligence. This figure shows that, nearly half (45.6%) of the nurses had moderate level of overall perception regarding nursing supervisors' emotional intelligence. More than a third (38.4%) of the nurses had high level of overall perception regarding nursing supervisors' emotional intelligence, while minority (16.0%) of them had low level.

Table (2): Shows nurses' perception regarding levels of nursing supervisors' emotional intelligence dimensions. The table noticed that 48.1%, 40.5%, 38.0% of nurses had high level regarding social awareness, motivation and self- awareness dimensions respectively. Also, 39.7% and 39.1% of nurses had moderate level regarding self-regulation and empathy dimensions respectively.

Figure (2): Describes levels of the nurses according to levels of overall nurses' thriving. This figure demonstrates that nearly half (45.4%) of the nurses had high level of overall nurses' thriving, and less than half (41.9%) of the nurses had moderate level of overall nurses' thriving. While, minority (12.7%) of them had low level

Table (3): This table demonstrates distribution of the nurses according to their levels of nurses' thriving dimensions. As noticed in this table that less than half (40.5%) of the nurses had high level of vitality dimension of nurses' thriving and nearly half (45.8%) of the nurses had high level of learning dimension of nurses' thriving.

Table (4) and Figure (3): clarify Correlation between nursing supervisors' emotional intelligence and nurses' thriving. There was a positive significant correlation between nursing supervisors' emotional intelligence and nurses' thriving at $p \leq 0.05$. Also, there was a positive statistically significant correlation between all dimensions of nursing supervisors' emotional intelligence and all dimensions of nurses' thriving, at $p \leq 0.05$.

Table (1): Distribution of the nurses according to their personal characteristics (n= 489)

Personal characteristic	No.	%
Age (years)		
≤25	142	29.0
25 – 30	145	29.7
>30	202	41.3
Min. – Max.	17.0 – 54.0	
Mean ± SD.	30.11 ± 8.42	
Sex		
Male	111	22.7
Female	378	77.3
Marital status		
Married	288	59.1
Un married	199	40.9
Years of experience		
<10	283	57.9
10-15	139	28.4
>20	67	13.7
Min. – Max.	0.50 – 35.0	
Mean ± SD.	9.08 ± 8.90	
Nurses position		
Staff nurse	377	77.1
Nurse supervisor	107	21.9
Head nurse	5	1.0
Educational level		
Secondary nursing diploma	51	10.4
Nursing technical institute	204	41.7
Bachelor of nursing	228	46.6
Post graduate studies	6	1.2
Attending Training courses		
No	363	74.2
Yes	126	25.8
Unit		
Cardiac Intensive Care Unit	102	20.9
Medical Intensive Care Unit	91	18.6
Psychological and neurological ICU	87	17.8
Pediatric Intensive Care Unit	101	20.7
Oncology intensive care unit	108	22.1

SD: **Standard deviation**

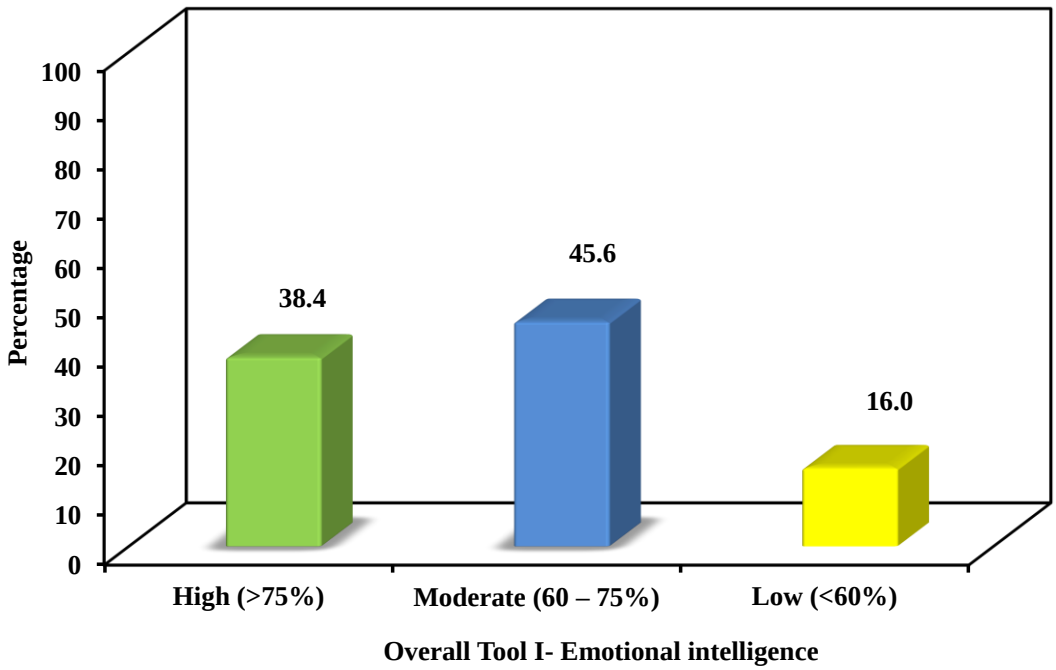

Figure (1): Distribution of the nurses' perception regarding overall levels of nursing supervisors' emotional intelligence (n = 489)

Table (2): Distribution of the nurses' perception regarding levels of nursing supervisors' emotional intelligence dimensions (n = 489)

Nursing supervisors' emotional intelligence dimensions	Levels of Emotional intelligence					
	High (>75%)		Moderate (60% – 75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Self-awareness	186	38.0	171	35.0	132	27.0
Self-regulation	183	37.4	194	39.7	112	22.9
Social awareness	235	48.1	183	37.4	71	14.5
Empathy	185	37.8	191	39.1	113	23.1
Motivation	198	40.5	167	34.2	124	25.4
Overall	**188**	**38.4**	**223**	**45.6**	**78**	**16.0**

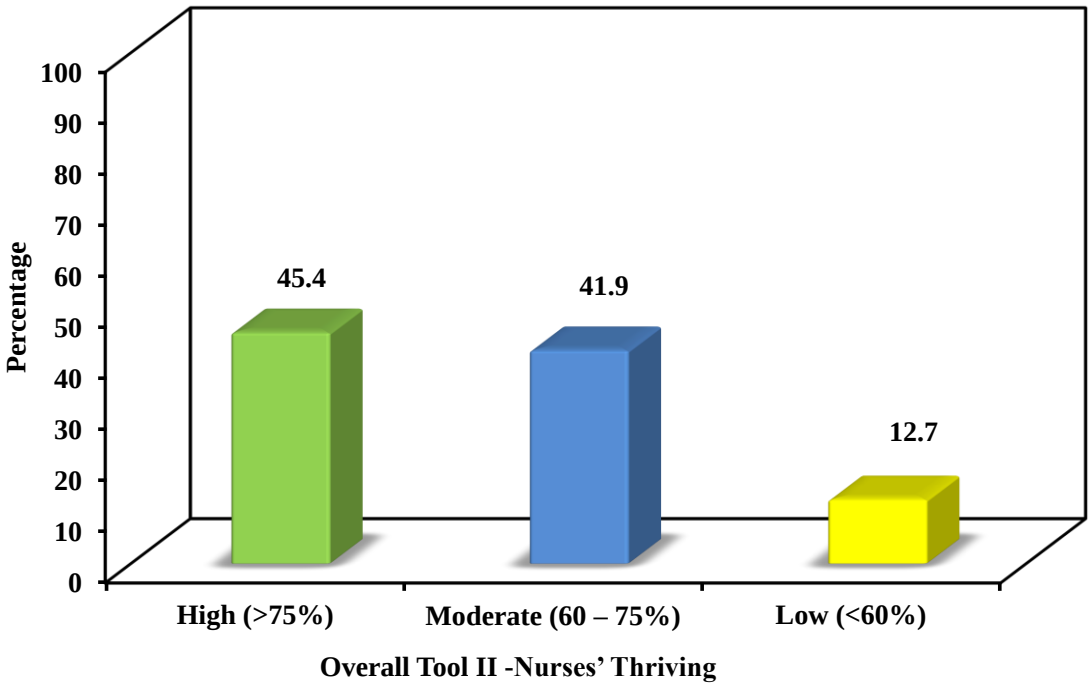

Figure (2): Distribution of the nurses according to levels of overall nurses' thriving (n = 489)

Table (3): Distribution of the nurses according to their levels of nurses' thriving dimensions (n = 489)

Thriving dimensions	Levels of nurses' thriving					
	High (>75%)		Moderate (60%-75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Vitality	198	40.5	192	39.3	99	20.2
Learning	224	45.8	218	44.6	47	9.6
Overall	**222**	**45.4**	**205**	**41.9**	**62**	**12.7**

Table (4): Correlation between nursing supervisors' emotional intelligence dimensions and nurses' thriving dimensions (n = 489)

		Vitality	Learning	Overall Tool II
Self-awareness	**R**	0.547*	0.501*	0.578*
	P	<0.001*	<0.001*	<0.001*
Self-regulation	**R**	0.577*	0.522*	0.607*
	P	<0.001*	<0.001*	<0.001*
Social awareness	**R**	0.693*	0.710*	0.771*
	P	<0.001*	<0.001*	<0.001*
Empathy	**R**	0.609*	0.530*	0.630*
	P	<0.001*	<0.001*	<0.001*
Motivation	**R**	0.586*	0.559*	0.631*
	P	<0.001*	<0.001*	<0.001*
Overall Tool I	**R**	0.716*	0.673*	**0.766***
	P	<0.001*	<0.001*	**<0.001***

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

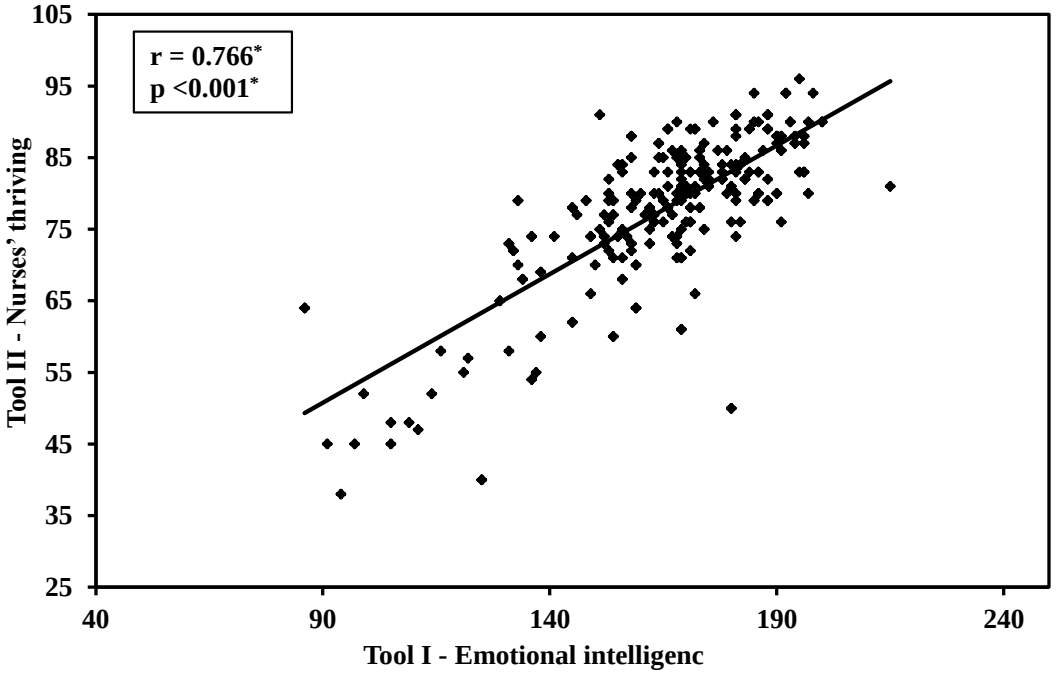

Figure (3): Correlation between nursing supervisors' emotional intelligence and nurses' thriving (n = 489)

Discussion

Emotional intelligence and nurses' thriving are two critical elements in the nursing profession which require proper identification to upgrade the nursing service. Awareness, regulation, and controlling the feelings are the key elements of emotional intelligence that improve qualities such as career advancement and nursing supervision, as well as, nurses' motivation and thriving (**Sadaf, Irshad & Haroon, 2025)**.

Nurses who work in the intensive care units always present in highly charged emotional situations that require them to provide a save and qualified care for critically ill patients **(Heradstveit, Larsen, Solberg, Steindal, 2023)**. So, intensive care units' nurses' thriving is a must to remain vital and using valuable skills and knowledge to enhance patient care outcomes. Therefore, emotional intelligence is an advantageous for nursing supervisors in various domains, including better healthcare system performance, effective teamwork productivity, high quality patient care and more nurses' thriving **(Elsaeed, Eldeep& Elbus, 2023).**

Level of the nurses' perception regarding nursing supervisors' emotional intelligence and its dimensions.

The findings of the current study showed that nearly half of the nurses had moderate level of overall perception regarding nursing supervisors' emotional intelligence. These results highlight that emotional intelligence has its own place in the supervision practice and nursing supervisors value the role of emotional intelligence in coordinating and facilitating nurses' behavior in the work place.

Also, this outcome might be caused by that intensive care units' nursing supervisors may ignore some of emotional intelligence abilities while meeting staff nurses' demands in a highly charged intensive care units, and facing challenging in balancing works demands. Additionally, high percent of nurses not attend training courses about emotional intelligence**.**

This result was supported by **Aldhafeeri, Abou Hashish& Abo Shereda, (2025)** whose results indicated that nurses possess an average levels of emotional intelligence. Also, **Ghareeb, et.al (2024)** demonstrated that majority of participants had moderate emotional intelligence level. And, **Rashad, Mostafa & Hemat Abdel Azem, (2022**) who demonstrated that a moderate degree of emotional intelligence was reported by roughly half of the surveyed head nurses.

This result contraindicated with the results of **Bhore & Dhanawade, (2025)** who found that the nurses have extremely high levels of

emotional intelligence. Likewise, **Kılıç and Duygulu, (2024)** found that unit-charge nurses had emotional intelligence scores above average. In the same line, **Jawabreh, (2024)** revealed that nurses reported high level perception of emotional intelligence. Also, the current finding disagreed with **Eldin, Abou Bakr & Mourad, (2023)** who revealed that the majority of nurses' exhibit below-average levels of overall emotional intelligence.

The present study findings displayed that over one-third of the nurses had strong agreements regarding self-awareness dimension of nursing supervisors' emotional intelligence. This result may be due to that nursing supervisors at ICUs appreciate that the emotions is very important at all times and they are being able to recognize the emotions properly including strengths, weaknesses, thoughts, beliefs, motives and feelings.

This outcome is in line with **Oweidat, et.al., (2024)** who found that the subjects typically displayed a highly developed sense of self-awareness dimension. Also, **Elshial, Shaban, Zahran & Eid (2023)** revealed that head nurses had high levels emotional self-awareness.

The current results is disagreement with the finding of **Eldin, Abou Bakr & Mourad (2023)** who found that about one half of studied subjects their self-awareness were ranged from slight and moderate regarding associate different emotions. Additionally, **Abdelkreem, Zaid, Alhayati & Adam (2021)** found that more than three quarters of critical care nurses had a low level of emotional self-awareness.

The present study findings displayed that more than a third of the nurses had moderate level of overall perception regarding self-regulation dimension of nursing supervisors' emotional intelligence. The study results may be due to the ICUs nursing supervisor not able to control the new generated reaction well especially when dealing with difficult nurse who may be annoying them in highly stressful situations. So, nursing supervisors still need more training on how to manage their own and others emotions at workplace during aggravating situations.

The current finding agreed with, **Gómez-Vallarta, Magos, Garcia-Rojas & Hernando-Gómez (2025)** who showed that self-regulation dimension is considered as regular in the results of the survey**. Xing, Nantsupawat & Thungjaroenkul (2022)** found that nurses revealed a moderate degree of emotional regulation.

In contrast the finding of current study is **David, Angeles, Barayuga, Escobar & Mangada (2025)** who

demonstrated that the result of self-regulation dimension reveals a high degree of agreement among nurse managers. **Almadani & Alamri (2024)** found that the peak average value was identified within the emotion regulation section.

The current finding revealed that, nearly half of the nurses rated nursing supervisors at a high level for the social-awareness dimension of emotional intelligence. The study result confirmed that social awareness of intensive care units' nursing supervisors is extremely observable and they work constantly in highly social and team-based environments.

Along with the present finding, studies that support high social awareness **David, Angeles, Barayuga, Escobar & Mangada (2025)** who demonstrated a strong social awareness among the nurse administrators. Also**, Elshial, Shaban, Zahran & Eid (2023)** found that head nurses display higher social-awareness means.

Contradictory findings include, **Eldin, Abou Bakr & Mourad (2023)** who illustrated that about over half of nurses have minimal degree of social awareness. **Kassem & Ahmed (2021)** revealed that head nurses scored lowest in social awareness.

The current findings revealed that the nurses rated nursing supervisors at a moderate level for the empathy dimension of emotional intelligence. This may be due to that nursing supervisors in intensive care units don't have a deeper connection with staff nurses so they can't clearly understand the feelings and thoughts of other nurses from their own perspective and don't have an active role in their concerns.

Along with the present study findings, **Ghazwani, Alshowkan & AlSalah (2023)** whose result indicated that in general, nurses demonstrated a moderate degree of empathy, and **Suleman, Syed, Mahmood & Hussain (2020)** found that the dimensions of emotional intelligence were scored as moderate level such as empathy dimension.

Contradictory findings include **David, Angeles, Barayuga, Escobar & Mangada (2025)** who found that the empathy dimension reveals a strong degree among the nurse managers. And, **Musio, et al. (2025)** who demonstrated that nurses who exhibited high levels of empathy were significantly more adept at recognizing and controlling other's emotions.

The current finding revealed that the nurses rated nursing supervisors at high level for the motivation dimension of emotional intelligence. This is due to that the nursing supervisors always motivate themselves to do difficult tasks and are able to prioritize important

activities. Additionally, nursing supervisors always meets deadlines of work activities, never waste time, always being motivated even when feeling low.

Along with the present study findings, **David, Angeles, Barayuga, Escobar & Mangada (2025)** demonstrated that the motivation dimension show a high level among the nurse managers. **Suleman, Syed, Mahmood & Hussain (2020)** demonstrated high level self-motivation dimension.

Contradictory to these results, **Eldin, Abou Bakr & Mourad (2023)** demonstrated that above one-half of the nurses has low level of self-motivation. Also, **Hebashy Elewa (2021)** found that about half of the staff nurses showed a moderate level of perception toward the motivation of nurse manager.

Level of nurses' thriving

The current study found that nearly half of the nurses exhibited a high level of overall thriving. Additionally, less half of nurses had a high level of the vitality dimension and nearly half of them had a high level of the learning dimension of nurses' thriving. From an investigator's perspective these findings may be because of the unique nature of intensive care work which, despite its challenges, can by their emotional intelligent supervisors provide significant opportunities for professional growth and a strong sense of purpose.

Additionally, nurses having a sense of assimilating new information and translating it into practice, they develop advanced clinical skills, engage in complex decision-making and have a confidence to master difficult tasks. So, they always promote psychological well-being, allowing themselves to feel they are learning and growing continuously, even under pressure**.**

The current results agreement with, **Zakaria& Moustafa Abd elGhani (2025)** who demonstrated that the studied nurses reported high levels of workplace thriving and its dimensions, vitality and learning. Likewise, **Abdallah, Mohamed & Ali, (2025)** found that more than three-fifths of the nurses had a high level of total thriving at work including high level of vitality and high level learning. And, **Elsaeed, Eldeep & Elbus, (2023)** found that three quarters of nurses exhibited a high degree of thriving at workplace and the most nurses reported elevated level of perception toward learning dimension and elevated level for vitality dimension. Also, **You, Chitpakdee & Akkadechanunt,** (**2022)** revealed that the thriving at work of nurses was at a high level**.**

Contradictory to these results, **Badran & Mohamed, (2025**) who revealed that a significant portion of

the studied group exhibited a moderate thriving at work, and above two-thirds of staff displayed an average level of total vitality and learning dimension of thriving at work. **Romeh & AboRamadan, (2024)** found that about fifty percent of nurses reported a minimal perception of thriving at work, in addition to, above fifty percent and over a third of studied nurses demonstrated a reduced capacity for vitality dimension and learning dimension, respectively. Also, **Saeed Ahmed Abd-Elrhaman, Ghoneimy Hasanin Ghoneimy & Ibrahem Ismael (2023)** who revealed that the most of surveyed nurses experienced an average degree of total thriving. And, **Mahmoud & Obied, (2022)** illustrated that the majority of critical care nurses had an average level for overall thriving.

Correlation between study's variables

The current study revealed a positive statistically significant correlation between all dimensions of nursing supervisors' emotional intelligence and all dimensions of nurses' thriving. This pivotal finding can be scientifically reasoned by the direct impact of emotionally intelligent supervisor on creating a work environment that conducive the growth and well-being.

Additionally, the supervisor with elevated emotional intelligence is better equipped more capable to foster a climate of psychological safety, where nurses feel respected, supported, and comfortable taking calculated risks necessary for learning. This supportive environment reduces debilitating stress and burnout, thereby preserving the nurses' energy and vitality. Furthermore, a motivated and self-regulating supervisor can inspire their team, set clear goals, and recognize achievements, which directly enhances the nurses' sense of accomplishment and forward momentum. In essence, the supervisors' emotional intelligence acts as a crucial buffer against the stressors of the intensive care unit and actively cultivates the conditions necessary for nurses to thrive.

The current findings go in the same line with **Sadaf, Irshad & Haroon, (2025)** whose result showed the positive significant correlation of emotional intelligence with thriving at work. And **da Silva, (2025)** illustrated that by fostering emotional intelligence through targeted training, healthcare sectors can create a thriving work condition. **Wang, Jiang & Blackman, (2024)** whose findings illustrated that Emotional intelligence drives nurses' thriving, which in turn leads to better safety performance. Also, **Ali, Khan, & Qureshi, (2024)** team's emotional

intelligence helps individuals manage conflicts best by reducing stress and enhancing energy, which further contributes to thriving.

Contradictory to the current results, **Jawabreh, (2024)** found that nurses' emotional intelligence and the capacity to influence or regulate others' emotions exhibited a weak positive association. Likewise, **Alsadaan et al., (2023)** found that emotional intelligence effect on engagement/work outcomes is substantially mediated by burnout levels (when burnout is high the direct benefit of emotional intelligence on engagement/thriving is attenuated). Also, **Lezar & van der Walt, (2023)** found that Culture intelligence does not have a statistically significant influence on thriving at work.

Conclusion

According to findings of the current study it was determined that, about nearly half of the nurses at all intensive care units in Tanta Main University Hospital had moderate level of overall perception regarding nursing supervisors' emotional intelligence, while minority of them had low level. Also, nearly half of the nurses had high level of overall nurses' thriving. There was a highly statistically significant positive correlation between nursing supervisors' emotional intelligence and nurses' thriving.

Recommendations

According to the present study results, recommendations below can be suggested:

For the health care facility's administrators

-Provide periodical refreshment training and development programs for nursing supervisors about emotional intelligence and thriving at the work as a crucial competence for manager's success in work.

-Apply recruitment and standard for selecting nursing supervisors with special skills of emotional intelligence.

-Involve emotional intelligence competencies in nursing supervisors' performance appraisal.

For nursing supervisor:

-Prioritizing and integrating emotional intelligence The nursing supervisors prioritize and integrate emotional intelligence development into their clinical practices via training and interactive, practice-based.

-Facilitate routine nursing sessions to encourage open dialogue, boost team morale, and enhance peer collaboration

-Create a positive work environment and promote mutual respect, compassion, and confidence.

-Create more open and comprehensive environments for nurses to boost their workplace focus and overall output.

-Have a strong sense of empathy in dealing nursing staff and make certain that every single nurse is valued and treated fairly.

-Have an unwavering determination in overcoming hardships which may arise from the intervention in medical fields.

For nurses:

-Participate in workshops and training sessions to develop and grow in a positive way.

-Cultivate positive professional connections that founded in mutual respect and trust, and learning new things from their peers in the work.

-Committed to continuous professional development and identifying innovative ways to improve work processes.

-Build motivation by looking forward to each new day and put their mental energy to work lovingly

For future research:

-Assess the effect of emotional intelligence on productivity of nursing staff.

-Study the effect of regenerative thriving on sustained development of nursing staff.

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Efficacy of Implementing Educational Program on Mothers' Knowledge and Practices regarding Hip Spica Casting for Their Children with Congenital Hip Dysplasia

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Abstract

Background: Congenital Hip Dysplasia is a common musculoskeletal disorder in children that may lead to serious complications if not diagnosed and managed early. Mothers play a vital role in caring for children with DDH, especially during hip spica casting, which requires proper knowledge and practice to prevent complications. **Aim of the Study:** The present study was aimed to evaluate the efficacy of educational program on mothers' knowledge and reported practices regarding Care of hip spica casting for Their Children with Congenital Hip Dysplasia **subjects and Method:** A quasi-experimental research design was used in present study. The study was conducted at the pediatric orthopedic units and Kafr El-Sheikh of Tanta Main University Hospital. A purposive sampling of 60 children diagnosed with Congenital Hip Dysplasia and their mothers was included. **Two tools included:** A structured questionnaire to assess mothers' knowledge and a reported practices checklist. **Results:** The findings revealed statistically significant improvement in mothers' knowledge and reported practices immediately after and one month following the educational program. **The study concluded that** educational program was effective in improving mothers' knowledge and practices regarding hip spica cast care. **The study recommended** that continuous education and follow-up are recommended to sustain improvement and enhance child health outcomes.

***Keywords*:** Educational program, Mothers' knowledge and practice, Hip spica cast, Children, Congenital Hip Dysplasia.

Introduction

Musculoskeletal disorders account for approximately 33% of childhood medical problems, ranging from acute fractures to lifelong disabling conditions **(Prakash, (2024)** and are the leading cause of disability worldwide **(Ghandour, Klotz, & Horsch, 2023)**They affect bones, muscles, tendons, ligaments, nerves, and discs due to hereditary factors, trauma, inflammation, or infection **(Hockenberry & Wilson,2019),** and are categorized as traumatic, congenital, acquired, infectious, neoplastic, or joint disorders **(Tan et al., 2018).**

Developmental hip dysplasia (DDH) is a common congenital deformity of the skeletal system in children. This refers to an illness that affects the skeletal system in which the femoral head and acetabulum are abnormal during development or in the anatomical structure accompanied by dysfunction. The normal development of the child's hip relies on the congruent stability of the femoral head within the acetabulum. The hip joint will not develop properly if it stays unstable and anatomically abnormal by walking age **(Yue et al., 2024).** Incidence is up to 5 per 1,000 newborns, with female predominance **(Grzybowski et al., 2023).** Etiology involves genetic, environmental, and mechanical factors; risk factors include first-born, female sex, breech positioning, swaddling, post-maturity, limited in-utero space, large-for-gestational-age, and family history **(Harsanyi et al., 2020& (El Sheikh, Shalan, & Kadhim, 2023)..**

Treatment depends on detection timing, neurological conditions, and care access **(Canavese et al., 2020).** Most cases are managed conservatively with Pavlik harness; surgical reduction is reserved for non-responsive or late-presenting cases **(Pavone et al., 2021; (Gunen & Sungur, 2023)**. Missed diagnosis leads to leg length discrepancies, gait abnormalities, limited range of motion, and pain **(Pang et al., 2024)**. Early detection allows complete healing with minimal adverse effects **(Sevencan et al., 2022).** Physical examination including limited hip abduction, asymmetric skin creases, and Barlow/Ortolani tests aids diagnosis **(Pavone et al., 2021; Ömeroglu, Tatlici, & Köse, (2020).** Early treatment aims for normal hip development, guided by age and severity **(Jawadi et al., 2018).** Pavlik harness is effective in infants under 6 months with ultrasound monitoring. Closed reduction with spica casting for 3–4 months is standard, with cast changes under anesthesia at 6–8 weeks Post-casting imaging (CT, MRI, or gadolinium-enhanced) assesses femoral head perfusion and osteonecrosis risk **(Yu et al., 2021).**

Cast complications include pressure ulcers, skin maceration, infection, discomfort, ischemia, and necrosis **(Ravi, Fernandez, , Whitaker& Kaffenberger, (2022).** A foul-smelling cast may indicate wound infection Pressure sore localization is challenging in children **(Ibrahim & Abd Elkhair, (2023).)**

Nurses involve parents in care through education to increase health literacy and promote healthy behaviors **(Thompson, Leach, Smith, Fereday & May,(2020).** Discharge education covers positioning, standing/walking, toileting, perianal care, lifting, bathing, clothing, skin care, feeding, play, cast care, pain relief, and warning signs .Caregivers are advised to avoid lifting the child alone, prop securely with pillows, check toes daily, keep cast dry, avoid heat for drying, use double diapering**,**check skin daily with flashlight, change position every 2 hours, support lower leg without heel pressure, and provide small frequent meals with fluids and roughage to prevent constipation **(Ibrahim & Abd Elkhair, (2023).),**

Significance of the Study:

Developmental dysplasia of the hip (DDH) is a common pediatric musculoskeletal disorder **(Young et al., 2020**). Risk factors include family history, abnormal clinical examination, breech presentation, twin pregnancy, oligohydramnios, cesarean section, and foot deformities. The incidence is up to 5 per 1,000 newborns **(Grzybowski et al., 2023).** Missed diagnosis leads to leg length discrepancies, gait abnormalities, limited range of motion, and pain **(Merchant, Tolk, Ayub, Eastwood, & Hashemi-Nejad,(2022).** The Importance of Monitoring and Factors That May Influence Leg Length Difference in Developmental Dysplasia of the Hip. Children, 9, 1945.**).** So, the study aims to evaluate the effectiveness of an educational program to improve mothers' knowledge and practices regarding hip spica casting for children with DDH **(Kolb etal.,2020).**

Aim of the study:

To evaluate the efficacy of educational program on mothers' knowledge and reported practices regarding care of their children with hip Spica casting

Research hypothesis:

Implementing educational program for mothers are expected to improve mothers' knowledge and reported practices regarding care of their children with hip Spica casting**.**

Subjects and Method:

Research design: A quasi-experimental research design was utilized.

Setting:

The study was conducted at pediatrics' orthopedic unit of Tanta and Kafr El-Sheikh Main University

Hospital which are affiliated to the Ministry of Higher Education and Scientific Research.

Subjects: . A purposive sample of 60 children diagnosed with DDH and their mothers was included

Tools of Data Collection:

Two tools were used in the current study:

Tool I: Mother's Knowledge Structured Questionnaire:

It was developed by the researcher after reviewing related literature. **(Ibrahim et al.,2021**) to collect data. It was composed of two parts, as follows:

Part (1): Mothers' socio-demographic characteristics and children's bio-sociodemographic characteristics:

A-Mothers' socio-demographic characteristics such as: age, residence, marital status, educational level, occupational status, income, and parents' consanguinity.

B-Children's bio-socio-demographic characteristics such as: age, gender, type of birth, birth order, main complaint, and reason of admission.

Part (2): **Mothers' knowledge** about Congenital Hip Dysplasia and Hip Spica Casting:

A-Mothers' knowledge about congenital hip dysplasia

The researcher designed it based on a review of recent literature to assess mothers' knowledge about congenital hip dysplasia including: meaning of congenital hip dysplasia, causes, types, diagnosis, complications, early management by soft brace (**Pavlik harness**), surgical management and precautions after hip reposition or replacement.

A-Mothers' knowledge about hip spica casting

It was designed by the researcher after consulting relevant literature. It included data related to the meaning of hip spica casting, importance, duration in casting, care of hip Spica casting, and precautions after hip spica casting, when to see a doctor, and follow-up.

Scoring system:

Scoring system of knowledge was checked with a model key answer where mothers' Scoring of the answers was done as follows:

-Done Correct and Complete Answer was scored (2).

-Done Correct and Incomplete Answers was scored (1).

-Done Incorrect / Don't Know Answers were scored (Zero).

The total score of knowledge was calculated as following:

-Score more than 70% was represented was considered good Knowledge.

- A score from 50-70% represented was considered fair

-Score less than 50% was considered poor knowledge.

Tool II: **Mothers' reported practices about care of hip spica casting:**

It was designed by the researcher after consulting relevant literature **(Ibrahim & Abd Elkhair, (2023).)&Alomran et al 2023)** to assess mothers' reported practice, it was focused on: positioning during sitting or lying, standing and walk, toileting and nappies, perianal care, lifting and holding the child, bathing and hair washing, clothing, skin care, feeding/ diet and playing.

Scoring system:

Mothers' reported practice was assessed as the following:

-A score of one was given for correct /done practice.

-A score of zero was given to the incorrect or not done practice.

The total score of mothers' reported Practice was calculated and classified as follow:

-Satisfactory ≥ 60.

- Unsatisfactory < 60%.

Method

1**. An official permission** secured from the Dean of the Faculty of Nursing to the Director of pediatrics' orthopedic unit in the sixth and seventh floor of Surgery Department at Tanta Main University Hospital and Kafr El-Sheikh Main University Hospital.

2. Ethical and legal considerations:

a) Ethical approval of the Scientific Research Ethical Committee in the Faculty of Nursing was obtained with code number 382/2/2024.

b) Nature of the study didn't cause any harm or pain to the entire sample.

c) Confidentiality and privacy were taken into consideration regarding data collection and was maintained by coding number.

d) Informed consent was taken from mothers to participate in this study.

They can withdraw from the study at any time.

e) Privacy and confidentiality for mothers were assured.

3. Meeting with mothers who participated in the study to explain the aim of the study.

4. Tools development: the study tools were developed by the Researcher in

Arabic language after reviewing recent literature.

5. Content validity. had been confirmed by a jury of five professor expertise in the field of Pediatric nursing students before conducting the study.

6. Reliability was tested for tools I, II, using the appropriate statistical test.

The reliability was done by Cronbach's Alpha coefficient test to assure homogeneity of tool.

7. A pilot study was carried out on 10% of mothers to test the tool for its clarity; applicability, feasibility, and the necessary modification were done. Pilot study was excluded from the study.

8. Children and their mothers were interviewed together in the study setting to collect the needed data using study tools.

9. Mothers' socio-demographic data and their children bio-socio-demographic characteristics were assessed using tool (I) part (1).

10. The researcher assessed the mothers' knowledge about developmental dysplasia of the hip and hip spica casting Tool (I) part (2&3).

11. Mothers 'reported practices regarding care of hip spica casting was assessed using Tool (II).

12. The duration of data collection was taken within 6 months.

Reliability for the structured questionnaire sheet for mother's knowledge was 0.928 and for their reported practices was 0.914. This indicated a high degree of reliability for the study tools.

13. The study conducted through four phases of educational program Including assessment, planning, implementation, and evaluation.

Statistical analysis:

The data statistical analysis was applied using (SPSS), version 28. Quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were displayed as counts and percentages. The following tests were performed: **Chi-square test, Pearson's correlation coefficient (r) test**, **Cronbach's Alpha test**, **Fisher's exact test**, ANOVA **(Analysis of Variance), Paired t-test**. The confidence interval was set to 95%, and the margin of error accepted was 5%. The p-value was considered significant as follows:

P-value ≤ 0.05 was considered significant.

P-value > 0.05 was considered insignificant.

Phases of the study:

1-**Assessment Phase**:

It was conducted by the researcher by using the study tools to assess mothers ' knowledge and practice regarding congenital hip dysplasia and hip spica casting before receiving educational program.

2-Planning Phase: -

- Setting objectives

-Preparing content that explained the rationale for conducting the session.

-The studied mothers divided into six groups and each group included ten.

-Setting all the equipment needed for the structured interview schedule.

-Write the questionnaire in simple Arabic language to be suitable for the child and his caregiver.

-Preparation of the environment to be quiet and free from any distractions.

-The researcher was available during the morning shifts, from 9:00am. The completion of each sheet took about 20:30 mins.

3-Implementation Phase:

-Educational instructions were conducted separately for each group through successive sessions, based on the actual needs assessment of the studied mothers.

-The educational program was delivered to 5 sessions, two / week and

-This session took about 30 minutes/session.

-Various educational techniques and media were employed, such as lectures, demonstration and re demonstration.

- The duration of the data collection was within six months.

The content of the session was presented in the following sequences:

-**The first session:** In this session the researcher focused on definition of congenital hip dysplasia, causes, types and diagnosis of congenital hip dysplasia.

-**The second session**: In this session the researcher focused on complications, early management by soft brace (Pavlik harness) as **Pictures** and surgical management in late stage of congenital hip dysplasia.

Pictures of Pavlik harness:

The third session: In this session the researcher focused on meaning of hip spica casting, importance, duration in casting and complication of hip spica casting.

Pictures of spica casting:

The fourth session: In this session the researcher focused on care of children with hip spica casting at home it included positioning during sitting or lying, standing and walking, toileting and nappies, perianal car and lifting and holding the child.

Original pictures for positioning of children with hip spica casting

The fifth session: It included educating mothers about additional care for their child that includes Bathing and hair washing, Clothing, Skin care, Feeding and diet, Playing and follow up.

4- **Evaluation Phase**: - Assessment of mothers' knowledge and practice regarding Congenital hip dysplasia and hip spica casting at home before receiving educational program was conducted with the same evaluation instruments immediately after (post-test) and one month after implementation of the educational

program and these was compared to pre-test levels.

Results:

Table (1): Shows distribution of the studied mothers according to their socio -demographic characteristics. It Observe that nearly half **(48.3%)** of the studied mothers were aged between 30 and 40 years, with the mean ± SD of mothers' age was 30.55±8.016 years. In terms of education**,** (36.7%) had a secondary level of education while less than three quarters (73.3%**)** of them were married and (63,3%) were housewives. Notably, 41.7% reported a consanguineous relationship with their spouse and majority of them (92%) had second degree relationship. More than half (53.3%) of them lived in rural areas, and the forty of them (40%) reported they hadn't enough income, while an equal proportion stated their income was enough.

Table (2): Presents distribution of the studied children according to their socio demographic characteristics. it was obvious that more than half (55.5%) of the children, their age ranged from 1<3 years with mean ± SD of the children age 2.78±1.17 years. Regarding children's gender, more than three quarters of the children (78.3%) are females and 66.7% of the children were the first mother's child and majority of them (80%) were delivered through caesarian section.

Continue Table (2): This table Illustrates that (23.3%) less than one quarter of children had a positive family history of congenital hip dislocation, while more than two thirds of children (68.3%) had breech presentation in the uterus. Regarding chief complaints, one-third (33.3%) of children heard a click or pop when changing the infant's diaper or when walking, while most of them (98.3%) had difficulty in moving and majority of them (89.8%) had difficulty moving the affected hip, most of them along with pain (98.3%), majority of them (84.7**%)** had persistent or intermittent pain in the hip or thigh area.

Additionally, most of the children (98.3%) had asymmetry in their legs and unequal leg size. Children experienced delayed walking and crawling, with majority of them (88.3%) reaching the age of two without walking. The condition affected all children's walking patterns, with more than half (60%) showing limping or abnormal gait. As for hospital admission, less than half (48.3%) came for routine follow-up, and almost two third of them (63.3**%**) were diagnosed with left-side dysplasia.

Figure (1): It was clear that there were statistically significant differences regarding all items of total mothers' knowledge level regarding congenital hip dysplasia and hip spica casting pre and

immediately after educational program and also between pre and one month after educational program p=0.000. It was found that, there were no statistically significant differences related to regarding total mothers' knowledge regarding hip spica casting immediately and one month of the educational program p=0.059.

Table (3): Illustrates that majority of mothers (93.3%, 88.4%) had a high level of knowledge regarding congenital hip dysplasia immediately post and one month after educational program compared to 3.3% preprogram. Concerning Hip Spica casting, it was noticed that the majority of mothers 96.6% & 91.7% of mothers' high level of knowledge immediately after and one month after educational program respectively compared to 5% of them preprogram. Regarding mean score of mothers' Knowledge, it was improved to 28.08±4.374 and 27.30±5.410 immediately and one month after educational program compared to 6.32±6.221 preprogram. It was found that there was a highly significant improvement regarding of total mothers' knowledge level regarding congenital hip dysplasia and hip spica casting 93.3% & 88.4% had high level of knowledge immediately and one month after educational program respectively compared to 3.3% preprogram.

Figure (2): Indicates total mothers' reported practices level ' regarding care of their children with hip spica casting. It revealed that 10% of mothers had satisfactory practice regarding care of their children with hip spica casting preprogram that is improved to 96.7% & 90% respectively immediately post and after one month of educational program. There was a statistically significant difference between pre, immediately post, and one month after the program (p=0.000).

Table (4): Shows correlation between mothers' total knowledge and reported practices pre with r (0.560), immediately with r (0.794) & one month after the educational program with r (0.895). A positive highly statistically significant correlations were noticed between mothers' knowledge and Mothers' reported practices pre, immediately & one month after the educational program P=0.000.

Table (1): Percentage Distribution of the Studied Mothers regarding Their Socio-Demographic Data (n=60)

Socio-demographic data	No.	%
Age/ years		
<20	9	15.0
20<30	18	30.0
30<40	29	48.3
40<0	3	5.0
≥50	1	1.7
Mean ±SD	**30.55±8.016**	
Educational level		
Illiterate	2	3.3
Read and write	6	10.0
Basic education	18	30.0
Secondary education	22	36.7
University education	12	20.0
Marital Status		
Married	44	73.3
Divorced	9	15.0
Widow	7	11.7
Occupation		
Working	22	36.7
Housewife	38	63.3
consanguinity relation ship		
Yes	25	41.7
No	35	58.3
If yes , Degree of relationship (n=25)		
First	0	0.0
Second	23	92.0
Third	2	8.0
Residence		
Urban	28	46.7
Rural	32	53.3
Income		
Enough	24	40.0
Enough and saved	12	20.0
Not enough	24	40.0

Table (2): Percentage Distribution of the Studied Children according to Their Bio-Socio-Demographic Characteristics (n=60)

Bio-socio-demographic characteristics	No.	%
Age/ years		
<1	2	3.3
1<3	33	55.0
3<5	22	36.7
5<7	3	5.0
Mean ±SD	**2.78±1.17**	
Sex		
Male	13	21.7
Female	47	78.3
Ranking of the child		
First	40	66.7
Second	18	30.0
Third	2	3.3
Type of labor		
Normal	12	20.0
Caesarian	48	80.0
Family history of congenital hip dislocation		
Yes	14	23.3
No	46	76.7
Position of the fetus in the uterus		
Breech presentation	41	68.3
Head presentation	19	31.7
Chief complain **Hear a click or pop when changing the baby's diaper or when walking**		
Yes	20	33.3
No	40	66.7
The child have difficulty moving		
Yes	59	98.3
No	1	1.7
Child experience pain or discomfort		
Yes	59	98.3
No	1	1.7

Continue Table (2): Percentage Distribution of the Studied Children regarding Their Bio-Socio-Demographic Characteristics (n=60)

Bio-socio-demographic characteristics	No.	%
If yes, reason for movement difficulty(n=59)		
Difficulty moving the affected hip	53	89.8
Stiffness or joint immobility	3	5.1
Pain and discomfort when move	1	1.7
Don't know	2	3.4
If yes, symptoms of pain or discomfort (n=59)		
Persistent or intermittent pain in the hip or thigh area	50	84.7
Crying or distress	9	15.3
Asymmetry in the legs		
Yes	59	98.3
No	1	1.7
If yes, the signs of leg asymmetry (n=59)		
One leg appears larger than the other	58	98.3
Skin folds are fewer on one leg than the other	1	1.7
The condition delay crawling or walking		
Yes	60	100.0
No	0	0.0
If yes, the signs of delayed crawling or walking (n=60)		
The child reached one year without crawling	6	10.0
The child reached two years without walking	53	88.3
The child reached eight months without crawling	1	1.7
The condition affect the child's walking pattern		
Yes	60	100.0
No	0	0.0
If yes, the signs of walking difficulty (n=60)		
Limping or abnormal walking pattern	36	60.0
Walking on tiptoe on the affected leg	17	28.3
Difficulty in initiating movement and changing direction	1	1.7
Don't know	6	10.0
Reason for Hospital Admission:		
Hip brace application	18	30.0
Routine follow-up	29	48.3
Management of complications (skin irritation, brace slippage, sores)	13	21.7
Place of hip dysplasia		
Right side	12	20.0
Left side	38	63.3
Right and left side	10	16.7

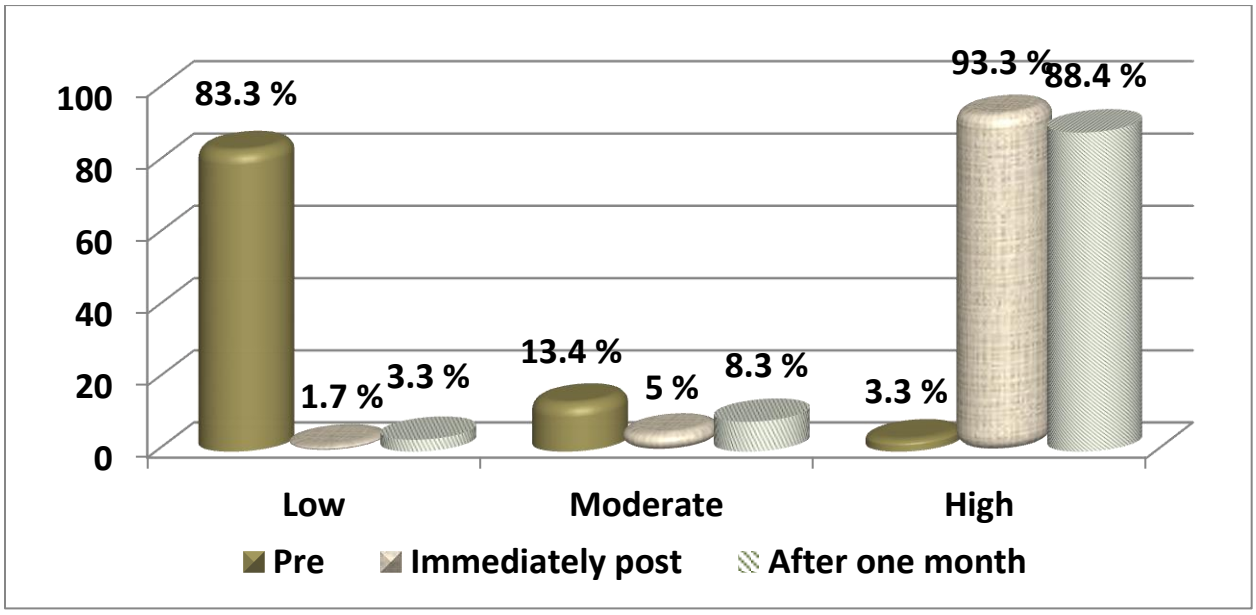

Figure (1): Total Mothers' Knowledge Level about Congenital Hip Dysplasia and Hip Spica Casting

Table (3): Percentage Distribution of Total Mothers' Knowledge Level Regarding Congenital Hip Dysplasia and Hip Spica Casting Q (n=60)

Mothers' total knowledge	Pre						Immediately post						After one month						Chi-square test		
	low		Moderate		High		low		Moderate		High		low		Moderate		High		$X^2$1 P 1	$X^2$2 P 2	X^2 3 P 3
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	No.	%	No.			
Congenital Hip Dysplasia	52	86.7	6	10.0	2	3.3	1	1.7	3	5.0	56	93.3	2	3.3	5	8.3	53	88.4	57.00 0.000*	56.00 0.000*	2.053 0.045*
Hip Spica casting	50	83.3	7	11.7	3	5.0	1	1.7	1	1.7	58	96.6	3	5.0	2	3.3	55	91.7	55.00 0.000*	54.00 0.000*	1.890 0.059
Total	50	83.3	8	13.4	2	**3.3**	1	1.7	3	5.0	56	**93.3**	2	3.3	5	8.3	53	**88.4**	57.0 0.000*	56.0 0.000*	2.00 0.046*
Range Mean ±SD	(2-25) 6.32±6.221						(1-30) 28.08±4.374						(4-30) 27.30±5.410						24.657 0.000*	22.220 0.000*	2.565 0.013*

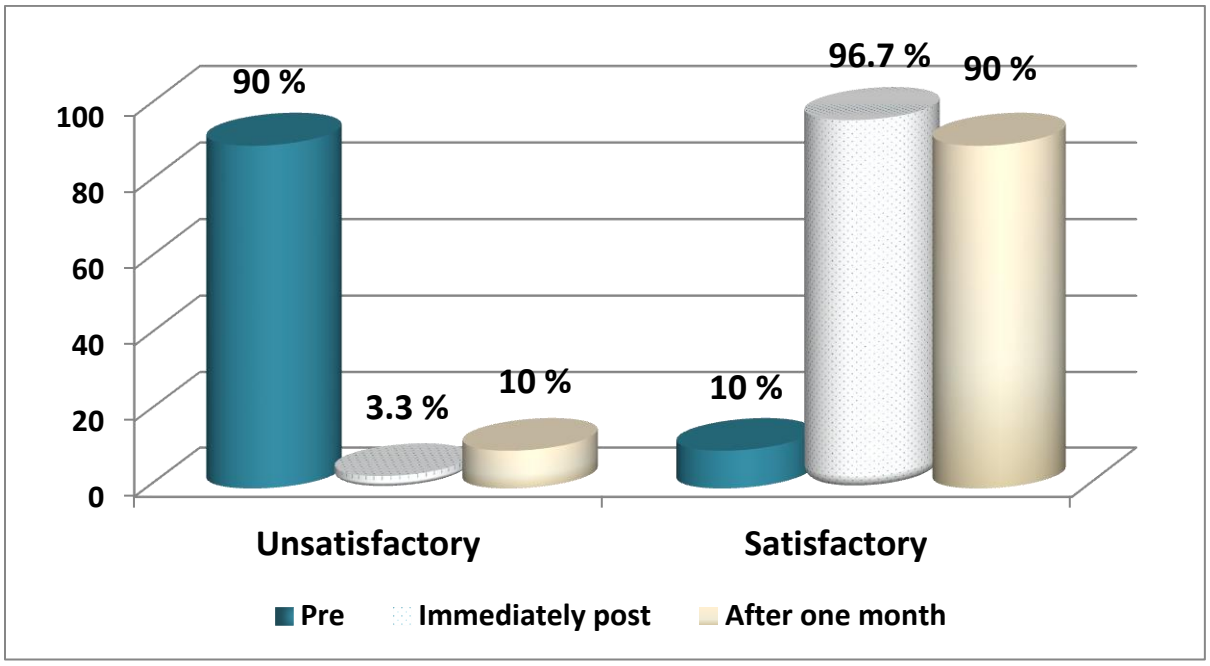

Figure (2): Total Mothers' Reported Practices Level ' Regarding Care of Their Children with Hip Spica Casting Pre, Immediately Post and One Month after Educational Program

Table (4): Correlation between Mothers' Total Knowledge and Reported Practices Pre, Immediately & One Month after the Educational Program

Variables	Mothers' reported practices					
	Pre		Immediately		After one month	
	r	p-value	r	p-value	r	p- value
Mothers' knowledge	0.560	0.000*	0.794	0.000*	0.895	0.000*

Discussion

Developmental dysplasia of the hip (DDH) is a common musculoskeletal disorder in children characterized by various abnormalities of the hip joint, such as instability, acetabular dysplasia, subluxation, and dislocation. It affects approximately 5 in 1,000 newborns, with a higher prevalence in females **(Young et al., 2020; Grzybowski et al., 2023)**. Early identification of developmental dysplasia of the hip (DDH) is essential, prior to complete maturation of the hip joint, in order to avert its potentially devastating consequences. **(Dawod et al., 2023).**

Key indicators of developmental dysplasia of the hip (DDH) include a shorter leg on the affected side, reduced hip abduction, uneven skin folds on the thigh or buttocks, and a "clunk" sound during diaper changes. Treatment depends on factors like the timing of detection and any associated neurological conditions. Most cases are treated conservatively with **a Pavlik harness**, while surgical options are reserved for those not responding to conservative methods or diagnosed late. Osteotomies are typically performed after 18 months. If DDH is missed, it can lead to increased morbidity and functional limitations, such as leg length discrepancies, gait abnormalities, restricted range of motion, and pain (**Canavese et al., 2020; Sevencan et al., 2022).**

Maternal involvement is pivotal in managing developmental dysplasia of the hip (DDH), as it contributes significantly to the prevention of complications and the enhancement of clinical outcomes in affected children. **(Gyurkovits et al., 2021).** So, the present study aimed to evaluate the effectiveness of an educational program on mothers' knowledge and practices regarding hip spica cast care for their children diagnosed with developmental dysplasia of the hip (DDH).

Regarding age of the studied mothers, the present study finding showed that, nearly half of the studied mothers their age ranged from 30 and 40 years, this finding is consistent with the study performed by **Mohammed, Bayoumi, & Mohammed, (2025).**who reported that the study sample less than half of them were from 30 ≤ 40 years old**.** This finding is also consistent with the study by **(Alanazi, Abokhesheim, Al Saqer, Alasmari, & Alotaibi, (2022)**who reported that less than one third of the study sample were between 26 and 35 years.

On the other hand, this result contrasts with the findings of

(Ibrahim & Abd Elkhair, (2023).) who reported that two-fifths of mothers in both the study and control groups were aged between 25 and 30 years. Likewise, **Abd Elkhair, Mohamed, Mohamed, & Elbarabary, (2020).** who found that less than two-thirds of mothers were aged between 20 and 30 years.

From Researcher's Perspective, the predominance of mothers aged 30–40 years could be explained by the fact that this stage of life often corresponds to heightened parental responsibility and maturity. Mothers in this age bracket are generally more engaged in their children's healthcare and decision-making processes. Moreover, their accumulated life experiences and emotional stability may enhance their adherence to treatment plans and follow-up care, particularly in managing chronic conditions such as developmental dysplasia of the hip (DDH).

In relation to the educational level of the mothers studied, **the current** study finding reflected that more than one third of them had a secondary level of education. This finding was **accepted.** with **Mohammed et al., (2025)** who found that approximately two thirds of the study sample had secondary education. The present study results were contradicted with **Ibrahim et al.,(2021) who found that over one-third of mothers in the control group had a basic education, while half of the mothers in the study group were illiterate**. Similarly, **Veloso et al., (2025),** mentioned that less than three quarters of the study sample completed higher education.

This outcome is in accordance with **The results of Dingemann et al. (2019)**, who concluded that less than three quarters had a low **level of education,** while Not more than one-third had a high educational level, and further concluded that **low level of maternal education** is linked to decreased screening uptake,
adverse health results, and a higher incidence of postoperative complications among children. Furthermore, the level of mothers' education may be considered a contributing element influencing their knowledge and practices in caring for children with casts.

Concerning **marital status**, the current study showed that less than three-quarters of the participating mothers were married. This finding is consistent with **Mohammed et al. (2025)**, who reported that less than two thirds of mothers in their study were married, this may be attributed that the predominance of married mothers may be

explained by cultural and social norms of the study population in which marriage is strongly tied to childbearing and caregiving responsibilities. In addition, being married often provides a more stable family environment, which can positively influence mothers' capacity to seek healthcare and secure support for their children with DDH.

Regarding Occupation of the studied mothers, the present study finding reflected that slightly less than two thirds of them were housewives .This finding was supported by the study performed by **Mohammed et al., (2025)** who found that more than two thirds of them housewives. Similarly, the study performed by **Sadeq & Al-Dujaili, (2023)**, who demonstrated that nearly two thirds of the study subjects' job are housewife.

The present study results were contradicted with **Ibrahim et al., (2021)** who reported that most mothers in the study group and control group were found to work outside the home. This finding was also inconsistent with **Ramdan et al., (2021)** who indicated that more than three-quarters of the studied children their mother were employed either in governmental positions, private sector jobs, or free business, while less than one quarter were not employed.

Likewise, **Desai (2020)** who entitled that work Particularly during the early years of a child's life, can significantly affect their growth and overall life course.

Regarding Residence of studied mother, the result of the current study illustrates that more than half of them lived in rural areas. Similarly, the study by **Ibrahim et al., (2023)** reported that less than two thirds and more than three quarters of studied mothers in both groups resided in rural settings, respectively. These findings are According to a study by **Abd Alkhair et al. (2020),** over half of the mothers in the control group and two thirds of the moms in the experimental group were from rural regions. In the same line, **(ElAwady , AlGameel , Ragab & Hassan (2021). mentioned that** in Egypt, musculoskeletal abnormalities were the second most frequent congenital condition, and most of the affected children were from rural areas.

From the perspective of the researcher, the predominance of mothers residing in rural areas among the studied sample may reflect the demographic distribution of the population served by the selected healthcare settings. Additionally, rural residence may be associated with limited access to specialized healthcare services,

lower educational levels, and reduced exposure to health awareness programs compared to urban areas. This, in turn, could influence mothers' knowledge and practices regarding developmental hip conditions and their management. Therefore, greater emphasis should be directed toward implementing targeted educational and preventive programs in rural communities to improve maternal awareness and early detection practices.

Regarding child age, the current study revealed that more than half of the children, their age ranged from 1<3 years. In keeping with this finding of a study carried out by **Abd Elkhair et al., (2020)** indicated that the highest percentages of children in both groups aged less than 3 years. Similarly, **Williams, (2021)** who stated that the most effective way to identify DDH early on is still to conduct thorough, frequent clinical examinations of the pediatric hip from birth to walking age. In addition, this finding was similar to **Ibrahim et al., (2021)** who reported that, highest percentages of children aged less than 3 years old. Also., **Mohammed et al., (2025)** reported that two fifths of children age were below 1<3 years old.

Regarding children's gender the present study finding showed that more than three quarters of the children are females. This finding was in agreement with **Mohammed et al., (2025)** who reported that the majority of children studied were girls. This finding was in the same direction with **Kadhim , (2023)** who reported that less than three quarters of the studied sample were female. In addition, this finding was similar to **El Fawal, Mohamed, Tantawy, & Mohamed,(2022).** who reported that less than two thirds were female. The results in the current study are in line with other previously published studies that found that the male: female ratio was 1:5 in the Northern Borders region and 1:4 in the Al-Jouf region. A recent meta-analysis reported that females have approximately half developing and being diagnosed with DDH than males. In the same line with current study, **Alrashdi et al., (2024) and Ibrahim et al., (2021)** clarified that the highest percentage of children were female.

From the researcher's point of view, this finding supports the evidence that female children have a higher incidence of DDH compared to males. This may be explained by hormonal influences

during female development that contribute to ligamentous laxity, predisposing them to DDH. In particular, ligamentous laxity and the increased risk of DDH are believed to be related to circulating estrogen from both the mother and the fetus. Moreover, studies have shown that DDH children exhibit a higher number of estrogen receptors than controls, further suggesting that hormonal factors contribute significantly to the disease's etiology.

Regarding the child's rank inside the family, the present study findings **Demonstrated that** almost two thirds of the children were the first child in their families. Similarly, the study by **Abd Elkhair et al., (2020)** indicated that two fifths and more than half of children in both groups were ranked as first child in their families. This result was also in the same line with **Mohammed et al.,(2025).** who reported that more than half of them were the first child. Also, this finding was in agreement with **Sadeq & Al-Dujaili, (2023).** who informed that the majority of The children were firstborns in their families. In the same context, **Hakim et al., (2024)** who demonstrated that more than half of children ranked as first child in their families.

On the other hand, **Ibrahim et al. (2021)**, in their study conducted in Saudi Arabia reported that although being a first-born child was prevalent among their sample, it was not significantly associated with the occurrence of developmental dysplasia of the hip. Likewise, **Xiao, Tang & Su, (2022).** who identified that, other perinatal factors (breech presentation, oligohydramnios, limb deformities) as the main risks in their research.

From the researcher's perspective, the predominance of first-born children among the study participants may suggest that birth order could play a potential role in the occurrence of developmental dysplasia of the hip, possibly due to the relatively restricted intrauterine environment experienced by firstborns. However, the contradictory evidence reported highlights that being a first-born child may not independently increase the risk of DDH. Instead, it is more likely that other perinatal factors such as breech presentation, oligohydramnios, or limb deformities contribute more strongly to the etiology of the condition. These inconsistencies emphasize the need for further multicenter studies to clarify whether the child's rank within the family is a genuine risk factor, or if

its apparent association is confounded by other underlying maternal or fetal conditions.

Regarding type of labor, the current study was evident that majority of them were delivered through caesarian section. These results can be interpreted by the abnormal baby position during pregnancy. This finding was in the same direction as **Alrashdi et al., (2024)** who confirmed that majority of children were delivered through caesarian section. In the same context, a study by **Ionescu, , Dragomirescu, Herdea& Ulici,. (2023)**who confirmed that the majority of births occurred via cesarean section. This finding was also corroborated by the study conducted by **Sadeq & Al-Dujaili, (2023))**, who revealed that less than two thirds of the study sample delivered with caesarean section. **Ionescu et al., (2023),** which also reported high rates of C-sections.

On the other hand, this result was disputed by **Hakim et al., (2024)** who noted that their study reignited the debate surrounding the mode of delivery and the risk of DDH. They concluded, however, that cesarean delivery had only a minimal impact on the occurrence of DDH.

According to Family history of congenital hip dislocation, the current study Highlighted that less than one quarter of children had a positive family history of congenital hip dislocation. The present study results were supported by **Lankinen, (2024)** who conducted and mentioned that the minority children had a positive family history of DDH. Similarly, a study executed by **Kardm et al., (2023),** that Suggested that around more than one third of children with DDH had a family history.

On the contrary, this finding was not matched with **Alrashdi et al., (2024)** who reported that family history of DDH, alongside female sex, breech delivery, oligohydramnios, cesarean section, and age less than 3 years, were the primary risk factors associated with DDH in Saudi Arabia. Likewise, **El Fawal et al., (2022)** who concluded that the risk of developing DDH is significantly increased among infants with a positive family history, especially first-degree relatives, emphasizing that positive family history has been consistently linked to DDH.

From the researcher's point of view, Family background may be considered a relatively rare cause of DDH incidence in the present sample. However, the strong associations reported in other studies suggest that genetic predisposition cannot be ignored and may play a more significant role in populations with higher

rates of consanguinity or strong hereditary patterns. This highlights the need to consider family history as a variable within broader multifactorial risk assessments rather than as an isolated predictor.

Regarding the position of the fetus in the uterus during pregnancy, the current study found that over two-thirds of the children had a breech presentation in the uterus. This may be explained by the mechanical effect of intrauterine positioning, where the fetus in breech presentation is seated within the maternal pelvis with the hips in an adducted posture. Such positioning can lead to excessive knee extension and hinder the proper articulation between the femoral head and the acetabulum. As this connection is crucial for normal hip development, the influence of breech presentation on DDH is therefore thought to be predominantly mechanical. These findings are consistent with **Abo Elela, El Dakhakhny, Bassam& El Abdeen. (2018).** who reported that nearly three quarters of studied fetal's presentation during pregnancy were breech presentation. Furthermore, **Jawadi et al., (2018)** who emphasized that Breech presentation as a critical risk factor in their review of 574 child diagnosed with DDH. Furthermore, this finding was in agreement with **Hakim et al., (2024),** who reported that only a minority of their sample had a cephalic presentation, whereas the overwhelming majority were delivered in breech position On the other hand, this finding was not matched with **Lankinen, (2024)** who demonstrated that less than two thirds of their sample had a cephalic presentation, while less than one third were breech-born, reinforcing that breech presentation is a well-established risk factor for DDH.

Regarding chief complaints, the study revealed that the majority of children with CHD had complained from difficulty moving the affected hip, pain or discomfort, Asymmetry in the leg and delay crawling and walking, while only one third of them their mothers, heard click or pop when changing the infant's diaper or when walking.in contrary of our study **Norlén & Faergemann .(2022)**, who found that hip click was one of the most frequent reasons for referral and diagnosis of DDH. Also, the study was done by **Morris et al., (2023).** mentioned that hip clicks, even in the absence of other risk factors, may be indicative of underlying hip dysplasia and therefore should not be overlooked.

In agreement of our study **Nie, Rymaruk, & Paton (2018).** who concluded that isolated hip clicks were mostly associated with normal hips, as most of infants with clicky hips had no dysplasia on ultrasound examination. In the same context, **Ziegler et al., (2022)** who emphasized that clinical examination and child history alone, including complaints such as hip clicks or movement difficulties, are not sufficient for neonatal hip screening, as many cases of DDH could be missed without the use of universal ultrasound.

From the researcher's point of view, hip clicks and related complaints should be interpreted cautiously. While they may serve as an early warning sign leading to further assessment, they should not be relied upon in isolation. Combining clinical findings with imaging techniques such as ultrasound remains essential to ensure accurate and early detection of DDH, thereby preventing misdiagnosis and delayed treatment.

Concerning Asymmetry in the leg, the current study reported that most of the children had asymmetry in their legs and unequal leg size. that affect walking and crawling children experienced delayed walking and crawling, and reaching the age of two without walking. The condition affected all children's walking patterns, with almost two third of them showing limping or abnormal gait. As for hospital admission, about half came for routine follow-up, and diagnosed with left-side dysplasia.

These findings are supported by **Mohammed et al., (2025**), who reported that Over one-third of the studied children were discovered to have DDH through the observation of unequal leg length. Similarly, **Abo Elela et al., (2018**) who found that less than three quarters of the children presented with unequal limbs, confirming asymmetry as a common clinical sign of DDH. On the other hand, contrasting evidence has been presented by **Alrashdi et al., (2024)** in Saudi Arabia, where the majority of children diagnosed with DDH had bilateral rather than unilateral involvement, and asymmetry of limbs was not consistently observed. Also, **Hakim et al., (2024)** reported that more than half of the affected children presented with bilateral DDH.

The present findings Confirmed that the majority of cases were diagnosed with left-sided dysplasia. These results are consistent with **Harsanyi, Zamborsky, Krajciova, Kokavec, & Danisovic, (2020).**

who confirmed that mechanical intrauterine factors predispose the left hip more than the right. Supporting this, **El Fawal et al., (2022)** at Zagazig University Hospitals reported that less than two thirds of children had left hip involvement, compared to less than nearly one quarter on the right side and less than nearly one quarter bilateral.

On the other hand, contradictory findings were reported in recent studies. **Alrashdi et al., (2024)** analyzed DDH cases from the Saudi National Program and found that the majority These results are consistent with had bilateral involvement, while only less than nearly one quarter were left-sided and minority right-sided. Likewise, **Hakim et al., (2024)** highlighted a predominance of bilateral cases in their tertiary referral center study.

From the researcher's point of view, the higher incidence of left-sided dysplasia in many studies can be explained by the most typical fetal position (left occiput anterior), which places the infant's left hip against the maternal sacrum. This mechanical factor increases adduction of the left hip, thereby elevating the risk of DDH development compared to the right side.

Regarding the total mothers' knowledge level about congenital hip dysplasia, the present study demonstrated a highly significant improvement following the educational program. Most of the participants achieved an elevated degree of knowledge in relation to congenital hip dysplasia immediately post and one month after educational program, compared to only a minority who had a high level of knowledge before the program. There were statistically significant differences regarding all items of total mothers' knowledge level regarding congenital hip dysplasia pre and immediately after educational program and between pre and one month after educational program.

The present study findings are in agreement with previous studies that demonstrated a significant improvement in mothers' knowledge levels following educational interventions. **Abd Elkhair et al., (2020)** Revealed a marked enhancement in maternal knowledge after the implementation of an educational program. The results of that study showed that most mothers in the study group achieved satisfactory knowledge outcomes immediately, two weeks, and one-month post-intervention, compared with the majority, less than two thirds and almost one half, respectively of

mothers in the control group who still had unsatisfactory knowledge outcomes. There was a statistically significant difference between both groups regarding knowledge outcomes ($p < 0.05$).

Similarly, **Abo Elel et al. (2018)** endorsed the importance of implementing educational programs about suitable nursing interventions for who children with DDH. They concluded that structured nursing education plays a vital role in improving caregivers' understanding, promoting effective postoperative care, and preventing possible complications. These findings collectively confirm that educational interventions are essential in improving mothers' knowledge and ensuring safe and effective postoperative care for children after DDH surgery. These findings also supported by qualitative studies by **Theunissen et al., (2022)** who highlight the importance of well-designed educational strategies in empowering parents and strengthening the overall quality of pediatric orthopedic care.

In contrary for our study, **Alqarni et al., (2021)** who reported that mother awareness regarding developmental dysplasia of the hip remained low despite exposure to health education, with persistent misconceptions related to early diagnosis and risk factors, concluded that existing educational efforts were insufficient to achieve meaningful improvement in mothers' knowledge, emphasizing the need for more structured, continuous, and tailored educational program.

Likewise, **Wang, Zhang, Guan, & Xie, (2024).),** concluded that while preoperative education improved child satisfaction and reduced anxiety, it did not produce a statistically significant effect on mothers' knowledge and long-term postoperative outcomes or functional recovery. Similarly, **Theunissen et al., (2022) who** found that although parents were provided with information, many still experienced uncertainty and emotional distress during their child's treatment journey. Their findings indicate that knowledge alone may not ensure confidence or effective coping among parents, highlighting the importance of emotional and psychological support alongside educational programs.

From the researcher's point of view, educational programs effectively improve mothers' knowledge, promote positive caregiving practices, and contribute to better health outcomes for their children. Also, continuous health education is essential for sustaining

and reinforcing the knowledge gained through such programs. In the present study, various educational materials, including illustrative pictures and instructional books, were used, which facilitated understanding and enhanced mothers' retention of information. Consequently, regular follow-up sessions, ongoing guidance, and practical demonstrations are considered crucial to help mothers apply the acquired knowledge in real-life situations and to maintain a high level of awareness, confidence, and competence in caring for their offspring.

Regarding the total mothers' knowledge level about hip spica casting, the present study demonstrated a highly significant improvement following the educational program. The most of and majority of the participants achieved a high level of knowledge regarding Hip Spica casting immediately post and one month after educational program, compared to only a minority who had a high level of knowledge before the program. There were statistically significant differences regarding all items of total mothers' knowledge level regarding congenital hip dysplasia pre and immediately after educational program and between pre and one month after educational program p=0.000.

The current study is consistent with the findings of **Ibrahim & Abd Elkhair, (2023)**, who investigated reported a statistically significant improvement in mothers' mean knowledge scores after receiving empowerment guidelines. These guidelines covered essential aspects such as the definition, purpose, duration, complications, treatment, and care of casts. Similarly, **Rahgoi et al., (2019)** who highlighted that family-centered empowerment programs play a vital role in enhancing family members' motivation, psychological well-being, knowledge, attitudes, and perception of health threats.

Khalafallha & Bahnsawy, (2020) who revealed that majority of mothers of infants with clubfoot demonstrated a satisfactory level of knowledge after receiving structured teaching instructions, with a statistically significant difference between pre- and post-intervention scores.

Similarly, **Ramadan et al., (2024) who** demonstrated the positive impact of structured educational programs on healthcare providers. The randomized controlled trial revealed that the implementation of the Pediatric Nursing Excellence Model led to a significant improvement in nurses' knowledge

and practical skills in pediatric orthopedic surgery care. This enhancement in professional competence was reflected in the overall quality of care provided to children and in the increased confidence and effectiveness of child mother at home.

In contrast, **Theunissen et al., (2022)**, in their qualitative study revealed that despite receiving education, many parents continued to experience confusion, stress, and uncertainty in managing postoperative care, particularly when information was not individualized or reinforced through follow-up support. Also, systematic review by **Longo et al., (2020)** noted that despite the benefits of educational interventions, caregivers continue to face significant challenges in maintaining proper home care due to limited resources, lack of continuous professional support, and emotional exhaustion.

From the researcher's perspective, although the current study demonstrated clear improvements in mothers' knowledge and understanding after the educational program, it is acknowledged that knowledge retention and translation into consistent practice may vary among individuals. Continuous reinforcement, follow-up education, and practical guidance are essential to sustain the achieved improvement. Accordingly, the researcher believes that integrating ongoing educational support, periodic evaluation, and interactive teaching methods will further enhance mothers' competence and ensure safer, more effective care for children with hip-spica casts.

Concerning the total Mothers' Reported Practices Level Regarding Care of Their Children with Hip Spica Casting, the current research illustrates that mothers the majority and most of had satisfactory practice of total mothers' reported practices level regarding care of their children with hip spica casting immediately post and one month after educational program compared to the minority preprogram. There was statistically significant difference regarding total mothers' reported practices level ' regarding care of their children with hip spica casting pre, and one month after educational program and between pre and after one month after educational program. There was statistically significant difference immediately post & one month after educational program regarding total mothers' reported practices level ' regarding care of their children with hip spica casting

except for lifting, skin care, nutrition, and clothing p=0.083.

These findings agree with **Abd Elkhair et al. (2020)** & **Ramadan et al., (2024)** who demonstrated that the intervention group exhibited markedly improved practice scores across all domains including preoperative, transfer, postoperative care, and health education immediately post-intervention, with these improvements sustained over six months. Furthermore, these sustained improvements are in line with the findings of **Doleman and Twigg, (2022)** who emphasized that continuous professional development and mentorship play crucial roles in reinforcing long-term practice competence and enhancing the overall quality of nursing care.

Additionally**, Ibrahim and Abd Elkhair, (2023)** reported that The overall mean scores of mothers' activities, feeding, bathing, and follow-up behaviors before and after obtaining empowerment instructions differed statistically significantly. This finding aligns with the results of **Zhang et al., (2025)**, who highlighted that parents often face considerable difficulties in performing essential home-care practices such as maintaining hygiene, diapering, toileting, and proper positioning of the child and emphasized that lack of proper guidance were major contributors to these challenges and they recommended structured educational interventions to enhance parental competence and reduce caregiving stress.

In agreement of our study, **Kocher, Ciarlo, Feroe, Dichtel & Traver, (2022).** who reported that immediate spica casting had a profound impact on family functioning and daily caregiving routines. Families experienced substantial practical challenges, including difficulties in hygiene maintenance, mobility, transportation, and home adaptation. The study emphasized that despite caregivers' best efforts, the physical and emotional demands of caring for a child in a spica cast often exceeded their preparedness and available support. The study underscores the need for integrated approaches that combine caregiver training with continuous psychosocial support and practical resources to effectively improve family functioning and reduce mother strain.

From the researcher's point of view, the findings of the current study clearly demonstrate that structured educational interventions have a powerful and sustained effect on improving mothers' caregiving skills related to hip spica

casting. providing targeted, continuous, and practical education empowers mothers to apply correct techniques and build confidence in daily care activities. Moreover, when combined with emotional support and follow-up guidance, these educational programs can effectively overcome most of the practical barriers highlighted in previous studies, ultimately enhancing both the quality of childcare and family well-being.

Concerning correlation between mothers' total knowledge and reported practices, the current research demonstrated that a positive highly statistically significant correlations were noticed between mothers' knowledge and Mothers' reported practices pre, immediately & one month after the educational program (P=0.000). This outcome is corroborated by **Ashcraft et al., (2019),** who found that parent empowerment guidelines may reduce child symptoms, boost advocacy and altruistic behaviors, improve informational requirements and skills, and increase parent involvement in daily care and care decisions. According to **Khalafallha & Bahnsawy, (2020**), mother who got nursing instructions had higher mean scores for knowledge and practices overall. There were fewer casting difficulties and better results for the children of the mother who received the nursing advice. In addition, **Abd Elkhair et al., (2020)** clarified that there were statistically significant correlations between improved postoperative outcomes and mothers' knowledge and reported practice after administration of the protocol of care.

From the researcher's point of view, the education program implemented in this study effectively enabled mothers to acquire accurate knowledge and practical skills regarding cast care. This enhancement in knowledge and practice not only improved mothers' self-confidence but also fostered their active participation in providing daily care for their children at home. Consequently, this empowerment contributed to the prevention of cast-related complications, reduced anxiety and dependency on healthcare providers, and promoted better postoperative recovery outcomes.

Conclusion:

Based on the findings of the present study it can be concluded that the educational program had a significant positive effect on improving mothers' knowledge and reported practices regarding the care of Hip Spica Casting for Their Children with Congenital

Hip Dysplasia. A positive correlation was found between mothers' knowledge and practices.

Recommendations:

The following recommendations were made in light of the study's findings:

-Develop Standard Nursing Protocols: Create unified nursing guidelines for developmental dysplasia of the hip care, covering cast care, skin monitoring, and mobility support.

-Ongoing educational programs should be provided for mothers to improve their knowledge and practices to care for their child with developmental dysplasia of the hip

-Launch Public Awareness Campaigns: Use social media and community platforms to raise awareness about the importance of early screening and treatment for developmental dysplasia of the hip.

-Support Further Research: Call for more studies on the long-term effects of developmental dysplasia of the hip treatment and the impact of caregiver education on recovery outcomes.

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Relation between Nursing Staff's Work Discipline and Patients' Safety

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Abstract

Background: Work discipline in nursing involves adherence to workplace rules, policies, and professional standards. It enhances productivity, accountability, and organizational effectiveness, while continuous professional development helps maintain care quality and patient safety. **Aim:** to assess the relation between nursing staff's work discipline and patients' safety. **Design:** A descriptive correlational design was used. **Setting and subject:** All head nurses (n= 35) and nurses (n=472) working at Tanta Main University Hospitals. **Tool:** Two tools were used for data collection: Nursing Staff's Work Discipline Scale and Nursing Staff's Perception Regarding Patient's Safety. **Results:** The majority (99%) of nursing staff had a high level of work discipline, and more than half (57.2%) of them had a high perception level regarding patients' safety. **Conclusion:** There was a statistically significant positive correlation between nursing staff work discipline and patient's safety. **Recommendations:** Healthcare management should provide educational programs, seminars, and workshops to strengthen nurses' understanding of work discipline and patient safety.

Keywords: Nursing Staff, Patient Safety and Work Discipline.

Introduction

Nursing staff play a critical role in providing high-quality patient care through assessment, treatment administration, and patient education **(Mostafa, 2023**). Through adherence to safety protocols, professional development, and effective decision-making, nurses contribute significantly to enhancing patient safety and care quality **(Tuinman, Greef, Finnema, & Roodbol, 2021).**

Hospitals operate under established policies, rules, and regulations that all staff must follow to maintain a safe, organized, and productive work environment. When non-compliance occurs, managerial interventions may be required to improve performance and ensure adherence **(Mostafa, Mostafa, 2024; Haryawan & Sopiah, 2024)**.

Work discipline comprises three key dimensions: attendance compliance, compliance with standards and regulations, and compliance with work ethics. Attendance compliance involves punctuality and regular work attendance. Compliance with standards and regulations refers to adherence to institutional policies, procedures, professional guidelines, and legal requirements that support safe and consistent nursing practice **(Nafsiyah, Cahyono, & Sanora, 2024).**

Compliance with work ethics involves following moral values and professional conduct standards that guide workplace behavior. Effective work discipline is closely linked to nursing performance and plays a critical role in ensuring high-quality patient care and patient safety **(Setiawan, Waluyo, & Andhika, 2023).**

Patient safety refers to the prevention and reduction of risks, errors, and harm that may occur during healthcare delivery (**Ulto & Sujoko, 2025).** Safety incidents often result from deficiencies in patient management, such as poor delegation, inadequate follow-up, inappropriate referrals, ineffective use of resources, clinical errors, and communication failures among patients, healthcare providers, and support staff **(Alabdaly, Hinchcliff, Debono, & Hor, 2024).**

Patient safety encompasses three key dimensions: patient safety incidents, preventive activities, and actions taken following unsafe care **(Ali et al., 2024).** Patient safety incidents include any intentional or unintentional event or circumstance that has the potential to cause

patient harm **(Airashidi & Al-Harbi, 2024).**

Because adverse healthcare outcomes can lead to serious injury or death, healthcare organizations should adopt proactive strategies that emphasize early risk identification and prevention rather than relying solely on corrective measures after harm occurs **(Vais et al., 2020).**

Significance of the study

Work discipline is essential for achieving high-quality healthcare services, as it reflects nurses' commitment, accountability, and responsibility toward organizational goals. Strong work discipline enhances teamwork, productivity, and quality of care, whereas poor discipline can lead to organizational disorder and negatively affect patient safety **(Noverina & Dhamanti, 2023).**

Patient safety focuses on protecting patients from harm and adverse events in healthcare settings. Improving patient safety requires learning from errors, strengthening communication among healthcare professionals and patients, adhering to established standards and procedures, and maintaining effective infection control and quality improvement practices **(Rifani & Dhamanti, 2023).**

Aim of the study: to assess the relation between nursing staff's work discipline and patients' safety.

Research questions:

-What are the levels of nursing staff's work discipline?

-What are the levels of nursing staff's perceptions regarding patients' safety?

-What is the relation of nursing staff's work discipline and patients' safety?

Research design:

A descriptive correlation study design was used.

Setting:

The study was conducted in departments at Tanta Main University Hospitals namely; gynecology and obstetrics, cardiac, neurology, plastic, Tropical, Chest, Pediatric, and medical departments.

Subjects:

Included all head nurses (n= 35) and nurses (n=472) working in previously mention settings at time of data collection.

Tools of data collection

Two tools were used:

Tool I: Nursing Staff's Work Discipline Scale. It included two parts: **Part 1**: Personal characteristics of nursing staff including, age, position department, marital status, qualification and years of experience.

Part 2: Nursing Staff Work Discipline Scale. It was modified the researcher based on **Susiloningtyas et al., (2022).** It used to assess levels of nursing staff work discipline through 23 items divided into three dimensions: Compliance to attendance of work (5 items), compliance to work standards, regulations, and laws (8 items), and compliance to ethical work (10 items)**.** Nurses' responses were measured on a five points Likert Scale ranging from (1 to 5) as strongly disagree=1, disagree=2, neutral=3, agree=4 and strongly agree=5. The total scores calculated by cut off points and summing scores of all categories. The total scores represent varying levels: High level >75%**,** moderate level 60%-75% and low level of professionalism <60%.

Tool II: Nursing Staff's Perception Regarding Patient's Safety. It was modified by the researcher based on **Elwkeel et al., (2023)** to assess nursing staff perception regarding patient safety through 20 items divided into three dimensions: Incident involved patient safety (5 items), activities to avoid and prevent adverse outcomes (8 items) and activities done after patient receive unsafe care practice (7 items). Nurses' responses were measured on a five points Likert Scale ranging from (1 to 5) as strongly disagree=1, disagree=2, neutral=3, agree=4 and strongly agree=5. The total scores calculated by cut off points and summing scores of all categories. The total scores represent varying levels as follows: High level >75%**,** moderate level 60%-75% and low level of nurses' safety competencies <60%.

Method

1-An official permission was obtained from the Dean of Faculty of Nursing Tanta University and the authoritative personnel of Tanta University Main Hospitals.

2-Approval from the Scientific Research and Ethical Committee at Faculty of Nursing was obtained with code (459-5-2024).

3-Nurses consent to participate in the study was obtained after they informed them about nature of the study with the right to withdraw at any time without penalty.

4-Tools I and II were modified, developed and **t**ranslated to Arabic and presented to a jury of five experts in the area of specialty to check their content validity. The face validity value of tool I was 96.0% and 96.9% for tool II.

5- A pilot study was carried out on sample 10% (n=35) of nurses, and they excluded from the main study

sample during actual collection of data. The pilot study was done to test clarity, sequence of items, applicability, and relevance of the questions.

6-Reliability of the tool was ascertained by measuring the internal consistency of its items using Cronbach Coefficient Alpha Test which tool I=0.895 and tool II= 0.737.

7-Data collection phase: the researcher distributed tools on nurses individually at their work setting during the morning and afternoon shifts. The researcher met nurses in the waiting area of their department to explain the aim of the study and distribute the questionnaire sheet for them. The subjects recorded the answer in the presence of the researcher to clarify any questions needed. The time needed to complete the questionnaires was 20 – 30 minutes and data was collected over a period of 6 months (from October to march 2024).

Results

Table (1): Shows distribution of nurses' personal data. It was observed that more than half (61.9%) of nurses aged between 30-40 years, with mean age score 29.0± 4.59%. The majority (89.5%) of nurses were married and more than half (51.9%) of them had bachelor's degree. 43.8% of nurses worked in Pediatric department. In relation to years of experience two-third 72.4% of them had 5-10 years of experience with mean (6.11 ± 2.29).

Figure (1): **Illustrates overall levels of nursing staff work discipline**. Nearly all (99.0%) of them had a high level of work discipline, while 1.0% of them had a moderate level.

Table (2): Reveals that mean scores and ranking of nursing staff regarding work discipline dimensions. The highest mean percent score was 87.20±5.11 related to compliance to work standards, regulations and laws then followed by compliance to ethical work with mean percent score 84.04±5.67, then compliance to attendance of work was last mean percent score 78.25±8.68.

Figure (2): **Clarifies that overall level of nursing staff perception regarding patients' safety.** More than half (57.2%) of them had a high perception level regarding patients' safety. While, 42.8% of them had a moderate perception level.

Table (3): Presents mean scores and ranking of nursing staff according to work patients' safety dimensions. The highest mean percent score was 82.0±9.17

related to incident involved patient safety then followed by activities to prevent adverse outcomes with mean percent score 74.20±6,52, then activities done after patient receive un safe care was last mean percent score 71.22±9.48

Figure (3): Shows the correlation between nursing staff work discipline and their perception regarding patient's safety. It reveals that there is significant positive correlation between nursing staff work discipline and their perception about patient safety at (P< 0.0029, r=0,097).

Table (4): **Shows relation between nursing staff of work discipline and their personal characteristics.** It shows that is no significant correlation between nursing staff of work discipline and their personal characteristics (p > 0.05).

Table (5): Presents relation between nursing staff's perception of patients' safety and their personal characteristics. It shows that there is no significant relation between nursing staff's perception of patients' safety and their personal charteristics except there is a significant relation between nursing staff's perception of patients' safety and their department and position (p < 0.05).

Table (1): Distribution of nursing staff according to their personal characteristics (n = 507)

Nursing personal characteristics	No.	%
Age		
20 – 25	58	11.4
25 – 30	125	24.7
30 – 40	314	61.9
>40	10	2.0
Min. – Max.	22.0 – 44.0	
Mean ± SD.	29.0 ± 4.59	
Position		
Nurse	472	93.1
Head Nurse	35	6,9
Department		
Gynecology & Obstetrics department	69	13.6
Cardiac department	46	9.1
Neurology department	40	7.9
Plastics department	15	3.0
Tropical department	18	3.6
Chest department	10	2.0
Pediatric department	222	43.8
Medical hospital unit	87	17.2
Marital Status		
Married	454	89.5
Unmarried	53	10.5
Qualification		
Nursing diploma	223	44.0
Baccalaureate degree	263	51.9
Post graduated studies	21	4.1
Years of Experience		
1 – 5	127	25.0
5 – 10	367	72.4
>10	13	2.6
Min. – Max.	1.0 – 14.0	
Mean ± SD.	6.11 ± 2.24	

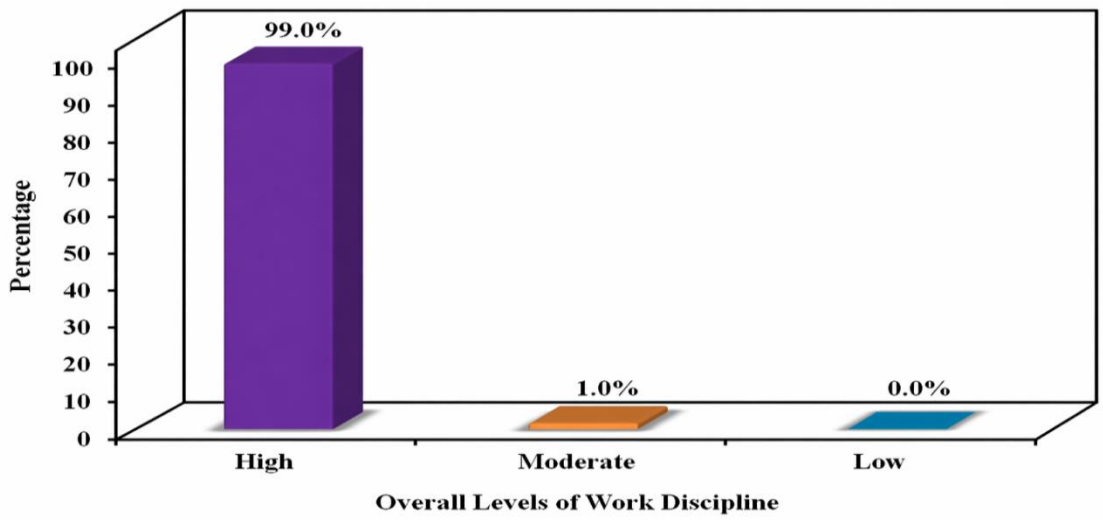

Figure (1): Overall levels of nursing staff work discipline (n = 507)

Table (2): Mean scores and ranking of nursing staff regarding work discipline dimensions (n = 507)

Work discipline dimensions	Total Score		Average Score	Percent Score	Rank
	Min. – Max.	Mean ± SD	Mean ± SD	Mean ± SD	
Compliance to attendance of work	15.0 – 25.0	20.65 ± 1.74	4.13 ± 0.35	78.25 ± 8.68	**3**
Compliance to work standards, regulations and Laws	31.0 – 40.0	35.90 ± 1.64	4.49 ± 0.20	87.20 ± 5.11	**1**
Compliance to ethical work	38.0 – 49.0	43.62 ± 2.27	4.36 ± 0.23	84.04 ± 5.67	**2**

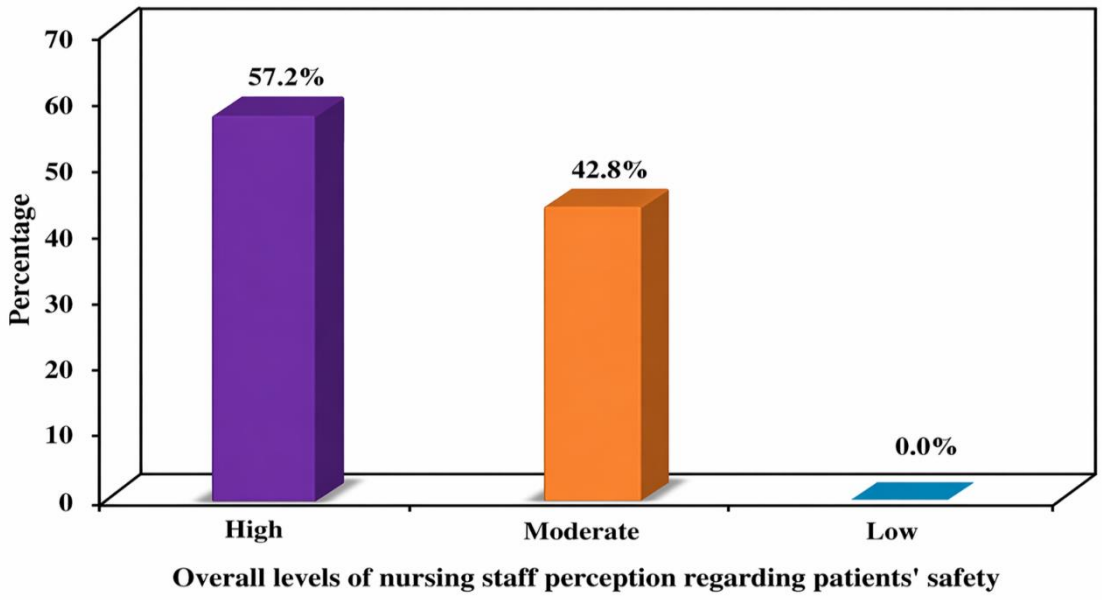

Figure (2): Overall levels of nursing staff perception regarding patients' safety (n = 507)

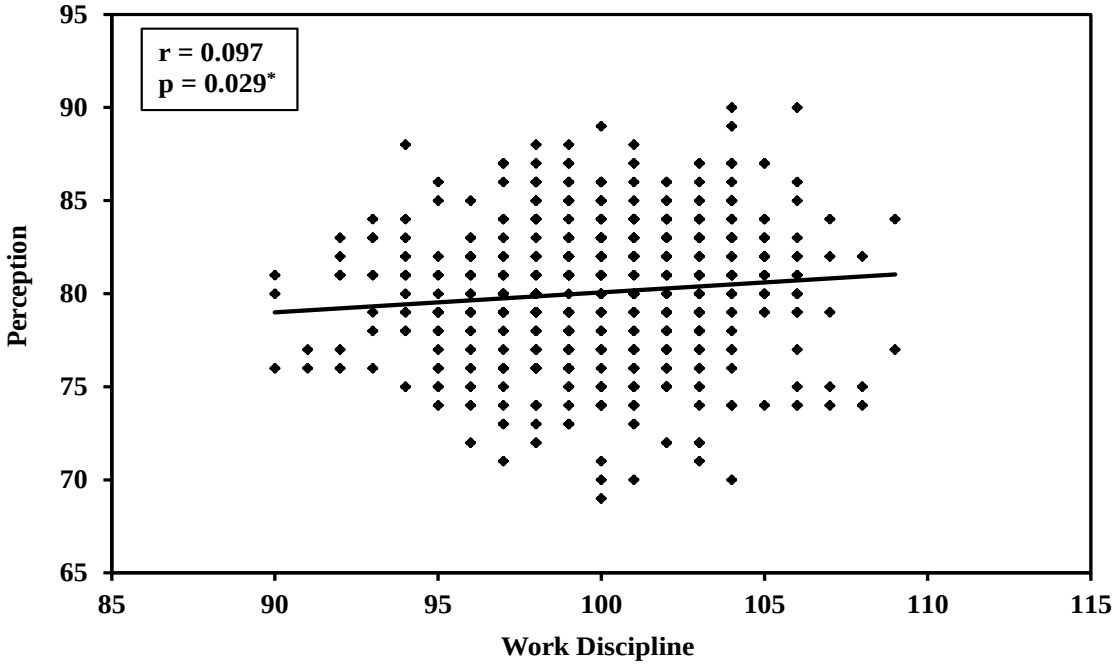

Figure (3): Correlation between nursing staff work discipline and patient's safety (n=507)

Table (3): Mean scores and ranking of nursing staff according to work patients' safety dimensions (n = 507)

Patient safety dimensions	Total Score		Average Score	Percent Score	Rank
	Min. – Max.	Mean ± SD	Mean ± SD	Mean ± SD	
Incident involved patient safety	15.0 – 25.0	21.40 ± 1.83	4.28 ± 0.37	82.0 ± 9.17	**1**
Activities to prevent adverse outcomes	25.0 – 37.0	31.75 ± 2.09	3.97 ± 0.26	74.20 ± 6.52	**2**
Activities done after patient receive unsafe care	18.0 – 34.0	26.94 ± 2.66	3.85 ± 0.38	71.22 ± 9.49	**3**

Table (4): Relation between nursing staff of work discipline and their personal characteristics

Nursing staff personal characteristics	Levels of work discipline				χ^2	p
	Moderate		High			
	No.	%	No.	%		
Age 20 – 25	2	40.0	56	11.2	4.617	^{MC}p=0.189
25 – 30	0	0.0	125	24.9		
30 – 40	3	60.0	311	62.0		
>40	0	0.0	10	2.0		
Position Nurse	5	100.0	467	93.0	0.374	^{FE}p=1.000
Head Nurse	0	0,0	35	7.0		
Department Gynecology & Obstetrics department	2	40.0	67	13.3	4.247	^{MC}p=0.734
Cardiac department	0	0.0	46	9.2		
Neurology department	0	0.0	40	8.0		
Plastics department	0	0.0	15	3.0		
Tropical department	0	0.0	18	3.6		
Chest department	0	0.0	10	2.0		
Pediatric department	2	40.0	220	43.8		
Medical hospital unit	1	20.0	86	17.1		
Marital Status Married	5	100.0	449	89.4	0.590	^{FE}p=1.000
Unmarried	0	0.0	53	10.6		
Qualification Nursing diploma	4	80.0	219	43.6	2.466	^{MC}p=0.339
Baccalaureate degree	1	20.0	262	52.2		
Post-graduate studies	0	0.0	21	4.2		
Years of Experience 1 – 5	3	60.0	124	24.7	8.792	^{MC}p=0.013
5 – 10	1	20.0	366	72.9		
>10	1	20.0	12	2.4		

FE**:** significant at $p \leq 0.05$

Table (5): Relation between nursing staff's perception of patients' safety and their personal characteristics

Nursing staff personal characteristics	Levels of patients' safety				χ^2	P
	Moderate		High			
	No.	%	No.	%		
Age 20 – 25	26	12.0	32	11.0	1.705	$^{MC}p=$ 0.651
25 – 30	59	27.2	66	22.8		
30 – 40	128	59.0	186	64.1		
>40	4	1.8	6	2.1		
Position Nurse	193	88,9	279	96.2	10.199*	0.001*
Head Nurse	24	11.1	11	3.8		
Department Gynecology & Obstetrics department	40	18.4	29	10.0	104.704*	$^{MC}p=$ <0.001*
Cardiac department	29	13.4	17	5.9		
Neurology department	12	5.5	28	9.7		
Plastics department	11	5.1	4	1.4		
Tropical department	6	2.8	12	4.1		
Chest department	0	0.0	10	3.4		
Pediatric department	53	24.4	169	58.3		
Medical hospital unit	66	30.4	21	7.2		
Marital Status Married	195	89.9	259	89.3	0.040	0.841
Unmarried	22	10.1	31	10.7		
Qualification Nursing diploma	85	39.2	138	47.6	5.772	0.056
Baccalaureate degree	119	54.8	144	49.7		
Post-graduate studies	13	6.0	8	2.8		
Years of Experience 1 – 5	157	72.4	210	72.4	4.072	0.131
5 – 10	9	4.1	4	1.4		
>10	51	23.5	76	26.2		

*: Statistically significant at $p \leq 0.05$

Discussion

Work discipline is a key factor influencing workforce effectiveness and productivity. Nurses who demonstrate strong work discipline are more likely to perform their duties consistently, maintain high standards of care, reduce medical errors and adverse events, and achieve better patient outcomes **(Nurpribadi, Rulianti, & Al Banteni, 2024).**

Nursing staff's perception related to work discipline

The current study revealed that the majority of nursing staff had a high level of work discipline. This finding may be attributed to nurses' strong sense of responsibility, professional commitment, and compassion toward patient care. This study finding is consistent with the study conducted by **Rosadisyam, Unsolemn, Isanti, and Dewi (2026),** who demonstrated that improvements in work discipline were directly, associated with increased productivity levels. Similarly, **Masruddin, Saharuddin& Hasbi (2025)** confirmed that work discipline positively affects participants' performance, indicating that higher discipline levels are associated with greater productivity, accountability, and effectiveness in task completion. In contrast, **Kelibulin et al. (2020)** reported low levels of work discipline among respondents. Therefore, healthcare organizations should implement effective strategies to address performance gaps, clarify expectations, and apply corrective actions when needed. These measures help strengthen work discipline, promote professional excellence, and improve organizational effectiveness.

The current study revealed that the majority of nursing staff had a high level of compliance to attendance of work dimension. This finding may be attributed to a strong professional work ethic and a moral commitment toward patient care that encourage nurses to maintain regular attendance, even under challenging working conditions. This study finding is consistent with the study conducted by **Motsepe (2025),** who found a high level of attendance compliance. In contrast, **Choi (2025)** identified a low level of attendance compliance among nurses. These variations may reflect the influence of organizational culture, leadership style, work environment, and institutional policies on staff attendance behavior.

The current study revealed that the majority of nursing staff had a high

level of compliance to work standards, regulations, and laws dimension. This finding may be attributed to the important role of compliance in ensuring patient safety and delivering high-quality healthcare services through minimizing risks and reducing medical errors.

This study finding is consistent with the study conducted by **Dunbar, Keyes, & Browne, (2023)** who demonstrated that enhancing work discipline significantly improves nurses' performance, corroborating earlier findings. In contrast **Behan, Grogan, Keyes (2024)** reported that some nurses demonstrated inadequate adherence to legal and ethical standards because of work stress, burnout, and limited knowledge of healthcare laws. Also, **Wang et al (2024)** study showed that nurses lack of education, inadequate supervision, poor safety culture, and organizational barriers may contribute to low nurses' compliance with healthcare rules, regulations, and laws.

The current study revealed that the majority of nursing staff had a high level of compliance to ethical work dimension. This finding may be attributed to increased accountability among nurses, strong intrinsic motivation, and the presence of continuous training and evaluation programs. Supporting these findings, **Sharifi et al. (2024)** and **Haladay**, **Oladiran & Okoh (2024),**who reported high levels of compliance with professional ethical standards among nurses. However**, Okafor et al. (2025)** found a moderate level of nurses' compliance with work ethics.

Nursing staff perception related to patients' safety

The current study revealed that more than half of nursing staff had a high perception level regarding patients' safety. This finding may be attributed to compliance with work rules and regulations, professional ethics, adherence to patient safety protocols, strong organizational policies, and effective communication among healthcare team members. In addition, supportive leadership and a safety-oriented organizational culture. Supporting these findings, **Alanazi et al. (2026)** who found a high level of perception regarding patient safety among nurses. In contrast**, Hajizadeh et al. (2025)** and **Bong et al., (2025)** reported a moderate level of perception regarding patient safety culture.

The current study revealed that nursing staff had a high perception level regarding incidents involving patient safety dimension. This may be attributed to strong work

discipline among nurses, including strict adherence to rules and regulations, compliance with patient safety protocols. This study finding is consistent with the study conducted by **Kim, Wei, and Woo (2025)** found a positive perception among healthcare providers regarding patient safety incidents.

The current study revealed that nursing staff had a high perception level regarding the activities to prevent adverse outcomes dimension. This may be attributed to adherence to clinical guidelines and hospital policies, consistent compliance with patient safety protocols, and careful execution of nursing procedures. In agreement with these findings, **Abu Rahmah, Etew, Ahmad& El Bilbeisi (2025**) found that when nurses perceive safety procedures as effective, their compliance with and participation in patient safety activities significantly increase. **Li, Ai, Wang, & Chen, (2024)** highlighted the importance of high nursing perception in improving the implementation of preventive measures and reducing the likelihood of adverse events. In contrast, **Alanazi, Sim & Lapkin (2022)** identified a moderate level of perception toward activities aimed at preventing adverse outcomes.

The current study revealed that nursing staff had a high perception level regarding activities done after patient receive unsafe care dimension. This may be attributed to adherence to work discipline, particularly sense of accountability. These findings are consistent with the study findings by **Zhao, Shi& Zhao (2022),** who emphasized the importance of appropriate responses following errors and the need for structured post-incident procedures to improve patient safety outcomes. Similarly, **D'souza et al. (2025**) who reported high levels of perception and awareness of patient safety practices among nurses. However, **Lee et al., (2025)** reported that nurses face difficulties in performing post-incident activities, while **Ismail, Al-Ezzi, Alanazy, Al-Enazi (2024)** found low awareness regarding key patient safety areas such as non-punitive response to errors and effective handoffs.

The current study revealed that there is a positive correlation between nursing staff work discipline and patients' safety. These findings indicate that disciplined nurses are generally more compliant with hospital policies, safety regulations, and professional standards, which in turn patient safety and a stronger

safety-oriented work culture. This may be because disciplined nurses are more likely to adhere strictly to hospital policies, rules, and clinical guidelines. Also, they demonstrate punctuality, responsibility, commitment to professional standards, and compliance with safety procedures. These practices increase their awareness of patient safety principles and improve the implementation of infection control and other safety measures during patient care.

These findings are consistent with the study findings by **Anders. (2025),** who concluded that nurses who demonstrated stronger commitment to institutional policies and safety procedures exhibited greater awareness and engagement in patient safety activities. Similarly, Patrician et al (2024) reported that adherence to organizational standards was a significantly associated with improved patient safety outcomes. In addition, **Emond et al. (2022)** found that higher levels of professional commitment and adherence to workplace regulations were associated with an improved patient safety culture and enhanced nurses' perceptions of patient safety.

The current study revealed that there is no significant relation between nursing staff work discipline and their personal characteristics. This finding may be attributed to the standardized nature of nursing education and hospital training programs, which ensure that all nurses follow the same rules, policies, and professional codes of conduct regardless of age, marital status, qualification or years of experience. These findings are consistent with those of **Rachmatullah, Purwadhi& Suwardhani (2025),** who found no statistically significant relationship between nurses' personal characteristics and their adherence to safety practices and workplace regulations. Similarly, **Vindu (2024),** concluded that the work environment and organizational support are stronger predictors of nurses' professional commitment and discipline than personal demographic variables.

In contrast, the study conducted by **Wang et al. (2024)** found that nurses' demographic and professional characteristics, particularly years of experience and educational level, positively influenced professional commitment and workplace behavior. Similarly, **Şimşekli, Öztürk& Karahan (2025).** concluded that nurses' personal and professional characteristics were significantly

associated with improved adherence to safety standards and organizational discipline.

Conclusion &Recommendations

It was concluded that majority of nurses had a high level of work discipline and more than half of them had a high level of safety competencies. There was a positive statistically significant correlation between work discipline and their perception regarding patient safety.

Recommendations:

Based on the results of the current study, it is recommended that

-Provide educational programs and workshops for nursing staff to update their knowledge and practice about work discipline and patient safety.

-Conduct regular assessments of work discipline effectiveness to explore challenges and obstacles.

-Establish a standardized work discipline program.

-Develop strategies and work systems that facilitate and maintain effective work discipline.

-Maintain effective leadership training of nursing staff to enhance their knowledge about work discipline and patient safety.

-Adopt a fair reward system to appreciate qualified nurses who comply with work discipline and patient safety strategies.

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Effect of Educational Intervention on Mothers' knowledge and Practices regarding Rehabilitation of their Children Post Cochlear Implantation

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Abstract

Background: Cochlear implantation represents an advanced electronic hearing solution designed to directly stimulate the auditory nerve, particularly the spiral ganglion cells, enabling auditory perception in children with severe-to-profound sensorineural hearing loss. Cochlear implants provide access to speech signals when acoustic amplification is insufficient. **Aim of the study:** was to evaluate the effect of educational intervention on mothers' knowledge and practices for rehabilitation of their children post cochlear implantation. **Research Design:** A quasi-experimental research design was used. **Subjects**: A purposive sampling of sixty mothers and their children with cochlear implantation. **Setting:** The study was conducted at Phoniatric Unit at Ear, Nose and Throat department of Tanta Main University Hospital and Al-Mabara Hospital. **Tools**: Two tools were used were used to collect data: **Tool (I):** Mothers' knowledge structured interview schedule. **Tool (II):** Mothers' reported practices for their children post-cochlear implantation. **Results:** Majority of mothers had a low level of knowledge about the rehabilitation of their children post-cochlear implantation pre-educational intervention implementation. While most of them had a high level of knowledge regarding rehabilitation of their children post-cochlear implantation post-educational intervention. Also, most of the studied mothers had an unsatisfactory reported practice pre-educational intervention. While most of them had a satisfactory level of practice regarding rehabilitation of their children post-cochlear implantation post-educational intervention. **Conclusion**: There was a significant effect of the educational intervention on improving the mothers' knowledge and practices regarding rehabilitation of their children post-cochlear implantation. **Recommendations**: educational interventions should be organized for mothers to elevate their awareness and competence in rehabilitation of their children with cochlear implantation.

Keywords: Children, Cochlear implantation, Educational intervention, Knowledge, Mothers, Practice

Introduction

Hearing loss is a significant health condition in childhood; particularly when it is severe or profound, as it can adversely affect brain maturation and multiple aspects of a child's overall development **(Podury et al., 2023).** If left untreated, hearing impairment can influence not only spoken language acquisition but also communication abilities, social participation, self-esteem, cognitive functioning, and academic performance **(Desoky, Raaft & Azab, 2021).** Cochlear implantation is a medical device designed for hearing loss to bypass damaged components of the ear to restore sensorineural hearing loss and to stimulate the auditory nerve. Cochlear implantations are made up of both internal and external parts that combine to transform sound into electrical signals, which are transferred to the cochlea and activate the auditory nerve. For those with severe to profound hearing loss, it is a major advancement that improves their hearing and quality of life **(Athanasopoulos, Samara & Athanasopoulos, 2024).**

Cochlear implantations provide children with advanced benefits, as they improve speech development, make it easier for them to integrate into regular education, and lessen their dependency on other methods of communication. The severity of the hearing loss depends on the age of the children and the existence of any physiological or anatomical problems **(Gagnon, Park, & Brown, 2021).**

Following cochlear implantation, rehabilitation is essential for improving speech and hearing results as well as assisting the brain in adjusting to novel auditory stimuli. Structured post-implantation rehabilitation programs greatly improve speech perception, language development, and social communication, particularly in children **(Cheng, Smith & Wang, 2020).**

Every child's path is unique, as is their rehabilitation program. These programs may involve auditory training, speech-language therapy, and counseling sessions to ensure a comprehensive approach to recovery. Our goal is to help children attain optimal hearing function and quality of life after implantation **(Van Bogaert et al., 2023).**

Nurses play a critical role throughout the cochlear implantation process. Before surgery, they assess the child's health status, review medical history, and monitor baseline

physiological parameters. During the surgical procedure, nurses assist in children's positioning and ensure appropriate preparation of the operating environment. Following surgery, they monitor complications such as infection or bleeding, manage wound care and mastoid dressings, and promptly communicate any concerns to the surgical team to promote safe recovery **(Krogmann & Khalil, 2023).**

Pediatric nurses play an important role in providing mothers with the essential knowledge and experience to care for their children, particularly after cochlear implantation, and they encourage them to attend planned follow-up appointments, which are required for effective results. Furthermore, support proper device management, and advise mothers to seek professional evaluation whenever concerns arise regarding their child's auditory or language development **(Krogmann, 2022).**

Mothers are considered key contributors to the rehabilitation process because they spend the greatest amount of time with their children and provide continuous support in the home environment. Their active participation is essential for monitoring progress and facilitating the development of speech, language, and communication skills following cochlear implantation **(Moradi et al., 2022).**

Significance of Study

Hearing loss is among the most prevalent congenital disorders affecting children and ranks as one of the leading chronic disabilities worldwide. According to WHO (2024), loss affects more than 430 million people globe, among whom approximately 34 million are children, representing over 5% of population **(WHO, 2024).** In Egypt, approximately 7,000 children require cochlear implantation each year, while only around 1,500 children undergo the procedure annually **(Samir, 2018).** Therefore, this study aims to evaluate the effect of educational interventions on mothers' knowledge and practices regarding the rehabilitation of their children following cochlear implantation.

Aim of the Study:

The present study aimed to evaluate the effect of educational intervention on mothers' knowledge and practices for rehabilitation of their children post cochlear implantation.

Research hypotheses

-Mothers' knowledge regarding rehabilitation of their children post cochlear implantation is expected to be improved after

implementing educational intervention

-Mothers' reported practice regarding rehabilitation of their children post cochlear implantation is expected to be improved after implementing educational intervention

Subjects & Method

Design: A quasi-experimental research design was utilized in the present study.

Study setting: The study was conducted at Phoniatric Unit at Ear, Nose and Throat department of Tanta Main University Hospital, which is affiliated to Ministry of higher education and scientific research and Al-Mabara Hospital which is affiliated to health insurance.

Study subjects:

A purposive sampling of 60 mothers and their children with age from 2-6 years old and free from mental disabilities selected from the previous setting during the study period.

Study tools:

Two tools were used in the study.

Tool I: Mothers' knowledge structured interview schedule

It was developed by the researcher after reviewing the literature to rehabilitate children after cochlear implants with their mothers**. (Muller et al., 2023) (Warner-Czyz, Nelson, Kumar & Crow, 2022).**

Part (1): Sociodemographic characteristics of the mothers such as age, marital status, level of education, occupation, residence, number of children in the family, and consanguinity.

Part (2): Sociodemographic characteristics of children such as age, sex, birth order, number of siblings, family history of hearing disorders, etiology of deafness, age of diagnosis, ability to talk before hearing loss, type of hearing impairment, usage of hearing aid before cochlear implantation, age at hearing fitting, duration of hearing aid usage per day until cochlear implantation surgery, age at implantation, and site of implantation.

Part (3): Mothers' knowledge assessment questionnaire:

It was conducted by the researcher to assess mothers' knowledge about cochlear implementation as a meaning of hearing impairment, definition of cochlear implant, signs and symptoms of hearing impairment, ideal age for cochlear implant, advantages of cochlear implantation, complications of cochlear implantation, and rehabilitation of children.

Scoring system for mothers' knowledge was as follows:

-Correct and complete answers were scored (2)

-Correct but incomplete answers were scored (1)

-Incorrect or unknown responses were scored (zero)

Total score was calculated and categorized as follows (Muller et al., 2023; Warner-Czyz, Nelson, Kumar & Crow, 2022).

-High level of knowledge was determined when the mother's score ranged from 70% to 100% of the total score.

-Moderate level of knowledge was identified when the mother's score was between 60% and less than 70% of the total score.

-Low level of knowledge was assigned when the mother's score was less than 60% of the total score.

Tool II: Mothers' reported practices for their children post-cochlear implantation

It was developed by researchers after reviewing the local and international related literature to evaluate mothers' practices about rehabilitation for their children post-cochlear implantation **(Warner-Czyz, Nelson, Kumar & Crow, 2022).** It included: auditory training and rehabilitation, communication and language development, communication challenges, and social and emotional well-being.

Mother's reported practice was scored as follows:

-Done was scored (1).

-Not done was scored (0).

The total score of mothers reported practice was classified into:

-Satisfactory level was considered from ≥ 70%.

-Unsatisfactory level was considered from < 70%.

Method:

The study was accomplished through the following steps:

-Administrative Process:

Official permission was secured from the administrative authorities of the previously selected hospital setting after providing a clear explanation of the study objectives to obtain their approval and cooperation.

Ethical Consideration

-Ethical approval for conducting the study was obtained from the Scientific Research Ethics Committee of the Faculty of Nursing. (Code: 602-3-2025) Informed consent was secured from all participating mothers after explaining the study purpose, procedures, benefits, and potential risks. Participation was voluntary, and participants were assured of their right to withdraw at any point without facing consequences.

-Data confidentiality and anonymity were protected and all information was used solely for research purposes.

Tools development

Structured questionnaire sheet consisted of two tools for collection. **Tool (1)** was developed by the researcher after reviewing relevant literature and used to collect biosocial data of mothers and children as well as to assess mothers' knowledge

about the rehabilitation of their children post-cochlear implantation.

Tool (II) was developed by the researcher to assess the mothers' practices regarding their children post-cochlear implantation. It was used two times before and immediately after data collection.

-Content validity was established by a panel of five experts in pediatric nursing who evaluated the tools for clarity, relevance, comprehensiveness, and applicability. The content validity index reached 98%.

-A pilot study was conducted on 10% of total sample (6 mothers) to assess the feasibility, clarity, and applicability of the research tools. Necessary modifications were performed before the main study, and pilot participants were included in the final sample.

-Reliability testing was conducted using Cronbach's alpha coefficient. The knowledge questionnaire demonstrated excellent internal consistency ($\alpha = 0.902$), while the reported practice scale showed good reliability ($\alpha = 0.847$).

Statistical analysis:

Data analysis was performed SPSS version 28. Quantitative variables were presented as mean ± standard deviation (SD), while qualitative variables were summarized using frequencies and percentages. The following statistical tests were applied:

Comparisons were made using Chi-square test or Fisher's Exact Test for qualitative data and paired t-test for pre- and post-intervention mean scores. Pearson's correlation coefficient (r) tested variable associations, while instrument reliability was verified via Cronbach's Alpha analysis. A 95% confidence interval and a 5% level of significance were adopted. Therefore, p-values ≤ 0.05 indicated statistical significance, while p-values > 0.05 indicated a lack of statistical significance.

Data collection: The data was collected within 6 months, from the beginning of July 2025 to December 2025 in four phases as follows:

1. Assessment phase:

-Before conducting the educational intervention, every mother and their children was interviewed separately to document characteristics of them and their children using part I of Tool I.

-Assessment of past and present medical history and associated with children with cochlear implantation using part II of Tool I.

-Assessment of mothers' knowledge about cochlear implantation was done by part III of the study tool.

-Assessment of mothers' reported practice regarding rehabilitation of their children post-cochlear implantation was done by tool II of the study.

2. Planning phase:

-Objectives, priorities, and expected outcomes were established based on the assessment phase results to meet the mothers' needs.

-The educational intervention was applied to all mothers through six sessions; mothers were divided into six groups (each group consisted of ten mothers).

-The time for each session ranges from 30 to 45 minutes.

-Teaching methods included group discussions, demonstration, and re-demonstration, and booklets.

3. Implementation phase:

First session: During this session, the researcher introduced herself. The aim of this session was to orient the mothers about the importance of the program, the definition and function of cochlear implantations, the difference between hearing aids and cochlear implants, the advantages of cochlear implantation. The session duration was 45 minutes to discuss topics.

Second session: the researcher discussed signs and symptoms of hearing impairment, steps in the cochlear implantation process, the ideal age for cochlear implants. It took 30-45 minutes to discuss the session's topics.

Third session: During this session, the researcher discusses the importance of auditory training after implantation, home-based activities, ensuring consistent device usage. It took 30-45 minutes to discuss the session's topics.

Fourth session: the researcher teaches the mother the importance of daily communication, reducing screen time, encouraging interaction with peers and siblings. It took 30-45 minutes to discuss the session's topics.

Fifth session: During this session the researcher helps the mother identify signs of delayed speech or language issues, learn how to encourage verbal expression in challenging situations. It took 30-45 minutes to discuss the session's topics.

Six sessions: the researcher Encourage social interactions with family and friends, emphasize the importance of peer support and community involvement. It took 30-45 minutes to discuss the session's topics.

4-Evaluation phase:

The researcher interviewed each mother separately after the educational intervention application immediately to evaluate their knowledge and

practice ` by part **3 of tool I and tool II** of the study tool.

Results

Table (1): **Presents the sociodemographic characteristics of the studied mothers.** More than one-third (43.3%) were aged 30–40 years, the majority (86.7%) were married, and 41.7% had secondary/diploma education. Nearly three-quarters (73.3%) were unemployed, while 85.0% lived in rural areas. More than half (55.0%) had three children and all mothers with consanguineous marriages (100%) were first cousins.

Table (2): **Illustrates the sociodemographic distribution of the children.** Nearly half of the children (46.7%) were between 5 and less than 6 years of age, with **Mean ± SD 4.15±0.953.** Male children represented 58.3% of the sample. Concerning birth order, 31.7% were the first-born child in their families. And 55.0% of them had two siblings. In addition, nearly one-third of children (36.7%) had a family history of hearing disorders, and 59.1% of them were second-degree relatives.

Figure (1): **Illustrates the distribution of the studied mothers' total knowledge levels regarding their children's rehabilitation pre- and post-educational intervention.** A highly significant improvement was observed after implementation of the educational intervention. Prior to the intervention, 90.0% of mothers exhibited a low level of knowledge. Following the intervention, 93.3% achieved a high level of knowledge, indicating the effectiveness of the educational intervention in enhancing maternal knowledge.

Figure (2): Illuminates the total score of the mother's reported practice about rehabilitation for children post-cochlear implantation. There were highly statistically significant differences in mothers' total reported practice regarding auditory training and rehabilitation, communication and language development, and social and emotional well-being with a p-value of $P < 0.001$. On the other hand, it was obvious that most of the studied mothers' (96.7%) of them exhibited an unsatisfactory reported practice pre-educational intervention. While converted to 91.7%, they achieved satisfactory practice scores regarding the rehabilitation of their children post-cochlear implantation and post-educational intervention, respectively.

Table (3): **Represents the relation between mothers' total knowledge scores and their reported practice scores pre- and post-educational**

intervention. The findings indicated a positive relationship between knowledge and practice levels pre- and post-educational intervention. This relationship was supported by high Pearson correlation coefficients before the intervention ($r = 0.812$) and after the intervention ($r = 0.834$), revealing statistically significant differences ($p < 0.001$).

Table (4): Reveals an association between mothers' sociodemographic characteristics and their total knowledge scores. Pre-educational intervention and post-educational intervention. The results indicated statistically significant associations between mothers' knowledge scores and both age and educational level during the pre- and post-intervention assessments ($\chi^2 = 6.221$, $p = 0.050$; $\chi^2 = 15.021$, $p < 0.001$). Conversely, there were no statistically significant associations ($p > 0.05$) between mothers' overall knowledge and their marital status or residence. or number of children in both pre- and post-intervention phases, indicating that these factors did not influence the mothers' ability to acquire knowledge from the intervention.

Table (5): **Illustrates the relationship between the socio-demographic characteristics of the studied mothers and their total practice scores before and after the educational intervention.** A statistically significant association was found between mothers' total practice scores and both age and educational level in the pre- and post-intervention periods ($\chi^2 = 7.880$, $p = 0.010$; $\chi^2 = 17.580$, $p < 0.001$). However, no significant associations were identified with other variables, including marital status and place of residence ($p > 0.05$).

Table (1): Percentage Distribution of the Studied Mothers regarding their Bio Sociodemographic Characteristics

Mothers' characteristics	The studied mothers (n=60)	
	No	%
Age/years		
20-<30	21	35.0
30-<40	26	**43.3**
≥40	13	21.7
Mean ±SD	**33.10±7.063**	
Marital status		
Married	52	**86.7**
Widow	7	11.6
Divorced	1	1.7
Educational level		
Do not read or write / Primary	9	15.0
Preparatory	5	8.3
Secondary Education / Diploma	25	**41.7**
University education or post graduate	21	35.0
Mother's Occupation		
Work	16	26.7
Not work	44	**73.3**
Place of Living		
Urban	9	15.0
Rural	51	**85.0**
Number of children in family		
1-2	17	28.3
2-3	33	**55.0**
3 and more	10	16.7
Consanguinity (Marriage between relatives)		
Yes	30	50.0
No	30	50.0
If yes, the degree of relationship (n=30)		
Cousin	30	**100.0**

Table (2): Percentage Distribution of Studied Children regarding Their Bio sociodemographic Characteristics

children's' characteristics	The studied children (n=60)	
	No	%
Age / years		
2-<3	4	6.7
3-<4	11	18.3
4-<5	17	28.3
5-<6	28	**46.7**
Mean ±SD	**4.15±0.953**	
Gender		
Male	35	**58.3**
Female	25	41.7
Birth order		
First	19	**31.7**
Second	17	28.3
Third	18	30.0
Fourth or more	6	10.0
Number of siblings		
1	17	28.3
2	33	**55.0**
3	9	15.0
4	1	1.7
Family history of hearing disorder		
Yes	22	**36.7**
No	38	63.3
If yes, the relative and type of disorder (n=22)		
1st degree	9	40.9
2nd degree	13	**59.1**

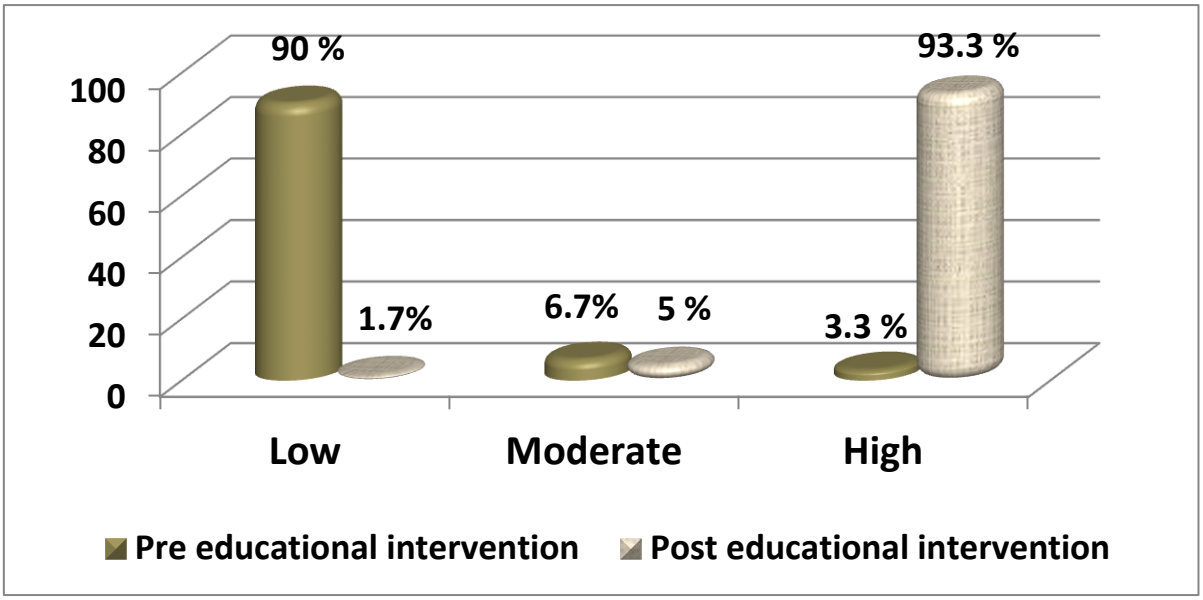

Figure (1): Studied mothers regarding their knowledge about rehabilitation of their children pre- and post-educational intervention

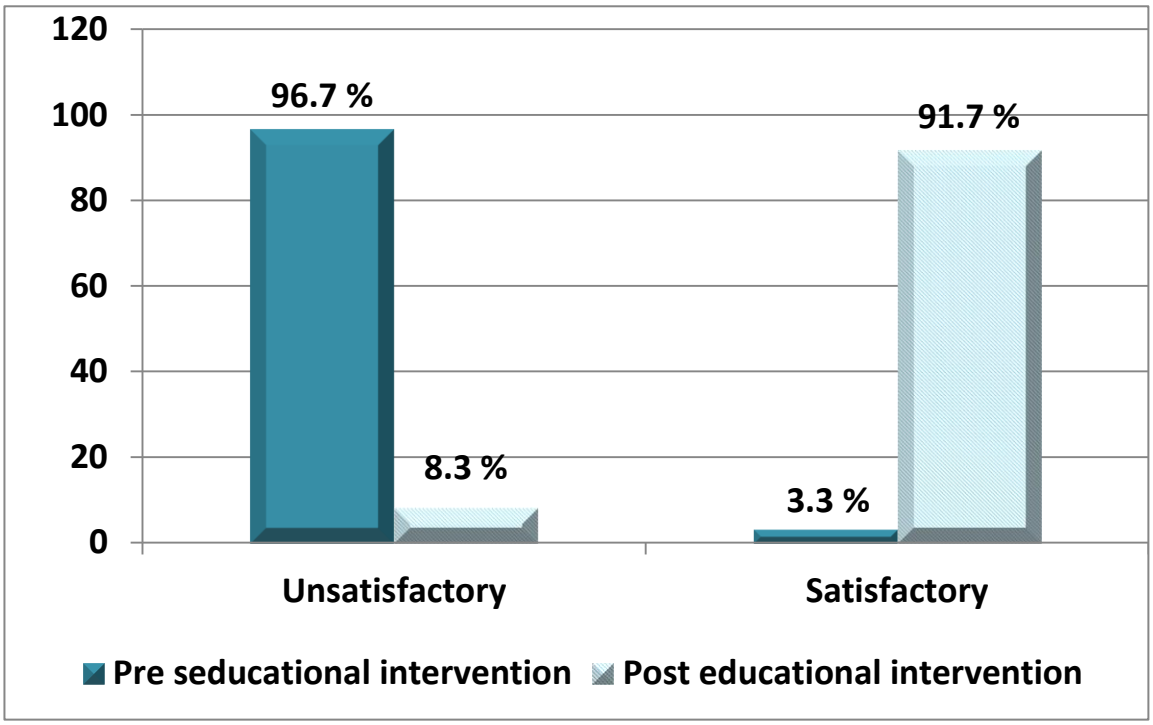

Figure (2): Studied mothers regarding their total reported practices about rehabilitation for their children pre- and post-cochlear implantation pre- and post-educational intervention

Table (3): Relation between total knowledge and reported practices among the studied mothers pre- and post-educational intervention. (n=60)

Total reported practices	Total knowledge level											
	Pre						Post					
	Low		Moderate		High		Low		Moderate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unsatisfactory	54	90.0	4	6.7	0	0.0	1	1.7	3	5.0	1	1.7
Satisfactory	0	0.0	0	0.0	2	3.3	0	0.0	0	0.0	55	91.7
X^2 ,p-value	FE=16.178, <0.001*						FE=23.414, ,0.001*					
r ,p	0.812, <0.001*						0.834, <0.001*					

Table (4): Relation between total knowledge and characteristics of the studied mothers pre- and post-educational intervention (n=60)

Items	Pre						Chi-square		Post						Chi-square	
	Low (n=54)		Moderate (n=4)		High (n=2)		X^2	p-value	Low (n=1)		Moderate (n=3)		High (n=56)		X^2	p-value
	No.	%	No.	%	No.	%			No.	%	No.	%	No.	%		
Age/ years																
20-<30	21	38.9	0	0.0	0	0.0	16.093	<0.001*	1	100.0	3	100.0	17	30.4	6.221	0.050*
30-<40	26	48.1	0	0.0	0	0.0			0	0.0	0	0.0	26	46.4		
≥40	7	13.0	4	100.0	2	100.0			0	0.0	0	0.0	13	23.2		
Marital status																
Married	47	87.0	3	75.0	2	100.0	4.308	0.593	0	0.0	3	100.0	49	87.5	8.430	0.207
Widow	6	11.1	1	25.0	0	0.0			1	100.0	0	0.0	6	10.7		
Divorced	1	1.9	0	0.0	0	0.0			0	0.0	0	0.0	1	1.8		
Educational level																
Do not read or write / Primary	9	16.7	0	0.0	0	0.0	9.320	0.050*	1	100.0	3	100.0	5	8.9	15.021	<0.001*
Preparatory	5	9.3	0	0.0	0	0.0			0	0.0	0	0.0	5	8.9		
Secondary Education / Diploma	25	46.3	0	0.0	0	0.0			0	0.0	0	0.0	25	44.6		
University education or post graduate	15	27.8	4	100.0	2	100.0			0	0.0	0	0.0	21	37.5		
Mother's Occupation																
Work	10	18.5	4	100.0	2	100.0	18.095	<0.001*	0	0.0	0	0.0	16	28.6	1.116	0.674
Not work	44	81.5	0	0.0	0	0.0			1	100.0	3	100.0	40	71.4		
Place of Living																
Urban	8	14.8	1	25.0	0	0.0	1.004	0.640	0	0.0	1	33.3	8	14.3	1.902	0.488
Rural	46	85.2	3	75.0	2	100.0			1	100.0	2	66.7	48	85.7		
Number of children in family																
1	1	1.9	0	0.0	0	0.0	5.949	0.584	0	0.0	0	0.0	1	1.8	1.566	0.955
2	14	25.9	2	50.0	0	0.0			0	0.0	0	0.0	15	26.8		
3	30	55.6	2	50.0	1	50.0			1	100.0	2	66.7	30	53.6		
4	9	16.7	0	0.0	1	50.0			0	0.0	0	0.0	10	17.9		
Consanguinity (Marriage between relatives)																
Yes	24	44.4	4	100.0	2	100.0	5.992	0.024*	0	0.0	0	0.0	30	53.6	3.825	0.112
No	30	55.6	0	0.0	0	0.0			1	100.0	3	100.0	26	46.4		

Table (5): Relation between total reported practices and characteristics of the studied mothers pre and post educational intervention (n=60)

Items	Pre				Chi-square		Post				Chi-square	
	Unsatisfactory (n=58)		Satisfactory (n=2)		X^2	p-value	Unsatisfactory (n=5)		Satisfactory (n=55)		X^2	p-value
	No.	%	No.	%			No.	%	No.	%		
Age/ years												
20-<30	21	36.2	0	0.0	4.665	0.044*	5	100.0	16	29.1	7.880	0.010*
30-<40	26	44.8	0	0.0			0	0.0	26	47.3		
≥40	11	19.0	2	100.0			0	0.0	13	23.6		
Marital status												
Married	50	86.2	2	100.0	0.318	0.853	4	80.0	48	87.3	1.782	0.524
Widow	7	12.1	0	0.0			1	20.0	6	10.9		
Divorced	1	1.7	0	0.0			0	0.0	1	1.8		
Educational level												
Do not read or write / Primary	9	15.5	0	0.0	3.079	0.407	5	100.0	4	7.3	17.580	<0.001*
Preparatory	5	8.6	0	0.0			0	0.0	5	9.1		
Secondary Education / Diploma	25	43.1	0	0.0			0	0.0	25	45.5		
University education or post graduate	19	32.8	2	100.0			0	0.0	21	38.2		
Mother's Occupation												
Work	14	24.1	2	100.0	5.690	0.017*	0	0.0	16	29.1	1.983	0.159
Not work	44	75.9	0	0.0			5	100.0	39	70.9		
Place of Living												
Urban	9	15.5	0	0.0	0.365	0.546	1	20.0	8	14.5	0.107	0.744
Rural	49	84.5	2	100.0			4	80.0	47	85.5		
Number of children in family												
1	1	1.7	0	0.0	3.674	0.403	0	0.0	1	1.8	0.243	0.970
2	16	27.6	0	0.0			1	20.0	15	27.3		
3	32	55.2	1	50.0			3	60.0	30	54.0		
4	9	15.5	1	50.0			1	20.0	9	16.4		
Consanguinity (Marriage between relatives)												
Yes	28	48.3	2	100.0	2.069	0.150	0	0.0	30	54.5	5.455	0.020*
No	30	51.7	0	0.0			5	100.0	25	45.5		

Discussion

Hearing impairment is among the most prevalent disabilities in children that influences the quality of their lives and their families', so children and parents feel more depressed and dejected. It is also impacts psychosocial, academic development and social well-being of children (**Zhang et al., 2020**).

Cochlear implantation (CI) surgery inspires **children suffering from severe-to-profound hearing impairment** to improve their hearing, language skills and speech production and perception **(Aylward et al., 2022).**

In terms of the sociodemographic characteristics of the investigated mothers, it was found that more than one-third of the studied mothers were aged between thirty years and less than forty years old, with a mean of 33.10±7.063 **(Table 1).** From the researcher's point of view, this may be due to the age of mothers being an important factor in acquiring knowledge and comprehending novel encounters with care. **A comparable result was documented by El-Zayat et al. (2023), who investigated the effectiveness of empowerment programs** in reducing burnout among mothers of children with hearing impairment. **Their findings showed that over two-fifths of the mothers belonged to the 30–<40 year age group, with a mean age of 39.6 ± 6.1 years.**

The study found that approximately one-third of the children under investigation were between five to six years old. From the researcher's opinion, this age distribution can be justified by that all children in the study had a history of using hearing aids before undergoing cochlear implantation. The time spent trying conventional hearing aids, followed by a surgical procedure and subsequent rehabilitation period, logically places children in this age at the time of data collection. The findings concurred with **Nada et al. (2021),** who, in their study titled "Evaluation of Quality of Life in Egyptian Children Post-Cochlear Implants," reported that 59% of the subjects were older than 5 years.

In regard to age at implantation, it was found that less than one-third of the examined children experienced implantation between the ages of three and four years old. From researcher point of view, which may be relatively later than the optimal recommended age for implantation but still recommended for optimal language equity with

normal-hearing peers. However, cochlear implantation before the age of five is still significant for gaining oral communication. **McGregor and Goldman (2022)** conduct a study that is in agreement with the present study and evaluate language outcomes after cochlear implantation, reporting that earlier cochlear implantation is strongly associated with better spoken language outcomes, emphasizing age at implantation as a key predictor of language acquisition.

The study found that over three-quarters of the studied mothers exhibited a low level of overall knowledge concerning rehabilitation of children post-cochlear implantation pre-educational intervention. From point of view, this initial lack of knowledge is due to a gap in the healthcare system, where the focus is mainly on the surgery itself, while long-term rehabilitation is often neglected. While most of them reached a completely advanced level of knowledge post-educational intervention. This finding aligns with a study by **Ahmed et al. (2025),** whose study is about the impact of an educational program on awareness among mothers having children with cochlear implants. They also found that most mothers had a low level of knowledge before their program but showed great improvement after receiving structured instruction.

Concerning the mothers' total level of reported practices. This study observed that over three-quarters of the mothers evaluated reported an inadequate level of practice prior to educational intervention, while the majority showed a satisfactory level of practice immediately following educational intervention. According to the researcher's viewpoint, this finding may be explained that the mothers knew that their children needed help but didn't know specific steps for auditory training or device maintenance. Educational interventions help mothers transition from a state of helplessness to active caregivers. This result was aligned with **Abd El-Fatah et al. (2023),** who reported that practices towards rehabilitation of their children post-cochlear implant were unsatisfactory before the educational program, which raised to a satisfactory level of practice immediately post the implementation of the educational

intervention, which was statistically significant at the level $P < 0.05$.

Similarly, the study by **Faheim et al. (2023)** indicated that there was a highly significant difference in mothers' total practice scores post-training program, with 90% of mothers showing adequate total practice scores post-program.

The present study findings clarified a highly statistically There is a substantial positive link between the examined mothers' total knowledge and total practice **(Table 3)** pre and post educational intervention. From researcher's perspectives, this explains that knowledge plays a significant function in modifying behavior, which leads to practice changes. The increase in overall knowledge was linked to an increase in total practice score. This finding was consistent with **Ismail et al. (2023),** who show that there was a highly statistically significant association between studied mother knowledge, practice, and the total quality of life of their children among mothers in the study group.

The present study's findings demonstrated a statistically significant difference between the examined mothers' knowledge and age. From researcher point of view, this could be attributed to the positive association between age and knowledge; the more increase in age, the more increase in knowledge and experience there is. The results of the present study were in agreement with **Shawky Elashry et al. (2023**), who reported a statistically significant association between maternal age and knowledge levels. Their study indicated that increased maternal age was associated with higher knowledge scores regarding care and rehabilitation of children with cochlear implants.

In light of the correlation between mothers' educational level and their knowledge, the current study stated a highly statistically significant difference in the knowledge levels of the studied mothers based on their educational background (**Table 4).** From the researcher's perspective, this may be due to the educational level of mothers may play a crucial role in shaping their knowledge, consequently influencing rehabilitation they extend to their children post cochlear implantation. This suggests that mothers with a higher level of education are more capable of acquiring knowledge to enhance their awareness and improve their

healthcare practices. This finding aligns with **Tork et al. (2022),** who demonstrated a positive association was found between parents' knowledge regarding care of their children with cochlear implantation and their education level.

Concerning mothers' practice in relation to their age and educational level, it demonstrated that there was a statistically significant difference between mothers' practices and their age and education level **(Table 5).** From researcher point of view, this can be explained that the increase mother's age, will increase the knowledge, hence consequently improve the given practice to children. **Ahmed et al. (2025),** whose findings, similar the current study, revealed a statistically significant difference in relation to the investigated mothers' practice, age, and education.

Conclusion

Based on the findings in the present study, it is concluded that the educational intervention was effective in improving mothers' knowledge and reported practices regarding the rehabilitation of their children post cochlear implantation. There was a statistically significant improvement in the total knowledge and reported practice following the implementation of the educational intervention.

Recommendations

In light of the study findings, the following recommendations are suggested:

-Integrated structured educational interventions into routine care of audiology and phoniatric units to enhance mothers' knowledge and practices.

-Educational booklets should be available in phoniatric units containing updated information about rehabilitation of children post cochlear implantation.

-Conduct regular workshops and hands-on training for parent on device troubleshooting to ensure the cochlear implant is used consistently during all waking hours.

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Effect of Educational Guidelines on Patients' Knowledge and Quality of Life regarding Nocturnal Gastroesophageal Reflux Disease

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Abstract

Background: Nocturnal Gastroesophageal Reflux Disease refers to acid reflux episodes that occur predominantly at night, often disrupting sleep and leading to prolonged exposure of the esophagus to stomach acid. **Aim:** to evaluate the effect of educational guidelines on patients' knowledge and quality of life regarding nocturnal Gastroesophageal reflux disease. **Subjects and Method:** A quasi-experimental study was conducted at the Department of Gastroenterology and Endoscopy and affiliated outpatient clinics at Tanta New Surgical Hospital, Egypt. A purposive sample of 80 adult patients diagnosed with nocturnal GERD was recruited. Data were collected using a structured interview questionnaire, the GERD Questionnaire (GERD-Q), the Reflux Symptom Index (RSI), and the GERD Health-Related QoL (GERD-HRQL) questionnaire. Patients received educational guidelines through three individualized educational sessions. Assessments were performed at baseline, one month, and two months following the intervention. **Results:** The results revealed significant improvement in knowledge regarding nocturnal gastroesophageal reflux disease among studied patients' post-educational guidelines at $p < 0$. Also, it was noticed that there was statistically significant improvement in quality of life. The percentage of patients with no GERD symptoms affecting their quality of life increased from 32.8% pre-intervention to 79.9% at two months post-intervention. **Conclusions:** The implementation of educational guidelines is an effective method to increase patients' knowledge regarding nocturnal GERD and has a positive effect on improving their QOL. **Recommendations:** To implement educational programs and periodic education for patients regarding nocturnal GERD.

Keywords: Educational Guidelines, Patient' knowledge, Quality of life, Nocturnal Gastro-esophageal Reflux Disease.

Introduction

Gastroesophageal reflux disease (GERD) is a common condition characterized by the backflow of gastric contents into the esophagus or adjacent structures, causing symptoms and/or mucosal injury. According to the American College of Gastroenterology, GERD results from abnormal reflux leading to chronic symptoms or esophageal damage **(Azer, Hashmi, & Reddivari, 2024).**

Nocturnal gastroesophageal reflux disease (GERD) is characterized by reflux episodes that occur predominantly during the night or while the patient is asleep. These episodes prolong esophageal exposure to gastric acid, increasing the likelihood of mucosal irritation and sleep disruption. The condition is commonly associated with symptoms including heartburn, acid regurgitation, chest discomfort, and nocturnal respiratory manifestations such as coughing or choking. In addition, the supine position during sleep facilitates reflux events, making nocturnal GERD more difficult to control than reflux occurring during daytime **(Shibli, Skeans, Yamasaki, & Fass, 2020).**

Nocturnal gastroesophageal reflux disease represents a clinically significant subtype of reflux disorder that is characterized by distinct pathophysiological mechanisms and heightened morbidity. Patients with nocturnal GERD experience nearly fourfold more supine reflux episodes compared to healthy individuals, with proximal esophageal exposure that is occurring six times more frequently. These events predominantly manifest as liquid reflux, with acidic composition dominating the initial nocturnal hours and weakly acidic reflux increasing in prevalence during later sleep phases. The prolonged mucosal contact time associated with supine positioning exacerbates tissue injury risk, while sleep fragmentation from nocturnal symptoms contributes to daytime functional impairment and reduced quality of life **(Fornari, Blondeau, Mertens, Tack, & Sifrim, 2011).**

Patient education serves as the foundation for the adoption and consistent implementation of self-management behaviors aimed at alleviating the symptoms of nocturnal GERD. This includes providing guidance on making appropriate dietary choices, such as avoiding known trigger foods like spicy or fatty meals, chocolate,

caffeine, and alcoholic beverages, particularly in the hours leading up to bedtime. Additionally, educational efforts highlight the necessity of dietary restructuring. This includes transitioning toward consuming downsized food portions distributed regularly over the day, while strictly refraining from heavy nutritional intake prior to sleeping **(Yadlapati et al., 2022).**

Nurses play a key role in GERD management by providing education, monitoring symptoms, and helping patients identify individual triggers. Their personalized support promotes adherence to treatment and improves disease outcomes **(Katz et al., 2022).** Specialized nursing interventions for nocturnal GERD include promoting sleep hygiene, recommending left-side sleeping and bed elevation, and advising patients to avoid eating within three hours of bedtime. These measures help reduce reflux episodes and prevent long-term complications **(Schuitenmaker, Kuipers, Smout, Fockens, & Bredenoord, 2022).**

Significance of the study:

Improved patient knowledge regarding nocturnal GERD through education can lead to better adherence to recommended lifestyle modifications and prescribed medication regimens. This enhanced adherence can result in more effective symptom control, which in turn contributes to an improved quality of life **(Jallepalli et al., 2022).**

Furthermore, education empowers patients to take a more active role in their care by providing them with the necessary information and skills to manage their symptoms effectively. This sense of control over their condition can significantly increase nocturnal GERD patient satisfaction and lead to a higher overall quality of life. By equipping patients with understanding needed for self-management. Educational interventions are likely to foster a greater sense of control over their nocturnal GERD, ultimately enhancing their well-being **(Jallepalli et al., 2022).**

The aim of the study was to evaluate the effect of educational guidelines on patients' knowledge and quality of life regarding nocturnal gastroesophageal reflux disease.

Research hypotheses:

-Post-implementation of the educational guidelines, patients were expected to exhibit

improvement in their knowledge regarding nocturnal gastroesophageal reflux disease.

-Post-implementation of the educational guidelines, patients with nocturnal gastroesophageal reflux disease were expected to exhibit improvement in their quality of life.

Subjects and Method

- A quasi-experimental study was conducted on 80 adult patients with nocturnal GERD at the Department of Gastroenterology and Endoscopy and its relevant outpatient clinics at Tanta New Surgical Hospital, Tanta University Hospitals, Egypt.
- Eligible participants were aged 21–60 years old, fully conscious, and experienced nocturnal heartburn and/or acid regurgitation at least twice weekly with documented nocturnal esophageal acid exposure.
-Patients with stroke, dementia, advanced pulmonary disease, esophageal cancer, motor dysfunction, candidiasis, eosinophilic esophagitis, or previous esophageal/gastric surgery were excluded.

Sample Size Calculation:

Sample size was calculated using Epi Info version 7 with a 95% confidence level and 5% margin of error.

Data Collection Tools

Tool I: Structured Interview Questionnaire: **Part (1):** Socio-demographic data of the patients, which includes the patient's code, age, sex, marital status, level of education, occupation, and residence. **Part (2):** Clinical data for patients, which includes weight, height, diagnosis, time of complaint of symptoms, patients' eating habits, whether the patients follow a special diet, duration of disease, type of medication, smoking, history of hospitalization, and the patient's past medical history.

Part (3): Patient Knowledge Assessment Sheet:

It was developed by the researcher after reviewing the related literature. To assess patients' knowledge regarding nocturnal gastroesophageal reflux.

Tool II: GERD Questionnaire (GERD-Q): Developed by **Jones et al. (2009)**, this six-item questionnaire was used to assess the frequency and severity of GERD symptoms during the previous seven days.

Tool III: GERD Health-Related QoL Questionnaire (GERD-HRQL): Developed by **Velanovich (2007)**, this 16-item instrument evaluated the impact of GERD symptoms on patients' QOL.

Tool IV: Reflux Symptom Index (RSI): Developed by **Belafsky, Postma & Koufman (2002),** the RSI consists of nine items used to assess reflux-related symptoms and their severity.

Method

1-Obtaining approval:

- Official permission to carry out the study was obtained from Tanta Main University Hospital and was submitted to the responsible authorities of the selected setting for permission to carry out the study.

2-Ethical considerations:

- Ethical committee of the Faculty of Nursing at Tanta University approval was obtained before conducting the study with code 428-4-2024.
- Confidentiality and privacy were taken into consideration regarding data collection.
-The nature of the study did not cause any harm or pain to any of the subjects.
- Patients' written informed consent to participate in this study was obtained after explaining the aim of the study.
-All participants were informed about the purpose of the study, confidentiality of information, benefits, and right to withdraw from the study at any time if desired.

3-Tool development:

-The tools of the study were developed by the researcher after reviewing related literature, except the Gastroesophageal Reflux Disease Questionnaire was adopted from **Jones et al. (2009),** the health-related Quality of Life (GERD-HRQL) Questionnaire was developed by **Velanovich (2007),** and the Reflux Severity Index was developed by **Belafsky, Postma, & Koufman (2002).**

- Tools of the data collection were translated into the Arabic language and back translated into English by another expert to adjust to patients' different levels of education and to ensure semantic equivalence and to guarantee confidentiality about the material being collected from them.

4-Tool validity:

-The content validity of the developed tools was tested for clarity and applicability by seven experts in medical-surgical nursing to ensure their validity, and the necessary modifications were carried out.

5-A pilot study:

A pilot study was carried out on 10% of the study sample from the previously mentioned setting to test the feasibility and applicability of the tools. The pilot study was excluded from the study sample.

6-Reliability of the developed tools:

Assessed using Cronbach's alpha coefficient to determine the internal consistency of the tools. The results revealed acceptable to excellent reliability levels for all study instruments. Cronbach's alpha coefficients were 0.911 for the Total Knowledge Scale, 0.845 for the GERD-Q, 0.938 for the GERD-Health-related Quality of Life Questionnaire, and 0.879 for the Reflux Severity Index (RSI), indicating high internal consistency and reliability of the study instruments.

7-Data collection:

The data collection was carried out over a period of 6 months.

The educational guidelines were developed based on patients' needs identified during the assessment phase and current evidence-based recommendations for nocturnal GERD management. The intervention was delivered individually through three sessions (approximately 30 minutes each).

Phase I: Assessment

Baseline assessment was conducted using all study tools to evaluate patients' socio-demographic characteristics, clinical profile, knowledge, symptom severity, reflux symptoms, and QOL.

Phase II: Planning

Educational guidelines were prepared according to assessment findings and relevant literature. An illustrated Arabic booklet was developed, and appropriate educational materials, including PowerPoint presentations and videos, were prepared.

Phase III: Implementation

The educational intervention consisted of three individual sessions:

-Session 1: Basic knowledge of nocturnal GERD, including definition, causes, risk factors, symptoms, investigations, and complications.

-Session 2: Dietary management and lifestyle modifications, including medication adherence, foods to avoid, and healthy dietary habits.

-Session 3: Diaphragmatic breathing exercises, proper sleeping positions, smoking cessation, and behavioral strategies to reduce nocturnal reflux.

Teaching methods included individual discussion, lectures, demonstrations, re-demonstrations, educational videos, and illustrated booklets.

Phase IV: Evaluation

Participants were reassessed using the same study tools one month post-intervention and two months post-intervention. Changes in patients' knowledge, symptom severity, reflux symptoms, and health-related QoL were evaluated.

8-Statistical analysis:

-Data were coded, entered, and analyzed using the Statistical Package for Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Quantitative data was summarized using mean and standard deviation (SD), whereas qualitative data was presented as frequencies and percentages.

-The normality of data distribution was assessed using the Shapiro–Wilk test. Differences in categorical variables across the study phases (baseline, one-month post-intervention, and two-month (follow-up) were examined using the Chi-square test (χ^2). For pairwise comparisons between study phases, post hoc chi-square tests were performed when appropriate.

-Associations between patients' sociodemographic characteristics and study outcomes were evaluated using the Chi-square test. Pearson's correlation coefficient (r) was used to assess the relationship between total knowledge level and GERD health-related QoL scores across the study phases.

-All statistical tests were two-tailed. A p-value <0.05 was considered statistically significant, while a p-value <0.01 was considered highly statistically significant.

Results

Table (1): Shows the baseline characteristics of the studied patients. The mean age of the participants was

44.86 ± 5.94 years. Approximately two-thirds (67.5%) were males, 60.0% were married, and 55.0% had a diploma level of education. The majority were employed (68.8%) and resided in urban areas (77.5%).

Table (2): Regarding clinical characteristics, obesity was common among the participants, with 47.5% classified as obese and 15.0% severely obese. Most patients reported nocturnal symptoms (80.0%), nighttime snacking habits (77.5%), and a disease duration of less than six months (85.0%). Additionally, smoking was reported by 60.0% of the patients, while 87.5% had a previous history of hospitalization.

Table (3): Illustrates that there was a statistically significant improvement in knowledge among

the studied patients regarding all items related to nocturnal gastroesophageal reflux post-implementation of educational guidelines at one-month and two-months of follow-up, compared to pre-implementation, with a p-value < 0.001.

Table (4): Shows a significant improvement in patients' knowledge regarding lifestyle management and organization after implementation of the educational guidelines at both one- and two-month follow-ups. compared with baseline ($p < 0.001$). No significant difference was observed between one and two months, indicating sustained knowledge retention.

Table (5) :Clarifies that there was a statistically significant improvement in the level of nocturnal GERD among the studied patients regarding all items post-implementation of educational guidelines compared to pre-implementation, with a p-value < 0.05. Additionally, a highly statistically significant improvement was observed between pre-implementation and follow-up regarding all items, with a p-value < 0.01. Meanwhile, no statistically significant difference was found between post-implementation and follow-up regarding all items, indicating that the improvement was maintained over time.

Table (6): Clarifies the distribution of the studied patients regarding GERD health-related quality of life. It was found that there was a statistically significant improvement in the GERD health-related quality of life among the studied patients regarding all items at one-month post-educational guidelines compared to pre-implementation, with a p-value < 0.01. Additionally, a highly statistically significant improvement was observed between pre-implementation and two-months of follow-up regarding all items, with a p-value < 0.01. Meanwhile, no statistically significant difference was found between one-month post-educational guidelines and two-months of follow-up regarding all items, indicating that the improvement was maintained over time.

Table (7): Clarifies the distribution of the studied patients regarding the Reflux Severity Index (RSI). It was found that with pre-educational guidelines, 30.0% of the patients experienced mild hoarseness or voice problems, and the same percentage of patients experienced a mild sensation of something stuck

in their throat, which progressively decreased to 23.8% post-intervention and 20.0% at follow-up for both. Regarding moderate symptoms, 23.8% of the patients had moderate excessive nasal or throat drip at baseline, dropping to 18.8% post-guidelines and further to 13.8% at follow-up, while moderate heartburn or stomach acid reflux decreased from 25% pre-intervention to 18.8% and 12.5% across the subsequent phases. Furthermore, severe symptoms showed a notable decline, as severe heartburn and acid reflux reduced from 23.8% in the pre-educational phase to 16.3% post-intervention, reaching 12.5% at the final follow-up.

Overall, the statistical analysis confirmed a highly significant reduction in the severity and frequency of all symptoms ($P < 0.001$). Highly statistically significant differences were confirmed between pre- and post-guidelines phases ($P1 < 0.01$ and $P3 < 0.01$), while no statistically significant differences were noted between the first and second months ($P2 > 0.05$), indicating that the clinical improvements achieved were successfully sustained and stabilized over time.

Table (1): Distribution of the studied patients regarding their socio-demographic characteristics (n=80)

Socio-demographic characteristics	No. (n=80)	%
Age		
21<30 years	3	3.8
30<40 years	15	18.8
40<50 years	42	**52.5**
≥50 years	20	25.0
Max-Min	**21-60**	
Mean±SD	**44.861±5.935**	
Sex		
Male	54	**67.5**
Female	26	32.5
Marital status		
Single	4	5.0
Married	48	**60.0**
Divorced	11	13.8
Widowed	17	21.3
Educational level		
Can't read and write	8	10.0
Read and write	19	23.8
Diploma	44	**55.0**
University	9	11.3
Occupational status		
Employee	55	**68.8**
Worker	10	12.5
Unemployed	13	16.3
Retired	2	2.5
Residence place		
Urban	62	**77.5**
Rural	18	22.5

Table (2): Distribution of the studied patients regarding their clinical data (n=80)

	Health data	No. (n=80)	%
Weight	**Max-Min44 - 121**		
	Mean±SD86.4 ± 18.2		
Height	**Max-Min152 - 182**		
	Mean±SD165.3 ± 6.5		
BMI	Below ideal weight: >18.5	6	7.5
	Ideal weight: 18.5-24.9	10	12.5
	Above ideal weight: 25-29.9	14	17.5
	Obesity: 30-39.9	38	**47.5**
	Severe obesity: >40	12	15.0
Time of complaints of symptoms	Night	64	**80.0**
	Both	14	20.0
Eating habits			
Number of meals per day	2-3 meals/day	20	25.0
	4-5 meals/day	56	**70.0**
	More than 5 meals/day	4	5.0
Eat snacks at night	Yes	62	**77.5**
	No	18	22.5
Eat spicy food	Yes	58	**72.5**
	No	22	27.5
Eat fatty foods	Yes	61	**76.3**
	No	19	23.8
Follow a special diet	No	80	**100.0**
Disease duration	<6 months	68	**85.0**
	6 months to 1 year	10	12.5
	More than 1 year	2	2.5
Type of medication you are currently taking to treat gastroesophageal reflux disease	Antacids (such as Temazepam)	78	**97.5**
	Proton pump inhibitors (such as omeprazole)	54	67.5
	H2 receptor antagonists (such as ranitidine)	68	85.0
Smoking	Yes	48	**60.0**
	No	32	40.0
What is the duration of smoking (n=48)	Less than 5 years	28	**58.3**
	5-10 years	12	25.0
	More than 10 years	8	16.7
How many times of smoking/day (n=48)	1-2 times/day	10	20.8
	3-4 times/day	25	**52.1**
	More than 4 times	13	27.1
Previous hospitalization	Yes	70	**87.5**
	No	10	12.5
What is the duration of stay in hospital (n=70)	3-4 days	17	24.3
	5-7 days	50	**71.4**
	More than 7 days	3	4.3

Table (3): Distribution of the studied patients' knowledge regarding nocturnal gastroesophageal reflux (n = 80)

Knowledge regarding nocturnal gastroesophageal reflux		Correct and complete answer		Correct and incomplete answer		Don't' know or incorrect answer		$X^2$1 P1	$X^2$2 P2	$X^2$3 P3
		No.	%	No.	%	No.	%			
What is nocturnal gastroesophageal reflux disease (GERD)?	Pre-educational guidelines	10	12.5	14	17.5	56	70.0	85.2 .000**	0.8 0.67	72.4 .000**
	One-month post-educational guidelines	62	77.5	10	12.5	8	10.0			
	Two months Post-educational guidelines	58	72.5	13	16.3	9	11.3			
Which of the following is a common cause of nocturnal GERD?	Pre-educational guidelines	6	7.5	28	35.0	46	57.5	78.9 .000**	2.4 0.31	65.1 .000**
	One-month post-educational guidelines	60	75.0	16	20.0	4	5.0			
	Two months Post-educational guidelines	54	67.5	20	25.0	6	7.5			
Which of the following is NOT a risk factor for nocturnal GERD?	Pre-educational guidelines	16	**20.0**	20	25.0	44	55.0	72.3 .000**	3.8 0.15	58.6 .000**
	One-month post-educational guidelines	68	**85.0**	7	8.8	5	6.3			
	Two months Post-educational guidelines	62	**77.5**	11	13.8	7	8.8			
Which of the following describes a type of GERD?	Pre-educational guidelines	12	15.0	18	22.5	50	62.5	89.5 .000**	0.7 0.72	81.2 .000**
	One-month post-educational guidelines	70	87.5	8	10.0	2	2.5			
	Two months Post-educational guidelines	68	85.0	9	11.3	3	3.8			
GERD can be classified into different stages based on severity	Pre-educational guidelines	18	22.5	0	0.0	62	77.5	55.6 0.000**	49.65 0.000**	33.54 0.000**
	One-month post-educational guidelines	64	80	0	0.0	16	20			
	Two months Post-educational guidelines	60	75	0	0.0	20	25			
Which of the following is a common symptom of nocturnal GERD?	Pre-educational guidelines	14	17.5	44	**55.0**	22	27.5	92.1 .000**	3.2 0.20	84.3 .000**
	One-month post-educational guidelines	72	90.0	6	**7.5**	2	2.5			
	Two months Post-educational guidelines	69	86.3	6	**7.5**	5	6.3			
Nocturnal GERD can	Pre-educational guidelines	25	31.2	0	0.0	55	68.8	64.6	45.65	57.65

disrupt sleep and lead to daytime fatigue	One-month post-educational guidelines	63	78.8	0	0.0	17	21.3	0.000**	0.000**	0.000**
	Two months Post-educational guidelines	61	76.3	0	0.0	19	23.8			
A barium swallow test is one of the diagnostic studies used to evaluate GERD	Pre-educational guidelines	21	26.3	0	0.0	59	73.7	61.5 0.000**	59.64 0.000**	39.87 0.000**
	One-month post-educational guidelines	69	86.3	0	0.0	11	13.7			
	Two months Post-educational guidelines	71	88.8	0	0.0	9	11.2			
Which laboratory investigation is commonly used to assess esophageal function?	Pre-educational guidelines	8	10.0	12	15.0	60	75.0	76.8 .000**	0.6 0.74	68.4 .000**
	One-month post-educational guidelines	61	76.3	10	12.5	9	11.3			
	Two months Post-educational guidelines	58	72.5	10	12.5	12	15.0			
Which of the following is commonly used to diagnose nocturnal gastroesophageal reflux?	Pre-educational guidelines	6	7.5	12	15.0	62	**77.5**	80.1 .000**	1.2 0.55	70.9 .000**
	One-month post-educational guidelines	61	76.3	11	13.8	8	**10.0**			
	Two months Post-educational guidelines	57	71.3	13	16.3	10	**12.5**			
Which of the following is NOT a diagnostic study for gastroesophageal reflux?	Pre-educational guidelines	11	13.8	19	23.7	50	62.5	32.8 0.000**	15.64 0.000**	29.35 0.000**
	One-month post-educational guidelines	55	68.8	9	11.2	16	20.0			
	Two months Post-educational guidelines	59	73.7	10	12.5	11	13.8			
Regular screening for GERD is unnecessary if symptoms are mild.	Pre-educational guidelines	9	11.3	0	0.0	71	88.8	47.32 0.000**	44.69 0.000**	52.34 0.000**
	One-month post-educational guidelines	66	82.5	0	0.0	14	17.5			
	Two months Post-educational guidelines	65	81.2	0	0.0	15	18.8			
Complications of untreated nocturnal GERD	Pre-educational guidelines	4	5.0	20	25.0	56	70.0	88.3 .000**	2.3 0.32	79.5 .000**
	One-month post-educational guidelines	70	87.5	6	7.5	4	5.0			
	Two months Post-educational guidelines	64	80.0	8	10.0	8	10.0			

Table (4): Distribution of the studied patients' knowledge regarding lifestyle management and organization (n=80)

Knowledge regarding lifestyle management and organization		Correct and complete answer		Correct and incomplete answer		Don't' know or incorrect answer		$X^2$1 P1	$X^2$2 P2	$X^2$3 P3
		No.	%	No.	%	No.	%			
Foods to include in a diet for managing nocturnal GERD	Pre-educational guidelines	6	7.5	14	17.5	60	75.0	116.4 .000**	2.1 0.35	98.7 .000**
	One-month post-educational guidelines	70	87.5	8	10.0	2	2.5			
	Two months Post-educational guidelines	65	81.3	10	12.5	5	6.3			
Foods to avoid for managing nocturnal GERD	Pre-educational guidelines	4	5.0	14	17.5	62	**77.5**	108.2 .000**	1.8 0.41	92.4 .000**
	One-month post-educational guidelines	68	85.0	7	8.8	5	**6.3**			
	Two months Post-educational guidelines	64	80.0	10	12.5	6	**7.5**			
It is advisable to eat large meals before bedtime if you have GERD	Pre-educational guidelines	9	11.3	0	0.0	71	88.7	90.65 0.000**	3.4 .18	95.32 0.000**
	One-month post-educational guidelines	59	73.8	0	0.0	21	26.2			
	Two months Post-educational guidelines	57	71.3	0	0.0	23	28.7			
How long should you wait after eating before lying down?	Pre-educational guidelines	8	10.0	12	15.0	60	75.0	124.6 .000**	0.5 0.78	106.3 .000**
	One-month post-educational guidelines	72	90.0	6	7.5	2	2.5			
	Two months Post-educational guidelines	70	87.5	8	10.0	2	2.5			
Over-the-counter antacids are commonly used medications for treating GERD symptoms.	Pre-educational guidelines	12	15.0	0	0.0	68	85.0	88.64 0.000**	0.6 0.74	84.89 0.000**
	One-month post-educational guidelines	67	83.8	0	0.0	13	16.2			
	Two months Post-educational guidelines	66	82.5	0	0.0	14	17.5			

Which type of medication is often prescribed for long-term management of GERD?	Pre-educational guidelines	6	7.5	38	**47.5**	36	45.0	94.8 .000**	1.2 0.55	82.1 .000**
	One-month post-educational guidelines	74	88.8	5	**6.3**	1	1.3			
	Two months Post-educational guidelines	69	86.3	7	**8.8**	4	5.0			
Which lifestyle change can help reduce symptoms of nocturnal GERD?	Pre-educational guidelines	10	12.5	14	17.5	56	70.0	102.7 .000**	2.9 0.23	88.5 .000**
	One-month post-educational guidelines	68	85.0	7	8.8	5	6.3			
	Two months Post-educational guidelines	62	77.5	10	12.5	8	10.0			
Diaphragmatic breathing exercises can help alleviate symptoms of GERD.	Pre-educational guidelines	11	13.8	0	0.0	69	86.2	79.35 0.000**	0.8 0.67	74.39 0.000**
	One-month post-educational guidelines	60	75.0	0	0.0	20	25.0			
	Two months post-educational guidelines	61	76.3	0	0.0	19	23.7			
Proper sleeping position for someone with nocturnal GERD	Pre-educational guidelines	12	**15.0**	16	20.0	52	65.0	110.3 .000**	2.6 0.27	95.2 .000**
	One-month post-educational guidelines	71	**88.8**	6	7.5	3	3.8			
	Two months Post-educational guidelines	65	**81.3**	9	11.3	6	7.5			
Which of the following can exacerbate nocturnal GERD symptoms?	Pre-educational guidelines	8	10.0	18	22.5	54	67.5	118.9 .000**	1.2 0.55	104.6 .000**
	One-month post-educational guidelines	74	92.5	4	5.0	2	2.5			
	Two months Post-educational guidelines	70	87.5	7	8.8	3	3.8			

$X^2$1P1 between pre and post educational guidelines $X^2$3P3 between pre educational guidelines and follow-up
No statistically significant difference (P>0.05)

$X^2$2P2 between post educational guidelines and follow-up **Highly statistically significant difference (P<0.01)

Table (5): Distribution of the studied patients regarding the nocturnal gastroesophageal reflux disease level (n=80)

Nocturnal Gastroesophageal Reflux Disease Level		0 day		1 day		2-3 days		4-7 days		$X^2$1 P1	$X^2$2 P2	$X^2$3 P3
		No.	%	No.	%	No.	%	No.	%			
Feel a burning sensation behind your breastbone	Pre-educational guidelines	7	8.8	17	21.3	28	35.0	28	35.0	11.13 0.011*	6.77 0.080	19.71 0.001**
	One-month post-educational guidelines	16	20.0	28	35.0	24	30.0	12	15.0			
	Two months Post-educational guidelines	30	37.5	24	30.0	18	22.5	8	10.0			
Stomach contents (liquid or food) move up your throat or mouth (reflux)	Pre-educational guidelines	8	10.0	18	22.5	24	30.0	30	37.5	5.34 0.149	7.54 0.057	13.51 0.004**
	One-month post-educational guidelines	19	23.8	22	27.5	23	28.8	16	20.0			
	Two months Post-educational guidelines	28	35.0	24	30.0	18	22.5	10	12.5			
Feel pain in the middle of your upper stomach	Pre-educational guidelines	5	6.3	12	15.0	25	31.3	38	47.5	9.48 0.023*	5.32 0.150	13.28 0.004**
	One-month post-educational guidelines	18	22.5	20	25.0	24	30.0	18	22.5			
	Two months Post-educational guidelines	27	33.8	22	27.5	20	25.0	11	13.8			
Feel nauseous	Pre-educational guidelines	6	7.5	10	12.5	26	32.5	38	47.5	8.25 0.041*	5.47 0.141	14.55 0.002**
	One-month post-educational guidelines	20	25.0	24	30.0	22	27.5	14	17.5			
	Two months Post-educational guidelines	34	42.5	22	27.5	18	22.5	6	7.5			
Trouble sleeping well at night due to heartburn or reflux	Pre-educational guidelines	3	3.8	7	8.8	30	37.5	40	**50.0**	17.72 0.001**	6.80 0.078	28.54 0.001**
	One-month post-educational guidelines	16	20.0	22	27.5	24	30.0	18	**22.5**			
	Two months Post-educational guidelines	36	45.0	24	30.0	14	17.5	6	**7.5**			
Take additional medications to treat your heartburn, reflux, or both, other than the medications your doctor prescribed	Pre-educational guidelines	6	7.5	10	12.5	24	30.0	40	**50.0**	9.74 0.021*	4.61 0.202	16.54 0.001**
	One-month post-educational guidelines	18	22.5	24	30.0	22	27.5	16	**20.0**			
	Two months Post-educational guidelines	34	42.5	22	27.5	16	20.0	8	**10.0**			

$X^2$1P1 between pre and post educational guidelines $X^2$3P3 between pre educational guidelines and follow-up Statistically significant difference (P<0.05)

$X^2$2P2 between post educational guidelines and follow-up **Highly statistically significant difference (P<0.01) No statistically significant difference (P>0.05)

Table (6): Distribution of the studied patients regarding GERD health-related quality of life (n=80)

GERD Health-related Quality of Life		No symptoms		Symptoms noticeable but not bothersome		Symptoms noticeable and bothersome but not every day		Symptoms bothersome every day		Symptoms affect daily activities		Symptoms are incapacitating – unable to do daily activities		$X^2$1 P1	$X^2$2 P2	$X^2$3 P3
How bad is the heartburn?	Pre-educational guidelines	10	12.5	18	22.5	22	27.5	15	18.8	10	12.5	5	6.3	35.6 .000**	8.2 0.146	28.3 .000**
	One-month post - guidelines	25	31.3	25	31.3	15	18.8	10	12.5	4	5.0	1	1.3			
	Two months Post- guidelines	30	37.5	20	25.0	12	15.0	10	12.5	6	7.5	2	2.5			
Heartburn when lying down?	Pre-educational guidelines	15	18.8	20	25.0	18	22.5	12	15.0	10	12.5	5	6.3	32.1 .000**	6.5 0.261	25.4 .000**
	One-month post- guidelines	30	37.5	22	27.5	12	15.0	8	10.0	6	7.5	2	2.5			
	Two months Post- guidelines	35	43.8	18	22.5	10	12.5	9	11.3	5	6.3	3	3.8			
Heartburn when standing up?	Pre-educational guidelines	20	25.0	22	27.5	15	18.8	12	15.0	8	10.0	3	3.8	28.7 .000**	5.3 0.378	22.9 .000**
	One-month post- guidelines	35	43.8	20	25.0	10	12.5	8	10.0	5	6.3	2	2.5			
	Two months Post- guidelines	40	50.0	18	22.5	8	10.0	7	8.8	5	6.3	2	2.5			
Heartburn after meals?	Pre-educational guidelines	12	15.0	25	31.3	20	25.0	13	16.3	7	8.8	3	3.8	26.5 .000**	7.1 0.212	20.8 .000**
	One-month post- guidelines	28	35.0	24	30.0	14	17.5	9	11.3	4	5.0	1	1.3			
	Two months Post- guidelines	32	40.0	22	27.5	10	12.5	8	10.0	6	7.5	2	2.5			
Does heartburn change your diet?	Pre-educational guidelines	25	31.3	20	25.0	15	18.8	10	12.5	7	8.8	3	3.8	24.3 .000**	4.8 0.441	18.6 .000**
	One-month post- guidelines	40	50.0	18	22.5	10	12.5	7	8.8	4	5.0	1	1.3			
	Two months Post- guidelines	38	47.5	17	21.3	12	15.0	8	10.0	4	5.0	1	1.3			
Does heartburn wake you from sleep?	Pre-educational guidelines	30	37.5	18	22.5	12	15.0	10	12.5	7	8.8	3	3.8	22.4 .000**	3.9 0.564	16.2 .000**
	One-month post- guidelines	45	56.3	15	18.8	8	10.0	7	8.8	4	5.0	1	1.3			
	Two months Post- guidelines	42	52.5	16	20.0	9	11.3	8	10.0	4	5.0	1	1.3			
Do you have difficulty swallowing?	Pre-educational guidelines	35	43.8	20	25.0	12	15.0	8	10.0	4	5.0	1	1.3	18.9 .000**	5.1 0.403	14.7 0.002**
	One-month post- guidelines	50	62.5	15	18.8	8	10.0	5	6.3	2	2.5	0	0.0			

	Two months Post- guidelines	48	60.0	14	17.5	9	11.3	6	7.5	3	3.8	0	0.0			
Do you have pain with swallowing?	Pre-educational guidelines	40	50.0	18	22.5	10	12.5	7	8.8	4	5.0	1	1.3	15.3 0.007**	4.2 0.521	14.1 0.009**
	One-month post- guidelines	55	68.8	12	15.0	6	7.5	5	6.3	2	2.5	0	0.0			
	Two months Post- guidelines	52	65.0	13	16.3	7	8.8	5	6.3	3	3.8	0	0.0			
If you take medication, does this affect your daily life?	Pre-educational guidelines	10	12.5	15	18.8	20	25.0	18	22.5	12	15.0	5	6.3	20.6 .000**	6.8 0.234	15.9 0.003**
	One-month post- guidelines	25	31.3	22	27.5	15	18.8	10	12.5	6	7.5	2	2.5			
	Two months Post- guidelines	22	27.5	20	25.0	16	20.0	12	15.0	7	8.8	3	3.8			
How bad is the regurgitation?	Pre-educational guidelines	15	18.8	22	27.5	20	25.0	12	15.0	8	10.0	3	3.8	30.1 .000**	7.5 0.187	23.8 .000**
	One-month post- guidelines	30	37.5	25	31.3	12	15.0	8	10.0	4	5.0	1	1.3			
	Two months Post- guidelines	28	35.0	24	30.0	13	16.3	9	11.3	5	6.3	1	1.3			
Regurgitation when lying down?	Pre-educational guidelines	20	25.0	25	31.3	15	18.8	10	12.5	7	8.8	3	3.8	27.9 .000**	6.2 0.287	21.5 .000**
	One-month post- guidelines	35	43.8	22	27.5	10	12.5	8	10.0	4	5.0	1	1.3			
	Two months Post- guidelines	32	40.0	20	25.0	12	15.0	9	11.3	5	6.3	2	2.5			
Regurgitation when standing up?	Pre-educational guidelines	25	31.3	23	28.8	14	17.5	9	11.3	6	7.5	3	3.8	24.3 .000**	5.7 0.336	19.8 .000**
	One-month post- guidelines	40	50.0	20	25.0	9	11.3	7	8.8	3	3.8	1	1.3			
	Two months Post- guidelines	38	47.5	19	23.8	10	12.5	8	10.0	4	5.0	1	1.3			
Regurgitation after meals?	Pre-educational guidelines	18	22.5	24	30.0	18	22.5	11	13.8	7	8.8	2	2.5	19.8 .000**	4.9 0.426	16.3 0.003**
	One-month post- guidelines	32	40.0	23	28.8	12	15.0	8	10.0	4	5.0	1	1.3			
	Two months Post- guidelines	30	37.5	22	27.5	13	16.3	9	11.3	5	6.3	1	1.3			
Does regurgitation change your diet?	Pre-educational guidelines	22	27.5	25	31.3	15	18.8	10	12.5	6	7.5	2	2.5	21.5 .000**	5.1 0.403	17.2 0.002**
	One-month post- guidelines	38	47.5	20	25.0	10	12.5	7	8.8	4	5.0	1	1.3			
	Two months Post- guidelines	35	43.8	19	23.8	11	13.8	8	10.0	5	6.3	2	2.5			
Does regurgitation wake you from sleep?	Pre-educational guidelines	28	35.0	20	25.0	12	15.0	10	12.5	7	8.8	3	3.8	23.7 .000**	4.3 0.503	18.6 0.001**
	One-month post- guidelines	45	56.3	15	18.8	8	10.0	7	8.8	4	5.0	1	1.3			
	Two months Post- guidelines	42	52.5	16	20.0	9	11.3	8	10.0	4	5.0	1	1.3			

Table (7): Distribution of the studied patients regarding reflux severity index (n=80)

Reflux Severity Index		No problem		Very Mild problem		Moderate or slight problem		Moderate problem		Severe problem		Problem as bad as it can be		$X^2$1 P1	$X^2$2 P2	$X^2$3 P3
Hoarseness or voice problems	Pre-educational guidelines	16	20.0	24	**30.0**	11	13.8	8	10.0	13	16.3	8	10.0	5.59 0.232	2.08 0.720	9.21 0.056
	One-month post- guidelines	32	40.0	19	**23.8**	10	12.5	6	7.5	8	10.0	5	6.3			
	Two months Post- guidelines	40	50.0	16	**20.0**	8	10.0	5	6.3	6	7.5	5	6.3			
Throat clearing	Pre-educational guidelines	13	16.3	22	27.5	19	23.8	7	8.8	11	13.8	8	10.0	2.63 0.621	1.31 0.859	4.02 0.402
	One-month post- guidelines	29	36.3	21	26.3	13	16.3	6	7.5	8	10.0	3	3.8			
	Two months Post- guidelines	35	43.8	19	23.8	9	11.3	5	6.3	6	7.5	5	6.3			
Excessive nasal or throat drip	Pre-educational guidelines	8	10.0	19	23.8	19	**23.8**	10	12.5	16	20.0	8	10.0	1.72 0.786	4.82 0.306	4.97 0.290
	One-month post- guidelines	19	23.8	24	30.0	15	**18.8**	7	8.8	10	12.5	5	6.3			
	Two months Post- guidelines	32	40.0	21	26.3	11	**13.8**	5	6.3	8	10.0	3	3.8			
Difficulty swallowing food, liquids, or pills	Pre-educational guidelines	19	23.8	16	20.0	12	15.0	12	15.0	13	16.3	8	10.0	1.87 0.759	4.47 0.345	6.42 0.170
	One-month post- guidelines	35	43.8	18	22.5	11	13.8	5	6.3	8	10.0	3	3.8			
	Two months Post- guidelines	45	56.3	14	17.5	7	8.8	4	5.0	6	7.5	3	3.8			
Coughing after eating or lying down	Pre-educational guidelines	10	12.5	21	26.3	18	22.5	8	10.0	16	20.0	8	10.0	1.11 0.892	3.76 0.439	6.50 0.164
	One-month post- guidelines	24	30.0	22	27.5	12	15.0	7	8.8	10	12.5	5	6.3			
	Two months Post- guidelines	38	47.5	18	22.5	11	13.8	5	6.3	8	10.0	3	3.8			
Difficulty breathing or choking attacks	Pre-educational guidelines	32	40.0	19	23.8	10	12.5	6	7.5	8	10.0	5	6.3	4.56 0.335	3.02 0.554	7.13 0.129
	One-month post- guidelines	48	60.0	13	16.3	6	7.5	5	6.3	5	6.3	3	3.8			
	Two months Post- guidelines	56	70.0	10	12.5	5	6.3	3	3.8	5	6.3	1	1.3			

An annoying cough	Pre-educational guidelines	13	16.3	22	27.5	13	16.3	8	10.0	13	16.3	8	10.0	1.07 0.900	2.70 0.609	4.38 0.356
	One-month post- guidelines	29	36.3	19	23.8	11	13.8	7	8.8	10	12.5	5	6.3			
	Two months Post- guidelines	40	50.0	16	20.0	8	10.0	5	6.3	8	10.0	3	3.8			
Feeling of something stuck in the throat	Pre-educational guidelines	13	16.3	24	**30.0**	16	20.0	6	7.5	13	16.3	8	10.0	3.78 0.436	3.21 0.523	6.11 0.191
	One-month post- guidelines	32	40.0	19	**23.8**	10	12.5	6	7.5	8	10.0	5	6.3			
	Two months Post- guidelines	42	52.5	16	**20.0**	7	8.8	4	5.0	6	7.5	5	6.3			
Heartburn, chest pain, indigestion, or stomach acid reflux	Pre-educational guidelines	8	10.0	16	20.0	20	**25.0**	9	11.3	19	**23.8**	8	10.0	2.31 0.678	3.25 0.517	5.78 0.215
	One-month post- guidelines	19	23.8	22	27.5	15	**18.8**	6	7.5	13	**16.3**	5	6.3			
	Two months Post- guidelines	32	40.0	19	23.8	10	**12.5**	6	7.5	10	**12.5**	3	3.8			

X21P1 between pre and post educational guidelines X23P3 between pre educational guidelines and follow-up

No statistically significant difference (P>0.05)

X22P2 between post educational guidelines and follow-up

Discussion

Nursing care for the patient with GERD is a dynamic and continuous process that integrates scientific knowledge, compassionate communication, and skilled clinical judgment. The nurse serves as the primary educator, demystifying the condition, explaining the rationale behind lifestyle and dietary modifications, and ensuring patients understand their medication regimen, including potential side effects and the importance of adherence **(Alruwaili et al., 2024)**.

Regarding educational level, the study results showed that more than half of the studied patients had a diploma education. These results were similar to **Goumaa, Abozead, Sayed, & Medhat (2025)** reported that the majority of GERD patients had a moderate level of education, indicating that educational status plays a significant role in shaping patients' knowledge and health-related behaviors. Lower or moderate educational levels may limit patients' access to reliable health information, thereby increasing the need for structured educational interventions. On the opposite side, **Alsuwat, Alzahrani, Alzhrani, Alkhathami, & Mahfouz (2018)** demonstrated no correlation between educational level and GERD.

Concerning occupational status, the present study results showed that more than half of the patients were employed; this is in line with **Zhang, Hou, Huang, Chen, & Liu (2021).** noticed that some occupational characteristics are related to GERD. Conversely, **Alsuwat, Alzahrani, Alzhrani, Alkhathami, & Mahfouz (2018)** noted that there was no association between GERD's prevalence and occupation.

Regarding residence, the present study showed that most of the nocturnal GERD patients were living in urban areas, which was consistent with **Chowdhury et al. (2019),** who reported that urban residents had a higher prevalence of GERD compared to rural residents. This contradicts **He et al. (2010),** who reported that individuals living in rural areas had a higher risk of GERD than those living in urban areas.

Concerning health data of the studied patients.

Regarding BMI distribution, the study revealed that almost half of the studied patients were classified as obese. Only a small proportion fell within the ideal weight range or above ideal weight, highlighting obesity as a potential risk factor for nocturnal GERD, in accordance with

Xie, Deng, Fass, & Song (2024), who announced that obesity was associated with a higher prevalence of GERD and GERD-related complications. In contrast, **Abed, Sayyed, Yamak, Abdoh, & Badrasawi (2024)** reported no significant association between body mass index and GERD symptoms, suggesting that other lifestyle factors such as night eating or physical activity may play a more important role.

In relation to eating habits, most of the studied patients consumed 4–5 meals per day, more than three-quarters ate snacks at night, and most of them consumed spicy food and fatty foods. These results were in the same line as **Ahmed & Khalil (2021),** who confirmed that diet is an important factor for the development of GERD symptoms and suggested eating frequently and slowly small amounts of food. This contradicts **Baklola et al. (2023),** who showed that dietary habits such as food type, eating dinner one hour or two hours before sleeping, and eating meals at midnight are not significantly associated with GERD in their sample.

Regarding medications, almost all the patients took antacids, most of them took histamine-2 receptor antagonists, and more than half took proton pump inhibitors. Accepted with **Mathew, Nandini, Saraswathy, Subeesh, & Maheswari (2017)**, the study revealed that more than half of the patients were treated with combination therapy, followed by nearly two-fifths of patients with monotherapy and a minority of patients with agents other than proton pump inhibitors Inconsistent with **Delshad, Almario, Chey, & Spiegel (2020)** reported that less than half of those who had experienced GERD symptoms were on therapy.

Concerning smoking history, more than half of patients were smokers. This is in harmony with **Kim et al. (2025),** who, in a systematic meta-analysis of inhalational exposures, including tobacco smoke, reported a pooled increased risk of GERD among exposed individuals, suggesting that smoking may contribute to disease development in diverse populations. Conversely, **Essa et al. (2024)** found no correlation between tobacco smoking and GERD prevalence, possibly due to the low proportion of smokers in this population and limited statistical power to detect an effect.

Pertaining to the studied patients' knowledge regarding nocturnal

GERD, lifestyle management, and organization. The present study revealed a significant improvement in patients' knowledge regarding nocturnal GERD, lifestyle management, and organization post-implementation of educational guidelines. This finding may be attributed to the effectiveness of structured patient education in enhancing awareness of the disease's causes, symptoms, and lifestyle modifications. This is in harmony with the findings of **Ali & Atiyah (2025),** who demonstrated that an educational program about lifestyle habits significantly improved GERD patients' knowledge compared with the control group.

In contrast, **Urnes, Petersen, & Farup (2008)** reported that although GERD education increased patients' knowledge scores, this improvement was not associated with significant changes in QOL.

In relation to the nocturnal GERD level of the studied patients, the study showed a noticeable improvement in the severity of nocturnal gastroesophageal reflux disease after the implementation of the educational guidelines. The proportion of patients with severe nocturnal GERD decreased markedly after the intervention and continued to decline during the follow-up period, while the percentage of patients with mild symptoms increased. This shift in disease severity may indicate the effectiveness of the educational guidelines in enhancing patients' awareness about lifestyle modifications, dietary habits, sleep positioning, and adherence to therapeutic regimens. These findings are consistent with **Ahmed & Khalil (2021)** reported that implementing an educational program for patients with GERD significantly improved patients' knowledge and promoted positive lifestyle changes that help in controlling GERD symptoms.

Regarding the GERD health-related QoL of the studied patients, the findings of the current study revealed a highly statistically significant improvement in the HRQOL among patients with GERD following the implementation of educational guidelines. This improvement was consistent across all studied parameters, including symptom severity, functional impacts, and daily life activities.

Regarding heartburn and regurgitation, there was a substantial shift from "bothersome symptoms" to "no symptoms." Specifically, the percentage of patients reporting no

heartburn, which increased from a small proportion at the pre-educational phase to more than one-third at the follow-up. Similarly, asymptomatic cases of regurgitation showed a noticeable increase over time.

The significant reduction in symptoms while lying down or after meals suggests that patients effectively adopted lifestyle modifications, such as elevating the head of the bed and managing meal timings. These results align with clinical evidence stating that behavioral changes are fundamental in reducing nocturnal reflux and postprandial distress.

The educational intervention also succeeded in alleviating the functional burden of the disease. Difficulty and pain during swallowing showed remarkable improvement, with most patients becoming asymptomatic by the follow-up period.

Furthermore, the impact of GERD on sleep quality and dietary habits was significantly minimized. The proportion of patients whose sleep was not interrupted by heartburn or regurgitation increased to more than half of patients during follow-up. This reflects better control over the disease's "silent" symptoms that typically occur during rest.

A key statistical highlight of this study is the non-significant difference observed between the "post-educational" and "follow-up" phases in most items; this indicates sustainability. The patients did not only improve immediately after the session but also managed to maintain those health gains over time. This proves that the educational guidelines led to a genuine and lasting change in the patients' self-management behaviors.

The high significance across pre- and post-intervention stages confirms that structured nursing education is an indispensable tool in nocturnal GERD management. It effectively reduces the transition of symptoms from "incapacitating" to "manageable" or "absent," thereby enhancing the overall patient well-being. The current results agreed with **Naguib, El-Deen, & Abosree (2024),** who reported a significant relationship between patients' knowledge, practices, and QoL among patients with gastroesophageal reflux disease, indicating that improving patients' knowledge and self-care practices may contribute to better disease management and improved QoL scores among the studied patients. In

contrast to the findings of the present study, **Urnes, Petersen, & Farup (2008)** reported that although the educational program significantly improved patients' knowledge about gastroesophageal reflux disease, the increase in knowledge was not associated with significant improvement in QoL or clinical outcomes among GERD patients. Concerning the Reflux Severity Index of the studied patients, results demonstrate a significant shift in the distribution of symptom severity from "severe" and "moderate" at the pre-educational stage to "No problem" or "Mild" at the follow-up stage. This transition suggests that providing patients with structured educational guidelines acts as a potent non-pharmacological intervention. When patients understand the pathophysiology of nocturnal GERD, they are more likely to adhere to behavioral changes.

A crucial highlight is the improvement in symptoms directly affected by nighttime behaviors, specifically coughing after lying down and difficulty breathing or choking attacks. The statistical significance in these areas indicates that the educational instructions were highly effective. Reducing these "choking attacks" is a primary driver for improving QOL, as it directly reduces sleep fragmentation and nocturnal anxiety.

The results show that increased knowledge leads to a decrease in the frequency of throat clearing and globus pharyngeus. This proves that "patient empowerment" through education is as vital as medical treatment in managing GERD.

The reduction in RSI scores is the primary mediator for the observed improvement in QOL. As the physical burden of reflux (heartburn and chest pain) decreased post-intervention, patients reported better sleep hygiene and higher daily productivity, which are core components of the QoL index used in this study.

The study results revealed a marked improvement in the RSI following the implementation of educational guidelines. Specifically, the percentage of patients reporting 'No problem' regarding choking attacks and nocturnal coughing increased significantly during the follow-up period. This suggests that the educational intervention successfully modified patient behaviors related to sleep posture and dietary timing.

These findings are consistent with **Katz et al. (2022).** ACG Clinical Guidelines The most recent American College of Gastroenterology guidelines strongly recommend weight

loss and avoiding meals 2–3 hours before bedtime for symptom control. This justifies the "Educational Guidelines" as being evidence-based and explains the statistical improvement in the results as a direct consequence of these timing-related changes. Also, **Zhang, Hou, Huang, Chen, & Liu (2021)** showed that structured nursing education for GERD patients led to higher self-management scores, which directly correlated with a better quality of life. This proves that "knowledge" is the bridge to "quality of life." And lifestyle modifications are the cornerstone of managing nocturnal GERD. Furthermore, the significant decline in symptom severity directly correlates with the improvement in the patients' overall quality of life, as controlled symptoms lead to restorative sleep and reduced psychological distress."

On the other hand, **Goumaa, Abozead, Sayed, & Medhat (2025)** conclude that poor knowledge among GERD patients is common, and patients experience severe symptoms regardless of their level of knowledge. This suggests that factors beyond knowledge, such as psychological well-being and adherence to treatment, play a significant role in the severity of GERD symptoms.

Limitations:

The sample size was relatively small, the study was in a single center, and the follow-up of patients was limited to a relatively short period.

Conclusion

Based on the findings of the present study, it can be concluded that there was significant improvement in patients' knowledge regarding nocturnal GERD disease. In addition, there was significant improvement in patients' QoL post-implementation of guidelines and patients' clinical data and symptoms post-implementation of guidelines.

Recommendations:

-Driven from the current study and based on the findings, it is recommended that educational guidelines for nocturnal GERD should be integrated into the routine nursing care to enhance patients' knowledge and self-management practices. Regular training programs should be provided for nurses to strengthen their role in patient education and counseling.

-Continuous educational interventions, supported by simple booklets, brochures, and illustrated materials, are also recommended to improve patients' understanding of nocturnal GERD and its

management. Furthermore, periodic follow-up should be maintained to monitor adherence to lifestyle modifications and evaluate improvements in symptom control and QOL. Future research involving larger samples and diverse healthcare settings is warranted to confirm the effectiveness of educational interventions and enhance the generalizability of the findings.

Financial support and sponsorship: Nil

Conflict of Interest: Nil

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Mindfulness Traits, Self-Concept Clarity and Emotion Regulation among Patients with Borderline Personality Disorder

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Abstract

Background: Studies indicate that emotion dysregulation (ED) and self-concept instability are core characteristics of borderline personality disorder (BPD) which undermine an individual's capacity to maintain stable identity representations and engage in mindful, non-reactive awareness of one's internal emotional states. Understanding these relationships may provide valuable insights into the psychological mechanisms underlying the disorder and support the development of more targeted therapeutic intervention **Aim:** assess relationship between mindfulness traits, self-concept clarity and emotion regulation among patients with borderline personality disorder. **Research design:** A descriptive-correlational research design was utilized. **Setting:** the study was conducted at outpatient clinics of the Psychiatry, Neurology and Neurosurgery of Tanta University hospitals. **Subjects:** All patients were diagnosed with borderline personality disorder during the time of the study (No = 60) **Tools: tool I;** The Five Facet Mindfulness Questionnaire (FFMQ) **tool II**; Self-concept Clarity scale **tool III**; Perth Emotion Regulation Competency Inventory (PERCI). **Results** the study revealed statistically significant positive correlation between mindfulness traits and self-concept clarity. Also, there was a statistically significant negative correlation between mindfulness traits and emotion regulation difficulties, as well as between self-concept clarity and emotion regulation difficulties**. Conclusion** mindfulness traits and self-concept clarity are interrelated and significantly influence emotion regulation of patients with BPD. **Recommendation** Mental health professionals should incorporate mindfulness-based interventions into treatment programs for individuals with BPD as well as prevention programs in at-risk populations.

Keywords*:* Mindfulness traits, Self-concept clarity, Emotion regulation, borderline personality disorders

Introduction

Borderline personality disorder (BPD) is a persistent and multifaceted psychiatric condition characterized by significant emotional distress, primarily driven by difficulties in regulating emotions **(Leichsenring et al ;2024).** Individuals with BPD frequently experience symptoms including intense fear of abandonment, impulsive and self-destructive behaviors, suicidality as well as marked difficulties in anger management **(Perrotta 2020).** The disorder is further distinguished by persistent feelings of emptiness andprofound instability across emotional, identity, and self-concept domains, reflecting a fragmented and incoherent sense of self. Compounding these difficulties, deficits in trait mindfulness have been shown to worsen symptom severity, reduced emotional awareness, and heightened interpersonal conflict **(APA-TR, 2022; Leichsenring et al., 2024).** Collectively, these overlapping features impose a considerable burden on patients with BPD, substantially diminishing quality of life and impairing their capacity to function adaptively across social, occupational, and relational contexts **(Dhar, Hay & Meade, 2023).**

An essential mechanism that plays a curtail role in these symptoms is diminished levels of mindfulness traits which empirically contribute to the development of personality psychopathology concerning BPD ***(*Thompson et al., 2020)**. Hence mindfulness traits have emerged as a critical multidimensional construct that may address both identity and emotional deficits in BPD. Mindfulness traits refer to the innate capacity of paying and maintaining attention to present-moment experiences with an open and nonjudgmental attitude **(Medvedev, Krägeloh, Narayanan, & Siegert ;2017).**

Trait mindfulness reduces emotional dysregulation by helping individuals observe their negative thoughts and emotions in a decentered and less judgmental manner, thereby reducing impulsive emotional reactivity, avoidance, and over-engagement with negative emotions **(Carpenter, Conroy, Gomez,Curren, & Hofmann., 2019)**. Conversely, rather than maintaining conscious awareness of their current emotional experiences, individuals with BPD are inclined toward abstract, generalized cognition, a pattern that substantially impairs their emotional

regulatory functioning **(Mungo, Delhaye, & Hein.,2026)**.

Deficits in mindfulness facets particularly non-judging and acting with awareness are linked with heightened emotional reactivity and a marked impairment in one's ability to navigate stressful experiences through adaptive and flexible coping mechanisms **(Salgó, Szeghalmi, Bajzát, Berán, & Unoka.,2021; Bogos, Măirean, Tiperciuc, Muntele-Hendreș, & Mariș.,2025).** Building on this idea, researchers have found that mindfulness plays a central role in reducing impulsive reactions and improving emotional stability **(Natividad, Huxley, Townsend , Grenyer, & Pickard .,2023).**

Parallel to mindfulness traits is the construct of self-concept clarity (SCC) which encompasses the degree to which one's self-perceptions are precisely defined, firmly held, free from internal contradiction, and persistent over time, as well as considering an empirically assessable aspect of identity and has implications on one's feelings and behaviors **(Campbell 1990).** Patients with BPD suffer from markedly low self-concept clarity, which is a significant predictor of identity disturbance ,self-injurious urges and behavioral dyscontrol **(Scala et al., 2018).** Studies have shown that low self-concept clarity can exacerbate the impact of negative affect and contribute to both emotional and behavioral dysregulation which further impose significant burdens on interpersonal functioning. In contrast higher self-concept clarity is associated with resilience against impulsive self-injurious tendencies even during periods of acute emotional dysregulation and supporting broader adaptive functioning and psychological well-being **(Zhang et al., 2026& Parise, Cannistrà , Papini , & Savarese., 2019)**

Indeed, self-concept clarity function as a key determinant in regulating cognition, emotion, and behavior within self-regulation contexts, hence emotion regulation (ER) is a central component of mental health that includes all of the conscious and non-conscious strategies that individuals use to increase, to maintain or decrease one or more components of an emotional response **(Gross.,2015&Mungo et al.,2026)**.

Within the psychological framework of BPD, emotion dysregulation is regarded as a central and diagnostically defining characteristic. This manifests in frequent episodes

of intense, unmanageable negative emotions including feelings of abandonment, loneliness, jealousy, rejection, hatred, envy, anger, shame, and guilt that can profoundly disrupt daily functioning. **(Göhre, Schulze, Bödeker, & Roepke.,2025 ; Daros & Williams .,2019).**

In addition, patients commonly report experiencing aversive tension — a pervasive, intensely heightened state characterized by a negative emotional tone — and they find it difficult to recognize, articulate, or make sense of what they are feeling **(Reivan Ortiz & Icaza Álvarez; 2021)**. The ways in which they react to their emotional states tend to be poorly regulated: patients may behave impulsively, erupt in sudden fits of anger, respond to situations in a reactive manner, and demonstrate an unstable or fluctuating emotional expression **(Waite et al.,2024).**

Findings have suggested that individuals presenting with BPD symptoms demonstrate a notably lower tendency to draw upon ER strategies that are broadly considered more effective in reducing negative affect — specifically, cognitive reappraisal, problem solving, and acceptance — alongside a markedly higher tendency toward ER strategies that are generally viewed as less effective in addressing negative affect, such as suppression, rumination, and avoidance **(Messina, Spataro, Gagliardini, Rossi , & Grecucci ., 2026; Daros & Williams., 2019)**.

Moreover, individuals with BPD are less equipped to employ adaptive emotion regulation strategies such as maintaining mindful awareness of their emotional states — and struggle to tolerate distress arising from both negative and positive emotions **(Roberts et al., 2023)**. Additionally low self-clarity is associated with heightened emotion dysregulation so individuals with low SCC may find themselves caught in a vicious cycle in which fluctuating emotions further obscure their sense of self. These challenges in recognizing, responding, and regulating emotions can in turn exacerbate BPD symptoms **(Light 2017, Jiang, Wang, Poon, Gaer, & Wang.,2023)**.

This study has contributed to a deeper understanding of the complex interplay among mindfulness, self-concept clarity, and emotion regulation, revealing that improvements in one construct may facilitate positive changes in the others. These insights into emotional life and its disturbances call upon mental health professionals to

prioritize the teaching of mindful emotion regulation skills to patients with BPD.

Aim of the Study

Assess relationship between mindfulness traits, self-concept clarity and emotion regulation among patients with borderline personality disorder.

Research questions

-What are the levels of mindfulness traits, self-concept clarity and emotion regulation among patients with borderline personality disorder?

-What is the relationship between mindfulness traits, self-concept clarity and emotion regulation among patients with borderline personality disorder?

Subjects and Method.

Research design:

This study used **a descriptive-correlational research design.**

Setting:

The study was conducted at outpatient clinics of Psychiatry, Neurology and Neurosurgery. This center provides a specialized tertiary care facility that serves a large population in the Nile Delta region. It comprises specialized outpatient clinics for adult and pediatric psychiatry, as well as inpatient departments. The clinics operate daily (except Fridays) from 8:00 am to 2:00 pm, this setting is affiliated to the Ministry of higher education and scientific research.

Subjects:

All patients were diagnosed with borderline personality disorder during the time of the study (No=60) and those patients were considered eligible for inclusion in the study if they satisfied the following criteria: a minimum age of 18 years, absence of an acute clinical presentation, and no documented history of intellectual disability, substance use disorder or co-occurring psychiatric conditions.

Tools of data collection:

Three tools were used for collecting data from the study subjects:

Tool I Five Facet Mindfulness questionnaire

Part I: Sociodemographic and clinical data questionnaire:

This part was developed by researchers to gather pertinent data pertaining to patients, sociodemographic profiles — namely sex, age, marital status, residence, income, level of education, cohabitation and type of family role. Clinical data including age of onset of illness, duration of disease, age of seeking treatment, number of previous suicidal attempts, number of previous hospitalizations, and history of child abuse.

Part II : Five Facet Mindfulness Questionnaire (FFMQ)

It was developed by **Baer, Smith, Hopkins, Krietemeyer & Toney (2006)** a self-report measure of trait mindfulness and adopted by the researchers. It was designed to measure the tendency to attend to present-moment experiences with awareness and a non-judgmental attitude. It composed of 39 items that focused on: Five Facets (Subscales); **Observing**(8 items that notice internal and external experiences) **Describing** (8 items that label experiences with words), **Acting with Awareness** (8 items that focuses on present activities),**Non-judging of Inner Experience** (8 items that refrain from evaluation), and **Non-reactivity to Inner Experience (**7 items that allow thoughts/emotions to pass). Scoring system; each item scored from 1 never to 5 very often**.** Reverse scoring applied to specific items (mainly awareness and non-judging items). **The total** score ranging from 39 to 195.

The total score of each item was summed then was converted into percentage scores as the following:

-Less than 50% low level of Mindfulness Traits.

-50% -75% moderate level of Mindfulness Traits.

-More than 75% high level of Mindfulness Traits.

Tool II: The Self-Concept Clarity Scale (SCCS).

It is a unidimensional scale that was developed by **Campbell et al., (1996)** and adopted by the researchers. **It was used to measure the extent to which self-beliefs are clearly and confidently defined, internally consistent, and stable over time. It included 12 items.** Scoring system; **each item rated on a five-point Likert scales. Score '1" indicates strongly disagree, while a score of '5" indicates strongly agree. The total** score ranging from 12 to 60.

The total score of each item was summed then was converted into percentage scores as the following:

-Less than 50% low level of Self-Concept Clarity.

-50% -75% moderate level of Self-Concept Clarity.

- More than 75% high level of Self-Concept Clarity.

Tool III: The Perth Emotion Regulation Competency Inventory (PERCI). It was developed by **Preece , Becerra , Robinson , Dandy , & Allan (2018)** to assess an individual's ability to regulate both

negative and positive emotions and adopted by the researcher. **It was used to modify emotional responses appropriately across experiential and behavioral domains and to know when regulation is needed. It includes 32 items,** 8 subscales (4 negative emotion and 4 positive emotion domains), and each subscale composed of 4 items.

Negative emotion regulation Subscales include negative-controlling experience, negative-inhibiting behaviour, negative-activating behaviour, and negative-tolerating emotions. While **positive emotion regulation Subscales include** positive-controlling experience, positive-inhibiting behaviour, positive-activating behaviour, positive-tolerating emotions.

Scoring system.

Each item rated on a 7-point Likert scale. Score ‘1" indicates strongly disagree, while a score of ‘7" indicates strongly agree.

The total score ranging from 32 to 224.

The total score of each item was summed then was converted into percentage scores as the following:

-Less than 50% low level of emotion regulation difficulties.

-50% -75% moderate level of emotion regulation difficulties.

- More than 75% of high levels of emotion regulation difficulties.

Method

1- An official permission to conduct the study was granted by the Dean of the Faculty of Nursing and subsequently forwarded to the director of the study setting.

2-Ethical considerations:

-An ethical approval was obtained from the Faculty of Nursing's ethical committee, Tanta University, under approval code number (490-6-2024).

-Written informed consent was obtained from all study subjects prior to their inclusion in the study.

-Study subjects were fully briefed on the study's objectives and assured that all collected information would be kept strictly confidential, with privacy protected, and exclusive use of their data for research purposes.

-Subjects were explicitly informed of their right to decline participation or to withdraw from the study at any point, without consequence. The study was designed to be entirely non-harmful, posing no risk to their wellbeing.

3-Developing tools:

-All three study tools (I, II, and III) were translated into Arabic, followed by back-translation carried out by the

researchers to verify linguistic accuracy. Content validity was subsequently established through review by a panel of five specialists in the field of psychiatric nursing, who evaluated the appropriateness and relevance of each item in measuring its intended construct. All tools were confirmed to demonstrate satisfactory content validity.

- A pilot study was conducted on a sample of six patients (10% of the study subjects) to evaluate the clarity and practical feasibility of the tools. These patients were subsequently excluded from the main study sample to ensure the integrity of the results.

-Cronbach's alpha was employed to determine the internal consistency of the Arabic versions of the three tools, producing coefficients of 0.87 (Tool I), 0.85 (Tool II), and 0.83 (Tool III), confirming satisfactory reliability.

4-The actual study:

- Every eligible patient fulfilling the predetermined inclusion criteria was individually approached and interviewed by the researchers.

-This interview served to foster rapport, establish a therapeutic relationship, and familiarize patient with the study's objectives, following which informed consent was obtained and the study tools were subsequently completed.

-Each interview ranged in duration from 30 to 45 minutes. Data collection was carried out over a period of three months, spanning from September to November.

Statistical analysis

All collected data were processed and statistically analyzed using SPSS (version 27). Quantitative data were described by means and standard deviations. While categorical variables were summarized through frequency tables and cross-tabulations with percentages. Two-tailed statistical tests were conducted at a significance level of $\alpha = 0.05$ ($p \leq 0.05$).

Pearson's correlation coefficient was utilized to determine the strength and direction of relationships between quantitative and ordinal variables, with $r < 0.25$ denoting a weak association and $r = 0.25–0.74$ reflecting an intermediate one. Linear regression analysis was further applied to model associations between dependent and independent variables, optimizing predictive accuracy through best-fit line estimation.

Results

Table (1): **Illustrates the distribution of the studied patients according to their socio-demographic characteristics.**

Regarding age distribution, less than half of the studied patients (45.0%) were aged between 20 and less than 30 years, with a mean age of 32.55 ± 7.77 years. Regarding sex, females represented the majority of the sample (61.7%), whereas males accounted for 38.3%.

Concerning marital status, more than one-third of the studied patients were single (38.3%), while (35.0%) were married and (26.7%) were divorced. In relation to residence, urban residents constituted the majority (61.7%) compared to rural residents (38.3%).

As for educational level, the highest percentage of patients had university education (38.3%), followed by secondary education (30.0%), while only 8.3% had primary education. **Regarding cohabitation**, the majority of the studied patients (71.7%) were living with their families. **Regarding, income** nearly two-thirds of the studied patients (63.3%) reported having enough income, whereas 36.7% indicated insufficient income. Finally, diffused family roles were the most frequently family pattern (43.3%), followed by rigid family roles (30.0%), while structured and flexible roles were (15%) (11.7%) respectively.

Table (2): Shows the distribution of the clinical characteristics of the studied patients. The findings revealed that nearly two-thirds of the studied patients (65.0%) experienced the onset of illness between the ages of 20 and less than 25 years, with a mean onset age of 24.17 ± 3.32 years. **Regarding the duration of illness**, almost half of the patients (48.3%) had been suffering from the disorder for 8 to less than 16 years, with a mean duration of 8.67 ± 5.52 years.

Concerning treatment-seeking behaviour, (40.0%) of the studied patients sought treatment between the ages of 20 and less than 25 years, with a mean age of seeking treatment of (26.48 ± 4.44) years. **Regarding suicidal behaviour**, the majority of patients had a history of suicidal attempts, where (41.7%) attempted suicide once, (31.7%) twice, and (18.3%) three times, while only (8.3%) had no previous suicidal attempts.

As for number of previous hospitalizations, 41.7% of the studied patients had been hospitalized three times previously, while (38.3%) had no prior hospitalization while (3.3%) had experienced hospital admissions for one time.

In relation to history of childhood abuse, more than two-thirds of the

studied patients (68.3%) exposed to childhood abuse. Among those exposed, physical abuse represented the majority (73.18%), whereas sexual abuse accounted for (26.82%).

Table (3): **Illustrates the mean score of Five Facet Mindfulness subscales among studied patients.** It showed that a total FFMQ mean score of 80.02 ± 22.89 and a median of 75. Among the five facets, observing had the highest mean score (16.60±4.938), closely followed by non-judging of inner experience (16.48±5.429), while non-reactivity to inner experience had the lowest mean score (14.60±4.287).

Table (4): Represents the mean score of Five Facet Perth Emotion Regulation Competency Inventory (PERCI) among studied patients. It reveals relatively high PERCI scores across both negative and positive emotion regulation difficulties domains, as the mean score of negative emotion regulation difficulties was (95.55±9.015), while the mean score of positive emotion regulation difficulties was (95.72±9.397), while the overall mean score was (191.27±18.026).

Figure (1): shows distribution of the studied patients, according to total level of self-concept clarity. It was found that 80% of the studied patients had poor levels of self-concept clarity while only 3.3% of them had high levels of self-concept clarity with Mean ± SD equal to 22.72±6.123.

Figure (2): Describes distribution of the studied patients regarding five facet mindfulness scales. It was found that 78.3% of the studied patients had low mindfulness traits while only 5% of them had high levels of mindfulness traits.

Figure (3): Reveals the distribution of the studied patients regarding Facet Perth emotion regulation competency scales. It was found that 76.7% of the studied patients had high levels of emotion regulation difficulties while only 8.3% of them had low levels of emotion regulation difficulties.

Table (5): Represents correlation matrix among the studied variables. It illustrates that there is statistically significant positive correlation between mindfulness traits and self-concept clarity as P-value = (0.000**), r = (0.603). Also, there was a statistically significant negative correlation between mindfulness traits and emotion regulation difficulties as P-value = (0.000**), r = (-.543). Regarding the correlation between self-concept clarity and emotion regulation

difficulties there was a statistically significant negative correlation as P-value = (0.000**), r = (-.583).

Table (6): Illustrates Linear regression analysis among the studied variables. It shows that the model was statistically significant and explained a moderate proportion of the variance in mindfulness, with $R = 0.648$, $R^2 = 0.419$, adjusted $R^2 = 0.399$, and $F = 20.582$. Self-concept clarity was a significant positive predictor of mindfulness, whereas emotion regulation difficulties was a significant negative predictor. Among the predictors, self-concept clarity showed a strong positive association with mindfulness ($B = 1.625$, $\beta = 0.435$, $t = 3.497$, $p = 0.001$), indicating that higher self-concept clarity is associated with higher mindfulness scores. In contrast, emotion regulation competency had a significant negative association with mindfulness ($B = -0.368$, $\beta = -0.290$, $t = -2.330$, $p = 0.023$), suggesting that this variable independently predicts lower mindfulness scores in this sample.

Table (1): Distribution of the patients studied according to their socio-demographic characteristics (N= 60)

Socio-demographic characteristics	The studied patients (n=60)	
	N	%
Age (in years) (20<30) years (30-<40) years (40- <50) years	 27 20 13	 45.0 33.3 21.7
Range **Mean ± SD**	**(21-48)** **32.55±7.77**	
Sex Male Female	 23 37	 38.3 61.7
Marital status Single Married Divorced	 23 21 16	 38.3 35.0 26.7
Residence Rural Urban	 23 37	 38.3 61.7
Educational Level Primary Secondary University Post graduated study	 5 18 23 14	 8.3 30.0 38.3 23.3
Cohabitation With family Alone	 43 17	 71.7 28.3
Income Enough Not Enough	 38 22	 63.3 36.7
Family role Rigid Structured Flexible Diffused	 18 9 7 26	 30.0 15.0 11.7 43.3

Table (2): Distribution of the studied patients according to their clinical characteristics (N= 60)

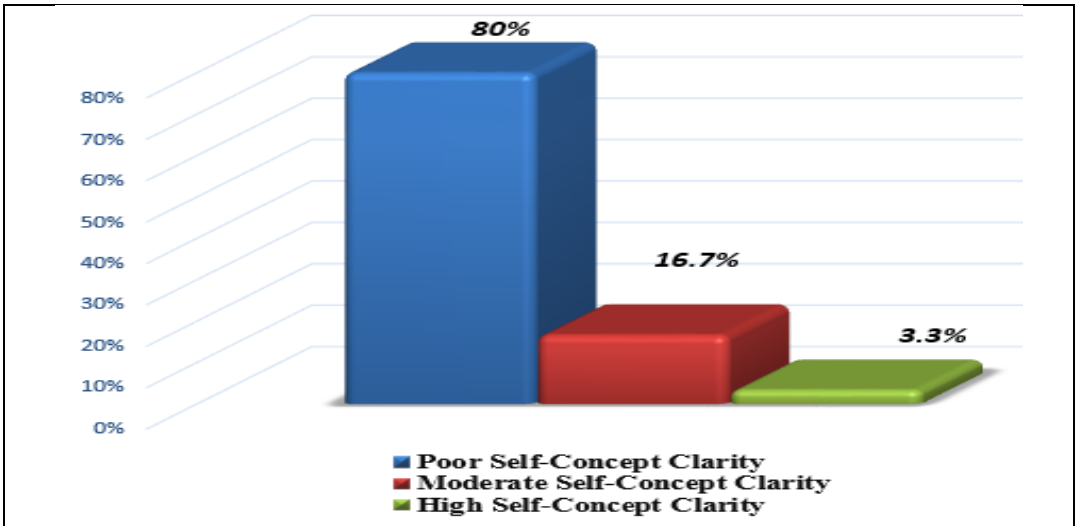
Clinical characteristics	The studied patients (n=60)	
	N	%
Age at onset of illness (in years)		
(20<25) years	39	65.0
(25-<30) years	15	25.0
(30- <35) years	6	10.0
Range	**(20-33)**	
Mean ± SD	**24.17±3.32**	
Duration of disease (in years)		
< 8	23	38.3
8- <16	29	48.3
16 : 25	8	13.3
Range	**(1-25)**	
Mean ± SD	**8.67±5.52**	
Age of seeking treatment (in years)		
(20<25) years	24	40.0
(25-<30) years	19	31.7
(30- <40) years	17	28.3
Range	**(20-38)**	
Mean ± SD	**26.48±4.44**	
Number Previous suicidal attempts		
zero	5	8.3
once	25	41.7
twice	19	31.7
three times	11	15.3
Number of previous hospitalizations		
zero	23	38.3
once	2	3.3
twice	10	16.7
three times	25	41.7
History of child abuse		
Yes	41	68.3
No	19	31.7
If yes, what is the type of abuse?		
Physical	30	73.18
Sexual	11	26.82

Table (3): Mean score of Five Facet Mindfulness Subscales among studied patients (No= 60)

Five Facet Mindfulness Subscales	Score Range	Total score		
		Min. – Max.	Mean ± SD	Median
Observing	(8-40)	(9-30)	16.60±4.938	16.00
Describing	(8-40)	(10-32)	16.27±4.836	14
Acting with Awareness	(8-40)	(10-28)	16.07±4.517	15
Non judging of inner experience	(8-40)	(9-31)	16.48±5.429	16
Non reactivity to inner experience	(7-35)	(8-27)	14.60±4.287	15
Total score FFMQ	(39-195)	(46-148)	80.02±22.89	75

Table (4): Mean score of Five Facet Perth Emotion Regulation Competency Inventory (PERCI) among studied patients (No= 60)

Emotion Regulation Competency Inventory (PERCI)		Score Range	Total score		
			Min. – Max.	Mean ± SD	Median
Negative emotion regulation difficulties subscales	Negative-Controlling Experience	(4-28)	(13-28)	23.83±2.423	25
	Negative-Inhibiting Behavior	(4-28)	(13-28)	23.85±2.320	24
	Negative-Activating Behavior	(4-28)	(15-28)	23.98±2.383	25
	Negative-Tolerating Emotions	(4-28)	(14-28)	23.88±2.650	24
Negative emotion regulation difficulties		(16-112)	(55-112)	95.55±9.015	99
Positive emotion regulation difficulties subscales	Positive-Controlling Experience	(4-28)	(12-28)	23.68±2.221	24
	Positive-Inhibiting Behavior	(4-28)	(14-28)	24.17±2.713	24
	Positive-Activating Behavior	(4-28)	(13-28)	24.18±2.528	25
	Positive-Tolerating Emotions	(4-28)	(13-28)	23.68±2.690	24
Positive emotion regulation difficulties		(16-112)	(52-112)	95.72±9.397	97
Overall Perth Emotion Regulation Competency Inventory (PERCI)		(32-224)	(107-224)	191.27±18.026	196



	Score range	Total score		
		Min. – Max.	**Mean ± SD**	**Median**
Self-concept clarity	(12-60)	15-47	22.72±6.123	20

Figure (1) Distributions of level of total Self-concept clarity scale the studied patients (No= 60)

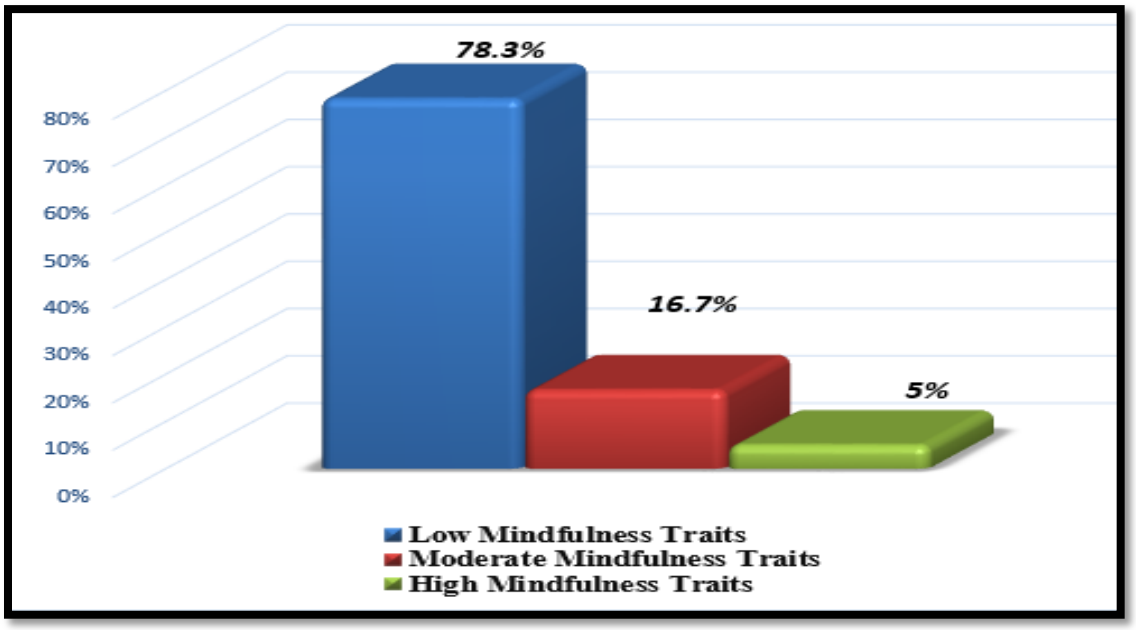


Figure (2): Distribution of level of total score of Five Facet Mindfulness scales among studied patients (No= 60)

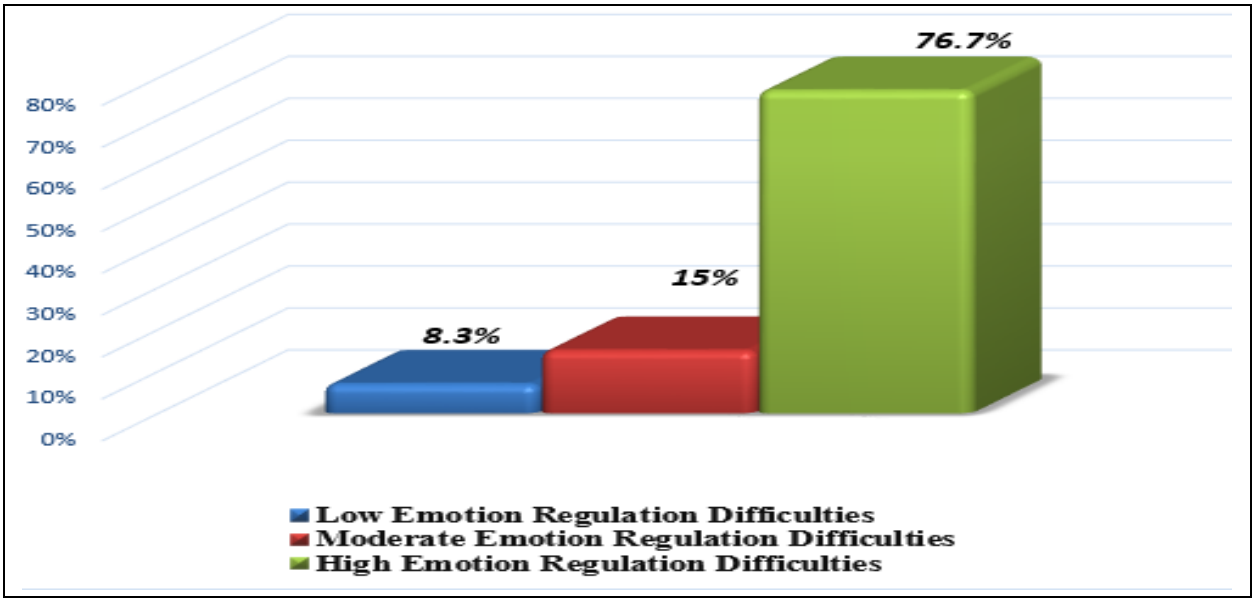


Figure (3): Levels of total score of Facet Perth Emotion Regulation Competency Inventory (PERCI) among studied patients (No= 60)

Table (5): Correlation matrix among the studied variables

		Self-Concept Clarity	Emotion Regulation Difficulties
Mindfulness Traits	r	0.603**	-.543**
	P	0.000	0.000
Self-Concept Clarity	r	----	-.583**
	P		0.000

** Correlation is significant at the 0.01 level (2-tailed)

Table (6): Linear regression analysis among the studied variables

Model	Unstandardized Coefficients		Standardized Coefficients	T	P	R	R^2	Adjusted R^2	F
	B	Std. Error	Beta						
1 (Constant)	113.446	37.401		3.033	.004	0.648	0.419	0.399	20.582
self-concept clarity	1.625	.465	.435	3.497	.001				
Emotion Regulation difficulties	-.368	.158	-.290	-2.330	.023				

a. Dependent Variable: Mindfulness

Discussion

BPD is defined by pervasive dysregulation of affect, identity, and interpersonal relationships, alongside marked impulsivity and emotional reactivity. Deficiencies in mindful awareness and self-concept clarity are considered core contributors to emotion regulation difficulties, which in turn precipitate self-injurious behavior, suicidality, and broad psychological instability **(Leichsenring et al., 2024; Keepers et al., 2024)**.The current study showed that majority of the studied patents had low level of mindfulness traits which reflect the patients' heightened reactivity and poor present-moment awareness. Moreover, difficulties in describing experience, acting with awareness, and accepting without judgment **(Wyatt, Eberle, Ruork & Neacsiu .,2023; Roberts, de Visser, Rosten, Startup & Strauss .,2023)**.

The core clinical and neuropsychological profile of BPD might be one of the attributions of low levels of mindfulness traits, additionally, dysfunction in the prefrontal cortex-amygdala regulatory circuitry, which limits the capacity for deliberate, present-moment awareness **(Giannoulis et al;2025)** .Moreover it can supported by study conducted by **Didonna et al., 2019** emphasizing mindfulness deficits across BPD Mindfulness, operationalized through the five facets of observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience, has been increasingly recognized as a critical psychological capacity linked to emotional regulation and impulse control and reflects the inherent deficits in self-awareness, emotional dysregulation, and impulsivity that characterize BPD as defined by the DSM-5 **(American Psychiatric Association, 2022& Keepers et al., 2024)**.

Deficits in mindfulness traits are thought to underline the characteristic emotional storms and maladaptive behavioral responses seen in BPD. Patients with low mindfulness may be particularly vulnerable to experiential avoidance, wherein distressing thoughts and emotions are not observed or tolerated but instead responded to with automatic, reflexive behaviors such as self-harm or substance misuse **(Gratz**

& Roemer 2004 & Bogos et al.,2025).

From a theoretical standpoint, these findings are coherent with Linehan's Biosocial Theory (1993), which posits that BPD emerges from a transactional process between biological emotional vulnerability and an invalidating environment. This chronic invalidation may inhibit the development of mindful self-awareness, as emotional experiences are repeatedly dismissed or punished rather than observed non-judgmentally **(Linehan.,1993).** Consequently, BPD patients may never fully develop the internal capacity to observe their emotional states with clarity which supported in the present mean score of FFMQ results of the studied patients (table3) **(Lazarus , Cheavens , Festa & Zachary-Rosenthal .,2014).**

The manifested low level of mindfulness traits in the present study could be attributed also to childhood abuse as two third of studied patients reported exposure to physical and sexual childhood abuse which considered antecedents of BPD and is linked to the deficits in mindful awareness that characterize the **disorder Kanj , Hallit , & Obeid ., 2023.** This goes in accordance with, **Bozzatello, Rocca, Baldassarri, Bosia , & Bellino., 2021** found that early traumatic experiences can promote early onset of BPD in young age. Also, **Mainali, Rai & Rutkofsky., 2020** stated found that one of the most influential elements of the low mindfulness traits is exposure to an adverse childhood experience in terms of emotional, physical, or sexual abuse.

This finding is similar with **Kounidas & Kastora., 2022** demonstrated that majority of patients with BPD scored significantly lower on all mindfulness facets and emphasize mindfulness training in BPD patients. Moreover, **Mariem & Gros., 2023** reported that BPD patients had significantly lower on all mindfulness facets. Furthermore, this comes in agreement with the research carried out by **Baer et al. 2004** found that population with BPD have score lower score on mindfulness compared to community sample that may reflect the neurobiological underpinnings of BPD.

Results of the present study found that majority of the studied patients had high level of emotion regulation difficulties, reflecting the central role of emotion dysregulation as a core mechanism in BPD pathology **(Leichsenring et al;2024).** Such difficulties are evident in patients' inability to manage emotional experiences effectively, manifesting in rapid mood swings, intense anger, feelings of emptiness, and impulsive actions. BPD is rooted in heightened emotional sensitivity and an innate inability to regulate emotional responses, which predisposes individuals to persistent negative affect across contexts, hindering the development of adaptive regulation strategies and driving reliance on dysregulated behaviors to cope with negative emotions **(Daros& Williams 2019& Waite et al.,2024) .**

The manifested high level of emotion regulation difficulties in the present study could be attributed also to the family role patterns, As the highest percentage of the studied patients reported diffused as well as rigid family roles. These findings may reflect the influence of dysfunctional family dynamics on emotional regulation and personality development among patients with BPD. These results can be supported by Linehan's biosocial theory (1993) which hypothesized that patients with BPD may learn maladaptive coping strategies such as avoidance, dissociation, and rumination from growing up in family (**Linehan., 1993).** These findings were in agree with **Roca et al., 2024** which reinforce the important role of family interactions in the individuals in BPD. **Also, Kaur, & Sanches., 2023** found that maladaptive parenting, parenting styles, influences psychopathology of BPD.These findings are in the same line with **Faraji, Muhtar, & Tezcan., 2023** reported that most BPD patients show marked difficulties in regulating emotions. Also, Mostafavi & **Rahimlooei.,2024** stated that majority of BPD patients show marked difficulties in conflict resolution and emotion regulation.

The present study illustrates that majority of the studied patients had poor levels of self-concept clarity this may be attributed to the affective instability that characterizes BPD is tightly

coupled with self-perception. Fluctuating emotional states disrupt the formation of a coherent, stable self-narrative, as individuals may perceive themselves markedly differently depending on their current mood state or relational context which required for self-concept clarity (Zeigler-Hill & Showers, 2007; Zhang et al;2026).Another attribution is the interpersonal hypersensitivity and fear of abandonment results in an externally anchored self-concept. When self-worth and identity are contingent on external validation, the self-concept becomes inherently unstable, shifting in response to real or imagined changes in relational dynamics (**Linehan, 1993)** and finally prevents the internalization of a stable, autonomous identity. Moreover, majority of studied patients had a history of childhood abuse and dysfunctional family dynamics that interfere with identity formation during developmental periods, leaving individuals vulnerable to the self-related instability observed in adulthood **(Zanarini et al., 1997)**, Consistent with the present study findings, **Sterna, Fuchs, & Moskalewicz.,2025** found that majority of BPD patients suffer from poor self-concept clarity as well as, findings reported by **Bańos , Botella, Perpiñá & Alcañiz., 2008; Zeigler-Hill & Showers 2007**, documented significant self-concept instability and compartmentalization in individuals with BPD-spectrum presentations.

There was a statistically significant negative correlation between mindfulness traits and emotion regulation difficulties. This may be attributed to individuals with BPD characteristically exhibiting heightened emotional reactivity, slower return to affective baseline, and impaired capacity to modulate emotional responses once activated **(Linehan, 1993).** within this framework mindfulness becomes theoretically relevant which is proposed to directly counteract each of these dysregulatory processes by promoting deliberate, non-reactive awareness of internal affective states before habitual maladaptive responses are enacted *(***Salgó, et al;2021).**

Similarly, **Natividad et al., 2024** found that mindfulness traits significantly negative correlate with emotion regulation difficulties and emphasize that self-harm and

BPD are associated with deficits in mindfulness traits and emotion dysregulation. Also, **Raugh**, **Berglund & Strauss.,2025** revealed that both Dialectical Behavior Therapy (DBT) Skills Training and Mindfulness-Based Cognitive Therapy (MBCT) interventions increase mindfulness, which subsequently reduce emotion regulation difficulties. Moreover, **Roberts et al., 2023** confirmed that trait mindfulness mediates the relationship between BPD symptoms and emotion dysregulation, indicating that low mindfulness is a core feature of BPD pathology.

In contrast to **Desrosiers** , Vine, Klemanski & Nolen-Hoeksema **.,2013** reported that not all mindfulness facets significantly predicted emotion regulation outcomes. Moreover, **Perroud, Nicastro, Jermann & Huguelet., 2012** found that mindfulness was not a significant predictor of emotion regulation outcomes at pre-treatment, suggesting trait mindfulness alone - without therapeutic scaffolding - does not significantly map onto regulatory difficulties in BPD**.**There was a statistically significant negative correlation between self-concept and emotion regulation difficulties this may be due to individuals with low self-concept clarity lack consistent beliefs about their own emotional tendencies, values, and characteristic responses. This makes it difficult to accurately identify, label, and interpret emotional states as they arise — processes that are prerequisite for effective regulation ***(*Gratz & Roemer., 2004*).*** These findings are in the same line with **Hong , Tan & Lee ., 2022** stated that self-concept clarity positively correlates with emotion regulation ability. Moreover, **Stopa, Brown, Luke & Hirsch.,2010** found that low SCC predicted increased emotional distress, maladaptive coping, and threat **appraisal in clinical samples** mechanisms directly relevant to emotion regulation failure in BPD. Furthermore, **Weber, Hopwood, Nissen & Bleidorn ., 2001** revealed that lower SCC was significantly associated with greater psychological distress and emotional dysregulation, with effects remaining significant after controlling self-esteem.

Conversely a study by **Smits et al.,2014** found that moment-to-moment emotion regulation

difficulties were more strongly driven by trait negative affect than by self-concept organization. Regarding the positive association between self-concept clarity and mindfulness traits **Jiang et al., 2025** emphasize that clear self-concept enables mindful awareness. Also, self-concept clarity is central to mindfulness training-based program. Moreover, **Kreszneritis, Rigó & Reinhardt., 2026** found that brief Mindfulness-Based Cognitive Therapy (MBCT) Non-suicidal self-injury (NSSI) program significantly increased mindfulness and reduced NSSI frequency and self-concept predicts mindfulness-related outcomes included self-esteem and emotion regulation improvements.

Regarding the negative association emotion regulation difficulties and mindfulness traits, N**atividad et al., 2024** found that emotion dysregulation interferes with mindfulness as evidence that BPD patients with poor emotional clarity had lower mindfulness skills. Moreover, **Hood, Beauchamp& Schmader., 2024** revealed that mindfulness reduces emotion regulation difficulties, as well as **Hong, Tan, & Lee, 2022** illustrated that emotion regulation ability moderates self-concept clarity effects. Similarly, **Parise et al., 2019** emphasize that higher self-clarity is associated with better emotion regulation skills, while emotion regulation mediates the association between self-clarity and adjustment. These findings highlight the crucial role of emotion dysregulation in the psychological conceptualization of BPD and the importance of developing effective mindful emotion regulation skills for building and maintaining better emotional well-being in those patients.

Conclusion:

The study provides evidence that trait mindfulness and self-concept clarity serves as a fundamental contributor in emotion regulation among patients with borderline personality disorders. Patients with higher levels of trait mindfulness are more capable of achieving greater self-concept clarity and managing their emotional experiences effectively, which in turn contributes positively to reducing emotion dysregulation and improving overall psychological well-being.

Recommendations

-Integration of mindfulness-based emotion regulation programs into the standard treatment protocols for BPD patients is strongly recommended.

- Strengthening mindful emotion regulation and self-concept clarity in BPD patients may serve as a primary focus of psychiatric nursing practice in mental health care.

-Mental Health professionals are encouraged to adopt comprehensive, recovery-focused approaches that transcend symptom management, targeting key domains including emotion dysregulation, self-concept clarity, and training of mindfulness skills.

-Healthcare policymakers and mental health service providers need to prioritize teaching mindful emotion regulation skills alongside pharmacological treatment in BPD care.

-Periodic assessment of mindfulness traits, self-concept and emotion regulation of patients with BPD

-Family-based interventions should be incorporated into treatment plans to address dysfunctional family dynamics and promote healthier emotional environments for patients with BPD.

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Transformative Effect of Nursing Educational Classes on Fear of Childbirth and Self-Efficacy among Primiparous Women

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Abstract:

Background: Fear of childbirth is a prevalent issue for primiparous women, potentially impacting their experiences and outcomes. Educational classes are effective in increasing knowledge, lowering childbirth-related fear, and enhancing childbirth self-efficacy. **Aim:** To evaluate the transformative effect of nursing educational classes on fear of childbirth and self-efficacy among primiparous women. **Design:** A quasi-experimental (pre/post-test) design was used. **Setting:** Maternal and Child Health Centers in Al-Sat Khadra, Helwan, Cairo. **Sample:** Fifty-five primiparous women who fit the inclusion requirements were selected using a purposive sampling technique. **Tools: Tool I:** a structured interviewing questionnaire to assess personal and obstetrical characteristics and women's knowledge; T**ool II:** the Childbirth Fear Questionnaire; and **Tool III:** the Childbirth Self-Efficacy Inventory. **Results:** The intervention led to significant improvements in women's knowledge regarding childbirth. Notably, there was a marked decrease in childbirth fear, with most women reporting no fear post-intervention, compared to severe fear beforehand. Additionally, childbirth self-efficacy rose dramatically; 80% of women had low self-efficacy before the program, while 94.5% achieved high self-efficacy afterward. These changes were statistically significant ($p < 0.001$). **Conclusion:** Women's knowledge and childbirth self-efficacy improved significantly, and fear of childbirth was notably reduced after participating in educational classes. **Recommendations:** Educating expectant mothers about the labor process, coping mechanisms, and preparation for childbirth can lessen their fear of giving birth and boost their self-efficacy. It is also advised that regular prenatal care services incorporate classes on birthing preparedness.

***Keywords*:** Childbirth Fear, Nursing Educational Classes, Primiparous Women, Self-Efficacy, Transformative Effect.

Introduction:

Pregnancy and childbirth significantly affect women physiologically, psychologically, and socially. Primiparous women often experience heightened stress and fear during childbirth, primarily due to their inexperience, leading to concerns about labor pain, complications, and safety. This fear adversely impacts psychological well-being and childbirth outcomes; previous studies showed that primiparous women suffer more from childbirth-related anxiety than those with prior experience **(Huang et al., 2024).**

Fear of childbirth comprises a range of negative emotions from mild apprehension to severe tokophobia. It can adversely affect women's physical and emotional responses during labor, leading to prolonged labor, heightened pain, sleep issues, and dissatisfaction with childbirth experience. Severe fear is linked to increased requests for elective cesarean sections and postpartum psychological disorders, such as anxiety and postpartum blues. Therefore, nursing professionals must address childbirth fear, as unmanaged fear can hinder maternal adaptation and impact mother-infant bonding **(Alizadeh-Dibazari et al., 2024).**

Self-efficacy is a vital psychological concept in maternity nursing that affects women's coping abilities during childbirth. According to Bandura's social cognitive theory, it represents a woman's belief in her capability to manage labor pain and emotional control. High self-efficacy correlates with lower anxiety, effective coping strategies, and more positive childbirth experiences, whereas low self-efficacy is linked to increased fear, stress, and helplessness in primiparous women **(Bandura, 2022).**

The relationship between fear of childbirth and self-efficacy is significant in maternity research. Women with higher confidence in managing labor report lower fear and better emotional adjustment. Conversely, lack of preparation and emotional support can diminish confidence and heighten fear, especially in primiparous women who often rely on negative narratives about childbirth. Enhancing self-efficacy is therefore a crucial nursing strategy to alleviate fear and improve maternal psychological readiness **(Çankaya & Şimşek, 2021).**

Educational classes during pregnancy are effective nursing interventions aimed at empowering women for childbirth. These antenatal programs offer information on labor stages, pain management, and postpartum care while providing emotional support and addressing misconceptions. Evidence shows that such interventions reduce fear of childbirth and enhance maternal confidence, coping behaviors, and satisfaction, particularly among first-time mothers **(Abd El-Kader, 2024).**

Educational classes enhance women's empowerment in maternity care by fostering active participation, decision-making, and a sense of control during labor and delivery. Such classes particularly benefit primiparous women by improving readiness for labor, facilitating adaptation, and boosting confidence in pain management. Additionally, they contribute to better maternal outcomes, including reduced stress, increased likelihood of normal vaginal births, and higher satisfaction with care services **(Athinaidou et al., 2024).**

Maternity nurses are crucial for educating and supporting first-time mothers during pregnancy and childbirth. Their care encompasses not only physical assessments but also psychological support and health education. By conducting educational classes, nurses can identify women with significant childbirth fears and offer tailored interventions to enhance coping skills and self-confidence. This supportive role is fundamental to fostering woman-centered maternity care, emphasizing emotional well-being, informed choices, and positive childbirth experiences **(Hassan et al., 2024).**

Despite progress in maternity healthcare, many primiparous women, particularly in low- and middle-income countries, lack sufficient childbirth preparation due to limited access to antenatal education. This absence of structured support can heighten fear and anxiety surrounding childbirth, as routine care often overlooks psychological and emotional aspects. There is an urgent need for evidence-based educational interventions that cater to the emotional and informational requirements of new mothers to enhance maternal outcomes and improve the quality of maternity care **(Alizadeh-Dibazari et al., 2024).**

Therefore, investigating the transformative effect of educational classes on childbirth fear and self-efficacy in primiparous women is crucial for nursing research and practice. Effective antenatal interventions can help maternity nurses create educational programs that empower women, alleviate fear, and boost self-efficacy, ultimately enhancing maternal psychological health and improving childbirth experiences and outcomes. This research area may also inform evidence-based nursing strategies supporting holistic maternity care and women's empowerment.

Significance of the study:

Fear of childbirth (FOC) is a widespread psychological condition impacting pregnant women globally, particularly affecting first-time mothers. Studies indicate that roughly 20-25% of pregnant women experience moderate to severe FOC, with 6-10% suffering from severe fear (tokophobia), impairing pregnancy adaptation and birth preparedness. Because of its link to poor mother outcomes and difficult birthing experiences, this syndrome is becoming more widely acknowledged as a public health concern **(Alizadeh-Dibazari et al., 2024; Zaman et al., 2025)**.

Because they have never given birth before, primiparous women are especially vulnerable to worry, false information, and inflated perceptions of labor pain and problems. Research shows that compared to multiparous women, primiparas exhibit far poorer childbirth self-efficacy and higher levels of dread, which directly affects their capacity to cope during labor **(Huang et al., 2024)**.

According to research conducted worldwide, up to 30–40% of first-time moms express low confidence in their capacity to manage childbirth, which increases the need for medical interventions and lowers satisfaction with the birthing process **(Zaman et al., 2025).**

Prenatal educational interventions can considerably reduce childbirth fear and improve self-efficacy, according to recent meta-analytical evidence. Standardized mean reductions in anxiety and significant improvements in maternal confidence ratings follow structured programs **(Zaman et al., 2025**). Despite these findings, structured, nurse-led educational programs that methodically address both fear reduction and self-efficacy enhancement are still lacking in many healthcare systems.

There is a notable gap in the consistent implementation of structured antenatal classes focused on psychological preparedness for primiparous women. This underscores the necessity for rigorous nursing research to assess how educational interventions can alleviate fear of childbirth and enhance self-efficacy, thereby improving maternal mental health and promoting positive childbirth experiences. Addressing this issue is crucial for advancing evidence-based nursing and enhancing holistic maternity care services.

Aim of the study:

This study aimed to evaluate the transformative effect of nursing educational classes on childbirth fear and self-efficacy among primiparous women.

Operational definitions:

-Nursing Educational Classes are organized sessions led by qualified nurses, such as Lamaze classes, aimed at enhancing knowledge, skills, attitudes, self-care behaviors, and health outcomes associated with specific health conditions or life events.

-Fear Of Childbirth (FOC) is the degree of anxiety, worry, or apprehension that a pregnant woman experiences regarding labor, delivery, and its outcomes.

-Self-Efficacy is defined as a pregnant woman's perceived confidence in her ability to cope effectively with labor and childbirth by using cognitive, behavioral, and emotional coping strategies.

-Transformative Effect is a measurable positive change in participants' knowledge, attitudes, self-efficacy, perceptions, and intended health-related behaviors following participation in a nursing educational intervention.

Study hypotheses:

H1: Primiparous women who participate in transformative nursing educational classes are expected to have a lower level of childbirth fear after intervention than before intervention.

H2: Primiparous women who participate in transformative nursing educational classes are expected to have a significantly higher level of childbirth self-efficacy after the intervention than before the intervention.

Material and Methods

Research design:

A quasi-experimental (pre-post-test) design was used.

Setting:

The study was carried out at Maternal and Child Health Centers in Al-Sat Khadra, Helwan, Cairo, a site chosen because of the large number of expectant mothers seeking immunizations and follow-up care. Within 6 months, the center's flow rate was about 316 women.

Sample and sampling technique:

For this study, 55 primiparous pregnant women were recruited as a purposive sample.

Sample size calculation:

The sample was calculated according to Steven K. Thompson's sample size equation:

n = N*P(1-P)/ [(N-1)(d2/z2)+P(1-P)

N (population) = 60

p (Hypothesized) = 0.50

d (tolerated margin of error) = 0.05 at CI 95%

Z (level of confidence) = 1.96 at CI 95%

n = 60*0.50*(1-0.50)/ [(60-1)*(0.052/ 1.962)] + 0.50(1-0.50)

n= 52 women; the calculated sample size of 52 women was changed to 55 to guard against non-response.

Instruments:

Three instruments comprised the structured and validated questionnaire used to gather the data:

Instrument one: A structured interview questionnaire:

To guarantee cultural acceptability, researchers created this tool after analyzing relevant literature. It was divided into the following three parts:

Part I: Demographic characteristics included: Age, income, residence, occupation, and level of education.

Part II: Obstetric history included gestational weeks, antenatal care at centers or private clinics for follow-up, and number of antenatal care visits.

Part III: Women's knowledge regarding childbirth preparation and labor process: This section includes 16 questions to gauge primiparous women's degree of knowledge of the preparation for childbirth and the labor process.

Knowledge scoring system:

For each item, a correct response received a score of 1, while an incorrect or "Don't Know" response received a score of 0. The total score is then calculated by adding the scores for each item. If the women's overall knowledge score ≥ 60% (10-16 grades), it was deemed satisfactory; if the score <60% (0-9 grades), it was deemed unsatisfactory.

Instrument two: Fear of Childbirth Questionnaire (CFQ):

This 40-item self-report measure was adopted from **Fairbrother et al. (2022)** to evaluate primiparous women's level of fear related to childbirth. Nine fear dimensions included (1) fear of loss of sexual pleasure or attractiveness (SEX), (2) fear of pain from a vaginal birth (PAIN), (3) fear of medical intervention (INT), (4) fear of embarrassment (SHY), (5) fear of harm to the baby (HARM), (6) fear of cesarean delivery (CS), (7) fear of mom or baby dying (DEATH), (8) fear of insufficient pain medication (MEDS), (9) fear of body damage from a vaginal birth (DAMAGE).

Scoring System

A Likert-type scale, from 0 (no fear) to 4 (extreme fear). It included 9 domains. The overall items are 40 items. The sum of the ratings for each domain item is used to determine the overall fear score. Higher scores correspond to higher levels of birth fear. The overall score fell into the following categories:

-No fear: < 20% (0-31) of the total score

-Mild fear: 20% – < 40% (32-63) of the total score

-Moderate fear: 40% – < 60% (64-95) of the total score

-Severe fear: 60% – < 80% (96-127) of the total score

-Extreme fear: ≥ 80% (128-160) of the total score

Instrument three: Childbirth Self-Efficacy Inventory (CBSE):

Based on Bandura's Self-Efficacy Theory, Lowe (1993) created the short version of childbirth self-efficacy, which was used to assess pregnant women's confidence in their capacity to handle childbirth. The tool assesses women's expectations about their capacity to use coping mechanisms during childbirth and is intended for use during pregnancy. The 16 items in this tool are split into two subscales: (1) Outcome Expectancy (OE) (8 items) to gauge the woman's confidence in the efficacy of coping mechanisms during labor. (2) Self-Efficacy Expectancy (SE) (8 items) to measure the woman's confidence in her capacity to carry out those coping mechanisms throughout childbirth.

Scoring System:

A Likert scale with 1 representing "not at all helpful" or "not at all sure" and 10 representing "very helpful" or "completely sure" is used to rate the 16 items. Higher

scores indicate stronger self-efficacy during birth. The total score goes from 16 to 160. The overall score was divided into the following categories:

-Low Self-Efficacy: <40% (16–63)

-Moderate Self-Efficacy: 40 %–<70% (64–111)

-High Self-Efficacy: ≥70% (112–160)

Validity:

To ensure the tool's validity, five maternal and neonatal health nursing professors were requested to evaluate their relevance, clarity, comprehension, and completeness. All necessary modifications were made.

Reliability:

Cronbach's alpha was used to measure reliability. For CFQ and CBSE, it was 0.87 and 0.88, respectively.

Ethical Consideration:

The Scientific Research Ethics Committee of Helwan University's Faculty of Nursing granted formal approval to carry out the study, Approval No. session number 39, date (13/2/2024). Before completing the informed consent form, each participant received thorough information about the study's goals and their individual roles. Participation in the study was completely voluntary. Participants' right to withdraw at any moment without penalty was explicitly stated in the ethical protocols. Strict adherence to data confidentiality ensured that no third party could obtain personal information without the participants' express consent. Every woman's ethics, morals, culture, and beliefs were honored during the entire study.

Pilot study:

It was carried out on five primiparous women (10% of the sample) after the instruments were developed and before the data were collected to assess the time needed to complete the instruments, test applicability, and practicability; no significant modifications were made.

Field work:

-Once the study was approved, data were gathered at the Al-Sat Khadra Maternal and Child Health (MCH) Center every Saturday, Monday, and Wednesday from 9 a.m. to 2 p.m, over the course of four months, from the end of August 2025 to the end of December 2025.

-The women were interviewed at the Maternal and Child Health (MCH) Center's reception. The researchers first gave the participants an introduction,

described the purpose of the study, and discussed the procedures for gathering data. Each participant was then asked for their informed consent before beginning the study.

-The research was carried out in three separate stages: preparation, implementation, and evaluation of outcomes:

The preparatory phases: A thorough literature review that included papers and electronic dissertations helped create a pertinent knowledge base. The research plan describes the objectives of the study for participants as well as the procedures for gathering data. A childbirth preparation booklet and an intervention plan for Lamaze classes were developed.

Implementation phase: The following procedures were followed by the researcher when applying this phase: The classes of preparing for childbirth are attended by the women. The study participants were divided into groups of three to five women each, and each group attended three nursing educational sessions, a single session/ time. The study's implementation was divided into two stages: the assessment phase and the educational phase.

Assessment Phase: The interview was conducted in a cozy, private setting. Each woman was interviewed one-on-one using a structured interviewing questionnaire to gather information on her obstetric history and personal characteristics, as well as her level of childbirth fear, her understanding of the labor and delivery process, and her level of self-efficacy.

Educational Phase:

Three classes were included, each lasting 30 minutes, with specific objectives, summaries, feedback, clarifications, and homework assignments. The researcher collected participants' contact information for follow-up purposes.

First childbirth class:

Participants in the first class were between 28 and 34 weeks of gestational age. The goal of the study was thoroughly presented in the first class. The brochure on delivery preparation was sent out along with instructions on how to use it. Concerns about labour were encouraged to be expressed by participants. The concept of normal labour, prenatal exercise as part of labour preparation, true and false labour pain, and an overview of the stages and phases of labour were all

included in the first class. The class lasted roughly half an hour.

Second prenatal class:

The second session, which took place at 35 weeks gestation, concentrated on coping mechanisms for delivery-related fear through therapy and emotional expression. Causes of fear and non-medical coping mechanisms were specifically covered. Discussions with the research group evaluated past pain experiences, such as dysmenorrhea, and coping mechanisms that have improved self-satisfaction. During the demonstration, the researcher used a pamphlet to show breathing control, exercise, and relaxation techniques. The exercise component comprised Kegel exercises to strengthen the pelvic floor muscles, pelvic tilt exercises to strengthen the back and abdominal muscles, tailored sitting exercises to improve pelvic flexibility and posture, and regular walking to boost physical endurance and encourage fetal descent.

Slow-paced breathing was used to relax during early labor, modified-paced breathing was used to deal with harder contractions during active labor, and pattern-paced breathing was used to keep focus and ease tension throughout powerful contractions. To improve both physical and psychological comfort, relaxation techniques included gradual muscle relaxation, guided imagery, visualization, and maintaining comfortable upright positions.

The participants then provided examples of various coping mechanisms. They then acted out role-playing as if they were giving birth. To develop these abilities, participants worked on maintaining an upright posture while concentrating on breathing and muscle relaxation. To employ the approach during labor and delivery, participants were urged to practice all these strategies every day. Then, to help the primiparous women become acquainted with the surroundings, the researcher gave them a tour of the MCH center's labor and delivery room and explained everything within, aside from the equipment used during labor. The duration of this class was roughly thirty minutes.

Third prenatal class:

During the 36-38 weeks of gestation, the third class took place. The researcher addressed questions and went over the participants' prior knowledge from the first and second prenatal classes. Additionally,

participants were urged to talk about any issues they had. The pregnant women and the researcher then collaborated to address any issues found. Participants then worked on their breathing, relaxation, and exercise skills. When they executed these methods correctly, the researcher gave them encouragement and praise. Lastly, this lesson focused on facts related to delivery and the postpartum period. The duration of this class was roughly thirty minutes.

Evaluation Phase (Post-test)

At the time of delivery, the evaluation phase was carried out. CFQ and CBSEI, the same data collection instruments used during the assessment phase, were used to reevaluate each participant's levels of childbirth fear and self-efficacy during this phase. The impact of the educational intervention in lowering childbirth fear and raising self-efficacy among primiparous women was assessed by comparing the post-test results with the baseline pre-test results.

Statistical analysis:

SPSS 27 software was utilized for data analysis. Univariate analysis presented continuous variables as mean and standard deviation, and categorical variables as percentages and frequencies. Paired sample t-tests compared two categories of normally distributed quantitative variables, while McNemar and Wilcoxon Signed Ranks tests assessed categorical variables pre- and post-intervention. For bivariate analysis, the Mann-Whitney test addressed unusually distributed data, while Pearson's coefficient and Kruskal-Wallis's test correlated traditionally distributed quantitative variables. The cut of significance was judged at the 5% level.

Results

Table (1): Illustrates that 45.4% of the women who participated were between the ages of 21 and 25. In terms of income, 43.6% stated that it was sufficient. Moreover, half (54.5%) of them lived in rural areas. Housewives made up 54.5% of the women's occupation. In terms of educational level, the largest percentage (40.0%) had a secondary education. According to obstetrical data, 58.2% of participants were between 30 and 40 weeks of gestation. Furthermore, 41.8% went to private clinics while 58.2% received prenatal care at centers. The range of prenatal care visits was 5–9, with an average of 6.93±1.03.

Figure (1): Demonstrates a considerable improvement in

women's knowledge regarding childbirth preparation and labor process after education. Only 3.6% showed satisfactory knowledge before the intervention; after the class, the vast majority of participants (98.2%) achieved satisfactory knowledge. Furthermore, following instruction, the mean knowledge score grew dramatically from 5.31±1.85 to 14.47±1.20. This difference was extremely significant ($p < 0.001$), demonstrating how well the educational program improved women's knowledge.

Table (2): Reveals a substantial reduction in all dimensions of childbirth fear following the program. Prior to the intervention, the majority of women had moderate to severe levels of fear across all categories. For instance, 58.2% and 27.3% of women, respectively, experienced severe and extreme fear of pain. All criteria showed a notable change toward the "no fear" and "mild fear" groups following the program. For example, 92.7% said they had no fear of bodily harm, 96.4% stated they had no fear of cesarean delivery, and 85.4% reported they had no fear of pain. The program had a large effect on lowering fears connected to childbirth, as evidenced by the high statistical significance of all reductions across the nine fear categories ($p < 0.001$).

Table (3): Shows that following the intervention, the overall fear of labor has significantly decreased, as the mean total fear score dropped from 120.47±5.70 to 22.95±8.43, showing a significant improvement. Prior to the intervention, 83.7% of women had severe fear. On the other hand, following the program, the majority of participants (83.7%) reported having no fear. These differences were statistically significant ($p < 0.001$), indicating that the training was successful in lowering the general fear of childbirth.

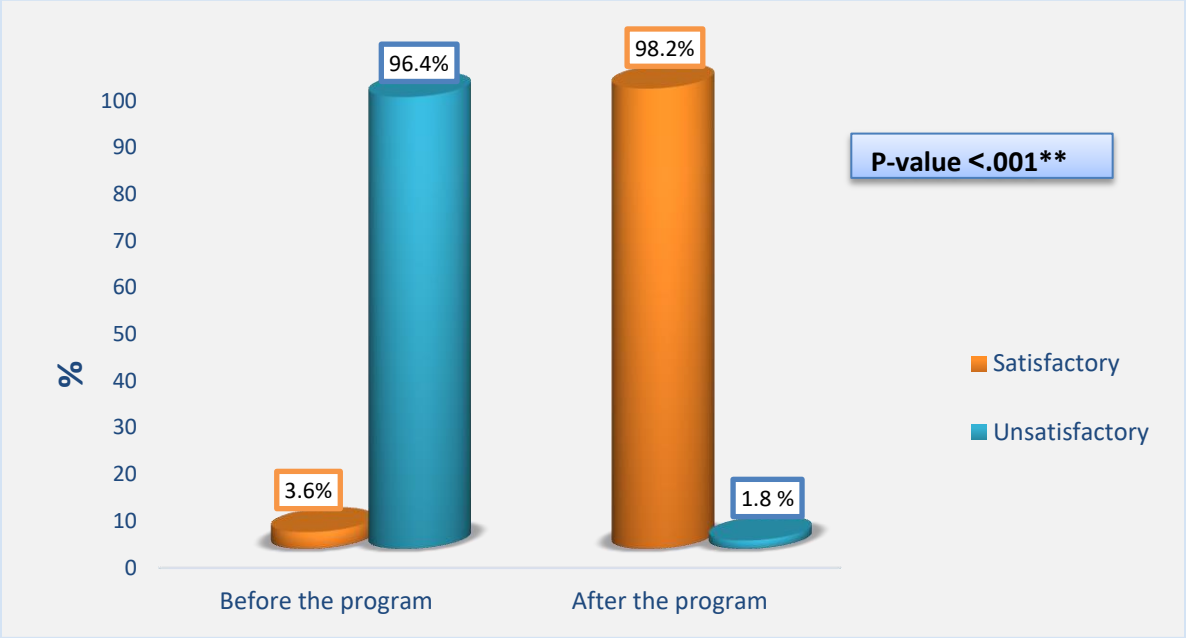
Table (4): Indicates that following the program, women's self-efficacy regarding childbirth significantly improved; 94.5% of them achieved high self-efficacy. Prior to the intervention, (80.0%) of participants had low levels of self-efficacy. Additionally, the average self-efficacy score rose dramatically from 53.05±9.86 before the program to 123.38±8.54 following it. The program was successful in boosting women's confidence in handling childbirth, as evidenced by the high

statistically significant difference ($p < 0.001$).

Table (5): Shows how women's knowledge, fear of childbirth, and self-efficacy scores relate to their obstetrical and personal traits both before and after the program. The findings showed that the majority of personal characteristics (age, income, occupation, educational level, and gestational age) had no statistically significant correlations with the examined scores before or after the program ($p > 0.05$). Nonetheless, a statistically significant relation was found between women's knowledge score prior to the program and their place of residence ($Z = 1.980$, $p = 0.048$), suggesting that baseline knowledge was influenced by residency. Following the intervention, this relevance vanished. Furthermore, neither the number of antenatal care visits nor the scores under investigation showed any significant relationships ($p > 0.05$). Overall, these results imply that the intervention itself, rather than individual or obstetrical traits, was largely responsible for the gains in knowledge, fear, and self-efficacy.

Table (1): Personal and obstetrical data of the participating women (n=55)

Variable	No	%
Age (years)		
20	12	21.8
21-25	25	45.4
26- 30	9	16.4
31–>35	9	16.4
Income		
Enough	24	43.6
Enough and save	16	29.1
Not enough	15	27.3
Residence		
Urban	25	45.5
Rural	30	54.5
Occupation		
Housewife	30	54.5
Employee	25	45.5
Educational level		
Illiterate	13	23.6
Primary education	9	16.4
Secondary education	22	40.0
College education	11	20.0
Gestational age/weeks		
28 – 30	23	41.8
30 – 40	32	58.2
Antenatal care at centers or private clinics for follow-up		
Antenatal care centers	32	58.2
Private clinics	23	41.8
Number of antenatal care visits		
Mean± SD	6.93±1.03	
Minimum-Maximum	5-9	



McNemar test

(**) Highly statistically significant difference

Figure (1): Women's knowledge regarding childbirth preparation and labor process before and after the program

Table (2): Levels of women's childbirth fear before and after the program

Fear levels	Before the program		After the program		P-value
	N (55)	%	N (55)	%	
Factor 1: Fear of Loss of Sexual Pleasure/Attractiveness (SEX)					
No fear (0-4.8)	0	0.0	51	92.7	**<.001****
Mild fear (4.8-9.6)	0	0.0	4	7.3	
Moderate fear (9.6-14.4)	4	7.3	0	0.0	
Severe fear (14.4-19.2)	35	63.6	0	0.0	
Extreme fear (19.2-24)	16	29.1	0	0.0	
Factor 2: Fear of Pain from a Vaginal Birth (PAIN)					
No fear (0-4)	0	0.0	47	85.4	**<.001****
Mild fear (4-8)	0	0.0	4	7.3	
Moderate fear (8-12)	8	14.5	3	5.5	
Severe fear (12-16)	32	58.2	1	1.8	
Extreme fear (16-20)	15	27.3	0	0.0	
Factor 3: Fear of Medical Interventions (INT)					
No fear (0-5.6)	0	0.0	39	70.9	**<.001****
Mild fear (5.6-11.2)	0	0.0	7	12.7	
Moderate fear (11.2-16.8)	2	3.6	5	9.1	
Severe fear (16.8-22.4)	40	72.7	3	5.5	
Extreme fear (22.4-28)	13	23.6	1	1.8	
Factor 4: Fear of Embarrassment (SHY)					
No fear (0-4.8)	0	0.0	50	90.9	**<.001****
Mild fear (4.8-9.6)	0	0.0	3	5.5	
Moderate fear (9.6-14.4)	19	34.5	1	1.8	
Severe fear (14.4-19.2)	36	65.5	1	1.8	
Extreme fear (19.2-24)	0	0.0	0	0.0	

Continue table (2): levels of women's childbirth fear before and after the program

Fear levels	Before the program		After the program		P-value
	N (55)	%	N (55)	%	
Factor 5: Fear of Harm to Baby (HARM)					
No fear (0-2.4)	0	0.0	47	85.5	**<.001****
Mild fear (2.4-4.8)	0	0.0	4	7.3	
Moderate fear (4.8-7.2)	0	0.0	2	3.6	
Severe fear (7.2-9.6)	3	5.5	1	1.8	
Extreme fear (9.6-12)	52	94.5	1	1.8	
Factor 6: Fear of Cesarean Birth (CS)					
No fear (0-2.4)	0	0.0	53	96.4	**<.001****
Mild fear (2.4-4.8)	0	0.0	2	3.6	
Moderate fear (4.8-7.2)	9	16.4	0	0.0	
Severe fear (7.2-9.6)	19	34.5	0	0.0	
Extreme fear (9.6-12)	27	49.1	0	0.0	
Factor 7: Fear of Baby or Mom Dying (DEATH)					
No fear (0-3.2)	0	0.0	43	78.3	**<.001****
Mild fear (3.2-6.4)	0	0.0	8	14.5	
Moderate fear (6.4-9.6)	4	7.3	2	3.6	
Severe fear (9.6-12.8)	29	52.7	1	1.8	
Extreme fear (12.8-16)	22	40.0	1	1.8	
Factor 8: Fear of Insufficient Pain Medication (MEDS)					
No fear (0-2.4)	0	0.0	46	83.6	**<.001****
Mild fear (2.4-4.8)	0	0.0	6	10.9	
Moderate fear (4.8-7.2)	9	16.4	3	5.5	
Severe fear (7.2-9.6)	24	43.6	0	0.0	
Extreme fear (9.6-12)	22	40.0	0	0.0	
Factor 9: Fear of Body Damage (DAMAGE)					
No fear (0-2.4)	0	0.0	51	92.7	**<.001****
Mild fear (2.4-4.8)	0	0.0	4	7.3	
Moderate fear (4.8-7.2)	10	18.2	0	0.0	
Severe fear (7.2-9.6)	25	45.5	0	0.0	
Extreme fear (9.6-12)	20	36.4	0	0.0	

Wilcoxon Signed Ranks Test
(**) Highly statistically significant difference

Table (3): Total score & levels of women's childbirth fear before and after the program

Total Fear levels	Before the program		After the program		P-value
	N (55)	%	N (55)	%	
Total mean± SD	120.472±5.699		22.945±8.431		**<.001**[b]
Total Median	121.0		21.0		
Minimum-Maximum	90.0-129.0		11.0-66.0		
No fear (0-31)	0	0.0	46	83.7	**<.001**[a]
Mild fear (32-63)	0	0.0	6	10.8	
Moderate fear (64-95)	7	12.7	3	5.5	
Severe fear (96-127)	46	83.7	0	0.0	
Extreme fear (128-160)	2	3.6	0	0.0	

[a] **Wilcoxon Signed Ranks Test**

[b] **Paired t-test**

(**) Highly statistically significant difference

Table (4): Childbirth Self-Efficacy Inventory Step 1: Subscale SE – Active Labor (SE-AL) (16 items) of the participating women before and after the program

Childbirth Self-Efficacy	Before the program		After the program		P-value
	N (55)	%	N (55)	%	
Low Self-Efficacy (<40%) (16-63)	44	80.0	0	0.0	**<.001**[a]
Moderate Self-Efficacy (40% – <70%) (64-111)	11	20.0	3	5.5	
High Self-Efficacy (≥70%) (112-160)	0	0.0	52	94.5	
Mean± SD	53.054± 9.864		123.381± 8.538		**<.001**[b]
Minimum-Maximum	37.0- 75.0		95.0-139.0		

[a] **Wilcoxon Signed Ranks Test**

[b] **Paired t-test**

(**) Highly statistically significant difference

Table (5): Correlation between Women's knowledge, fear of birth, self-efficacy with personal and obstetrical data of the participating women before and after the program (n=55)

		Women's knowledge score		Fear of birth score		Self-efficacy score	
		Before program	After program	Before program	After program	Before program	After program
Age	χ^2	3.106	2.730	3.417	5.430	1.505	5.827
	P-value	.540	.604	.491	.246	.826	.212
Income	χ^2	2.969	1.757	1.951	.559	2.158	3.836
	P-value	.227	.416	.377	.756	.340	.147
Residence	Z	1.980	-.555	-.711	.585	-.135	.347
	P-value	**.048***	.579	.477	.559	.892	.729
Occupation	Z	-.583	1.127	-1.287	-.737	-.609	1.194
	P-value	.560	.260	.198	.461	.542	.233
Educational level	χ^2	5.659	1.681	2.105	1.840	3.981	3.024
	P-value	.129	.641	.551	.606	.264	.388
Gestational age/weeks	Z	-.337	.169	1.060	.548	.726	.837
	P-value	.736	.866	.289	.584	.468	.402
Antenatal care at centers or private clinics for follow-up	r	-.165	.115	.053	-.012	-.239	-.147
	P-value	.230	.402	.700	.930	.079	.284
Number of ante-natal care visits	r	-.081	-.010	.138	.227	.144	-.035
	P-value	.556	.944	.315	.096	.295	.802

Mann-Whitney (Z)

Kruskal-Wallis (χ^2)

Pearson Correlation (r)

****Statistically Significant Correlation at P-value < 0.01**

***Statistically Significant Correlation at P-value < 0.05**

Discussion

Childbirth fear is prevalent among first-time mothers, largely due to uncertainties surrounding the delivery process, including concerns about pain and potential complications. An instructional nursing package can help mitigate this fear by providing detailed information on labor stages, pain management, and childbirth expectations. Enhanced knowledge promotes better preparation and confidence, ultimately reducing anxiety and improving emotional readiness for labor challenges **(Winford, 2025).**

Self-efficacy during childbirth refers to a woman's confidence in managing labor. A nursing instructional package boosts this self-efficacy by teaching coping strategies and reinforcing the woman's role. Increased knowledge and emotional support from nurses lead to greater confidence, resulting in a positive birth experience, particularly for first-time mothers, and ultimately improving birth outcomes. **(Golnazari et al., 2026).**

Concerning the obstetrical and personal traits of the women who participated, according to the results of the current study, almost half of the women were between the ages of 21 and 25, and over half lived in rural areas. These findings support a study carried out in Egypt by **Hassen (2026)**; They discovered that almost two-thirds of the women in the age group over 20 were from rural areas. **From researchers' point of view,** this age group is often linked to early adulthood, where many women experience their first pregnancies. Women in this range frequently begin families, aligning with the study's focus on primiparous women. Rural residency may also influence factors such as socioeconomic status, education levels, and healthcare delivery methods, all of which are significant in studying maternal health and childbirth experiences.

Regarding the participating women's educational level and prenatal care visits. According to the current study, over half of them had prenatal care at centers, and the largest percentage had secondary education. This outcome is consistent with research done in Iran by **Najafi et al., (2026),** who discovered that over one-third of participants had secondary education and over half had received prenatal care at centres. Additionally, these results are consistent with a study carried out in Egypt by **Rabie et al., (2026).** They reported that over half of the women in the study had completed secondary school, and the majority of them routinely got prenatal care at facilities. **From researchers'**

point of view, Secondary education is frequently the greatest degree of formal education attained by people in many communities, especially in rural or developing countries. These results imply that although a sizable percentage of women do have access to formal healthcare services, obstacles to full participation in prenatal care may still exist, such as financial limitations, cultural influences on healthcare-seeking behaviors, or the distance to healthcare facilities. In relation to the participating women's gestational age. The results of the current study showed that over half of the individuals fell into the 30–40-week gestational age range. This outcome is in line with research conducted in Iran by **Rezaei et al., (2025);** They observed that over half of the samples under study fell into the 30–40-week gestational age range. **From the researchers' point of view,** this period is especially critical for tracking the mother's and the foetus' health because it is during this time that prenatal care becomes more necessary for guaranteeing a safe and healthy delivery.

In terms of the overall level of knowledge, the current study showed that nearly all participants attained a satisfactory level of knowledge, with less than 10% still having unsatisfactory knowledge following the program. This result was consistent with **Mousavi et al., (2022),** who conducted a study in Malaysia and found that, following the program, the vast majority of participants attained a satisfactory level of knowledge, with less than 10% remaining at an unsatisfactory level. **According to the researcher,** attaining such a high percentage of satisfactory knowledge indicates that the program's content was pertinent and well-designed, meeting the participants' learning needs and main concerns.

According to the current research, the majority of women had moderate to extreme levels of childbirth fear before the intervention. For instance, over half of women reported severe fear of pain, while over one quarter reported extreme fear. This outcome was consistent with research published in Egypt by **Hassan et al., (2024),** who reported that most women expressed moderate to high levels of fear across a variety of characteristics before the program. For example, almost half and roughly one-fourth of women reported having severe and extreme pain-related fear, respectively. According to **researchers' point of view**, a woman's mental and physical health can be adversely affected by excessive levels of fear,

which may result in increased stress, anxiety, and even problems during childbirth. One of the most prevalent and severe worries during labour is the fear of pain. Given that a sizable portion of women expressed severe or extreme fear, it appears that addressing this issue is essential to enhancing the birth experience.

In terms of women's fears of childbirth, the current study revealed that following the program, a notable shift toward the categories of "no fear" and "mild fear" was noted across all parameters. For example, the vast majority of women stated they had no fear of pain, caesarean delivery, or bodily harm. These results were consistent with research conducted in Saudi Arabia by **Abdelaziz et al., (2025),** who found that most women expressed low levels of fear across a variety of criteria after the program; the vast majority of participants said they were not afraid of pain, caesarean delivery, or bodily harm.

But disagreed with **Abdolalipour et al., (2023),** who conducted research in Iran and found that most women reported moderate levels of fear across a variety of criteria following the program. For instance, the majority of women showed moderate to high levels of fear of body damage and caesarean delivery, and the majority reported moderate levels of fear of pain. According to the researchers, the program probably included preparation, education, and knowledge regarding birth. Fear can be greatly reduced by knowing what to anticipate. For instance, women might have learned about alternatives for managing pain, the safety of caesarean deliveries, and how the body recovers following labour. Women could have approached childbirth with a calmer and more optimistic mentality if the intervention had included mindfulness or relaxation techniques that helped lower stress and anxiety.

In terms of the overall level of women's fears of birth, the current study revealed that, before the intervention, most women had severe fear, whereas less than a tenth had extreme fear. In contrast, the majority of participants reported no fear following the program. This finding aligns with a study conducted in Saudi Arabia by **Alsufyani et al., (2024),** who concluded that while only 2.9% of women reported extreme fear, a significant portion of women reported severe fear prior to the educational sessions. Nevertheless, most participants reported feeling no fear following the educational sessions. **In the opinion of the researcher,** by providing coping

strategies and emotional support, the program gave women a greater sense of control over their circumstances, which inevitably reduced their fear. The program probably equipped women with fear management techniques and knowledge, making them feel more prepared and lowering their general anxiety.

Regarding the childbirth self-efficacy inventory, the current study demonstrated that, following the program, a dramatic improvement was noted, with the vast majority of women demonstrating high self-efficacy, only less than a tenth maintaining a moderate level, and no participants exhibiting low self-efficacy. This finding was corroborated by **Abd El-Kader (2024),** who conducted a study in Egypt and reported that, following the program, a significant improvement was noted, with most women achieving high self-efficacy, only 3.1% maintaining a moderate level, and no participants displaying low self-efficacy. According to the **researcher's point of view**, the program probably gave women the knowledge and abilities they required to comprehend and handle childbirth, which immediately raises their self-efficacy. Women are better able to handle the psychological and physical difficulties of childbirth when they feel knowledgeable. Confidence and self-efficacy are closely related. To make women feel more in control and prepared, the intervention might have included exercises like role-playing, relaxation techniques, or instruction in labour and delivery procedures.

Regarding the relationship between women's knowledge, fear of giving birth, and self-efficacy with personal and obstetrical data, the results showed that there were no statistically significant correlations between the majority of personal variables (age, income, occupation, educational level, and gestational age) and the studied scores either before or after the program. These findings concurred with those of **Said et al., (2022)**, who carried out a study in Egypt and found no statistically significant correlations between all personal variables and the scores observed both before and after the program. **From the perspective of the researchers,** for instance, the intervention may have offered basic knowledge that was available to all participants, regardless of their prior education, even if education level might be predicted to influence knowledge.

In terms of the relationship between women's knowledge, fear of giving birth, and self-efficacy with personal and obstetrical data, the results showed that there were no

significant correlations between the frequency of antenatal care visits or the number of visits and the scores under investigation. This finding corresponded with **Mostafa et al., (2024),** who published a study in Egypt, and the results indicated that there were no significant correlations between the frequency of antenatal care visits or the number of visits and the scores investigated. **From the viewpoint of the researchers,** the study indicates that the program itself significantly influenced changes in women's knowledge, fear, and self-efficacy, rather than the number of antenatal care visits. This suggests that the intervention offered targeted information and support that effectively met the women's needs, independent of visit frequency.

Conclusion

Participation in nursing educational classes significantly improved primiparous women's knowledge about childbirth and reduced their fear of childbirth; post-intervention, the majority of women reported no fear. The high level of childbirth self-efficacy rose dramatically after the program. These findings achieved the study aim and supported the research hypothesis that primiparous women who receive nursing educational classes will have higher knowledge and childbirth self-efficacy levels and lower fear of childbirth than before receiving the educational classes.

Recommendations

-Raising awareness among primiparous women through antenatal educational classes on childbirth preparation, labor processes, coping strategies, and pain management can alleviate fear and boost self-efficacy.

-Childbirth preparation educational classes should be integrated into routine antenatal care to enhance knowledge, confidence, and psychological readiness for labor.

-Training nurses in evidence-based childbirth education and counseling techniques is crucial for improving women's childbirth experiences and outcomes.

-Continuous counseling and emotional support from maternity nurses are essential to help women manage fears and adopt positive coping skills.

-Additionally, providing educational materials, such as booklets and digital resources, in antenatal clinics can promote self-directed learning.

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Effectiveness of Nursing-Based Intervention on Mothers' Knowledge, Practices, and Treatment Adherence Regarding Their Children with Iron Deficiency Anemia

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Abstract

Background: Childhood iron deficiency anemia is a major global public health problem, particularly in developing countries. Mothers' knowledge, home care practices, and adherence to treatment play a crucial role in the prevention and management of iron deficiency anemia in children. **Aim:** This study aimed to evaluate the effectiveness of a nursing-based educational intervention on mothers' knowledge, practices, and treatment adherence regarding their children with iron deficiency anemia. **Design:** A quasi-experimental research design was used. **Setting:** The study was conducted at the pediatric inpatient department and pediatric outpatient clinics of Zagazig University Children's Hospital, Sharqia Governorate, Egypt. **Sample:** A purposive sample of 100 mothers of children diagnosed with iron deficiency anemia were recruited and equally assigned into a study group (n = 50) and a control group (n = 50). **Tools:** four tools were used: A structured socio-demographic and clinical data sheet, Mothers' Knowledge Questionnaire, Mothers' Reported Home Care Practices Checklist and Mothers' Treatment Adherence Questionnaire. **Results:** The findings revealed highly statistically significant improvements in mothers' knowledge, reported home care practices, and adherence to iron therapy following implementation of the nursing-based educational intervention ($p < 0.001$). **Conclusion:** The nursing-based educational intervention was effective in improving mothers' knowledge, reported home care practices, and treatment adherence regarding childhood iron deficiency anemia. **Recommendations:** Implementing structured nursing-based educational interventions for mothers in pediatric healthcare settings is recommended to enhance maternal knowledge, improve home care practices and treatment adherence, and contribute to preventing and effectively managing childhood iron deficiency anemia.

Keywords: Children, Iron Deficiency Anemia; Knowledge; Mothers; Nursing-Based Intervention; Practices; Treatment Adherence.

Introduction:

Anemia remains one of the most common nutritional and hematological disorders affecting children worldwide and continues to represent a significant public health challenge, particularly in low- and middle-income countries. The condition is characterized by a reduction in the hemoglobin concentration below the normal level required to meet physiological needs, resulting in reduced oxygen transport to body tissues. Childhood anemia has been recognized as a major contributor to morbidity, impaired growth, poor cognitive development, reduced immunity, and diminished quality of life. Despite considerable progress in preventive healthcare services and nutritional interventions, anemia continues to affect a substantial proportion of children globally and remains a priority concern for healthcare professionals and policymakers **(World Health Organization [WHO], 2024).**

Anemia in childhood is a multifactorial condition resulting from nutritional deficiencies, infectious diseases, chronic illnesses, genetic disorders, and environmental influences. Among the various forms of anemia, iron deficiency anemia is the most prevalent and accounts for approximately half of all anemia cases worldwide. Iron is an essential micronutrient required for hemoglobin synthesis, oxygen transport, cellular metabolism, neurological development, and immune function. During infancy and childhood, periods characterized by rapid growth and increased nutritional demands, children become particularly vulnerable to iron deficiency and subsequent anemia if dietary intake is inadequate or physiological requirements are not met **(Kliegman et al., 2024).**

The burden of childhood anemia extends far beyond hematological abnormalities. Numerous studies have demonstrated that anemia adversely affects physical growth, psychomotor development, cognitive function, school performance, and social interaction. Children with anemia often experience fatigue, weakness, decreased concentration, behavioral disturbances, poor appetite, and increased susceptibility to infections. More importantly, anemia occurring during the critical stages of early brain development may produce long-lasting consequences that persist into adolescence and adulthood, thereby affecting educational achievement and future productivity

(Hockenberry & Wilson, 2023).

Globally, anemia remains highly prevalent among children under five years of age. According to recent estimates, approximately two out of every five children worldwide are affected by anemia, with the highest prevalence rates reported in developing countries. The persistence of anemia is strongly associated with poverty, food insecurity, poor dietary diversity, recurrent infections, parasitic infestations, inadequate healthcare access, and limited caregiver awareness regarding appropriate child nutrition and health practices **(WHO, 2024).** These factors collectively contribute to the ongoing burden of anemia and highlight the necessity of implementing effective preventive and educational interventions.

The prevention and management of childhood anemia require a comprehensive approach that extends beyond medical treatment. Maternal participation plays a central role in ensuring successful disease management and preventing recurrence **(Jember, et al., 2021).** Mothers are primarily responsible for providing daily nutrition, administering medications, monitoring their children's health status, and seeking healthcare services when necessary. Therefore, their knowledge, adherence to the prescribed treatment regimen, and caregiving practices significantly influence children's nutritional status and overall health outcomes **(Black et al., 2021).**

Maternal knowledge regarding childhood anemia is essential for early recognition of symptoms, adherence to treatment regimens, and implementation of preventive measures. Mothers with adequate knowledge are more likely to provide iron-rich foods, encourage healthy dietary habits, administer prescribed iron supplements correctly, and recognize symptoms requiring medical evaluation. Conversely, inadequate knowledge may contribute to delayed diagnosis, inappropriate feeding practices, poor treatment compliance, and increased risk of disease complications. Previous studies have identified substantial gaps in maternal understanding of childhood anemia, emphasizing the need for targeted educational interventions aimed at improving caregiver awareness and competence **(Gebreweld & Tsegaye, 2018).**

Maternal home-care practices are fundamental to the successful management of childhood anemia because most therapeutic measures are implemented within the family

setting. Mothers are responsible for providing iron-rich meals, ensuring adherence to prescribed iron supplements, encouraging foods that facilitate iron absorption, limiting dietary factors that interfere with iron utilization, monitoring the child's health status and treatment response, and maintaining regular medical follow-up. Consistent implementation of these practices contributes significantly to treatment effectiveness, prevention of complications, and reduction of anemia recurrence **(WHO, 2024).**

Health education remains a key strategy for strengthening caregivers' ability to manage childhood health conditions. Through educational activities, mothers gain essential knowledge about disease prevention, early symptom recognition, treatment compliance, and healthy nutritional behaviors. Educational interventions also help caregivers make informed decisions regarding their children's health and improve their confidence and self-efficacy in managing their children's health at home **(Bastable, 2023).**

Nurses are among the most influential healthcare professionals involved in caregiver education and family support. Their continuous interaction with children and their families enables nurses to identify caregivers' learning needs, correct misconceptions, and provide individualized education and support. In addition to direct patient care, nurses contribute to health promotion by facilitating behavioral changes that support positive health outcomes. Previous evidence indicates that nursing educational interventions can improve caregiver knowledge, increase adherence to treatment recommendations, and enhance disease-management practices **(Hockenberry & Wilson, 2023).**

A nursing-based intervention is a systematic educational approach developed to deliver accurate and comprehensive information concerning a specific health condition. Such interventions typically incorporate a variety of teaching methods, including face-to-face instruction, group discussions, demonstrations, printed educational materials, and audio-visual materials. Combining different educational techniques enhances understanding and retention of information while supporting the development of practical caregiving skills. For mothers of children with anemia, educational packages may focus on causes of anemia, symptoms, nutritional management, medication adherence, preventive strategies, and home-care

responsibilities **(Bastable, 2023).**

Research findings consistently support the effectiveness of structured educational programs in improving caregivers' knowledge and health-related practices. Educational interventions have been associated with better understanding of disease management, greater compliance with medical recommendations, healthier dietary behaviors, and improved child health outcomes. Furthermore, caregiver education may contribute to reducing disease complications and reducing unnecessary healthcare utilization through earlier recognition and management of health problems **(Yılmaz et al., 2023).**

Despite substantial efforts to control childhood anemia, deficiencies in maternal knowledge and caregiving practices continue to be reported in many settings. Mothers may encounter challenges related to understanding nutritional requirements, following treatment instructions correctly, and identifying symptoms that necessitate medical consultation. These challenges highlight the need for effective educational approaches that empower mothers and strengthen their caregiving capabilities **(WHO, 2024).** However, evidence regarding the effectiveness of structured nursing-based educational interventions on mothers' knowledge, home care practices, and treatment adherence remains limited in the Egyptian context, highlighting the need for the present study.

Treatment adherence is considered one of the most important determinants of successful management of childhood iron deficiency anemia. Mothers play a central role in ensuring that their children receive prescribed iron supplements regularly, follow the prescribed dosage and duration of treatment, attend scheduled follow-up visits, and comply with dietary recommendations that enhance iron absorption. Poor treatment adherence may result in persistent anemia, delayed recovery, recurrent episodes, and increased risk of physical and cognitive complications. Therefore, improving mothers' treatment adherence through educational interventions is essential for achieving optimal therapeutic outcomes and reducing the burden of childhood iron deficiency anemia **(WHO, 2024; Hockenberry & Wilson, 2023).**

Considering the high burden of childhood iron deficiency anemia and the crucial role of mothers in its management, there is a need to

enhance maternal competencies related to disease prevention and management. In particular, mothers' knowledge, treatment adherence, and home care practices are essential determinants of effective disease control and prevention **(American Academy of Pediatrics, 2023).**

Therefore, a structured nursing-based educational intervention may represent an effective strategy for empowering mothers by improving their knowledge, strengthening adherence to iron therapy, and promoting appropriate home care practices. Accordingly, the present study was conducted to evaluate the effectiveness of such an intervention among mothers of children with iron deficiency anemia.

Significance of the Study

Iron deficiency anemia (IDA) is one of the most common nutritional disorders and a major public health problem among children worldwide due to its adverse effects on physical growth, cognitive development, immunity, and school performance. According to **WHO (2024),** anemia affects approximately 40% of children aged 6–59 months globally, with iron deficiency accounting for nearly half of all anemia cases. Despite the availability of effective preventive and therapeutic strategies, IDA remains highly prevalent, particularly in low- and middle-income countries.

In Egypt, childhood iron deficiency anemia continues to represent a significant public health concern, as national reports indicate that anemia affects a considerable proportion of Egyptian children, particularly those under five years of age, with iron deficiency being the major contributing factor **(Egypt Demographic and Health Survey [EDHS], 2021; UNICEF Egypt, 2023)**.

Since mothers are the primary caregivers responsible for children's nutrition, medication administration, and home care, improving their knowledge and home care practices is essential for preventing anemia-related complications and promoting better health outcomes. **Accordingly,** this study is expected to provide evidence regarding the effectiveness of a nursing-based educational intervention in improving mothers' knowledge, home care practices, and treatment adherence, thereby contributing to better management and prevention of childhood iron deficiency anemia.

Operational Definitions

1. Nursing-Based Intervention

Operationally, the nursing-based intervention refers to a structured

educational program developed by the researchers to improve mothers' knowledge, practices, and treatment adherence regarding childhood anemia through educational sessions, discussions, demonstrations, and counseling. The intervention was implemented according to the educational protocol developed by the researchers.

2. Mothers' Knowledge

Operationally, mothers' knowledge refers to mothers' understanding of childhood anemia, including its causes, symptoms, prevention, treatment, nutrition, and iron supplementation, as measured by the total score of the knowledge questionnaire **Tool II**: Mothers' Knowledge Questionnaire.

3. Mothers' Treatment Adherence

Operationally, mothers' treatment adherence refers to the extent to which mothers comply with the prescribed treatment regimen for childhood iron deficiency anemia, as measured by the total score of the treatment adherence questionnaire as measured by **Tool III:** Mothers' Treatment Adherence Questionnaire.

4. Mothers' Home Care Practices

Operationally, mothers' home care practices refer to the activities performed by mothers to prevent and manage childhood iron deficiency anemia, including appropriate nutrition, correct administration of iron supplements, adherence to medical advice, and regular follow-up care. It is measured by **Tool IV:** Mothers' Reported Home Care Practices Checklist.

5. Childhood Iron Deficiency Anemia

Operationally, childhood iron deficiency anemia refers to a condition diagnosed in children aged 3–12 years who have been diagnosed with iron deficiency anemia based on age-specific hemoglobin reference values and who are receiving care in the selected study settings. It is identified using the child's clinical data recorded in **Tool I:** Structured Socio-demographic and Clinical Data Sheet.

6. Effectiveness

Operationally, effectiveness refers to the extent to which the nursing-based intervention improves mothers' knowledge, treatment adherence, and practices regarding childhood anemia, as demonstrated by statistically significant improvements in post-intervention scores compared with pre-test scores. It is determined by comparing mothers' scores on **Tool II:** Mothers' Knowledge Questionnaire, **Tool III:** Mothers'

Treatment Adherence Questionnaire and **Tool IV:** Mothers' Reported Home Care Practices Checklist before and after implementation of the intervention.

Aim of the study:

The aim of this study was to evaluate the effectiveness of a nursing-based intervention on mothers' knowledge, practices and treatment adherence regarding their children with iron deficiency anemia

This aim can be achieved through:

1-Assess mothers' knowledge, home care practices, and treatment adherence regarding their children with iron deficiency anemia before implementing the nursing-based educational intervention.

2-Implement the nursing-based educational intervention for mothers of children with iron deficiency anemia.

3-Evaluate changes in mothers' knowledge, practices, and treatment adherence before and after implementing the nursing-based educational intervention.

4-Determine the relationship between mothers' knowledge, practices, and treatment adherence regarding their children with iron deficiency anemia following the implementation of the nursing-based intervention.

Research Hypotheses

H1: Mothers who receive the nursing-based educational intervention will demonstrate significantly higher knowledge scores after the intervention than before the intervention.

H2: Mothers who receive the nursing-based intervention will demonstrate significantly better home care practices regarding their children with iron deficiency anemia after the intervention compared with before the intervention.

H3: Mothers who receive the nursing-based intervention will demonstrate significantly higher treatment adherence regarding their children with iron deficiency anemia after the intervention compared with before the intervention.

H4: There will be a statistically significant positive correlation between mothers' knowledge, home care practices, and treatment adherence regarding their children with iron deficiency anemia following implementation of the nursing-based educational intervention.

Subjects and method

Research Design

A quasi-experimental research design (pre-test/post-test with a control group) was used to evaluate

the effectiveness of a nursing-based educational intervention on mothers' knowledge, practices, and treatment adherence regarding childhood iron deficiency anemia. This design is commonly used in nursing and health education research to assess the effectiveness of interventions when randomization is not feasible **(Polit & Beck, 2021)**.

Research Setting

The study was conducted at the pediatric inpatient department and pediatric outpatient clinics of Zagazig University Children's Hospital, Sharqia Governorate, Egypt. These settings were selected because they receive a large number of children diagnosed with iron deficiency anemia and provide continuous follow-up care for affected children and their mothers.

Subjects

A total sample of 100 mothers of children diagnosed with iron deficiency anemia was recruited and assigned to either the study group (n = 50) or the control group (n = 50).

Inclusion Criteria:

-Mothers of children aged 3–12 years

-Mothers of children diagnosed with iron deficiency anemia.

-Mothers who were willing to participate in the study.

-Mothers who were able to communicate and understand the educational content.

Exclusion Criteria:

-Mothers of children with chronic hematological or genetic disorders other than iron deficiency anemia.

-Mothers who had previously attended similar educational programs.

Sample Size Calculation

The required sample size was calculated using G*Power software version 3.1.9.7 **(Universität Düsseldorf, Germany & Faul, et al., 2009).** Based on a priori power analysis for comparing two independent groups using an independent-samples t-test. The effect size (d = 0.50) was selected according to Cohen's recommendation for a medium effect size. The calculation assumed a significance level ($\alpha = 0.05$), a statistical power of 80% ($1-\beta = 0.80$), a medium effect size (d = 0.50), and a 1:1 allocation ratio. Based on these assumptions, the minimum required sample size was 100 participants. Therefore, a total of 100 mothers were recruited and divided into two equal groups: a study group (n = 50) and a control group (n = 50).

Sampling Technique

A purposive sampling technique was used to recruit mothers of children diagnosed with iron deficiency anemia who met the

study inclusion criteria from the selected study settings. Eligible mothers were consecutively enrolled during the data collection period until the required sample size was reached. To minimize contamination between participants, eligible mothers were assigned to the study or control group according to predetermined outpatient clinic attendance days rather than by random allocation. Mothers attending the clinic on the predetermined intervention days were included in the study group, whereas those attending on the alternate clinic days were included in the control group. Recruitment continued until each group comprised 50 mothers, resulting in a total sample of 100 participants. This allocation method was considered appropriate for the study setting, as it maintained the routine workflow of the outpatient clinics while minimizing contamination between the study and control groups.

Tools of Data Collection

Data were collected using four structured data collection tools developed by the researchers after reviewing the relevant literature (**Bastable, 2023; WHO, 2024**).

Tool I: Structured Socio-demographic and Clinical Data Sheet

This tool was developed by the researchers after reviewing the relevant literature to collect the socio-demographic and clinical data of mothers and their children. It consisted of two parts:

Part I: Mothers' Socio-demographic Data as: Age (years), educational level, and occupation.

Part II: Children's Socio-demographic and Clinical Data

This part included data related to the children's socio-demographic and clinical characteristics, including age, gender, history of iron deficiency anemia, duration of illness, current treatment for iron deficiency anemia, and hemoglobin level (g/dL).

Tool II: Mothers' Knowledge Questionnaire

This tool assessed mothers' knowledge regarding childhood iron deficiency anemia, including its definition, causes and risk factors, signs and symptoms, complications, prevention, nutritional management, and iron supplementation.

Scoring system:

The knowledge questionnaire consisted of 25 multiple-choice and close-ended questions. Each correct response was assigned one point, while each incorrect or "don't know" response was assigned zero. Therefore, the total knowledge score ranged from 0 to 25, with

higher scores indicating better knowledge regarding childhood iron deficiency anemia.

The total knowledge score was categorized as follows:

-Poor knowledge: <50% of the total score (<13 points).

-Fair knowledge: 50% to <75% of the total score (13–18 points).

-Good knowledge: ≥75% of the total score (19–25 points).

Tool III: Mothers' Treatment Adherence Questionnaire

Mothers' treatment adherence was assessed using a structured questionnaire developed by the researchers based on the relevant literature.

The questionnaire evaluated mothers' adherence to the prescribed treatment regimen through items related to:

-Adherence to iron supplementation.

-Compliance with the prescribed dosage and duration of treatment.

-Adherence to follow-up visits and laboratory investigations.

-Adherence to dietary recommendations that enhance iron absorption and minimize factors interfering with iron therapy.

Scoring system:

The treatment adherence questionnaire consisted of 10 close-ended items. Each adherent response was scored as one point, while each non-adherent response was scored as zero. The total treatment adherence score ranged from 0 to 10. Higher scores indicated better adherence to the prescribed treatment regimen. The total adherence score was classified into:

-Poor (<50%)

-Fair (50–<75%)

-Good (≥75%)

Tool IV: Mothers' Reported Home Care Practices Checklist

The checklist assessed mothers' reported home care practices regarding the following:

-Providing iron-rich foods.

-Offering vitamin C-rich foods with meals.

-Avoiding tea or coffee immediately after meals.

-Administering iron supplements correctly (timing, dosage, and method of administration).

-Completing the prescribed duration of iron therapy.

-Attending regular follow-up visits.

-Monitoring children for symptoms of anemia.

-Encouraging balanced nutrition.

-Taking the child for periodic hemoglobin testing.

-Seeking medical advice when symptoms worsen.

Scoring system:

The checklist consisted of 30 items; with a total score ranging from 0 to 30. Each correctly reported practice was scored as one point, while an

incorrect or not-performed practice was scored as zero. Total scores were categorized into: Satisfactory (≥60%) and unsatisfactory (<60%), with higher scores indicating better reported home care practices.

Validity and Reliability

Content validity was assessed by a panel of five experts (three professors of Pediatric Nursing and two professors of Pediatrics) to evaluate the clarity, relevance, comprehensiveness, and appropriateness of the study tools. The study tools were revised and modified according to the experts' comments and recommendations before their final administration.

Pilot Study

A pilot study was conducted on 10 mothers (10% of the total sample), who were excluded from the main study sample, to assess the clarity, feasibility, applicability, and estimated time required to complete the study tools. Based on the pilot study findings, the necessary modifications were made before the actual data collection commenced.

Reliability was assessed using Cronbach's alpha coefficient, which demonstrated acceptable internal consistency for all study tools. Cronbach's alpha coefficients were 0.84 for the Mothers' Knowledge Questionnaire, 0.87 for the Treatment adherence questionnaire, and 0.82 for the Home Care Practices Checklist, indicating good reliability.

Fieldwork / Procedure

The fieldwork was conducted over a period of six months from January to June 2026 at the pediatric outpatient clinics and pediatric inpatient department of Zagazig University Children's Hospital.

The study was carried out through four consecutive phases:

Phase I: Assessment Phase/Pretest

During this phase, mothers of children diagnosed with iron deficiency anemia were interviewed individually. Each interview lasted approximately 20–30 minutes. The researchers explained the purpose of the study and obtained informed consent from each participant. Baseline data were collected using the structured interview questionnaire to assess mothers' socio-demographic characteristics, knowledge, treatment adherence, and reported home care practices regarding childhood iron deficiency anemia (Tools I–IV).

Phase II: Planning Phase

Based on the results of the pre-test assessment and relevant literature review, a nursing-based educational intervention was developed. The educational content included information about the definition, causes, signs and symptoms,

complications, prevention, nutritional management, iron supplementation, treatment adherence, and home care practices related to childhood iron deficiency anemia. Educational materials including illustrated handouts and brochures were prepared in simple Arabic. Also, an educational booklet was prepared in simple Arabic language and supported with colored illustrations to facilitate understanding.

Phase III: Implementation Phase

The nursing-based educational intervention was implemented for the mothers in the study group. Mothers were divided into small groups consisting of 5–10 participants. Three sessions were delivered over three consecutive weeks (one session per week), with each session lasting approximately 30–45 minutes. Different teaching methods were used, including lectures, group discussions, demonstrations, re-demonstrations, brainstorming, and question-and-answer sessions. Educational booklets were distributed to all mothers. Each mother received one copy of the educational booklet for future reference at home. The control group received the routine hospital care only.

Session 1: Overview of childhood iron deficiency anemia, definition, causes and risk factors, signs and symptoms, and complications.

Session 2: Nutritional management of childhood iron deficiency anemia, iron-rich foods, foods enhancing iron absorption, foods inhibiting iron absorption, and prevention of iron deficiency anemia.

Session 3

-Home care practices for children with iron deficiency anemia.

-Correct administration of iron supplements (dose, timing, and method of administration).

-Adherence to the prescribed treatment regimen and completion of the full course of iron therapy.

-Importance of regular follow-up visits and laboratory investigations.

-Recognition and management of common side effects of iron supplements.

-Reinforcement of the key educational messages and answering mothers' questions.

Control Group

The mothers in the control group received the routine hospital care provided by the pediatric outpatient clinics and inpatient department without receiving the nursing-based educational intervention during the study period. To ensure ethical considerations, the educational booklet was provided to the mothers

in the control group after completion of data collection.

Phase IV: Evaluation Phase (Post-test)

Evaluation was conducted one month after completion of the nursing-based educational intervention. The same study tools used during the pre-test (Tools II, III, and IV) were re-administered to assess changes in mothers' knowledge, treatment adherence, and reported home care practices. The post-test findings were compared with the pre-test results and with those of the control group to determine the effectiveness of the nursing-based educational intervention.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing, Zagazig University, prior to the commencement of the study. Official permission to conduct the study was obtained from the administrative authorities of Zagazig University Children's Hospital. Written informed consent was obtained from all participants after explaining the purpose, nature, and procedures of the study. Confidentiality and anonymity of the collected data were strictly maintained by assigning identification codes instead of participants' names. Participation in the study was entirely voluntary. Participants were assured that refusal to participate or withdrawal from the study at any time would not affect the healthcare services provided to them or their children. Participants were informed of their right to withdraw from the study at any time without providing a reason. All collected data were used solely for scientific research purposes and were kept securely to ensure participants' privacy.

Statistical Analysis

Data were coded, entered, and analyzed using the Statistical Package for the Social Sciences IBM SPSS Statistics for Windows, Version 26.0 **(IBM Corp., Armonk, NY, USA)**. Descriptive statistics were used to summarize the data and were presented as frequencies, percentages, means, and standard deviations. The Chi-square (χ^2) test was used to compare categorical variables between groups. McNemar's test was used to compare paired categorical variables (pre- and post-intervention responses) within the study group. The Independent-samples t-test was used to compare mean scores between the study and control groups, while the Paired-samples t-test was used to compare pre- and post-intervention mean scores

within the same group. Pearson correlation coefficient (r) was used to examine the correlations among mothers' knowledge, reported home care practices, and treatment adherence scores. The normality of continuous data was assessed before applying parametric tests. Statistical significance was set at $p < 0.05$, whereas $p < 0.001$ indicated a highly statistically significant difference.

Results

Table (1): Presents the socio-demographic characteristics of the participating mothers. No statistically significant differences were observed between the study and control groups regarding mothers' age, educational level, and occupation at baseline ($p > 0.05$).

Table (2): Shows that the highest percentage of children in both the study (44.0%) and control (48.0%) groups were aged 6–<9 years, with a mean age of **6.84 ± 2.31** and **6.97 ± 2.28** years, respectively. Males constituted **56.0%** of the study group and **60.0%** of the control group.

Regarding the duration of illness, **42.0%** of the study group and **40.0%** of the control group had been diagnosed for less than 6 months, while **22.0%** in both groups had duration of illness of 12 months or more. Concerning the current treatment the majority of children (**76.0%** in the study group and **72.0%** in the control group) were receiving oral iron supplementation only.

As for hemoglobin level, more than half of the children (**52.0%** of the study group and **56.0%** of the control group) had hemoglobin levels ranging from **8 to <10 g/dL**, whereas **18.0%** and **16.0%**, respectively, had levels below **8 g/dL.**

Table (3): Presents the comparison of mothers' knowledge items regarding childhood iron deficiency anemia before and after the educational intervention in the study group. The findings demonstrated a highly statistically significant improvement in mothers' knowledge after the intervention. The proportion of correct responses increased markedly across all knowledge domains, including the definition, causes, high-risk groups, signs and symptoms, diagnostic methods, iron-rich foods, factors affecting iron absorption, the role of vitamin C, and iron supplementation ($p < 0.001$).

Table (4): Presents the comparison of mothers' total knowledge scores before and after the educational intervention. The mean knowledge score increased

significantly in the study group from 8.9 ± 2.4 before the intervention to 24.8 ± 2.1 after the intervention, whereas only a slight improvement was observed in the control group. The difference between the two groups was highly statistically significant ($p < 0.001$), indicating the effectiveness of the educational intervention in improving mothers' knowledge regarding childhood iron deficiency anemia.

Figure (1): Illustrates mothers' total knowledge levels regarding childhood iron deficiency anemia.

The findings revealed a marked positive shift in knowledge levels among the study group following the educational intervention, with a substantial increase in the proportion of mothers who achieved a good knowledge level and a corresponding decrease in those with poor knowledge, while only minimal changes were observed in the control group.

Table (5): Presents the comparison of mothers' reported practices regarding the prevention and management of childhood iron deficiency anemia before and after the educational intervention in the study group.

The findings demonstrated a highly statistically significant improvement in all reported practice items following the intervention. Mothers demonstrated significant improvements in their reported home care practices, including providing iron-rich foods, offering vitamin C-rich foods with meals, avoiding tea or coffee after meals, administering iron supplements according to medical instructions, completing the prescribed duration of treatment, attending regular follow-up visits, monitoring anemia-related symptoms, encouraging balanced nutrition, performing periodic hemoglobin testing, and seeking medical advice when necessary ($p < 0.001$).

Table (6): Presents the comparison of mothers' total practice scores before and after the educational intervention.

The mean total practice score in the study group increased significantly from 11.4 ± 3.1 before the intervention to 26.7 ± 2.8 after the intervention. In contrast, only a slight increase was observed in the control group (11.8 ± 2.9 to 12.6 ± 3.2). The mean change was significantly greater in the study group than in the control group ($p < 0.001$), demonstrating the effectiveness of the nursing-based educational intervention on mothers' reported practices.

Figure (2): Illustrates mothers' total practice levels regarding the

prevention and management of childhood iron deficiency anemia. A remarkable improvement was observed in the study group after the intervention, where the percentage of mothers with satisfactory reported home care practices increased from 26.0% before the intervention to 92.0% after the intervention. In contrast, only slight changes were observed in the control group. The improvement was highly statistically significant ($p < 0.001$).

Table (7): Presents the comparison of mothers' treatment adherence items regarding childhood iron deficiency anemia before and after the educational intervention in the study group. The findings revealed a highly statistically significant improvement in all treatment adherence items following the intervention. Mothers demonstrated significantly better adherence to regular iron supplementation, the prescribed dosage and duration of treatment, scheduled follow-up visits, recommended laboratory investigations, the appropriate timing of iron administration, dietary recommendations that enhance iron absorption, avoidance of foods and beverages that interfere with iron absorption, and consultation with healthcare providers before discontinuing treatment ($p < 0.001$).

Table (8): Presents the comparison of mothers' total treatment adherence scores before and after the educational intervention. The mean treatment adherence score in the study group increased significantly from 10.8 ± 2.9 before the intervention to 23.9 ± 2.3 after the intervention. In contrast, the control group showed only a slight improvement from 11.1 ± 2.7 to 11.9 ± 2.8. The mean change was significantly greater in the study group than in the control group ($p < 0.001$), demonstrating the effectiveness of the nursing-based educational intervention in improving mothers' adherence to the prescribed treatment regimen for childhood iron deficiency anemia.

Figure (3): Illustrates mothers' total treatment adherence levels before and after the educational intervention. The proportion of mothers with good treatment adherence increased from 6.0% before the intervention to 80.0% after the intervention, whereas the proportion with poor adherence declined from 70.0% to 6.0%. In contrast, only minimal changes were observed in the control group. This improvement was highly statistically significant ($p < 0.001$).

Table (9): Demonstrates the correlation between mothers' knowledge, practices, and treatment adherence after the educational intervention among the study group. A strong positive correlation was found between mothers' knowledge and practices ($r = 0.71$, $p < 0.001$), knowledge and treatment adherence ($r = 0.76$, $p < 0.001$), and practices and treatment adherence ($r = 0.82$, $p < 0.001$). These findings demonstrated that higher mothers' knowledge scores were significantly associated with better reported home care practices and higher treatment adherence scores. Furthermore, better reported home care practices were significantly associated with higher treatment adherence scores.

Table (1): Distribution of Mothers' Sociodemographic Characteristics in the Study and Control Groups (n = 100)

Mothers' Characteristics	Study Group (n=50) No. (%)	Control Group (n=50) No. (%)	χ^2	p-value
Age (years)				
18–<25 years	14 (28.0)	13 (26.0)	0.184	0.912
25–<32 years	21 (42.0)	22 (44.0)		
≥32 years	15 (30.0)	15 (30.0)		
Educational level				
Illiterate	8 (16.0)	9 (18.0)	0.701	0.874
Read and write	12 (24.0)	11 (22.0)		
Secondary education	18 (36.0)	17 (34.0)		
University education	12 (24.0)	13 (26.0)		
Occupation				
Housewife/not employed	34 (68.0)	36 (72.0)	0.189	0.664
Employed	16 (32.0)	14 (28.0)		

Chi-square test was used. Fisher's Exact test was used when appropriate,

No statistically significant differences (N S) ($p > 0.05$)

Table (2): Distribution of Children According to Their Socio-demographic and Clinical Characteristics in the Study and Control Groups (n = 100)

Children's Characteristics	Study Group (n=50) No. (%)	Control Group (n=50) No. (%)	χ^2	p-value
Age (years)				
3–<6	17 (34.0)	15 (30.0)	0.29	0.773
6–<9	22 (44.0)	24 (48.0)		
9–12	11 (22.0)	11 (22.0)		
Mean ± SD	6.84 ± 2.31	6.97 ± 2.28	t = 0.28	0.780
Gender				
Male	28 (56.0)	30 (60.0)		
Female	22 (44.0)	20 (40.0)	0.16	0.689
Duration of illness				
<6 months	21 (42.0)	20 (40.0)		
6–<12 months	18 (36.0)	19 (38.0)	0.23	0.891
≥12 months	11 (22.0)	11 (22.0)		
Current treatment				
Iron supplementation only	38 (76.0)	36 (72.0)		
Iron supplementation & dietary modification	12 (24.0)	14 (28.0)	0.21	0.648
Hemoglobin level (g/dL)				
<8 g/dL	9 (18.0)	8 (16.0)		
8–<10 g/dL	26 (52.0)	28 (56.0)	0.30	0.860
≥10 g/dL	15 (30.0)	14 (28.0)		

Chi-square test was used for comparison. Fisher's Exact test was applied when appropriate.

Independent t-test for Mean ± SD. NS ($p > 0.05$).

Table (3): Comparison of Mothers' Knowledge Items Regarding Iron Deficiency Anemia Before and After the Intervention in the Study Group (n=50)

Knowledge Items	Pre-test No. (%)	Post-test No. (%)	p-value
Definition of iron deficiency anemia	18 (36.0)	47 (94.0)	<0.001*
Causes of iron deficiency anemia	16 (32.0)	45 (90.0)	<0.001*
High-risk groups (children, vegetarians, etc.)	14 (28.0)	44 (88.0)	<0.001*
Signs and symptoms	17 (34.0)	46 (92.0)	<0.001*
Methods of diagnosis	15 (30.0)	45 (90.0)	<0.001*
Iron-rich foods	19 (38.0)	48 (96.0)	<0.001*
Iron absorption inhibitors (tea/coffee)	13 (26.0)	46 (92.0)	<0.001*
Vitamin C role in iron absorption	12 (24.0)	45 (90.0)	<0.001*
Treatment with iron supplements	20 (40.0)	49 (98.0)	<0.001*

McNemar's test was used to compare the proportion of mothers with correct responses before and after the intervention. *Statistically significant at p <0.05.

Table (4): Comparison of Mothers' Total Knowledge Scores between the Study and Control Groups before and after the Intervention

Total Knowledge Score	Study Group (n=50) Mean ± SD	Control Group (n=50) Mean ± SD	t-value	p-value
Pre-test	8.9 ± 2.4	9.1 ± 2.6	0.34	0.732
Post-test	24.8 ± 2.1	10.3 ± 2.8	28.74	<0.001*
Mean Change (Post–Pretest)	+15.9 ± 3.2	+1.2 ± 2.5	24.41	<0.001*

Independent samples t-test was used to compare the study and control groups at baseline, post-intervention, and for the mean change scores (post-test minus pre-test). Statistical significance was considered at $p < 0.05$.

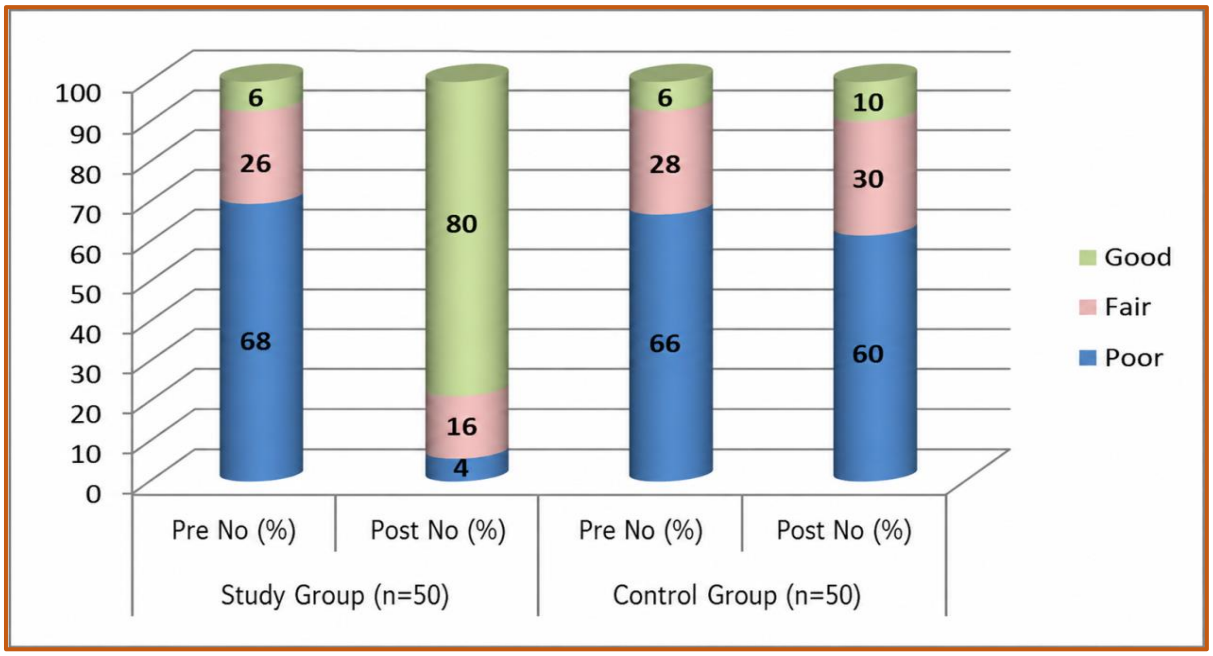

Figure (1): Comparison of Mothers' Total Knowledge Scores before and After the Intervention in the Study and Control Groups

Table (5): Comparison of Mothers' Reported Practice Items Regarding the Prevention and Management of Iron Deficiency Anemia Before and After the Intervention in the Study Group (n = 50)

Reported Practice Items	Pre-test No. (%)	Post-test No. (%)	p-value
Providing iron-rich foods (liver, red meat, beans, spinach)	16 (32.0)	47 (94.0)	<0.001*
Offering foods rich in vitamin C with meals	14 (28.0)	46 (92.0)	<0.001*
Avoiding tea or coffee immediately after meals	12 (24.0)	45 (90.0)	<0.001*
Administering iron supplements according to physician instructions	18 (36.0)	48 (96.0)	<0.001*
Ensuring adherence to the prescribed duration of iron therapy	15 (30.0)	47 (94.0)	<0.001*
Following up regularly at health clinics	17 (34.0)	46 (92.0)	<0.001*
Monitoring child for symptoms of anemia	19 (38.0)	48 (96.0)	<0.001*
Encouraging balanced nutrition for the child	22 (44.0)	49 (98.0)	<0.001*
Performing periodic hemoglobin testing	13 (26.0)	44 (88.0)	<0.001*
Seeking medical advice when symptoms worsen	20 (40.0)	49 (98.0)	<0.001*

McNemar test was used to compare mothers' reported practices before and after intervention.

*Highly statistically significant ($p < 0.001$).

Table (6): Comparison of Mothers' Total Practice Scores between the Study and Control Groups Before and After the Intervention

Total Practice Scores	Study Group (n=50) Mean ± SD	Control Group (n=50) Mean ± SD	t-value	p-value
Pre-test	11.4 ± 3.1	11.8 ± 2.9	0.46	0.648
Post-test	26.7 ± 2.8	12.6 ± 3.2	23.65	<0.001*
Mean Change (Post–Pre)	+15.3 ± 3.4	+0.8 ± 2.7	23.84	<0.001*

Independent samples t-test was used to compare the study and control groups at baseline, post-intervention, and for the mean change scores (post-test minus pre-test). Statistical significance was considered at $p < 0.05$.

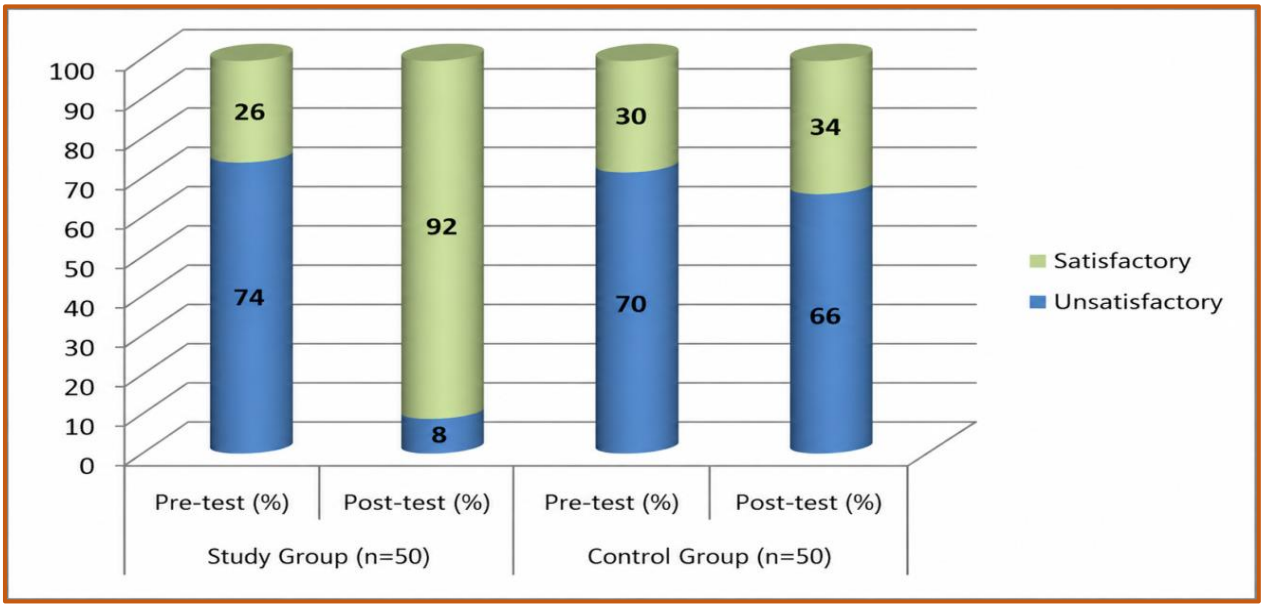

Figure (2): Comparison of Mothers' Total Practice scores Regarding the Prevention and Management of Iron Deficiency Anemia Before and After the Intervention in the Study and Control Groups

Table (7): Comparison of Mothers' Treatment Adherence Items Regarding Childhood Iron Deficiency Anemia Before and After the Intervention in the Study Group (n = 50)

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Treatment Adherence Items	Pre-test No. (%)	Post-test No. (%)	p-value
Administering iron supplements regularly as prescribed	19 (38.0)	48 (96.0)	<0.001*
Giving the correct prescribed dose	20 (40.0)	49 (98.0)	<0.001*
Completing the full duration of iron therapy	16 (32.0)	47 (94.0)	<0.001*
Not discontinuing iron therapy when symptoms improve	15 (30.0)	46 (92.0)	<0.001*
Attending scheduled follow-up visits	18 (36.0)	47 (94.0)	<0.001*
Performing recommended laboratory investigations	17 (34.0)	46 (92.0)	<0.001*
Giving iron supplement at the recommended time	16 (32.0)	48 (96.0)	<0.001*
Following dietary recommendations that enhance iron absorption	18 (36.0)	47 (94.0)	<0.001*
Avoiding foods and drinks that interfere with iron absorption	14 (28.0)	45 (90.0)	<0.001*
Consulting the physician before stopping treatment	20 (40.0)	49 (98.0)	<0.001*

McNemar test was used to compare treatment adherence items before and after the intervention.

Table (8): Comparison of Mothers' Total Treatment Adherence Scores between the Study and Control Groups Before and After the Intervention

Total Treatment Adherence Score	Study Group (n=50) Mean ± SD	Control Group (n=50) Mean ± SD	t-value	p-value
Pre-test	10.8 ± 2.9	11.1 ± 2.7	0.53	0.598
Post-test	23.9 ± 2.3	11.9 ± 2.8	23.11	<0.001*
Mean Change (Post–Pre)	+13.1 ± 3.0	+0.8 ± 2.4	21.84	<0.001*

Independent samples t-test was used to compare the study and control groups at baseline, post-intervention, and for the mean change scores (post-test minus pre-test). Statistical significance was considered at $p < 0.05$.

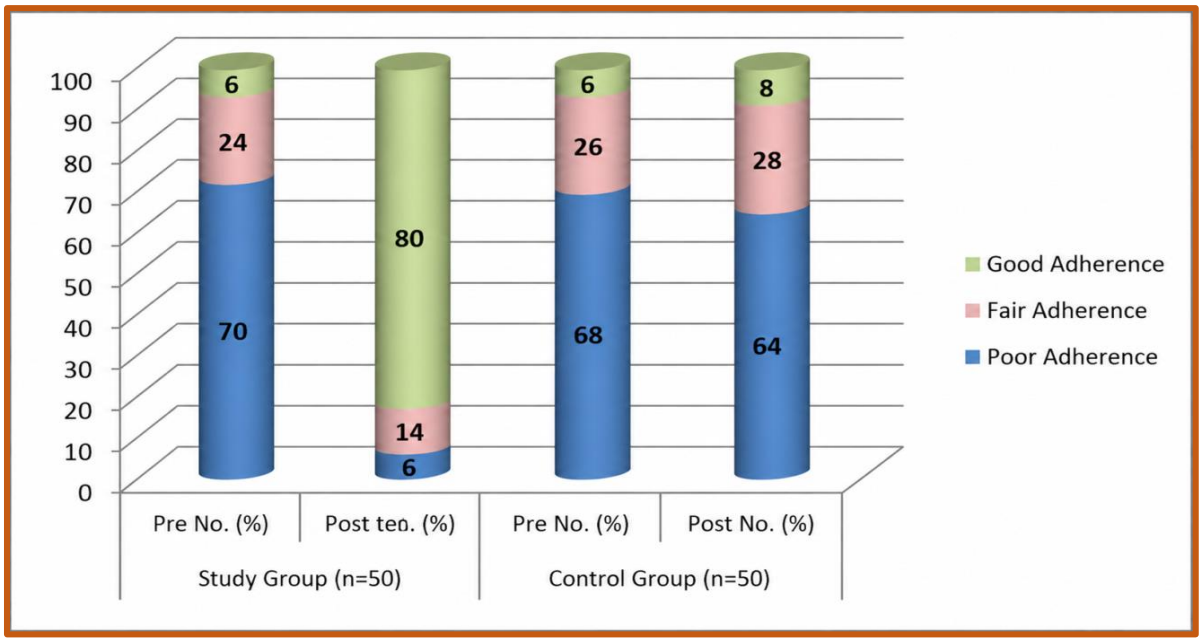

Figure (3): Comparison of Mothers' Treatment Adherence Levels Before and After the Intervention in the Study and Control Groups

Highly statistically significant ($p < 0.001$)

Table (9): Correlation between Mothers' Knowledge, Home Care Practices, and Treatment Adherence Scores After the Intervention Among the Study Group (n=50)

Variables	Knowledge	Reported Home Care Practices	Treatment Adherence
Knowledge	1	0.71**	0.76**
Reported Home Care Practices	0.71**	1	0.82**
Treatment Adherence	0.76**	0.82**	1

Pearson correlation coefficient (r) test was used.

All correlations were positive and statistically significant ($p<0.001$).

Discussion:

Regarding socio-demographic characteristics, the present study revealed that there were no statistically significant differences between the study and control groups regarding mothers' age, educational level, and occupation before the implementation of the educational intervention. This finding indicates baseline homogeneity between both groups, which enhances the validity of the study results and confirms that the observed changes after the intervention were most likely attributable to the educational intervention rather than demographic variations.

This finding may be explained by that the homogeneity of the study and control groups before implementation of the intervention provided a suitable foundation for evaluating the effectiveness of the nursing-based intervention. Similar findings were reported by **Hassan et al., (2020),** who found no significant differences between intervention and control groups regarding socio-demographic characteristics before conducting an educational program on childhood iron deficiency anemia.

Concerning children' socio-demographic and clinical characteristics, the present study findings indicate that the study and control groups were comparable regarding children's socio-demographic and clinical characteristics before the implementation of the nursing-based intervention.

The present finding may be attributed to, that the two groups were comparable before implementing the nursing-based intervention. Such baseline comparability strengthens the validity of the study findings by minimizing the influence of confounding variables on the intervention outcomes.

These findings are consistent with the study conducted by **Amer et al. (2021)**, who reported no significant baseline differences between the intervention and control groups before implementing an educational program for mothers of children with iron deficiency anemia. Similarly, **Abu Alhaija and Hasab (2024)** found that both groups were comparable in their baseline characteristics prior to the educational intervention, allowing the observed post-intervention improvements to be attributed to the intervention itself rather than to pre-existing differences. In addition, the predominance of school-aged children and the distribution of hemoglobin levels observed in the current study are in line with the epidemiological patterns of childhood iron deficiency anemia

reported by **Black et al. (2021.**

In relation to mothers' knowledge regarding iron deficiency anemia, the current study demonstrated a marked improvement in mothers' knowledge regarding iron deficiency anemia after implementation of the educational intervention. Before the intervention, mothers showed limited knowledge related to the definition, causes, risk factors, signs and symptoms, diagnosis, prevention, and treatment of iron deficiency anemia. Following the intervention, significant improvements were observed across all knowledge domains.

The researcher attributes this improvement to the effectiveness of the educational sessions, which provided clear and practical information tailored to mothers' educational levels and daily experiences. Educational materials and interactive discussions may also have enhanced knowledge retention and understanding.

These findings are consistent with those reported by **(Ibrahim et al., (2022)**, who found that educational interventions significantly improved mothers' knowledge regarding childhood iron deficiency anemia. Likewise, **Ojwang' et al., (2022),** reported substantial increases in mothers' awareness after participation in structured health education programs. Furthermore, the findings support recommendations issued by the **WHO (2023),** emphasizing the importance of parental education in preventing and managing childhood anemia.

Concerning knowledge levels and total knowledge scores, the results revealed that most mothers in the study group had poor knowledge before the intervention, whereas the majority achieved a good level of knowledge after implementation of the educational package. Similarly, the mean total knowledge score increased significantly in the study group compared with the control group.

From the researcher's perspective, this finding highlights the existence of knowledge deficits among mothers regarding childhood anemia and underscores the importance of educational programs in addressing these gaps. Improved knowledge may empower mothers to make informed decisions regarding nutrition, supplementation, and healthcare-seeking behaviors.

These findings are in agreement with **(Ibrahim et al., 2022),** who reported significant improvements in mothers' knowledge levels following educational interventions. Similar improvements were also documented by **Chungkham, et al. (2021),** who emphasized that health education plays a critical role in enhancing

caregivers' understanding of childhood anemia and its management.

About mothers' reported practices regarding iron deficiency anemia, the present study demonstrated significant improvements in mothers' reported practices concerning prevention and management of iron deficiency anemia. Improvements were observed in providing iron-rich foods, encouraging vitamin C intake, avoiding beverages that inhibit iron absorption, adherence to iron supplementation, regular follow-up visits, and monitoring symptoms of anemia.

The improvement in reported home care practices may have resulted from the substantial increase in mothers' knowledge following the educational intervention. When mothers understand the causes and consequences of anemia, they become more capable of applying appropriate preventive and therapeutic measures in daily childcare.

These findings are supported by **Gupta et al. (2022),** who found that educational interventions significantly improved caregivers' nutritional and health-related practices. Similarly, the **WHO (2023)** emphasized that improving parental knowledge contributes directly to better adherence to recommended nutritional and therapeutic practices for children with anemia.

Around practice levels and total practice scores, the findings indicated a dramatic improvement in practice levels among mothers in the study group after implementation of the educational intervention. The proportion of mothers with satisfactory practices increased substantially, while unsatisfactory practices decreased markedly. In contrast, only minor changes were observed in the control group.

According to the researcher, practical demonstrations, educational discussions, and individualized guidance contributed to the successful translation of knowledge into practice. Mothers were provided with practical recommendations that could be easily incorporated into everyday childcare routines.

This result is consistent with findings reported by **Jullien, (2021)**, who observed significant improvements in caregiving practices among mothers following educational interventions. Similar conclusions were also reported by **UNICEF (2022)**, which highlighted the importance of parental education in improving child nutrition and health outcomes.

Regarding mothers' treatment adherence toward childhood iron deficiency anemia, the present study

revealed significant improvements in mothers' treatment adherence following the implementation of the intervention. Mothers demonstrated better adherence to administering iron supplements regularly as prescribed, following the correct dosage, completing the full course of iron therapy, attending scheduled follow-up visits, performing recommended laboratory investigations, administering iron supplements at the recommended time, adhering to dietary recommendations that enhance iron absorption, avoiding foods and beverages that interfere with iron absorption, and consulting healthcare providers before discontinuing treatment.

The researchers believe that this improvement may be attributed to the comprehensive educational intervention, which emphasized not only the importance of treatment adherence but also the practical skills required to implement the prescribed therapeutic regimen correctly. Providing mothers with simple educational materials, individualized guidance, and opportunities for discussion may have enhanced their confidence and commitment to adhering to treatment recommendations.

The findings also demonstrated a remarkable improvement in mothers' treatment adherence levels and total treatment adherence scores after the intervention. The proportion of mothers with good treatment adherence increased markedly, while poor adherence declined substantially in the study group. In contrast, only minimal changes were observed in the control group. Furthermore, the mean total treatment adherence score increased significantly among mothers in the study group compared with those in the control group, confirming the effectiveness of the nursing-based educational intervention in improving adherence to treatment recommendations.

This improvement may be explained by the use of repeated educational sessions, simple language, and practical demonstrations, which facilitate information retention and behavioral change among caregivers. These findings are consistent with those reported by **Ibrahim et al., (2022),** who found that educational interventions significantly improved caregivers' adherence to iron therapy among children with iron deficiency anemia. Similar findings were also reported by the World Health Organization, which emphasized that caregiver education and counseling play a crucial role in improving adherence to iron supplementation and reducing the burden of childhood iron deficiency anemia.

With regard to the correlation

between knowledge, practices, and treatment adherence, an important finding of the current study was the strong positive correlation between mothers' knowledge and practices following the intervention. Mothers with higher knowledge scores were more likely to demonstrate better caregiving practices related to the prevention and management of childhood iron deficiency anemia.

Moreover, the study revealed a strong positive correlation between mothers' knowledge and treatment adherence, as well as between reported practices and treatment adherence, this relationship suggests that improving mothers' knowledge may facilitate the adoption of appropriate caregiving behaviors, which in turn enhances adherence to the prescribed treatment regimen.

This finding agrees with the work of **Gupta et al. (2022)** who reported significant positive associations between caregivers' knowledge and health-related practices. Additionally, the **Samararathna, et al., (2022).** emphasized that improving health literacy is a key determinant of successful disease prevention and management behaviors.

Regarding the overall effectiveness of the nursing-based educational intervention, the findings of the current study demonstrated that the intervention was highly effective in improving mothers' knowledge, practices, and treatment adherence. Knowledge demonstrated the greatest improvement, followed by reported home care practices and treatment adherence.

The researchers believe that nurses play a pivotal role in health education because of their continuous interaction with mothers and children in healthcare settings. Through structured educational programs, nurses can effectively enhance mothers' understanding, encourage positive behavioral changes, and improve child health outcomes.

These findings support the recommendations of the **WHO (2023)** and **UNICEF (2022)**, which advocate strengthening caregiver education as a key strategy for reducing the burden of childhood anemia. The current results are also in line with previous studies conducted by **Hassan, et al., (2020), & Kassie & Workie (2021),** all of which reported significant improvements in caregivers' knowledge, practices, and treatment adherence following educational interventions related to childhood iron deficiency anemia.

Conclusion:

The findings of the current study demonstrated that the educational intervention had a significant positive effect on mothers'

knowledge, practices, and treatment adherence regarding the prevention and management of childhood iron deficiency anemia. Prior to the intervention, mothers exhibited inadequate levels of knowledge, practices, and treatment adherence. Following implementation of the educational package, substantial improvements were observed across all measured outcomes.

The educational intervention significantly enhanced mothers' understanding of iron deficiency anemia, including its causes, symptoms, prevention strategies, dietary management, and treatment requirements. In addition, mothers showed marked improvements in their caregiving practices, particularly regarding the provision of iron-rich foods, adherence to iron supplementation, regular health follow-up, and monitoring of anemia-related symptoms. Furthermore, mothers demonstrated significantly better treatment adherence, including regular administration of iron supplements, compliance with the prescribed dosage and duration of therapy, attendance at scheduled follow-up visits, performance of recommended laboratory investigations, and adherence to dietary recommendations that enhance iron absorption.

Furthermore, strong positive correlations were identified between mothers' knowledge and practices, knowledge and treatment adherence, as well as practices and treatment adherence after the intervention, indicating that increased knowledge contributed to improved caregiving behaviors and better adherence to the prescribed treatment regimen. Therefore, the study concludes that nursing-based educational interventions are effective strategies for promoting maternal awareness, improving home care practices, and enhancing treatment adherence related to childhood iron deficiency anemia.

Recommendations:

Based on the findings of the present study, the following recommendations are proposed:

1-Implement regular nursing-based educational programs in pediatric outpatient clinics and primary healthcare settings to improve mothers' knowledge, home care practices, and adherence regarding the prevention and management of childhood iron deficiency anemia.

2-Develop and distribute simple educational materials, including booklets, brochures, posters, and digital resources, to increase mothers' awareness of iron deficiency anemia, healthy nutrition, iron supplementation, and preventive measures.

3-Integrate anemia prevention, nutritional education, and treatment adherence counseling into routine maternal and child healthcare services, with emphasis on individualized education and regular follow-up for children at risk of iron deficiency anemia.

4-Strengthen community awareness and early screening programs through collaboration among healthcare providers, schools, and community organizations to facilitate early detection and prevention of iron deficiency anemia.

5-Conduct further research using larger and more diverse samples and longer follow-up periods to evaluate the long-term effectiveness of educational interventions and explore innovative educational approaches, such as mobile health applications and digital learning platforms.

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Head Nurses'Intuition in Decision Making and its Relation to Intensive Care Nurses' Innovative Behavior

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Abstract

Background: Nurses 'work in intensive care units (ICUs) is difficult and includes many requirements for developing care. Caring for the seriously ill patients is an intensive process that needs a dedicated clinical team and immediate observation to provide sustainable life interventions. **Aim:** This work aimed to assess head nurses' intuition in decision making and its relation to intensive care nurses' innovative behavior. **Research design:** Descriptive correlation research design was utilized to conduct this study. **Setting:** The study was conducted in Tanta Main University Hospital and Emergency Hospital. **Subjects:** The study subjects consisted of available nursing staff (n=390) and available head nurses (n=50). **Tools:** tool (I): Intuitive Decision-Making Structured Questionnaire and tool (II) Innovation Work Behavior Scale. **Results:** More than seventy percentage of head nurses (72%) had moderate level of intuitive decision making. While, the total intuitive decision making level of nurses was moderate (59.4%) in addition, more than half of nurses (52.1%) had moderate level of innovative work behavior. **Conclusions:** There were statistically significant positive correlation between total intuitive decision-making score and head nurses age and marital status. There were no statistically significant relation between total intuitive decision-making score and all items of studied nurses' socio–demographic characteristics except place of work at ($P < 0.05$). **Recommendations:** Hospital management should develop a culture of innovation within healthcare settings by encouraging nurses to participate in quality improvement projects and evidence-based initiatives and Implement continuous professional development programs focusing on enhancing critical thinking, intuition, and innovative competencies among nursing staff.

***Keywords*:** Head Nurses, Intuition, Decision Making, Intensive Care Nurses, Innovative Behavior.

Introduction

Nurses' work in intensive care units (ICUs) is difficult and includes many requirements for developing care. Caring for the seriously ill patients is an intensive process that needs a dedicated clinical team and immediate observation to provide sustainable life interventions(**Checkley et al., 2014)** .Head nurses' decision at ICUs play an essential role in ensuring that all patients receive the best nursing care (**Perrie, 2006).** So, they use intuitive decision-making rather than structured approaches. They follow a recognition primed decision that fits their experience, and arrive at a course of action without weighing alternatives(**Dubov, 2017) .**

Intuitive decision-making can be described as the process by which information acquired through associated learning and stored in long-term memory. This information is accessed unconsciously to serve as the foundations for judgment or decision-making and can be transferred through affect induced by exposure to available options, or through unconscious cognition (**Nockur et al., 2020).**

Intuition is based on the implicit knowledge available to the decision-maker. Intuitive decision making is a decision making approach that is less structured and more flexible compared to other approaches like rationalistic decision making (**Julmi et al ., 2019).**

There are three essential aspects of intuition in decision making: affective intuition, inferential intuition and holistic intuition (**Hodgkinso et al., 2018).**

Affective intuition is response made utilizing emotions, the basis of these emotions is difficult to explain, and affective intuition gauged how much a person relies on their feelings. Inferential intuition is an automated, analytical process.

The analytical process is quickened due to experience, and the steps no longer require concentration. On the other hand, holistic intuition, integrates information from the whole rather than the parts. It is a process in which a person sees abroad range of influences that contribute to a problem's solution (**Wingo, N., Jones, C. R., Pittman, B. R., Purter, T., Russell, M., Brown, J., & Ladores, S. 2020).**

Innovative behaviour can be defined as the activities of nurses who work on creating, presenting and applying new ideas and

solutions to problems in the workplace (**Dediu et al., 2018).**

Intensive care nurses' innovative behaviour has immense significance for organizational effectiveness and survival, which ultimately leads an organization toward sustainable development (**Gross et al., 2017).**

According to the International Council of Nurses (2009)(**(Quality, 2009).**innovation is highly needed for nursing practice in promoting health, minimizing risk factors for health conditions, avoiding diseases, improving attitudes toward the healthy life, and enhancing the treatment strategies and procedures.

Innovative work behaviour consists of four dimensions; idea exploration ,idea generation, idea championing and idea implementation (**Bagheri et al., 2017)** .

Idea exploration refers to look for opportunities to improve existing nursing services or work relationships, idea generation refers to the generation of new and workable ideas leading to the discovery of different discrepancies and problems in the organization and available plans and solutions to solve those problems, Further, idea championing refers to the efforts on the part of nurses to promote their ideas and seek support from the fellow workers and organization.

Finally, idea implementation refers to the practical implementation and simulation of once developed and promoted ideas **(Hecker et al., 2017).**

The aim of this work wasto assess head nurses' intuition in decision making and its relation to intensive care nurses' innovative behaviour.

Subjects and Method

Study design

A descriptive correlation research design was used to carry out this study.

Setting

The current study was conducted in intensive care units at Tanta Main University Hospital and Emergency hospital. Including Cardiac, Medical Hospital, Neurology, Chest Hospital, Pediatric Hospital, Ophthalmology and Neonatal ICUs and Emergency Hospital including Anaesthesia and Medical ICUs.

Subjects

The subject of this study included all head nurses (50) and all nurses (340) working in ICUs at previously mentioned settings and available at time of data collection.

Tools of data collection

Tool I: Intuitive decision-making structured questionnaire was developed by the researcher guided by Pretz and Brookings (**(Pretz et**

al., 2014).., and other related research. The tool was used to assess the head nurse's intuitive decision-making as perceived by head nurses and nurses. it was consisted of two main parts: **Part I:** Personal and work related Data include age ,gender, marital status ,years of experience, working unit, educational qualifications and **Part II:** Intuitive Decision, it was consisted of (30) items under 3 dimensions as follow: Affective Intuition10 items (1-10), Inferential Intuition8 items (11-18) and Holistic Intuition12 items (19-30).

Scoring system

Subjects' responses were measured on five point Likert scale ranging from (1-5) where (1) strongly disagree, (2) disagree, (3) little agree, (4) agree (5) strongly agree. The scoring levels were arranged according to cut off point as follow; Low intuition decision making <65%, Moderate intuition decision making from 65% to less than 75% and High intuition decision making ≥ 75% .

Tool II: Innovation work behavior scale was developed by the researcher based on **De Jong (De Jong et al ., 2007) , It** was used to assess innovative work behavior of nurses. It consisted of 20 items under 4 dimensions as follow: Idea exploration 6items (1-6), Idea generation 5items (7-11), Idea championing 4items (12-15) and Idea implementation 5items (16-20).

Scoring system

Nurses' responses were measured on five point Likert scale ranging from (1-5) where (1) never, (2) rarely, (3) sometimes, (4) often and (5) always., The scoring levels were arranged according to cut off point as follow; Low innovative work behaviour <65%, Moderate innovative work behavior from 65% to less than 75% and High innovative work behavior ≥75%.

Method

1-Official permission to carry out the study was obtained from Faculty of Nursing and to administrator of Tanta University hospitals.

2-Ethical consideration

-The ethics commission of Tanta University's Faculty of Nursing gave its clearance.

-Every participant was made aware of the study's objectives.

-Every participant in the research gave their informed permission, which included the option to withdraw at any moment.

-The researcher was assured that the overall sample would not be harmed by the nature of the investigation.

-When gathering data, privacy and confidentiality were taken into account.

3-The researcher designed and translated data collecting instruments into Arabic after reviewing recent literature.

4-A panel of five experts from the relevant field evaluated the content validity of each instrument. Two professors of nursing administration from Tanta University and three assistant professors of nursing administration from Tanta University made up the jury.

5- In order to assess the instrument's reliability, an appropriate statistical test was carried out. Using the test coefficient Cronbach's Alpha, the validity of this study was assessed.

-Cronbach's Alpha for**tool I is 0.881**for 37 items applied on 5headnurses.

-Cronbach's Alpha for**tool IIis 0.951**for 26 items applied on34nurses.

6- To evaluate the instruments for clarity and applicability, the researcher performed a pilot study on 10% of nurses, who will be removed from the sample.

7-The researcher was met nurses in the waiting area of their department to explain the aim of the study and distribute the questionnaire sheets for them.

8-The data collected from February to April 2023

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 26. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison was done using Chi-square test ($\chi 2$). For comparison between means for variables pre and post intervention in a group, paired samples T-test was used. For comparison between means for variables during three periods of intervention in a group, or for more than two variables, the F-value of analysis of variance (ANOVA) was calculated. Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A significance was adopted at $P<0.05$ for interpretation of results of tests of significance (*). Also, a highly significance was adopted at $P <0.01$ for interpretation of results of tests of significance (**) (Burt, 2023).

Results

Table (1): Illustrates percent distribution of the studied head nurses and studied nurses according to their personal and

work related data. The table reveals that more than half (52%) of head nurses at age group (40-<50) with mean age 41.38 ± 3.551. Nearly three quadrants (72%) of them working in Tanta university main hospital and all of them were female. Additionally, about one quarter (24%) of studied head nurses worked in medical ICU. Majority (86%) of them were married and ≥15 years of experience. Regarding education, more than half (56%) of nurses had bachelor degree while 36% had master degree and 8% had PhD degree. While, the table reveals that 45.9% of nurses at age group (20-<30) with mean age 32.01±8.027. About two thirds (71.2%) of nurses worked in Tanta university main hospital and less than one quarter (28.8%) of them worked in emergency hospital. Majority (94%) of them were female, while (23.5%) of them worked in neonatal ICU and (22.4%) of them worked in medical ICU. The majority (88.2%) of nurses were married and had 5- <10 years of experience and more than half (51.5 %) had technical institutes.

Table (2): Shows the percent distribution of the studied head nurses and studied nurses according to their level of intuitive decision making. In total more than (70%) of head nurse had moderate level of intuitive decision making. specially 52% of them had moderate level for affective intuition. while, 54% and 44% of head nurses had low level for holistic intuition and inferential intuition. While the total intuitive decision making level was moderate with (59.4%) of nurses. especially 42.9% of them had moderate level of affective intuition. while, 50.6% and 44.4% of head nurses had low level for holistic intuition and inferential intuition.

Figure (1): States the mean percentage and ranking of the intuitive decision-making dimensions among the studied head nurses. As noticed in the figure the mean percentage of affective intuition dimension was 74.36% while the mean percentage of holistic intuition dimension was 72.63% and finally the inferential intuition dimension was 72.35%.

Figure (2): States the percent distribution of the studied head nurses according to their level of intuitive decision-making. As it noticed in the figure, more than seventy percentages of head nurses had moderate level of intuitive decision making. While more than one quarter had low level and little percent had high level.

Figure (3): States the mean percentage of the intuitive decision-making dimensions among the studied nurses. As noticed in the figure the mean percentage of affective intuition dimension was 72.78% while the mean percentage of inferential intuition dimension was 72.63% and finally the holistic intuition dimension was 72.4%.

Figure (4): States the percent distribution of the studied nurses according to their level of intuitive decision-making. As it noticed in the figure, the level of intuitive decision-making was moderate. more than fifty percentage of nurses (59.4%) had moderate level of intuitive decision making. While 37.9% had low level and little percent (2.6%) had high level.

Table (3): Represents the mean scores of the innovation work behavior dimensions of the studied nurses. As noticed the highest mean score was for idea generation 73. 56%, followed by idea exploration 73.40% and implementation 71.8%.

Figure (5): Describes total levels of innovation work behavior of studied nurses. As more than half (52.1%) of nurses had moderate level regarding the Innovation work behavior and 36.2% of them had low level while, only 11.8 % of them had high level.

Figure (6): Shows that there is no Significance correlation between intuitive decision making of studied head -nurses and innovative work behavior score of the studied nurses.

Table (1): Percent distribution of the studied head nurses and studied nurses according to their socio–demographic characteristics

Characteristics		The studied nursing sample		
		Head nurses(n=50)	Nurse(n=340)	χ^2 P
Place of work	Tanta Main University Hospital	36 (72.0%)	242 (71.2%)	FE 1.00
	Emergency Hospital	14 (28.0%)	98 (28.8%)	
Age (in years)	(20-<30)	0 (0.0%)	156 (45.9%)	--
	(30-<40)	21 (42.0%)	103 (30.3%)	14.848
	(40-<50)	26 (52.0%)	73 (21.5%)	**0.002***
	(50-60)	3 (6.0%)	8 (2.4%)	--
Age (in years)		41.38±3.551	32.01±8.027	**P=0.000***
Gender	Male	0 (0.0%)	20 (5.9%)	FE 0.091
	Female	50 (100.0%)	320 (94.1%)	
Department	Cardiac ICU	5 (10.0%)	20 (5.9%)	--
	Medical ICU	12 (24.0%)	76 (22.4%)	2.546
	Neurology ICU	7 (14.0%)	45 (13.2%)	0.924
	Chest ICU	3 (6.0%)	13 (3.8%)	--
	Pediatric ICU	4 (8.0%)	36 (10.6%)	--
	Ophthalmology ICU	3 (6.0%)	18 (5.3%)	--
	Neonatal ICU	9 (18.0%)	80 (23.5%)	--
	Anesthesia ICU	7 (14.0%)	52 (15.3%)	--
Marital status	Single	0 (0.0%)	31 (9.1%)	--
	Married	43 (86.0%)	300 (88.2%)	18.258
	Divorced	5 (10.0%)	5 (1.5%)	**0.000***
	Widow	2 (4.0%)	4 (1.2%)	--
Years of experience	(1-<5)	--	87 (25.6%)	--
	(5-<10)	--	105 (30.9%)	--
	(10-<15)	--	56 (16.5%)	--
	(15-<20)	--	13 (3.8%)	--
	(≥20)	--	79 (23.2%)	--
	(<15)	7(14.0%)	--	--
	(≥15)	43(86.0%)	--	--
	mean ± SD	17.52±3.448	11.29±8.711	--
Educational level	Bachelor	28 (56.0%)	74 (21.8%)	--
	Master degree	18(36.0%)	--	--
	PhD degree	4(8.0%)	--	--
	Diplome	--	82 (24.1%)	--
	Technical institute	--	175 (51.5%)	--
	Post studies	--	9 (2.6%)	--

Data are presented as mean ± SD or frequency (%).FE: Fisher' Exact test, * Statistically significant at level P<0.05.

Table (2): Percent distribution of the studied head nurses and studied nurses according to their level of intuitive decision making

Intuitive decision making dimensions	The studied nursing sample												
	Head nurses (n=50)						Nurse (n=340)						χ^2 P
	Low <65%		Moderate 65-<75		High ≥75%		Low <65%		Moderate 65-<75		High ≥75%		
	N	%	N	%	N	%	N	%	N	%	N	%	
1.Affective intuition	14	28.0	26	52.0	10	20.0	123	36.2	146	42.9	71	20.9	1.673 0.433
2.Inferential intuition	22	44.0	19	38.0	9	18.0	151	44.4	129	37.9	60	17.6	0.005 0.998
3.Holistic intuition	27	54.0	15	30.0	8	16.0	172	50.6	132	38.8	36	10.6	2.077 0.354
Intuitive decision Making level	**13**	**26.0**	**36**	**72.0**	**1**	**2.0**	**129**	**37.9**	**202**	**59.4**	**9**	**2.6**	3.026 0.220

Data are presented as frequency (%). * Statistically significant at level P<0.05.

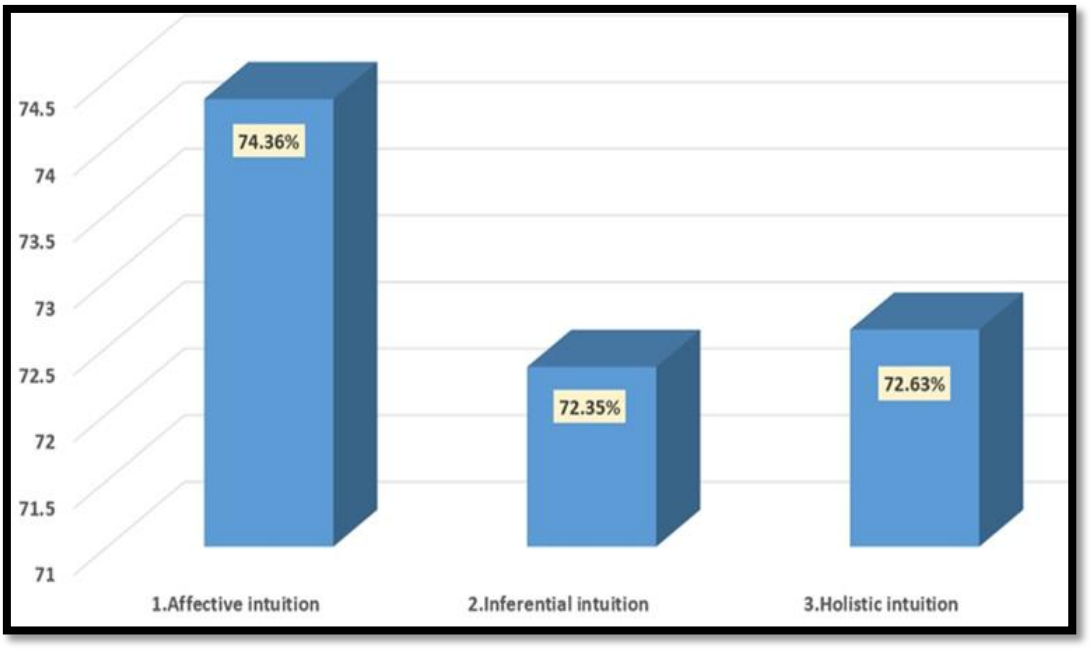

Figure (1): Mean percentage of the intuitive decision-making dimensions among the studied head nurses

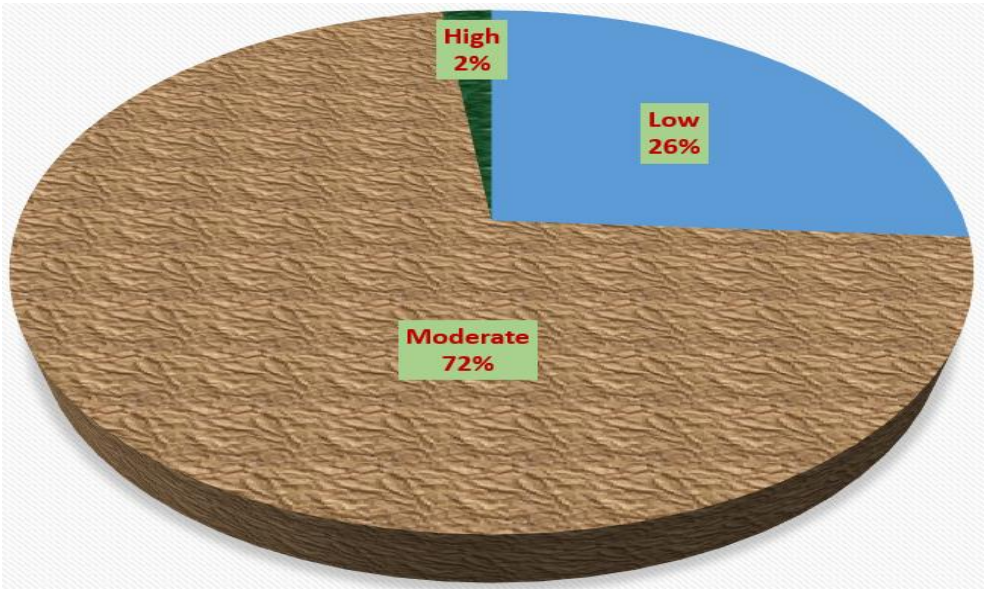

Figure (2): Percent distribution of the studied head nurses according to their level of intuitive decision-making (n=50)

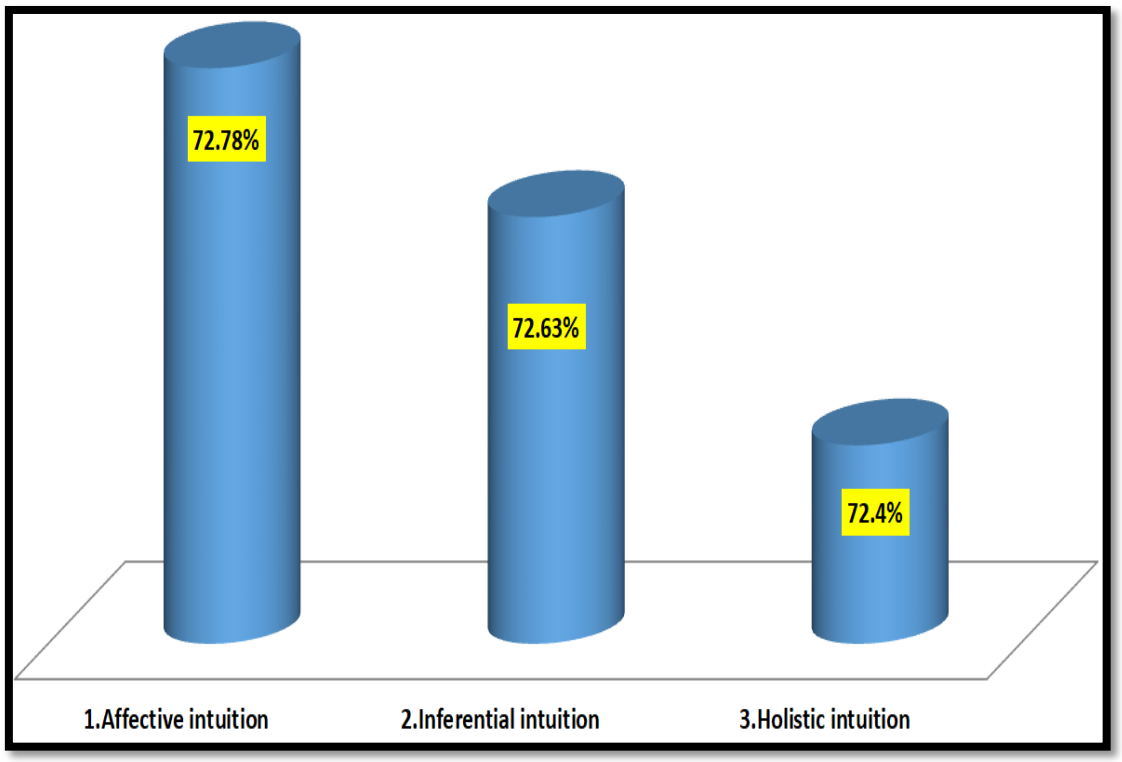

Figure (3): Mean percentage and ranking of the intuitive decision-making dimensions among the studied nurses

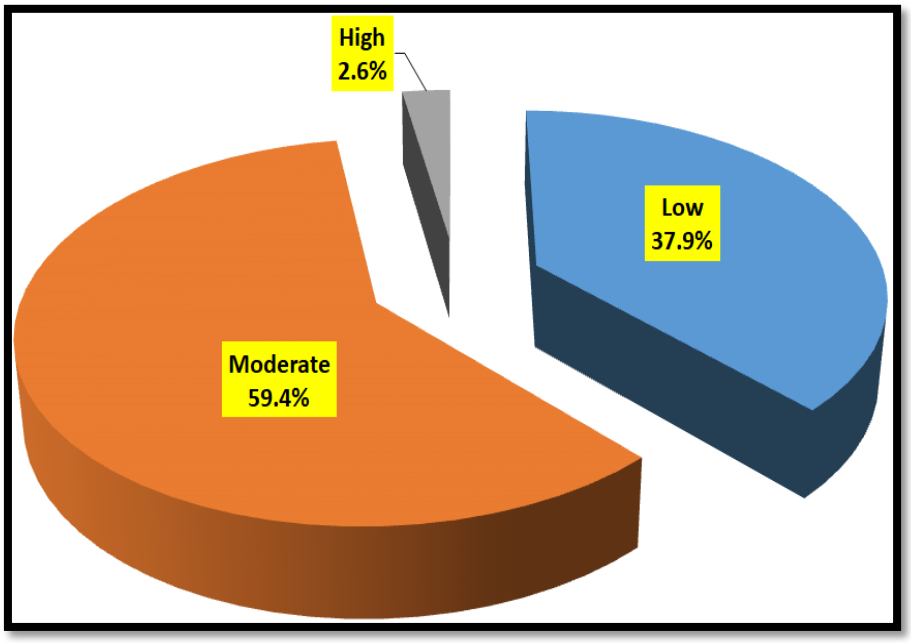

Figure (4): Percent distribution of the studied nurses according to their level of intuitive decision-making

Table (3): Mean scores of the innovation work behavior dimensions of the studied nurses

Innovation Work behavior Dimensions	The studied nurses (n=340)						
	No items	Min	Max	Mean	SD	Mean percentage%	Ranking
Idea exploration	6	15	29	22.02	2.702	73.40	2
Idea generation	5	11	24	18.39	2.501	**73. 56**	**1**
Idea championing	4	8	20	14.63	1.964	73.15	3
Implementation	5	9	24	17.95	2.353	**71.8**	**4**
Total score of Innovation work Behavior	**20**	**57**	**88**	**73**	**5.125**		

Data are presented as mean ± SD or frequency (%).* Statistically significant at level P<0.05.

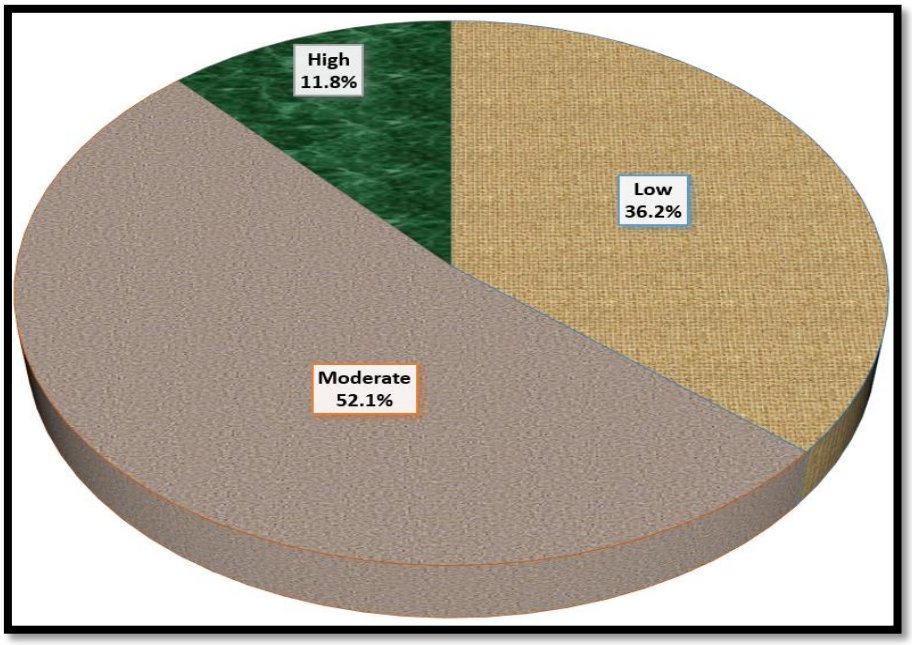

Figure (5): Total levels of innovation work behavior of studied nurses (n=340)

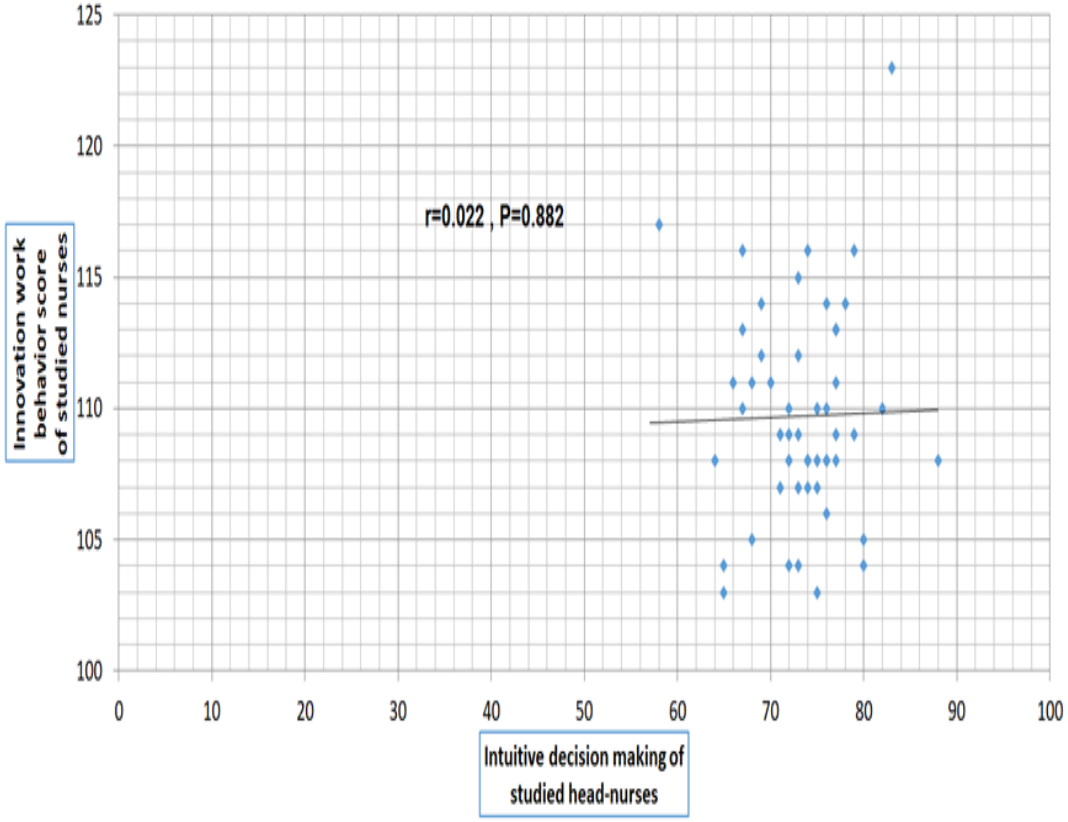

Figure (6): Canonical correlation between intuitive decision making of studied head-nurses and innovation work behavior score of the studied nurses

Discussion

Intuitive decision-making is not merely a spontaneous process; rather, it is deeply rooted in experience, clinical expertise, and pattern recognition. Experienced nurses are more likely to rely on intuition as they develop the ability to quickly interpret complex clinical situations (**Lee and Kim, 2022).**

The present study revealed that more than half of the studied subjects had a moderate level of affective intuition, while a smaller percentage demonstrated a high level, and a minority had a low level. This indicates that emotional-based decision-making is moderately practiced among nurses, which may be due to the emotionally demanding nature of nursing work.

This finding is consistent with Ahmed et al., (**Ahmed et al., 2025),** who reported that nurses tend to rely on emotional awareness when making decisions in stressful clinical situations. On the other hand, this finding disagrees with **Johnson Onne,(2024),** who suggested that nurses rely more on analytical rather than emotional decision-making.

The findings reveal that both head nurses and staff nurses demonstrated a generally moderate tendency toward affective intuition in decision-making. Similarly, **(Catherine et al., 2024)** reported that intuition plays a central role in clinical decision-making, particularly in complex and uncertain situations. Moreover, the study found that many participants reported that they rarely allow emotions to override logic, which was statistically significant. This finding agrees with (**(Hammond et al., 2024)**, who proposed that decision-making occurs on a continuum between intuition and analysis rather than relying exclusively on one approach.

In contrast, some previous studies reported lower reliance on affective intuition among nurses. For example, studies such as those conducted by (**(Thompson et al., 2024),** found that nurses tend to prioritize analytical reasoning and clinical guidelines over intuition , especially in highly standardized healthcare settings.

The present findings regarding inferential intuition provide valuable insights into how head nurses and staff nurses utilize cognitive-based intuitive processes in decision-making. The statistically significant differences observed in relation to decision-making based on limited information indicate that head nurses are more comfortable

making decisions in situations characterized by uncertainty.

This interpretation is consistent with **Patricia Benner (2025),** who emphasized that expert nurses rely on intuitive pattern recognition developed through experience.

This finding reflects the transition from analytical to intuitive thinking as experience increases, which has been well documented by **Christine Tanner (2023),** who described clinical judgment as evolving from rule-based reasoning to intuitive understanding.

In contrast, the absence of statistically significant differences in several other items suggests that inferential intuition is not exclusive to head nurses but is also present among staff nurses.

Additionally, the findings indicate that nurses tend to justify their intuitive judgments logically. This integration between intuition and logic reflects a sophisticated level of decision-making, where intuitive insights are validated through cognitive evaluation. Such a perspective is consistent with Kenneth who proposed that decision-making lies on a continuum between intuition and analysis.

Moreover, the reliance on intuition in situations with limited experience or knowledge highlights the role of uncertainty in activating inferential intuition. This interpretation is supported by Pretz and Folse (**(Pretz et al., 2014)** ,who suggested that intuition becomes particularly relevant in complex and uncertain environments. In contrast, this finding disagrees with Hassan et al., (**Hassan and Ali, 2024),** who reported no significant differences between head nurses and staff nurses.

Conversely, head nurses demonstrated relatively higher agreement in structured cognitive aspects, such as concentrating on big ideas and breaking problems into smaller parts, reflecting a more analytical–holistic combined approach. Studies in agreement with the current findings **Patricia Benner (2024),** who indicated that nurses at different experience levels use intuition differently, where experienced nurses integrate both analytical and intuitive thinking rather than relying purely on holistic perception.

On the other hand, these findings contradict Hammond Kenneth (**Hammond, 2024)**, who suggested that decision-making tends to fall clearly on a continuum between intuitive and analytical thinking, rather than showing the mixed pattern observed in this study.

As regard to the overall level of innovation work behavior among nurses, the present study revealed that the majority of nurses had a moderate level of innovative work behavior. This may be due to heavy workload, time constraints, and limited organizational support, which may hinder the ability of nurses to implement innovative ideas. This finding is consistent with Zhang et al., (**Zhang et al., 2024),** who reported that nurses often demonstrate moderate levels of innovation due to environmental constraints. On the other hand, this finding disagrees with Hassan et al.,(**Hassan and Ali, 2024),** who found that nurses demonstrated high levels of innovative work behavior.

The present findings indicate that nurses demonstrated a moderate to high level of idea behaviour, reflecting a generally positive orientation toward innovation, but with some limitations in consistent practice. This finding is consistent with **(Janssen et al., 2026),** who found that nurses may exhibit a high level of idea exploration while their actual innovative practices remain moderate due to job demands. On the contrary, these findings are Disagreement with (**De Jong, 2007),** who reported that nurses in supportive environments tend to exhibit consistently high levels of idea exploration across both thinking and practice.

The findings indicate that nurses demonstrated a moderate to high level of idea generation behavior, with variation across different aspects of generating new ideas within nursing practice. The results show a high level of idea generation in behaviours related to searching for and developing new ways of working. For instance, more than half of the nurses only "sometimes" try to come up with new proposals to develop nursing care, and less than fifty only "sometimes" take advantage of the opportunities available in the workplace. These findings are consistent with **Janssen Onne, (2025),** who indicated that healthcare professionals, including nurses, tend to engage more in innovation when responding to work-related problems, while proactive idea generation remains moderate due to job constraints. In contrast, these findings differ from **De Jong Jeroen 2007**, who reported that nurses in supportive environments demonstrate a consistently high level of proactive idea generation, including initiating new proposals and actively utilizing opportunities.

The findings indicate that nurses demonstrated a moderate to high

level of idea championing behavior, with noticeable variation between supportive and persuasive aspects of innovation within nursing practice. These findings are agreement with **Janssen Onne (2024),** who indicated that employees in healthcare settings, including nurses, often show higher levels of support for innovation than actual advocacy behaviours due to organizational constraints.

As regard to idea implementation, the present study revealed that this dimension recorded the lowest mean score as under eighty percent, indicating that nurses face considerable difficulties in translating their ideas into practice. This finding highlights a critical gap between idea generation and implementation. These finding are supported by previous studies. Similarly, **De Jong Jeroen et al., 2007,** highlighted that successful implementation depends heavily on leadership style, autonomy, and resource availability-factors that are often constrained in clinical nursing environments.

As regard to the relationship between intuitive decision-making and innovation work behavior, the present study revealed that there was no statistically significant correlation between both variables, where (r = 0.022, P = 0.882).This finding is consistent with Davis et al., **(Davis, 2021)** who reported that leadership decision-making styles do not necessarily translate into innovative behaviours among staff unless supported by organizational factors. On the other hand, this finding disagrees with Wang et al., **(Wang et al., 2024)**who found a significant positive correlation between intuitive decision-making and innovative behavior.

The limitations of the study were that single centre study, relatively small sample size.

Conclusions

More than seventy percentage of head nurses had moderate level of intuitive decision making. While, the total intuitive decision making level of nurses was moderate.in addition, more than half of nurses had moderate level of innovative work behavior. There is no Significance correlation between intuitive decision making of studied head-nurses and innovative work behavior score of the studied nurses.

Recommendation

For hospital administration

-Develop a culture of innovation within healthcare settings by encouraging nurses, implement continuous professional development programs.

-design clear communication channels within hospital units and incorporate performance appraisal systems.

For head nurses

-Encourage nurses to rely on both analytical and intuitive decision-making approaches in handling patient care situations.

-facilitate regular team discussions and reflective sessions.

For nurses

-participate in innovation-related activities, collaborate effectively with colleagues and for further research to conduct studies to explore the impact of intuitive decision-making on patient safety and quality of care outcomes .

-Investigate factors influencing innovative work behavior among nurses in different healthcare settings.

Financial support and sponsorship: Nil

Conflict of Interest: Nil

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Relation between Nursing Staff Actual Role Awareness and Their Job Security

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Abstract

Backgrounds: Nursing staff must be aware about their actual role in healthcare setting. Actual role awareness creates a sense of stability and commitment to the healthcare setting. It increases the nurse's confidence and reduces medical error and allows the nurse to concentrate on patient care and also increase the job security. **Aim:** Assess the relation between nursing staff actual role awareness and their job security. **Subjects and Method:** The study was conducted at Tanta Emergency hospital. The study subjects included 55 head nurse, and 346 staff nurses. **Tools**: two tools were used: Role Awareness Structured Questionnaire and Job Security Questionnaire. **Results:** 54.8% of the nursing staff had high awareness level about their actual role, and 68.3% of the nursing staff had moderate perception regarding their job security. **Conclusion:** There is a highly significant positive correlation between nursing staff actual role awareness and their job security **Recommendations:** Hospital administrator should implement workshops and training courses for staff nurses on actual role awareness. Also, establish nursing committees that allow nursing staff to participate in clinical and operational decisions.

***Keywords*:** Actual Role Awareness, Job security, Nursing Staff.

Introduction:

Nursing staff is a cornerstone of health systems in diverse countries all over the world functioning as a key interface between patients and an ever-complicated medical care. The profession of nursing has over time evolved to include more than just the traditional bedside care to entail more aspects such as advanced clinical judgement, patient advocacy, health promotion, and evidence-based practice **(Alghanim et al., 2026)**.

Nursing staff awareness of their actual role is crucial for nursing staff to perform effectively, ethically, and confidently in healthcare settings. Nursing staff are not just caregivers; they are educators, advocates, coordinators, communicators, and leaders within the interdisciplinary care team. (**American Nurses Association, 2023**).

Nursing roles are essential to the healthcare system. Nurses have nine vital actual role dimensions including: care giver, administrative role, communicator role, educational role, advocator role, researcher role, developing clear planned goals, self-development and time management (**World Health Organization [WHO], 2020**).

Actual role awareness in nursing refers to a nurse's accurate understanding of their professional duties, responsibilities, and scope of practice within the healthcare team. This awareness empowers nurses to perform confidently, make sound clinical decisions, and communicate effectively with colleagues (**Samir, Abdel Rahman, Gabra, & Abdelhakm, 2025**) .

Job security among nurses in healthcare settings is an important factor that influences both individual well-being and organizational effectiveness. Nurses experiencing higher levels of job security reported better psychological health and reduced stress related to shift work **(Alghamdi, & Bahari, 2025)**.

Domains of job security include: Comfort in jobs, organizational justice, job prospect and stability, organizational climate, wages and salaries, relationship with the manager and colleagues, rules and regulation, work environment, job retention and benefits perception (**Safari & Foroutanfar, 2020**).

Significance of the study

Increasing nursing staff awareness about their roles and responsibilities in hospital may affect efficiency and effectiveness of their performance **(McDermott, McEwing, Lopez, Osso & Trujillo, 2021)**. And also avoid extra psychological and physical pressure on them. The nurses are exposed to many troubles and risks in their career. Job security is a critical factor behind quality of care delivery. Lack of job

security is an internal organizational factor that leads to job burnout and is followed by reduced efficiency of nursing staff **(Broetje, Gregor, Jenny, Georg, & Bauer, 2020)**.

Aim of the Study: Assess the relation between nursing staff actual role awareness and their job security.

Subject and method:

Study Design: A descriptive correlational research design was used to conduct this study.

Study setting:

The study was conducted at Tanta Emergency Hospital, which is affiliated to the Ministry of Higher Education and scientific research, with total bed capacity of about 233 beds.

Study subjects: The study subjects will contain all head nurses (N = 55) and a stratified proportional randomized sampling of staff nurses (N=346) who are working in previously mentioned setting and available at the time of data collection. Each department was considered as strata of the sample to be selected based on the proportion of the number of nurses in each department. The total study sample was calculated using EPI. Info. Microsoft to ensure obtaining an adequate and representative size were N= population size (719), Z = confidence level at 99% (1.96) d=margin of error proportion (0, 05)

Tools of data collection:

The data of the study was collected by using two tools as following:

Tool I: Nursing staff Actual Role Awareness Questionnaire:

This tool was developed by the researcher based on **Abd El Hameed et al., 2018; Mohamed et al., 2019; sabra et al 2021)**. It consisted of two parts.

Part I: **Nursing staff Personal data:**

It included nursing staff personal data: Age, sex, position, marital status, education qualification and years of experience.

Part II: Nursing Staff Assessment of Actual Role Awareness:

It was used to assess nursing staff actual role awareness. It consisted of nine dimensions as following:

- Care provider consisted of two sub dimension **a**- direct giver role contained 14 items and **b**- indirect nursing role included 13 items**,** **Administrative role** included 6 items**,** **Communicator role** included two sub dimension **a**- communication with the patient contained 4items and **b**- communication with the other nurses contained 8 items**,** **Educational role** included 6 items**,** **Advocator role** icluded11 items**,** **Researcher role** included 5 items.**,** **Developing a clear planned goal** included 3 items, **Self - development** included 4 items and **Time management role** included 3 items.

Scoring system:

Responses of the nursing staff were measured on three points Likert scale ranging from (3) Agree (2) Neutral and (1) disagree. The total scores will be calculated by summing of all categories and then will be calculated according to statistical cut-off point as:

High awareness level ≥75%

Moderate awareness level 60 <75%

Low awareness level < 60 %.

Tool II: Job Security Questionnaire:

This tool was developed by the researcher based on review of literatures (**Kraimer, Wayne, Liden, 2005; Soklianvar, et al., 2018**). It was used to assess job security as reported by nursing staff it consisted of items categorized into ten dimensions as following: -

Comfort in job included 4items, **Organizational justice** included 6 items**, Job stability** included 3items, **Organizational climate** included 4 items**, Wages and salary** included 2 items**, Relation with the manager and colleagues** included 4 items**, Rules and regulation in the hospital** included 4items**,Work environment** included 3 items**, Job retention** included 5 items and **Benefits perception** included 5items.

Scoring system:

Responses of the nursing staff was measured on three points Likert scale as, (3) agree (2) neutral (1) disagree. The scores for each item were summed up and the total divided by the number of the items, giving mean scores for each dimension. The total scores were calculated by summing of all dimensions and then was calculated according to statistical cut-off point as:

- High level of job security ≥75%
- Moderate level of job security 60 <75%
- Low level of job security <60%

Method

-**An official permission** was obtained from Dean of Faculty of Nursing and the authoritative personnel of Tanta Emergency Hospital.

-Ethical considerations

a-An approval was obtained from form Nursing Research Ethical Committee before conducting the study under the code 624-4-2025.

b-The nature of the study was not cause harm to the entire participant.

c-Each subject was informed about the nature process of the study and outcome and informed consent will be obtained from them.

d-All the gathered data kept confidential and were used for the research purpose.

e-Each study subjects had the right to withdraw from the study whenever they want.

-Tool I and Tool II were translated in to Arabic for better understanding were presented to jury of five

experts on area of specialty to check its validity (face and content), five experts were from Faculty of Nursing Tanta University. All the five experts were professors.

-The experts' responses were reported in four points Likert scale ranging from (1-4) where 1 not relevant, 2 little relevant, 3 relevant, 4 strongly relevant.

-The face validity value of tool I: nursing staff actual role awareness was 96% and the tool II nursing staff level of job security was 92 %.

-A pilot study was carried out by the researcher on 5 head nurses and 35 of the nursing staff. The pilot study was done to evaluate the clarity and applicability and for further required modification and also, to estimate time needed for answering it and identify obstacles and problems that may be encounter in data collection and the necessary modification were done including; clarification, omission of certain items and simplifying work related words.

-Suitable statistical test was used to test the tools for its reliability.

-Reliability of the tool was tested using Cronbach Alpha coefficient test. The reliability value of tool I (actual role awareness of nursing staff) was .990 and tool II (job security) was .949.

-Data was collected by the researcher. The researcher met the nursing staff individually at their work setting to distribute the tool I and tool II. The questionnaire was completed at the presence of the researcher to ascertain all question answered the estimated time used to complete questionnaire items from the subject was 30mintues.

-The data was collected over a period of three months from the beginning of September 2025 to end of November 2025.

Statistical analysis:

The statistical analysis of the data was performed using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011).Categorical data were summarized as numbers and percentages. For continuous data, normality was assessed using the **Kolmogorov-Smirnov** test. Quantitative data were described using range (minimum and maximum), mean and standard deviation. Significance of the obtained results were judged at the 5% level.

The used tests were

1 - F-test (ANOVA)

For normally distributed quantitative variables, to compare between more than two groups

2 -Pearson coefficient

To correlate between two normally distributed quantitative variables

3 - Student t-test

For normally distributed quantitative variables, to compare between two studied groups

Results:

Table (1): Illustrates the distribution of nursing staff according to personal and work-related information. Nursing staff age ranged from 30-40 with the mean scores 36.82 ± 8.56. The majority of them (87.5%, 81.3%) were female and married. The largest percent of them (61.6%) had bachelor degree of science in nursing.

Additionally, more than fifty percent of them (51, 9%) had less than ten years' experience in the present unit. About sixteen percent (16%) of them were working at orthopedic ward while 11, 5% were working at medical ICU and 11, 2% of them were working at burn department respectively. Regarding to job position 13, 7% of them were head nurses, while the majority of them (86, 3%) were staff nurses respectively. More than 50% of them participated in training courses. While 49, 9% of them did not participate. Additionally high percent of them (64, 8%) had access to technology in their practice. Finally only 30, 2% of them agreed that the hospital provide adequate staff and resources.

Figure (1): Reveals the distribution of the studied nursing staff overall level of awareness about their actual role. The figure shows more than fifty percent (54.8%) of the nursing staff had high awareness level, moreover, more than thirty percent (33, 7%) of them had moderate awareness level. While only 11.5% of them had low awareness level about their actual role.

Table (2): Reveals the mean scores, standard deviation and ranking of nursing staff about the levels of actual role awareness dimensions. The overall levels of actual role awareness 73.64 ± 17.34. Care provider role ranked the highest mean ±SD=77.79 ± 24.73, followed by researcher role with mean± SD= 74.54 ± 25.16, then communication role with mean ± SD= 74.22 ± 27.07, followed by advocator role with mean ± SD=73.78±22.76, followed by developing a clear planned goals with the mean ± SD=73.15 ± 30.29.While the self-development role ranked as the last with the mean± SD= 70.23 ± 28.16.

Figure (2): **This figure illustrates overall levels nursing staff job security.** As shown more than two third (68.3%) of nursing staff had moderate perception regarding job security. Moreover 23.2% high level and 8.5% had low level of perception toward job security.

Table (3): Reveals mean scores, standard deviation and ranking of nursing staff about levels of job security. As shown the overall levels of job security was 65.11 ± 27.19. Dimension of relation with

manager is ranked the highest with mean ±SD=69.30 ± 26.86**,** followed by comfort in job with mean ±SD= 69.17 ± 26.84 then wages and salaries with mean ±SD= 68.89 ± 31.72 and job retention with mean ±SD=68.38 ± 26.69. While, work environment is ranked as the last with mean ±SD= 61.55 ± 32.86.

Figure (3): Indicates correlation between nursing staff actual role awareness and job security. As shown there is positive significant correlation between the nursing staff actual role awareness and their job security at $p \leq 0.05$.

Table (4): Displays relation between mean score of nursing staff actual role awareness with personal data. The table shows no statistically significant relation between nursing staff actual role awareness and all their personal data except for the items of years of experience, work units, job position, and training attending at $p \leq 0.05$.

Table (1): Distribution of the studied nursing staff according to Personal data and work related information (n = 401)

Personal data	No.	%	Personal data	No.	%
Age (years)			**Job position**		
<30	103	25.7	Head nurses	55	13.7
30 – 40	162	40.4	Staff nurse	346	86.3
>40	136	33.9	**Are you participating in training course?**		
Min – Max.	23.0 – 52.0		Yes	201	50.1
Mean ± SD.	36.82 ± 8.56		No	200	49.9
Educational qualification			**Are you have access to technology in your practice?**		
Nursing Diploma	111	27.7	Yes	260	64.8
Bachelor of Nursing	247	61.6	No	141	35.2
Post Graduate	43	10.7	**Is the hospital provide with adequate staff and resources**?		
Years of experience			Yes	121	30.2
<10	208	51.9	No	280	69.8
10 - 20	118	29.4			
>20	75	18.7			
Mean ± SD.	11.75 ± 8.96				
Work units					
neurosurgery	20	5.0			
General surgery	39	9.7			
orthopedic	64	16.0			
toxicology	36	9.0			
Radiology	24	6.0			
burn	45	11.2			
Vascular surgery	35	8.7			
recovery	29	7.2			
Medical ICU	46	11.5			
Emergency medical ICU	35	8.7			
Anesthesia	28	7.0			

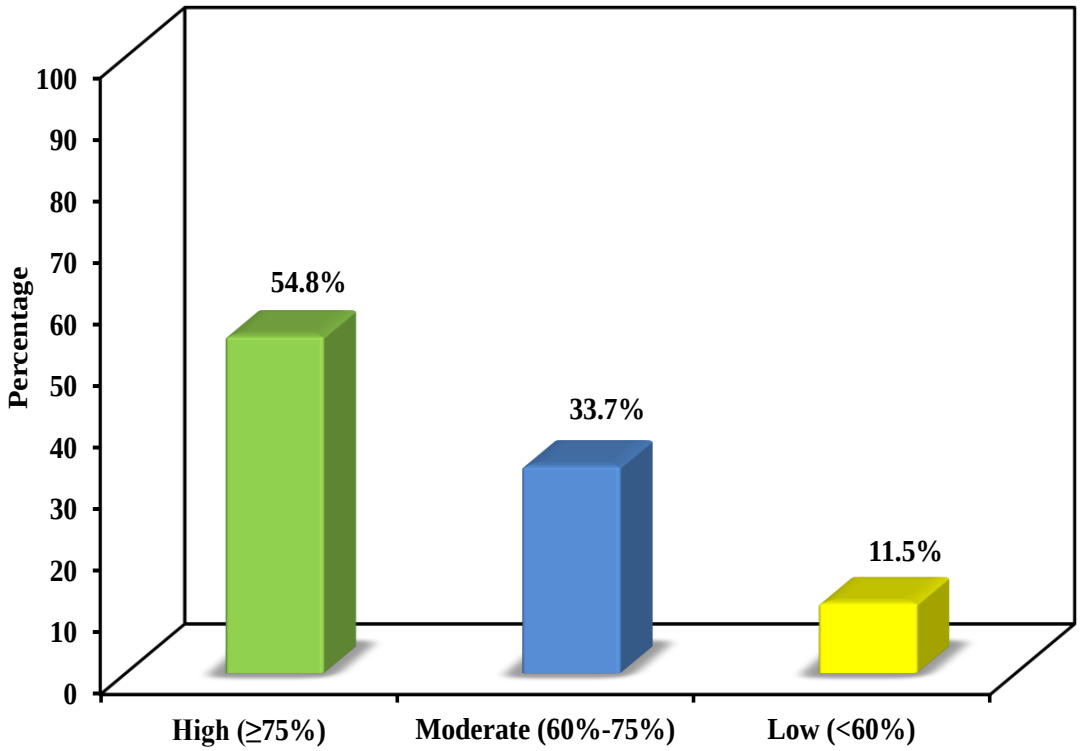

Figure (1): Distribution of studied nursing staff overall levels of actual role awareness.

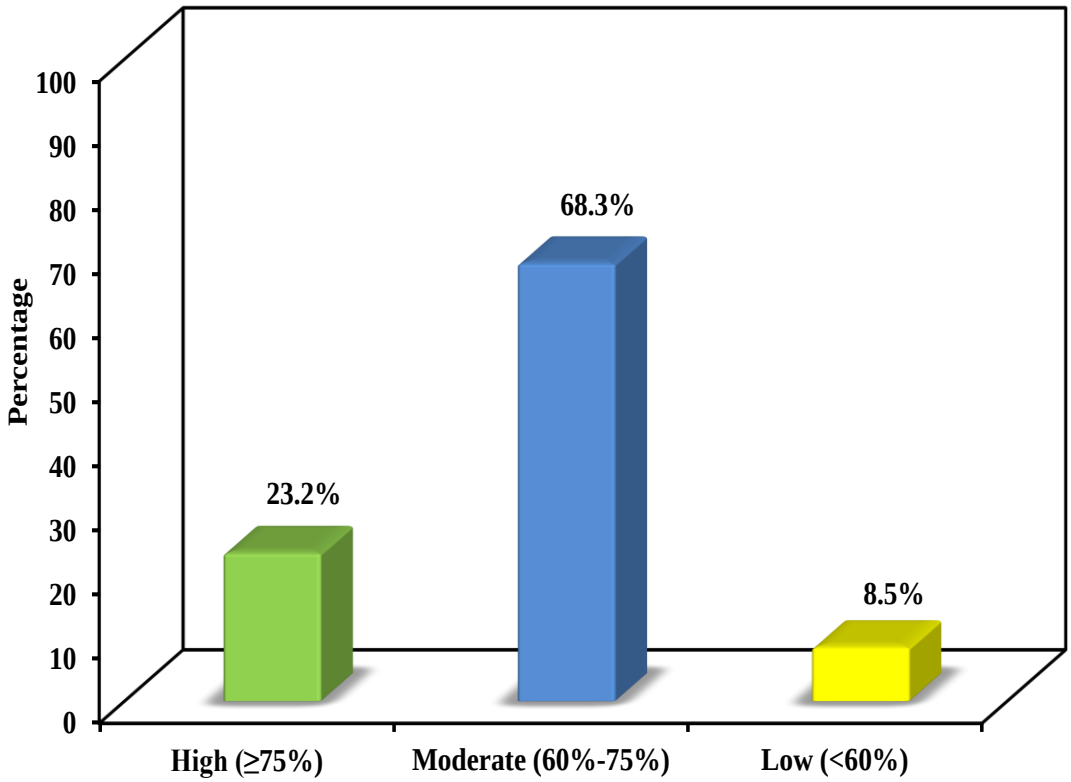

Figure (2): overall levels of nursing staff job security

Table (2): Mean scores, standard deviation and ranking of nursing staff about levels of actual role awareness dimensions (n = 401)

Dimensions	Score Range	Total Score		Average Score (1 – 3)	Percent Score	Rank
		Min. – Max.	Mean ± SD	Mean ± SD	Mean ± SD	
Care provider						
Direct nursing care role	(14 – 42)	14.0 – 42.0	35.78 ± 6.92	2.56 ± 0.49	**77.79 ± 24.73**	**1**
Indirect nursing care role	(13 – 39)	13.0 – 39.0	31.63 ± 5.86	2.43 ± 0.45	71.66 ± 22.55	**10**
Administrative role	(7 – 21)	7.0 – 21.0	17.20 ± 3.62	2.46 ± 0.52	72.85 ± 25.87	**7**
Communicator role						
Communication with patient	(4 – 12)	4.0 – 12.0	9.94 ± 2.17	2.48 ± 0.54	**74.22 ± 27.07**	**3**
Communication with other	(8 – 24)	8.0 – 24.0	19.63 ± 3.80	2.45 ± 0.47	72.68 ± 23.75	**8**
Educational role	(6 – 18)	6.0 – 18.0	14.62 ± 3.12	2.44 ± 0.52	71.86 ± 26.03	**9**
Advocator role	(11 – 33)	11.0 – 33.0	27.23 ± 5.01	2.48 ± 0.46	**73.78 ± 22.76**	**4**
Researcher role	(5 – 15)	5.0 – 15.0	12.45 ± 2.52	2.49 ± 0.50	**74.54 ± 25.16**	**2**
Developing a clear planned	(3 – 9)	3.0 – 9.0	7.39 ± 1.82	2.46 ± 0.61	**73.15 ± 30.29**	**5**
Self -development	(4 – 12)	4.0 – 12.0	9.62 ± 2.25	2.40 ± 0.56	**70.23 ± 28.16**	**11**
Time management role	(3 – 9)	3.0 – 9.0	7.39 ± 1.92	2.46 ± 0.64	73.11 ± 32.03	**6**
Overall	**(78 – 234)**	**78.0 – 234.0**	**192.9 ± 27.05**	**2.47 ± 0.35**	**73.64 ± 17.34**	

Table (3): Mean scores, standard deviation and ranking of the nursing staff regarding job security dimensions (n = 401)

Dimensions	Score Range	Total Score		Average Score (1 – 3)	Percent Score	Rank
		Min. – Max.	Mean ± SD	Mean ± SD	Mean ± SD	
Comfort in job	(4 – 12)	4.0 – 12.0	9.53 ± 2.15	2.38 ± 0.54	**69.17 ± 26.84**	**2**
Organizational justice	(6 – 18)	6.0 – 18.0	13.85 ± 3.35	2.31 ± 0.56	65.38 ± 27.91	**8**
Job stability	(3 – 9)	3.0 – 9.0	6.74 ± 1.95	2.25 ± 0.65	62.39 ± 32.58	**9**
Organizational climate	(4 – 12)	4.0 – 12.0	9.27 ± 2.27	2.32 ± 0.57	65.90 ± 28.39	**7**
Wages and salary	(2 – 6)	2.0 – 6.0	4.76 ± 1.27	2.38 ± 0.63	**68.89 ± 31.72**	**3**
Relation with the manager	(4 – 12)	4.0 – 12.0	9.54 ± 2.15	2.39 ± 0.54	**69.30 ± 26.86**	**1**
Rules and regulation	(4 – 12)	4.0 – 12.0	9.44 ± 2.25	2.36 ± 0.56	67.96 ± 28.15	**5**
Work environment	(3 – 9)	3.0 – 9.0	6.69 ± 1.97	2.23 ± 0.66	**61.55 ± 32.86**	**10**
Job retention	(5 – 15)	5.0 – 15.0	11.84 ± 2.67	2.37 ± 0.53	**68.38 ± 26.69**	**4**
Benefits perception	(5 – 15)	5.0 – 15.0	11.51 ± 2.72	2.30 ± 0.54	66.47 ± 15.47	**6**
Overall	**(40 – 120)**	**40.0 – 117.0**	**93.17 ± 12.38**	**2.33 ± 0.31**	**65.11 ± 27.19**	

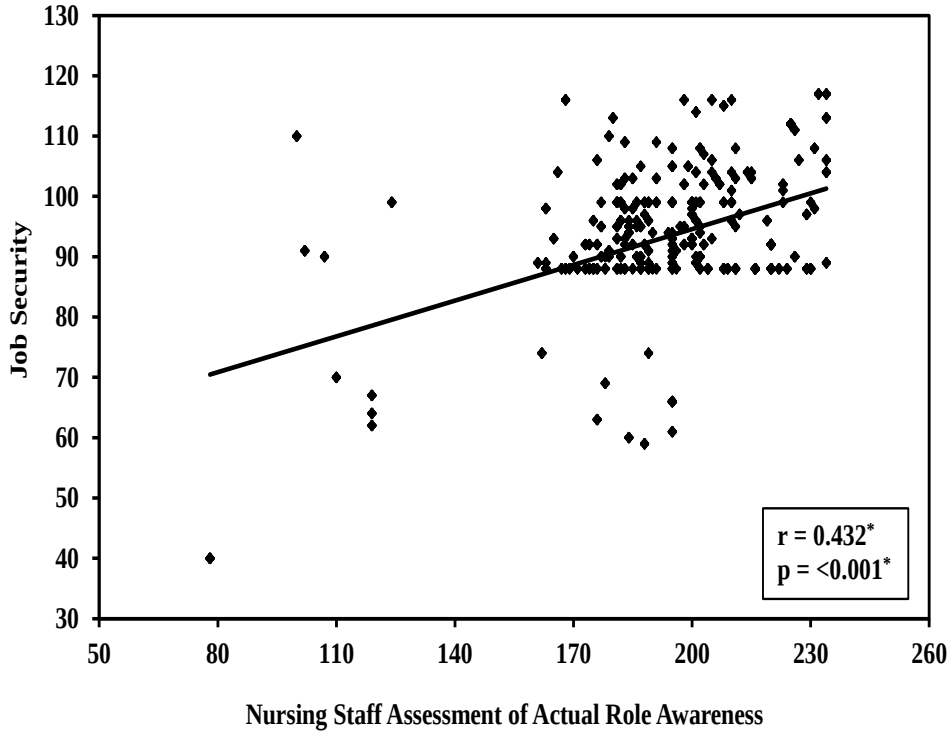

Figure (3): Correlation between nursing staff Actual Role awareness and Job Security

Table (4): Relation between mean score of nursing staff actual role awareness with personal data (n = 401)

Personal data	No.	Tool I –Nursing Staff Assessment Mean ± SD.	Test of Sig.	p
Age (years)				
<30	**103**	194.1 ± 27.17	F= 0.417	0.659
30 – 40	**162**	191.4 ± 26.75		
>40	**136**	193.7 ± 27.43		
Sex				
Male	**50**	193.1 ± 17.05	t= 0.061	0.951
Female	**351**	192.8 ± 28.20		
Marital status				
Married	**326**	193.5 ± 26.15	t= 0.885	0.377
Un married	**75**	190.4 ± 30.71		
Educational qualification				
Nursing Diploma	**111**	191.1 ± 24.83	F= 0.521	0.594
Bachelor of Nursing	**247**	193.2 ± 29.31		
Post Graduate	**43**	195.9 ± 17.42		
Years of experience				
<10	**208**	188.3 ± 29.98	F= 12.530*	<0.001*
10 - 20	**118**	203.0 ± 17.02		
>20	**75**	189.6 ± 27.36		
Work units				
neurosurgery	**20**	209.6 ± 25.69	F= 8.759*	<0.001*
General surgery	**39**	184.8 ± 40.42		
orthopedic	**64**	183.2 ± 23.37		
toxicology	**36**	197.3 ± 15.78		
radiology	**24**	190.0 ± 8.67		
burn	**45**	208.0 ± 13.57		
Vascular surgery	**35**	213.5 ± 13.01		
Recovery	**29**	181.8 ± 48.24		
Medical ICU	**46**	189.0 ± 21.61		
Emergency medical ICU	**35**	177.4 ± 19.78		

Personal data	No.	Tool I –Nursing Staff Assessment	Test of Sig.	p
		Mean ± SD.		
Anesthesia	**28**	198.3 ± 15.14		
Job POSITION				
Head nurse	**55**	212.8 ± 11.17	t= 10.939*	<0.001*
Staff nurse	**346**	189.7 ± 27.49		
Are you participate in training attending in the last year				
No	**201**	200.4 ± 18.58	t= 5.767*	<0.001*
Yes	**200**	185.4 ± 31.79		
If yes list them				
Infection control	**49**	201.6 ± 21.94	F= 6.768*	<0.001*
Quality management	**69**	201.8 ± 18.55		
Hospital administration	**41**	198.4 ± 19.01		
Cardiopulmonary resuscitation	**12**	199.2 ± 16.71		
Training of trainers	**30**	198.2 ± 12.43		
Are you have access to technology in your practice				
Yes	**260**	191.2 ± 23.30	t= 1.497	0.136
No	**141**	195.9 ± 32.74		
Is the hospital provide with adequate staff and resources				
Yes	**121**	193.7 ± 21.89	t= 0.424	0.672
No	**280**	192.5 ± 29.03		

SD: Standard deviation F: F for One way ANOVA test

t: Student t-test

p: p value for comparing between the studied categories

* Statistically significant at $p \leq 0.05$

Discussion:

Nursing staff role awareness refers to the degree to which nurses understand, internalize, and can articulate their professional roles, responsibilities, and expectations within clinical practice **(Miao et el., 2024; Menoufia Nursing Journal, 2024**).

Therefore, the current study aimed to assess the relation between nursing staff actual role awareness and their job security.

Nursing staff overall levels of awareness about their actual role.

The current study results revealed that more than half of the nursing staff had high awareness level, moreover, more than one third of them had moderate awareness level. While the minority of them had low awareness level about their actual role. This may be because nurses possess a clear understanding of their actual professional role as the majority of the studied nursing staff hold bachelor degree in nursing and half of them had 10 years' experience, which may reflect the effectiveness of existing educational preparation, institutional orientation programs, and accumulated clinical experience.

Accordingly, these results agreed with the study done by **Elmehy et al., (2023),** who revealed that almost all of the nurses had high level of awareness regarding their actual role. Also, **Hisaka et al., (2021),** found that the nurses' awareness and actual practice were high. Also, **Moustafa et al., (2019),** who revealed that the majority of the baccalaureate nurses have higher awareness about actual role. Conversely, these results disagreed with the study performed by **Abd Elhamid et al., (2018),** who found that there was low expectation of the staff nurses to various dimensions of their role and also, **Guy, Hughes& Ferris-Day**, (**2022**), who conducted the study in New Zealand and found a lack of awareness of actual role of the nurses.

According to the studied nursing staff regarding levels of actual role awareness dimensions the current study revealed that around two thirds of nursing staff had high level of awareness regarding care provider role and communicator role respectively. While more than half of them had high level of awareness regarding self-development role, developing a clear planned goals role, time management role and educational role, administrative role, researcher role and advocator role respectively. This may be because these roles are routinely exercised in daily nursing activities, which may contribute to stronger role recognition and confidence.

In this context, **Elmehy et al., (2023)** demonstrated that almost all

of the nurses had high level of awareness regarding their advocator role, care provider and administrative roles. Also **Moustafa et al., (2019)** reported that baccalaureate nurses have high level of awareness regarding care provider and, communicator role. While, these results disagreed with the study performed by **Abd Elhamid et al., (2018),** who found that nearly half of nurses had high level of awareness regarding administrative role followed by communication role. Also, these results disagreed with **Kirca & Bademli, (2019),** who indicated the need for supporting nurses with in service training on communication.

The current study results revealed that the care provider role ranked the highest mean, followed by researcher role, then communication role, followed by advocator role, followed by developing clear planned goals. While the self-development role ranked as the last. This may be attributed to the centrality of direct patient care within nursing practice and reflects the primary focus of nurses' daily responsibilities in clinical settings. In contrast, the lower ranking of developing clear planned goals and, self-development suggests that long-term professional growth and personal career planning may be underemphasized in routine practice.

These results were supported by **van Hell-Cromwijk et al., (2021),** who found that the care provider role (specifically, direct patient care and nursing) frequently receives the highest mean scores. Conversely, these results disagreed with **Elmehy et al., (2023),** who found that the highest mean scores of nurses' awareness about their actual roles were related to advocator role .While the lowest mean score of nurses was related to time management.

Regarding overall levels of nursing staff job security the current study illustrated that more than two third of nursing staff had moderate perception regarding job security. Moreover less than one quarter high level and the minority had low level of perception toward job security. This may be explained by workforce policies and administrative practices including unclear promotion pathways, performance-based evaluations, or limited career advancement opportunities that may contribute to cautious perceptions of long-term employment security.

These results were supported by **Falatah et al., (2021),** who revealed that more than half of nurses had moderate levels of job security related to workplace security. Additionally, **Sokhanvar et al., (2018),** demonstrated that the highest mean score was for comfort

in job followed by relationships with managers and colleagues.

According to mean and standard deviation and ranking of the nursing staff regarding job security dimensions**.** The current study showed that dimension of relation with manager was ranked the highest**,** followed by comfort in job then wages and salaries and job retention. While, work environment was ranked as the last. This may be because of supportive managerial interactions, guidance, and open communication play a critical role in fostering nurses' confidence and professional reassurance.

Correlation between studied variables

The current study results indicated that there was positive significant correlation between the nursing staff actual role awareness and their job security. This may be because when nurses have a clear understanding of their roles they become more likely to perform their duties effectively and meet organizational standards.

Similarly, **Elmehy et al., (2023),** revealed that there was highly statistically significant positive correlation between nurses' total levels of awareness of their actual role and their job security.

According to **Mohamed, & Hossny, (2020),** revealed that role clarity of the nurses has been present to increase the stability and perception of their job security. Also, **Samat et al., (2020),** revealed that there were a moderate correlation between nurses' career development and their job security. Moreover, **Selenko et al.,** (**2020),** declared that there was highly statically significant positive correlation between nurses' total level of their practice role and their job security. But, this study disagreed with **Konig et al., (2020),** who found that there wasn't relation between nurses' levels of their practice role and their job security.

The current study results displayed that there was no statistically significant relation between nursing staff actual role awareness and all their personal data except for the items of years of experience, work units, job position, and training attending. This may be because role awareness is more influenced by professional experience, workplace exposure, and formal training than by other demographic factors.

Accordingly, these results were supported by **Oweidat et al., (2025),** who revealed that there was no statistically significant relation between nursing staff actual role awareness and their age. Additionally, these results were in harmony with **Mohamed et al., (2019),** who found that there was a positive correlation between age and nurses' awareness about their responsibilities. Also, these results

agreed with **Hisaka et al., (2021),** who demonstrated that there was statistically significant relation between nursing staff actual role awareness and their years of experience.

The current study results indicated that there was no statistically significant relation between nursing staff job security and all their personal data except for the items of job position, training attending and availability of adequate staff and resources. This may be because nurses in higher-level or managerial positions often have greater job stability, clearer responsibilities, and more influence over decisions, which naturally increases their perception of job security.

These results agreed with the study done by **He et al., (2023),** who showed that job position, was significantly and independently associated with job security among healthcare workers. Additionally, these results were in harmony with **Oweidat et al., (2025),** who revealed that there was no statistically significant relation between nursing staff job security and all their age and experience. But, these results disagreed with **Al-Harazneh et al., (2024),** who revealed that there was no statistically significant relation between nursing staff job security and their age, years of experience or monthly income.

Conclusion

More than half of the nursing staff had high awareness level about their actual role, and more than two third of the nursing staff had moderate perception regarding their job security. Furthermore, there was highly significant statistical correlation between actual role awareness of nursing staff and their job security.

Recommendations

In the light of the findings obtained from the present study, the following recommendations were suggested.

For the hospital administration

-Encourage open door policy to help the nursing staff to discuss their problems without fear of being punished.

-Involve the nurse in hospital committees to share their opinion.

-Develop policies and practice to avoid ambiguity regarding nurse's actual role.

-Establish training workshops for head nurses about the meaning, importance dimensions and theoretical frame work of role awareness and its impact on job security.

-Build a resilient organization culture that influence nurses health and wellbeing including job control and design, a feeling of being treated fairly and job security.

-Implement effective healthy management strategies for work

place uncertainty caused by role ambiguity.

-Establish a peer support programs, mentoring and ethical consultation services to help nurses manage ethical dilemmas and moral distress.

-Use adequate remuneration to increase nurse's motivation, improve performance and consequently improve the quality of health care.

-Implement clear, confidential system for reporting incidents of uncivil behavior without fear of retaliation.

For head nurses

-Promote a just culture that focus on teamwork, communication and a collaborative work environment, to encourage nurses to speak courageously about safety concern and unethical practices without fear of unfair blame.

-Pick up the false rumors and dispel them to improve nursing staff confidence by spreading the good news and do your best to keep a lid on the negative information.

For nursing staff

-Provide continuous education for the nurses on actual role and its effect on job security.

-Provide effective communication practices and updating professionals often can build trust between managers and their staff.

-Share only the most relevant information includes the necessary details without overlapping professional with information to avoid ambiguity.

-Don't ignore gossip and rumors in their institution and have the ability to consider them a call for aid for an event that can damage the institution.

For nursing education

-Integrate the topic of workplace role awareness into the nursing curriculum equips the future nurses with knowledge and skills about that important topics.

-Provide safe learning environments where nursing students feel psychologically safe to speak up and report incidents without fear of reprisal.

-Utilize and establish models and frameworks to help nursing students to develop actual role clarity.

For further research

Investigate the adverse effect of role ambiguity on nursing performance and its effect on patient satisfaction and safety.

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Effect of Moodle based Learning on Maternity Nursing Students' Competence Regarding First Stage of Labor

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Abstract

Background: Learning Management Systems (LMS) are digital platforms designed to facilitate online teaching and learning by enabling educators, students, and administrators to manage educational content, communication, and learning activities. **Aim**: This study aimed to evaluate the effect of Moodle-based learning on maternity nursing students' competence regarding the first stage of labor. **Research Design**: A quasi-experimental research design was utilized. **Setting**: The study was conducted at the Obstetrics and Gynecological Nursing Department, Faculty of Nursing, Benha University, Egypt. **Subjects** : A sample total of 228 third-year, seconed term nursing students enrolled during the academic year (2025–2026) participated in the study**.** **Tools**: Data were collected using four instruments: a structured self-administered questionnaire, competency observational checklists, the Nurse Competence Scale, and a maternity nursing students' satisfaction questionnaire regarding the use of Moodle-based learning. **Results**: The findings revealed highly statistically significant improvements in students' knowledge, clinical practice, competence, and satisfaction during the post-intervention and follow-up assessments compared with the pre-intervention phase and with students who received traditional teaching methods, demonstrating effective retention of learning outcomes. **Conclusion**: Implementing Moodle-based learning significantly enhanced maternity nursing students' competence in managing the first stage of labor and proved to be more effective than conventional teaching methods. **Recommendations**: Moodle-based learning should be integrated into maternity nursing curricula as a complementary educational strategy alongside traditional classroom instruction and clinical training to improve students' competence and educational outcomes.

Keywords: Competence, First stage of labor, Maternity nursing students, Moodle Based learning.

Introduction

Normal labor is defined as the spontaneous birth of a single, full-term fetus in the vertex presentation through the birth canal within a normal duration and without maternal or fetal complications. It is classified into four sequential stages. The first stage begins with the onset of true labor contractions and continues until complete cervical dilatation and effacement. The second stage starts with full cervical dilatation and ends with the delivery of the fetus. The third stage extends from the birth of the baby to the expulsion of the placenta and fetal membranes. The fourth stage, also known as the immediate postpartum period, begins after placental delivery and involves close observation of the mother for at least one hour to ensure maternal stability and identify any early postpartum complications **(Ersdal, 2025).**

Moodle is a widely adopted Learning Management System (LMS) designed to facilitate the organization, delivery and management of online courses. It enables educators to create and manage course content, enroll students, and maintain comprehensive records of course registrations and student participation. Moodle promotes a learner-centered approach by encouraging active engagement, enhancing students' motivation, and fostering meaningful participation in the learning process. The platform supports both synchronous and asynchronous educational activities, including chat rooms, discussion forums, quizzes, assignments, and collaborative content creation, thereby facilitating effective communication and interaction among learners and instructors. Additionally, Moodle provides instructors with a variety of assessment and monitoring tools to administer examinations, evaluate assignments, track students' academic progress, monitor learning performance, and generate detailed reports. Through these features, Moodle supports inquiry-based, collaborative, and interactive learning, making it an effective platform for improving teaching quality and student learning outcomes in higher education **(Al-Teete et al., 2023).**

Moodle, which stands for **Modular Object-Oriented Dynamic Learning Environment**, is an open-source Learning Management System (LMS) that enables educators to develop flexible, dynamic, and interactive online learning environments tailored to students' educational needs. Its widespread adoption in higher education is largely attributed to its flexibility, ease of use, customizable features, and

strong global support community. Moodle facilitates the integration of diverse instructional strategies and educational resources, thereby enhancing learner engagement and promoting effective learning in both theoretical and clinical disciplines. Furthermore, recent research has demonstrated Moodle's effectiveness in improving accessibility and usability for students with diverse learning needs. **(Lamis et al., 2025).**

Traditional teaching, in contrast, emphasizes face-to-face interaction between instructors and students and remains a fundamental approach in nursing education. It incorporates classroom lectures, practical demonstrations, interactive discussions and case-based learning to strengthen students' understanding and facilitate the application of theoretical concepts in clinical practice. This approach enables immediate feedback, allowing educators to clarify misconceptions and respond promptly to students' questions. Furthermore, standardized assessment methods are commonly used to evaluate students' achievement of the intended learning outcomes. Although digital technologies have increasingly been integrated into higher education**, (Arthur William, 2024).**

Clinical competence is a fundamental requirement of the nursing profession and encompasses a broad range of abilities, including effective communication, teamwork, critical thinking, self-development, innovation, research utilization, and the ability to adapt to stressful clinical situations. Developing these competencies requires comprehensive preparation through both undergraduate nursing education and continuing professional development. Clinical competence is most accurately assessed through the demonstration of knowledge, skills, and professional performance in real clinical settings, ensuring that nurses are capable of delivering safe and high-quality patient care (**Van Hecke et al., 2025).**

Maternity nursing is a specialized field that focuses on promoting the health and well-being of women and their newborns throughout pregnancy, labor, childbirth, and the postpartum period. Providing safe and effective maternity care requires nurses to possess specialized knowledge and clinical skills to manage normal labor, monitor maternal and fetal well-being, recognize potential complications and implement timely evidence-based interventions. **(Haanes et al., 2024).**

Nurse educators play a pivotal role in preparing nursing students for safe and competent clinical practice by employing effective teaching and

learning strategies that foster knowledge acquisition, clinical skills, self-confidence, and learner satisfaction. Knowledge, clinical performance, and confidence are considered essential determinants of nursing competence and form the foundation upon which new graduates enter professional practice. **(Makhene, 2022).**

Significance of the research: The first stage of labor is a crucial period that requires maternity nursing students to possess adequate theoretical knowledge, clinical skills, and sound clinical judgment to ensure safe and effective maternal care. However, conventional teaching approaches may not adequately develop these competencies because of limited opportunities for clinical practice increasing student numbers and overcrowded clinical settings, all of which may reduce students' exposure to real-life learning experiences **(Ahmed, 2024).** Moodle-based learning has emerged as an innovative educational approach that provides a flexible, interactive and learner-centered environment to support nursing education. Moodle enhances knowledge acquisition, promotes self-directed and lifelong learning, and strengthens clinical competence and increases students' confidence and preparedness for clinical practice **(Change et al., 2022).** Previous studies have also reported that Moodle and other e-learning strategies positively influence nursing students' academic achievement, engagement, satisfaction, and clinical competence **(Elsayed et al., 2026)**. Therefore, the present study was conducted to evaluate the effect of Moodle-based learning on maternity nursing students' competence regarding the first stage of labor.

Despite the growing adoption of Moodle-based learning in nursing education worldwide, evidence from the Egyptian context remains limited. No previous study has investigated the effectiveness of Moodle-based learning in improving maternity nursing students' competence regarding the first stage of labor at the Faculty of Nursing, Benha University. This knowledge gap highlights the need for the current study which may provide valuable evidence to support the integration of Moodle-based learning into maternity nursing education and contribute to improving students' clinical competence and educational outcomes.

Aim of the study:

The study aimed to evaluate the effect of Moodle Based learning method on maternity nursing student’s competence regarding first stage of labor would achieve through the following objectives:

1.Assess Maternity nursing students' knowledge regarding first stage of labor.
2.Assess Maternity nursing students' practices regarding first stage of labor.
3.Evaluate students' clinical competence before and after Moodle-based learning.
4.Evaluate Maternity nursing students' satisfaction regarding Moodle based learning method

Research Hypotheses

The study was conducted to test the following hypotheses:

H1: Maternity nursing students who receive Moodle-based learning will achieve significantly higher knowledge scores regarding the management of the first stage of labor than those who receive traditional teaching methods.

H2: Maternity nursing students who receive Moodle-based learning will demonstrate significantly better clinical practice performance in managing the first stage of labor than those who receive traditional teaching methods.

H3: Maternity nursing students who receive Moodle-based learning will attain significantly higher clinical competence scores regarding the management of the first stage of labor than those who receive traditional teaching methods.

H4: Maternity nursing students who receive Moodle-based learning will report significantly higher levels of satisfaction with the educational process than those who receive traditional teaching methods.

Operational Definition:

Moodle-Based Learning (MBL): In the present study, Moodle-Based Learning refers to an educational approach delivered through the Modular Object-Oriented Dynamic Learning Environment (Moodle), an open-source Learning Management System (LMS) used to design, organize, and deliver interactive online learning experiences. It enables educators to provide course materials, facilitate communication and collaborative learning, administer assessments, monitor students' progress, and provide timely feedback.

Research Design: A quasi-experimental research design was employed to achieve the aim of the present study. This design is appropriate for evaluating the effectiveness of educational interventions when random assignment is not feasible. It facilitates the examination of cause-and-effect relationships by comparing outcomes between an intervention (study) group and a control group using pre-test and post-test assessments, while the control group receives the conventional educational approach without exposure to the intervention during the study period **(Vannini et al., 2024).**

Setting: The research was conducted at the Obstetrics and Gynecological Nursing Department, Faculty of Nursing, Benha University, Egypt.

Sampling: A systematic random sampling technique was used to recruit participants for the study. The target population comprised third- year, second-term nursing students enrolled in the Obstetrics and Gynecological Nursing course during the academic year (2025–2026) at the Faculty of Nursing, Benha University. A total of 530 eligible students constituted the study sample and were allocated to either the intervention or the control group. The required sample size was determined using the formula proposed by Yamane (1967), which provides an appropriate estimate of sample size based on the target population and the desired level of precision.

$$n=\frac{N}{1+N(e)^2}=228$$

$$n=\frac{530}{1+530\,x(\ 0.05\ )^2}=228$$

Where N = total population (530) students at second academic year 2024/2025).

n = required sample size

e = level error of 0.05, 5%

The Epi info program was used to estimate the sample size based on 10% acceptable error, 95% confidence coefficient, 50% expected frequency and a population size of 228

Sample technique: Students randomly assigned into: * **Intervention group (114) student:** (Moodle-based learning) the students were reset username and password to get in the platform of Moodle based learning. * **Control group (114) student:** (traditional learning) students were received the lectures through face to face at classroom with traditional method.

Tools of data collection

Four tools were used to collect the necessary data in the current research:

First tool: A structured self-administered questionnaire: was designed by the researchers after reviewing the relevant literature, it was included two parts: **Part I: General characteristics of maternity nursing students**, it included 4 items such as (phone number, age, residence and collaborative experiences with information technology). **Part II: Maternity Nursing Students' Knowledge Questionnaire:** This questionnaire was adapted from **Alhafez and Berghella (2020)** and modified by the researchers to assess maternity nursing students' theoretical knowledge regarding the first stage of labor. The instrument consisted of 10 multiple-choice questions presented in English and covered key concepts related to labor, including the definitions of labor and normal labor, the stages of

normal labor, the phases of the first stage of labor, the duration of each phase in primiparous and multiparous women, cervical dilatation, and uterine contractions.

Scoring system: Scoring System for the Knowledge Questionnaire: Each correct response was assigned a score of **2**, while each incorrect response received a score of **1**.The total knowledge score was converted into a percentage and classified into three levels: **poor** (<65%), **fair** (65% to <75%), and **good** (≥75%).

Second tool: Objective Structured Clinical Examination (OSCE) Competence Observational Checklists: The Objective Structured Clinical Examination (OSCE) is a standardized assessment method used to evaluate healthcare students' clinical competence and technical skills in simulated practice settings **(WHO, 2020**; **American College of Obstetricians and Gynecologist, 2024).** The observational checklists were adapted from **Sirisomboon (2024)** and modified by the researchers to assess maternity nursing students' clinical performance in managing the first stage of normal labor. The instrument consisted of two sections.

Section I: Management of the First Stage of Labor comprised 15 domains covering the essential components of intrapartum care: initial assessment (7 items), maternal and fetal assessment (4 items), Leopold's maneuvers (23 items), assessment of uterine contractions (12 items), vaginal examination (19 items), performance of routine investigations (3 items), identification of the sure signs of labor (6 items), nutrition and hydration (3 items), rest and pain relief measures (5 items), maternal positioning during labor (3 items), bladder and bowel care (3 items), observation for maternal and fetal distress (2 items), assessment of labor complications (3 items), and documentation and reporting (2 items).

Section II: Partograph Application consisted of seven domains evaluating students' ability to accurately complete and interpret the partograph, including admission assessment (4 items), uterine contractions (3 items), fetal membrane and amniotic fluid status (3 items), labor progress (5 items), fetal condition monitoring (3 items), maternal condition monitoring (2 items), and medication administration (3 items).

Scoring System for the OSCE Checklist: Students' clinical performance was evaluated using a three-point Likert scale. Each item was scored **2** if the procedure was performed completely, **1** if

performed incompletely, and **0** if not performed. The total practice score ranged from **0 to 230**, with higher scores indicating better clinical performance. Students' practice was classified as **satisfactory** when they achieved **≥75%** of the total score (115–230 points) and **unsatisfactory** when they scored **<75%** (0–114 points).

Third tool: Nurse Competence Scale: This instrument was adapted from the National Academic Reference Standards (NARS) for Nursing Education (2018) and modified by the researchers to assess maternity nursing students' competence in providing nursing care during the first stage of labor. The scale consisted of four competency domains: Professional and Ethical Practice (7 items), Holistic Patient-Centered Care (6 items), Safety and Quality Improvement (7 items), and Interprofessional Communication and Collaboration (6 items), yielding a total of 26 items.

Scoring System: Each item was assessed using a dichotomous scale, with **1** assigned for "compliance" and **0** for "non-compliance." The total competence score ranged from **0 to 26**. Students who achieved **85% or more** of the total score (23–26 points) were classified as **competent**, whereas those who scored **less than 85%** (0–22 points) were classified as **incompetent**.

Fourth tool: Maternity Nursing Students' Satisfaction with Moodle-Based Learning and Traditional Teaching Regarding the First Stage of Labor: This questionnaire was adapted from **Al-Suroor (2024)** and modified by the researchers to evaluate maternity nursing students' satisfaction with the Moodle-based learning program and the traditional teaching method. The instrument consisted of 14 statements that assessed students' perceptions of the educational process. Each statement was rated using a two-point Likert scale, with **1** indicating "satisfied" and **0** indicating "unsatisfied." **Scoring System:** The total satisfaction score ranged from **0 to 14**, with higher scores reflecting greater satisfaction. Students who achieved **75% or more** of the total score were categorized as **satisfied**, whereas those who scored **less than 75%** were considered **unsatisfied**.

Administrative Approval: Written administrative approval to conduct the study was obtained from the Faculty of Nursing, Benha University, and the relevant authorities at the Obstetrics and Gynecological Nursing Department before initiating the research. All participants provided written informed consent after receiving a comprehensive explanation of the study objectives and procedures. They were assured that participation

was voluntary, that the confidentiality of their information would be maintained, and that the collected data would be accessible only to the research team and used exclusively for research purposes.

Ethical Considerations: Prior to data collection, ethical approval was obtained from the Research Ethics Committee of the Faculty of Nursing, Benha University (Approval No. **REC-OBSN-P128**). Official administrative permission was also obtained from the responsible authorities at the study setting. Before participation, the researchers explained the purpose, significance, and procedures of the study to all eligible maternity nursing students. Written informed consent was obtained from each participant after emphasizing that participation was entirely voluntary and that they had the right to withdraw from the study at any time without any academic or personal consequences. Participants were assured that the study posed no physical, psychological, or social risks. Confidentiality and anonymity were strictly maintained throughout the research process, and all collected data were used solely for scientific research purposes. No identifying information was collected, and participants' privacy, cultural values, beliefs, and personal rights were fully respected.

Validity of the Instruments: The content validity of the study instruments was evaluated by a panel of three experts in Obstetrics and Gynecological Nursing from the Faculty of Nursing, Benha University. The experts reviewed the instruments to assess their clarity, relevance, comprehensiveness, simplicity, and applicability to the study objectives. Their comments and recommendations were considered and the necessary modifications were made to enhance the validity of the instruments.

Pilot Study: A pilot study was conducted on 10% of the calculated sample (23), who were excluded from the final analysis, to evaluate the clarity, feasibility, and applicability of the study instruments and data collection procedures. The pilot study also helped estimate the time required to complete the questionnaires and assess the suitability of the study setting. Based on the pilot findings, minor modifications were made to improve the clarity and comprehensiveness of the instruments before commencing the main study.

Reliability of the Instruments: The reliability of the study instruments was assessed using Cronbach's alpha coefficient to determine their internal consistency. The results indicated that the

instruments demonstrated good to excellent reliability, reflecting a high degree of homogeneity among the items. The knowledge questionnaire achieved a Cronbach's alpha coefficient of **0.834**, while the maternity nursing students' satisfaction questionnaire demonstrated excellent internal consistency with a Cronbach's alpha coefficient of **0.901**

Field work: The fieldwork was conducted over a three-month period from the beginning of February 2025 to the end of April 2026 after obtaining all required ethical and administrative approvals. Data collection was carried out at the Obstetrics and Gynecological Nursing Department, Faculty of Nursing, Benha University. The researchers visited the study setting three days per week (Saturday, Monday, and Wednesday) from 9:00 a.m. to 1:00 p.m., according to the academic timetable, until the required sample size was achieved.

At the beginning of the study the researchers introduced themselves to the maternity nursing students, explained the purpose, significance and procedures of the study, and obtained written informed consent from those who agreed to participate. The educational intervention consisted of both theoretical and practical components developed by the researchers. Four theoretical sessions addressing the first stage of normal labor were prepared and delivered to both the study and control groups. Each session lasted approximately one hour and was conducted once weekly on Saturdays over four consecutive weeks. Both groups received the same theoretical content; however, the intervention group received the instruction through the Moodle-based learning platform, whereas the control group received conventional face-to-face lectures.

In addition, four practical sessions focusing on the management of the first stage of normal labor were conducted for both groups. Each practical session lasted approximately two hours and was delivered twice weekly on Mondays and Wednesdays over a one-month period. The practical sessions included demonstrations and supervised clinical training using a static simulation model to ensure that all participants received standardized instruction. The study participants were equally allocated into an intervention group and a control group, each comprising 114 maternity nursing students. Students assigned to the intervention group were provided with individual usernames and passwords to access the Moodle learning platform, while those in the control group received traditional

classroom-based instruction. To facilitate teaching and practical training each group was further divided into eight subgroups, with approximately 14 students in each subgroup. Every clinical procedure was demonstrated and practiced over two training days with approximately 60 minutes allocated for each subgroup. The study was implemented through five sequential phases: the preparatory phase, assessment and interviewing phase, planning phase, implementation phase, and evaluation phase.

Preparatory Phase

During the preparatory phase, the researchers conducted an extensive review of current national and international literature related to Moodle-based learning, nursing education, and the management of the first stage of labor. This review facilitated a comprehensive understanding of the research problem, identified existing knowledge gaps, and provided the scientific basis for developing the study instruments and educational intervention.

Assessment and Interviewing Phase

Each maternity nursing student was interviewed individually in a private setting to ensure confidentiality and encourage accurate responses. Baseline data collection was conducted before implementing the educational intervention, with the control group assessed first, followed by the intervention group. At the beginning of each interview, the researchers introduced themselves, explained the objectives of the study, and clarified the intervention schedule, including the number, duration, and frequency of the educational sessions. The assessment began with the collection of students' general demographic characteristics using **First Tool (Part I)**, which required approximately **5–10 minutes** to complete. Students' baseline theoretical knowledge regarding the first stage of labor was then assessed using **First Tool (Part II)**, requiring approximately **15–20 minutes**. Subsequently, students' clinical performance was evaluated using the **Objective Structured Clinical Examination (OSCE) Competence Observational Checklists (Second tool)**, followed by assessment of their overall clinical competence using the **Nurse Competence Scale (Third tool)**. Completion of the practical competency assessment required approximately **60 minutes** for each participant. Following completion of the educational intervention, students' satisfaction with the Moodle-based learning program or the traditional teaching method was evaluated using Fourth tool.

Planning Phase: Based on the findings of the assessment phase, a competency-based educational program addressing the management of the first stage of normal labor was developed by the researchers. The educational content was specifically designed to match the learning needs and comprehension level of second-year maternity nursing students. The program consisted of theoretical lectures, recorded educational videos, power Point, presentations, illustrative images and practical demonstrations. The learning objectives, educational content, teaching methods, instructional media, and duration of each session were determined according to the intended learning outcomes. Prior to implementation, written informed consent was obtained from all participants. Students were assured that participation was voluntary that the collected data would remain confidential, and that they could withdraw from the study at any time without any academic consequences.

Implementation Phase: The implementation phase was conducted after obtaining ethical approval and administrative permission from the Faculty of Nursing, Benha University. A suitable learning environment was prepared to ensure participants' privacy and confidentiality throughout the study. At the beginning of the intervention the researchers introduced themselves, explained the purpose and procedures of the study, and provided participants with detailed instructions regarding the educational program.

For the intervention group, individual Moodle accounts were created by assigning each student a unique username and password. The Moodle homepage included a welcome message, course instructions, researchers' contact information, and links to the learning materials. Students received orientation regarding account activation, website navigation, and the use of the Moodle platform. The online course remained accessible throughout the intervention period allowing students to review the educational materials at their convenience and communicate with the researchers through the platform.

The Moodle course included comprehensive theoretical content related to the first stage of normal labor, including the definition and physiology of labor, obstetric terminology, signs and stages of labor, cervical dilatation, uterine contractions, fetal monitoring and evidence-based nursing care during the first stage of labor. The educational materials were presented through PowerPoint

presentations, recorded video lectures, images, interactive quizzes, discussion forums, brainstorming activities, and critical-thinking exercises. Synchronous online sessions were conducted weekly using Zoom to facilitate interaction, discussion, and immediate feedback.

The theoretical component consisted of four weekly sessions. The first session introduced students to the Moodle platform and covered basic obstetric terminology, normal labor, and the physiology of the first stage of labor. The second session focused on the signs, stages, and physiological processes of labor. The third session addressed cervical dilatation, uterine contractions, and fetal monitoring. The fourth session focused on nursing interventions during the first stage of normal labor, followed by an interactive discussion and opportunities for students to ask questions and clarify any misconceptions. Students in the **control group** received the same theoretical content through conventional face-to-face lectures delivered once weekly in the classroom. Traditional teaching strategies included lectures, PowerPoint presentations, group discussions, brainstorming activities, and audiovisual presentations. Both groups received identical educational content; however, the mode of delivery differed. The practical component was identical for both groups and consisted of four supervised practical sessions delivered over one month. Two sessions were conducted each week, with each session lasting approximately two hours. Practical training was carried out in the Obstetrics and Gynecological Nursing Laboratory using static simulation models. The first session covered Leopold's maneuvers and vaginal examination. The second session focused on the application and interpretation of the partograph. The third session addressed assessment of uterine contractions, cervical dilatation, and fetal monitoring. The fourth session emphasized comprehensive nursing management during the first stage of normal labor. All practical procedures were demonstrated by the researchers, followed by supervised student practice and immediate feedback.

Evaluation Phase: The effectiveness of the educational intervention was evaluated for both the intervention and control groups using the same study instruments. Students' theoretical knowledge was assessed using the knowledge questionnaire. The control group completed the assessment using a paper-based format, whereas the intervention group completed the same examination electronically

through the Moodle platform using their mobile devices. The theoretical assessment required approximately 15–30 minutes to complete. Students' clinical performance and competency were evaluated one month after completion of the educational program using the Objective Structured Clinical Examination (OSCE) competence observational checklists and the Nurse Competence Scale. Practical assessments were conducted in the Obstetrics and Gynecological Nursing Laboratory under standardized conditions. In addition, students' satisfaction with the educational method was assessed using the researcher-modified satisfaction questionnaire. Comparisons between the intervention and control groups were performed to determine the effect of Moodle-based learning on students' knowledge, clinical practice, competence, and satisfaction.

Statistical analysis: Upon completion of data collection, data was computed and analyzed using Statistical Package for the Social Science (SPSS), version 24 for analysis. The P value will be set at 0.05. Descriptive statistics tests as numbers, percentage, mean ± standard deviation (±SD), will be used to describe the results. Appropriate inferential statistics.

Results

Table (1): There were no statistically significant differences between the intervention and control groups regarding socio-demographic characteristics ($p > 0.05$), indicating that the two groups were homogeneous and comparable at baseline prior to implementation of the intervention.

Table (2): The intervention group demonstrated a highly statistically significant improvement in knowledge regarding the first stage of labor from the pre-test to the post-test, with knowledge gains largely maintained at follow-up ($p < 0.001$). In contrast, the control group showed only slight improvements over the same period, indicating the effectiveness of the Moodle-based learning program in enhancing and retaining students' knowledge.

Figure (1): The proportion of students achieving a good level of knowledge increased markedly in the intervention group after implementation of the Moodle-based learning program, accompanied by a substantial reduction in poor knowledge levels. Conversely, only modest changes were observed in the control group, demonstrating the superior impact of the intervention on knowledge acquisition.

Table (3): No statistically significant differences were

observed between the intervention and control groups in clinical practice related to the management of the first stage of labor before the intervention. Following implementation of the Moodle-based learning program, the intervention group achieved highly statistically significant improvements across all practice items compared with the control group ($p < 0.001$), with these improvements largely maintained during follow-up.

Table (4): Baseline practice scores related to the active management of the first stage of labor did not differ significantly between the two groups. However, after the intervention, the intervention group demonstrated highly statistically significant improvements in all practice domains compared with the control group ($p < 0.001$). Although a slight decline was observed at follow-up, performance remained significantly higher than that of the control group, indicating sustained learning retention.

Table (5): There were no statistically significant differences between the intervention and control groups regarding monitoring and management practices during the first stage of labor before the intervention. Following the Moodle-based learning program, the intervention group demonstrated highly statistically significant improvements in all practice domains, and these improvements remained significantly higher than those of the control group at follow-up ($p < 0.001$).

Figure (2): Before the intervention, most students in both groups demonstrated unsatisfactory practice levels. Following implementation of the Moodle-based learning program, the intervention group exhibited a marked shift toward satisfactory practice, whereas only minimal improvement was observed in the control group, confirming the positive effect of the intervention on students' clinical practice.

Table (6): No statistically significant differences were observed between the intervention and control groups regarding professional, ethical and patient-centered competency domains before the intervention. Following implementation of the Moodle-based learning program, the study group demonstrated highly statistically significant improvements across all competency domains compared with the control group ($p < 0.001$), with these gains partially maintained at follow-up.

Table (7): Baseline competency scores regarding the management of the first stage of labor were comparable between the study and control groups. After implementation of the Moodle-

based learning program, the intervention group demonstrated highly statistically significant improvements in overall competency compared with the control group, and these improvements remained evident during the follow-up assessment ($p < 0.001$).

Table (8): Most students in the study group expressed high satisfaction with the Moodle-based learning strategy. The highest satisfaction levels were related to the accessibility of learning materials and improved preparation for examinations and practical sessions. Overall, the findings indicate that Moodle-based learning was well accepted and perceived as an effective educational strategy despite minor challenges related to workload and technological skills.

Table (9): Among the intervention group, no statistically significant correlation was observed between knowledge and practice before the intervention ($p = 0.438$). However, after implementation of the Moodle-based learning program, statistically significant positive correlations emerged among knowledge, practice, and satisfaction ($p < 0.01$), indicating that improvements in knowledge were associated with better clinical practice and higher levels of student satisfaction.

Table (10): Among the control group, a weak but statistically significant positive correlation was observed between knowledge and practice before the intervention ($r = 0.163$, $p = 0.037$). Following the intervention period, a strong positive correlation was identified between knowledge and practice ($r = 0.690$, $p < 0.001$). However, satisfaction remained unrelated to either knowledge or practice throughout all assessment phases, indicating that students' satisfaction was independent of their knowledge acquisition and clinical performance under the traditional teaching approach.

Table (1): Distribution of the students studied according to their socio-demographic data, (n=228)

Socio-demographic data	Intervention group (n=114)		Control group (n=114)		Significance test	
	No.	%	No.	%	X^2	P-value
Age (Years):						
20≥ 21	111	97.3	113	99.2	1.871	0.171
< 21	3	2.7	1	0.8		
Mean ±SD	18.5 ±6.7		17.5 ±6.7			
Work:						
Working	12	10.5	16	14.1	1.125	0.289
Not working	102	89.5	98	85.9		
Residence:						
Rural	77	67.5	85	74.5	1.99	0.753
Urban	37	32.5	29	25.5		
The presence of collaborative experience with informatics technology:						
Yes	110	100.0	114	100.0	0.79	0.863
Years of experience with informatics technology:						
1 - > 2	19	16.6	17	14.9	1.232	0.541
2 - > 3	65	57.1	71	62.3		
≥ 3	30	26.3	26	22.8		

$X^{2:}$ Chi Chi-square square test a. No statistics are computed because VAR00006 is a constant

Table (2): Distribution of the studied students according to their knowledge regarding the first stage of labor pre and post and follow-up of the application of the Moodle-based learning program (n = 228)

Items	Assessment Time	Intervention group N=114				Control group N= 114				Paired t-test	P- value
		Correct		Incorrect		Correct		Incorrect			
		No	%	No	%	No	%	No	%		
Items of labor											
Definition of normal labor	Pre	30	26.4	84	73.6	25	21.9	89	78.1	*119.34 **116.34	<0.001**
	Post	105	92.1	9	7.9	30	26.4	84	73.6		
	Follow up	99	86.8	15	13.2	20	17.5	94	82.5		
Definition stages of normal labor	Pre	40	35.1	74	64.9	35	30.7	79	69.3	*255.38 **255.36	<0.001**
	Post	90	78.9	24	21.1	37	32.4	77	67.5		
	Follow up	85	74.5	29	25.5	33	28.9	81	71.1		
Definition of first stage of labor	Pre	41	35.9	73	64.1	36	31.5	78	68.5	*256.18 **220.06	<0.001**
	Post	93	81.5	21	18.5	35	30.7	79	69.3		
	Follow up	90	78.9	24	21.1	30	26.4	84	73.6		
Phases of the first stage of labor	Pre	30	26.4	84	73.6	40	35.1	74	64.9	*232.09 **219.83	<0.001**
	Post	95	83.4	19	16.6	35	30.7	79	69.3		
	Follow up	90	78.9	24	21.1	30	26.4	84	73.6		
Duration of the first stage of labor in primipara	Pre	35	30.7	79	69.3	44	38.5	70	61.5	*137.50 **193.10	<0.001**
	Post	85	74.5	29	25,5	38	33.4	76	66.6		
	Follow up	75	65.7	39	34.3	35	30.7	79	69.3		
Duration of first stage of labor in multipara	Pre	25	21.9	89	78.1	38	33.4	76	66.6	*107.62 **147.34	<0.001**
	Post	88	77.2	26	22.8	34	29.8	80	70.2		
	Follow up	85	74.5	29	25.5	30	26.4	84	73.6		
Cervical dilatation											
Cervical dilatation in the latent phase during first stage of labor	Pre	26	22.8	88	77.2	43	37.7	71	62.3	*217.70 **200.14	<0.001**
	Post	85	74.5	29	25.5	40	35.1	74	64.9		
	Follow up	80	70.2	34	29.8	39	34.2	75	65.8		
Cervical dilatation during active phase in first stage of labor	Pre	25	21.9	89	78.1	39	34.2	75	65.8	*196.50 **179.99	<0.001**
	Post	95	83.4	19	16.6	33	28.9	81	77.1		
	Follow up	85	74.5	29	25.5	29	25.5	85	74.5		
Cervical dilatation in the transition phase in the first stage of labor	Pre	30	26.4	84	73.6	40	35.1	74	64.9	*187.58 **186.79	<0.001**
	Post	90	78.9	24	21.1	39	34.2	75	65.8		
	Follow up	85	74.5	29	25.4	37	32.4	77	67.6		
Uterine contraction											
Definition: uterine contraction in the first stage of labor	Pre	31	27.1	83	72.9	40	35.1	74	64.9	*129.30 **126.31	<0.001**
	Post	95	83.3	19	16.7	37	32.4	77	67.6		
	Follow up	85	74.5	29	25.5	35	30.7	79	69.3		

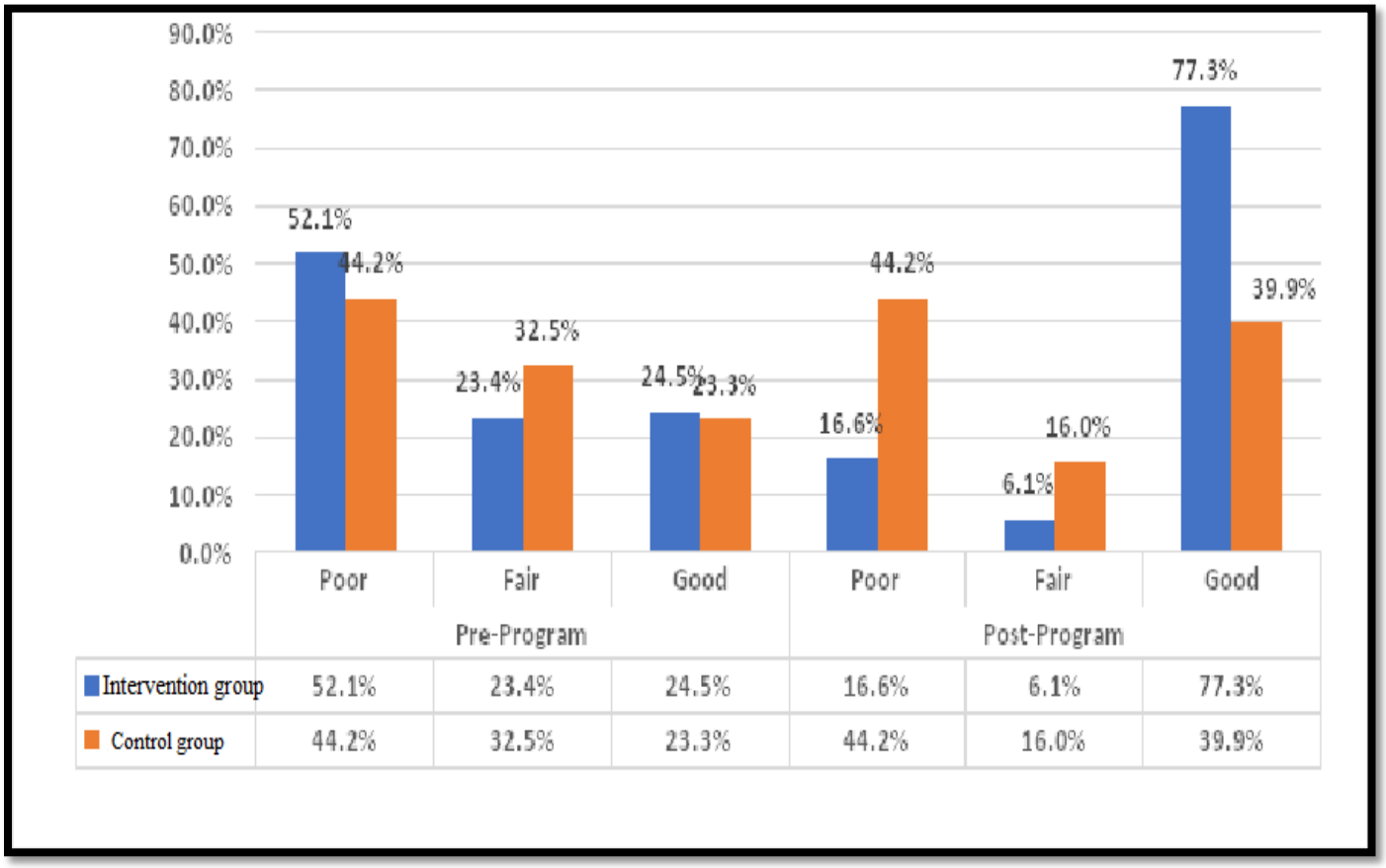

Figure (1): Distribution of the studied students according to level of total knowledge regarding the first stage of labor pre and post the application of the Moodle Moodle-based learning program (n =228)

Table (3): Distribution of the studied sample according to their practices regarding management of 1st stage during admission at pre, post and follow up of the application of Moodle based learning program (n = 228)

Procedures	Assessment Time	Intervention	Control	Independent t- test	p- value
		Mean ±SD	Mean ±SD		
Leopold's maneuver	Pre	31.52±7.53	31.69±7.79	0.202	0.840
	Post	74.22± 4.53	31.43±8.32	32.12	0.000**
	Follow up	46.21±3.70	30.72±8.32	21.72	0.000**
Assessment of uterine contraction	Pre	16.05±4.18	16.25±3.94	0.437	0.663
	Post	43.18±3.45	30.06±6.15	22..76	0.000**
	Follow up	18.41±3.42	15.18±5.15	6.66	0.000**
Vaginal examination	Pre	21.18±6.05	20.18±6.69	1.46	0.160
	Post	44.19±7.03	19.18±8.02	34.18	0.000**
	Follow up	27.80±5.95	19.39±7.06	11.62	0.000**
Routine investigation	Pre	24.57±7.20	23.03±8.08	1.81	0.070
	Post	34.16±8.04	21.17±6.03	44.18	0.000**
	Follow up	35.31±6.02	21.90±8.38	16.58	0.000**
Current maternal and fetal assessment	Pre	93.31±16.85	91.15±16.41	12.17	0.241
	Post	32.19±7.03	19.12±6.04	33.56	0.000**
	Follow up	28.17±7.01	21.17±7.08	32.33	0.000**

Table (4): Distribution of the studied sample according to their practices regarding active management of 1st stage at pre, post and follow up phases after the application of Moodle-based learning program (n = 228)

Procedures	Assessment Time	Intervention	Control	Independent t test	p- value
		Mean ±SD	Mean ±SD		
Nutrition and hydration: Ensure the following	Pre	34.32±7.23	29.62±6.75	0.212	0.877
	Post	64.21± 6.53	41.53±7.32	37.14	0.000**
	Follow up	47.21±7.80	33.72±9.32	20.62	0.000**
Rest and (Pain relief)	Pre	18.05±6.18	18.25±6.93	0.428	0.683
	Post	43.18±3.45	30.06±6.15	28..74	0.000**
	Follow up	18.51±3.42	16.18±5.15	61.69	0.000**
Posture of woman in labor	Pre	24.18±6.05	22.18±6.69	12.49	0.190
	Post	45.19±7.03	20.18±8.02	36.16	0.000**
	Follow up	38.80±5.95	21.39±7.06	12.52	0.000**
Care of bladder and Powel	Pre	26.57±7.20	19.03±8.08	11.71	0.090
	Post	35.16±8.04	22.17±6.03	44.18	0.000**
	Follow up	36.31±6.02	27.90±8.38	16.58	0.000**
Observe signs of maternal distress	Pre	83.31±16.85	81.15±16.41	12.16	0.261
	Post	32.19±7.03	18.12±6.04	43.56	0.000**
	Follow up	29.17±7.01	21.17±7.08	39.33	0.000**
Observe for any fetal and maternal complication:	Pre	25.57±7.20	18.03±8.07	10.81	0.090
	Post	36.16±8.04	23.17±6.03	44.18	0.000**
	Follow up	37.31±6.02	27.90±8.38	16.58	0.000**
Documentation and reporting	Pre	89.31±16.85	80.15±16.41	12.16	0.261
	Post	39.19±7.03	17.12±6.04	33.56	0.000**
	Follow-up	37.19±8.03	97.12±6.09	23.58	0.000**

Table (5) Usage of partogram at pre, post and follow up phases of application of Moodle-based learning program regarding active management of 1st stage (n = 228)

Procedures	Assessment Time	Intervention Mean ±SD	Control Mean ±SD	Independent t test	p- value
Admission assessment	Pre	33.52±8.53	30.69±9.79	0.203	0.940
	Post	76.22± 7.53	41.49±8.32	33.12	0.000**
	Follow up	47.21±3.80	31.72±9.31	26.72	0.000**
Uterine contractions	Pre	17.05±4.18	17.25±3.94	0.438	0.663
	Post	48.18±3.45	31.06±6.15	23..76	0.000**
	Follow up	19.41±3.42	16.18±5.15	5.66	0.000**
Fetal membrane amniotic fluid status	Pre	22.18±6.05	19.18±6.69	4.46	0.180
	Post	49.19±7.03	33.18±8.02	36.18	0.000**
	Follow up	28.80±5.95	20.39±7.06	13.62	0.000**
Progress of Labor: Cervical Dilation Monitoring	Pre	26.57±7.20	21.03±8.08	2.81	0.090
	Post	36.16±8.04	22.17±6.03	45.18	0.000**
	Follow up	37.31±6.02	24.90±8.38	18.58	0.000**
Uterine Contractions Monitoring	Pre	94.31±16.85	92.15±16.41	2.17	0.541
	Post	38.19±7.03	20.12±6.04	39.56	0.000**
	Follow up	29.17±7.01	23.17±7.08	34.33	0.000**
Fetal condition monitoring: Fetal heart rate monitoring	Pre	24.18±6.05	21.18±6.69	1.46	0.180
	Post	45.19±7.03	22.18±8.02	34.18	0.000**
	Follow up	28.80±5.95	20.39±7.06	11.62	0.000**
Maternal condition monitoring: Vital signs monitoring	Pre	25.57±7.20	22.03±8.08	1.81	0.090
	Post	36.16±8.04	23.17±6.03	44.18	0.000**
	Follow up	37.31±6.02	29.90±8.38	16.58	0.000**
Medication	Pre	83.31±16.85	81.15±16.41	1.17	0.261
	Post	39.19±7.03	20.12±6.04	33.56	0.000**
	Follow up	38.17±7.01	29.17±7.08	32.33	0.000**

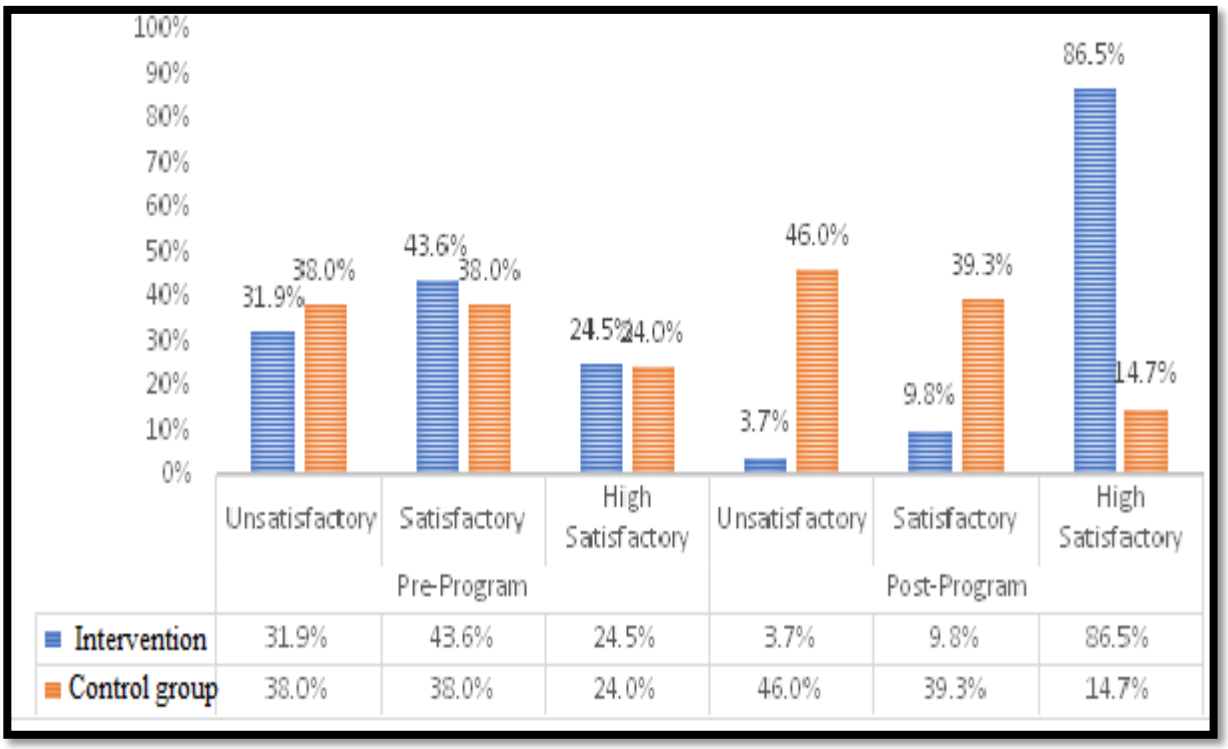

Figure (2): Distribution of the studied students according to satisfactory level regarding the first stage of labor pre and post the application of Moodle based learning program (n = 228)

Table (6): Distribution of the studied sample according to their competence with professional and ethical practice and holistic patient centered care at pre, post-intervention and follow up phases after application of Moodle based learning program (n = 228)

Procedures	Assessment Time	Intervention Mean ±SD	Control Mean ±SD	Independent t test	p- value
Competency:(Maintain professional, legal, and ethical behavior throughout nursing practices	Pre	31.52±7.53	31.69±7.79	0.412	0.730
	Post	74.22± 4.53	31.43±8.32	36.15	0.000**
	Follow up	46.21±3.70	30.72±8.32	28.42	0.000**
Holistic patient centered care Competency:(Provide holistic patient centered care within the context of nursing process in different health care settings	Pre	16.05±4.18	16.25±3.94	0.637	0.823
	Post	43.18±3.45	30.06±6.15	29..72	0.000**
	Follow up	18.41±3.42	15.18±5.15	7.16	0.000**
Competency:(Provide health education based on the needs and problems of the patient within a nursing framework)	Pre	21.18±6.05	20.18±6.69	2.44	0.420
	Post	44.19±7.03	19.18±8.02	36.19	0.000**
	Follow up	27.80±5.95	19.39±7.06	12.42	0.000**
Competency:(Contribute to the safety and security of individuals, families, and communities, and to risk management of work environment)	Pre	24.57±7.20	23.03±8.08	2.61	0.370
	Post	34.16±8.04	21.17±6.03	46.28	0.000**
	Follow up	35.31±6.02	21.90±8.38	18.58	0.000**
Competency: (Utilize quality concepts to improve nursing care provision)	Pre	93.31±16.85	91.15±16.41	13.17	0.321
	Post	32.19±7.03	19.12±6.04	35.56	0.000**
	Follow up	28.17±7.01	21.17±7.08	33.36	0.000**
Competency: (Communicate effectively as a member of the health care team)	Pre	27.18±6.05	21.18±6.69	3.44	0.320
	Post	47.19±7.03	22.18±8.02	37.19	0.000**
	Follow up	29.80±5.95	20.39±7.06	22.42	0.000**
Competency: (Manage information using technology to improve patient care	Pre	27.57±7.20	21.03±8.08	12.61	0.420
	Post	36.16±8.04	23.17±6.03	48.28	0.000**
	Follow up	37.31±6.02	24.90±8.38	19.58	0.000**

Table (7): Total mean scores of studied samples' competence during management of 1st stage of labor through application the Moodle based learning program at pre, post-intervention and follow up phases (n= 228)

Total Competence domains	Assessment Time	Intervention Mean ±SD	Control Mean ±SD	Independent t - test	p- value
Professional and ethical practice	Pre	29.52±7.53	28.69±7.79	0.512	0.630
	Post	84.22± 4.53	34.43±8.32	38.15	0.000**
	Follow up	48.21±3.70	33.72±8.32	31.42	0.000**
Holistic patient centered care	Pre	22.05±4.18	21.25±3.94	0.640	0871
	Post	48.18±3.45	33.06±6.15	33..72	0.000**
	Follow up	40.41±3.42	23.18±5.15	17.16	0.000**
Safety and quality improvement	Pre	21.18±6.05	20.18±6.69	3.44	0.480
	Post	49.19±7.03	33.18±8.02	96.19	0.000**
	Follow up	37.80±5.95	29.39±7.06	=22.42	0.000**
Inter-professional communication and collaboration	Pre	24.57±7.20	23.03±8.08	3.61	0.330
	Post	49.16±8.04	24.17±6.03	28.28	0.000**
	Follow up	35.31±6.02	23.90±8.38	19.58	0.000**
Total scores	Pre	83.31±16.85	70.15±16.41	17.17	0.377
	Post	90.19±7.03	33.12±6.04	39.56	0.000**
	Follow up	85.17±7.01	33.17±7.08	37.36	0.000**

Table (8): Distribution of the Intervention group according to their satisfaction towards using the Moodle based learning strategy regarding first stage of labor (n = 114)

Statements	Satisfied		Unsatisfied	
	No	%	No	%
Moodle based learning strategy improves academic achievement by enhancing access to electronic content.	95	83.4	19	16.6
Students can present their hands-on activities to the course instructor through an online course.	80	70.2	34	29.8
Moodle based learning strategy allows to access study materials anytime and anywhere, which is convenient for learning.	100	87.7	14	12.3
The feedback and assessments provided on Moodle based learning strategy help to improve understanding to the course content.	85	74.5	29	25.5
The use of the Moodle based learning strategy contributes to better communication of information.	90	78.9	24	21.1
The interaction with teachers increases when I use the Moodle based learning Strategy.	75	65.7	39	34.3
The interactive features of Moodle based learning strategy (e.g., forums, quizzes) improve learning experience.	85	74.5	29	25.5
Moodle based learning strategy provides sufficient resources for learning across topics in maternity nursing.	85	74.5	29	25.5
Moodle based learning strategy helps simplify complex scientific concepts and terms related to maternity nursing.	90	78.9	24	21.1
The use of Moodle based learning strategy has helped better prepare for practical sessions and exams related to course content.	98	85.9	16	14.1
Moodle based learning strategy helps solve specific educational challenges related to the course content.	77	67.5	37	32.5
The use of Moodle-based learning strategy may require advanced technological skills and could increase the workload for students.	87	76.3	27	23.7
The use of Moodle-based learning strategy encourages collaboration among students, allowing them to share insights and learn from each other.	90	78.9	24	21.1
Using the Moodle based learning strategy gives better results than using traditional teaching strategies.	94	82.4	20	17.6

Table (9): Correlation among total practice, knowledge and satisfaction among the study group participants

Group	Times of assessment	Variables	Test	nowledge	Practice	Satisfaction
Intervention group	Pre-intervention	Knowledge	r	-	0.061	-
			p-value		0.438	-
		Practice	r	0.061	-	-
			p-value	0.438		-
	Post-intervention	Knowledge	r	0.244**	0.236**	0.393**
			p-value		0.003	0.000
		Practice	r	0.234**	-	0.391**
			p-value	0.003		0.183
		Satisfaction	r	-		
			p-value	0.393**	0.105	-
		Competence	r	-		0.001**
			p-value	0.000	0.183	
Control group	Pre-intervention	Knowledge	r	-	-	-
			p-value		0.037	-
		Practice	r	0.163*	-	-
			p-value	0.037		-
		Practice	r	-	-	0.139
			p-value		0.000	0.078
		Satisfaction	r	0.690**	-	0.095
			p-value	0.000		0.227
		Competence	r	0.139	0.095	-
			p-value		0.000	0.078

***. Correlation is significant at the 0.05 level (2-tailed).**

****. Correlation is significant at the 0.01 level (2-tailed).**

Table (10): Correlation among total practice, knowledge, and satisfaction among the control group participants

Group	Times of assessment	Variables	Test	Knowledge	Practice	Satisfaction
Control group	Pre-intervention	Knowledge	r	-	-	-
			p-value		0.037	-
		Practice	r	0.163*	-	-
			p-value	0.037		-
	Post-intervention	Knowledge	r	-	-	0.139
			p-value		0.000	0.078
		Practice	r	0.690**	-	0.095
			p-value	0.000		0.227
		Satisfaction	r	0.139	0.095	-
			p-value			

***. Correlation is significant at the 0.05 level (2-tailed)**

****. Correlation is significant at the 0.01 level (2-tailed).**

Discussion

The present study aimed to aimed to evaluate the effect of Moodle-based learning on maternity nursing students' competence regarding the first stage of labor. The major finding of the current study revealed that, significantly improved maternity nursing students' competence regarding the management of the first stage of labor. Students who participated in the Moodle-based learning program demonstrated significantly higher level of knowledge, clinical practice, competence and satisfaction than those who received traditional teaching methods. The results clearly answered the research hypotheses.

Regarding the socio-demographic characteristics of the participants, the findings demonstrated no statistically significant differences between the intervention and control groups with respect to age, employment status, place of residence, or previous experience with information technology ($p > 0.05$). Most participants in both groups were 20–21 years of age, were not employed, and resided in rural areas. Additionally, nearly all students reported previous exposure to information technology with comparable years of experience between the two groups. These findings indicate that the study and control groups were homogeneous at baseline, thereby minimizing the potential influence of demographic characteristics on the study outcomes and strengthening the validity of the intervention effect.

Knowledge is a fundamental component of clinical competence and an essential prerequisite for safe nursing practice. The present study demonstrated a significant improvement in maternity nursing students' knowledge regarding the first stage of labor following implementation of the Moodle-based learning program. Students in the intervention group showed substantial increases in correct responses across all knowledge domains from the pre-test to the post-test, and these improvements were largely maintained during the follow-up assessment. Conversely, students in the control group exhibited only modest changes over the same period. The differences observed across the three assessment phases were highly statistically significant ($p < 0.001$). Furthermore, the proportion of students achieving a good level of knowledge increased markedly after the intervention, whereas the percentage of students with poor knowledge declined considerably. These findings demonstrate that Moodle-based learning effectively enhanced both knowledge

acquisition and knowledge retention regarding the management of the first stage of labor. Consequently, the results support the first research hypothesis, which proposed that maternity nursing students exposed to Moodle-based learning would achieve significantly higher knowledge scores than those receiving traditional teaching methods.

The observed improvement in knowledge among students who participated in the Moodle-based learning program may be attributed to the learner-centered nature of the platform which promotes self-directed learning and provides continuous access to educational resources. Moodle allows students to review learning materials repeatedly at their own pace through a variety of multimedia resources, including presentations, recorded lectures, videos, interactive quizzes and formative assessments. These features encourage active participation, immediate feedback, and continuous reinforcement of learning, thereby facilitating deeper understanding and long-term retention of theoretical concepts related to maternity nursing. Moreover, the flexibility of Moodle enables students to revisit difficult topics whenever needed, enhancing independent learning and improving overall academic performance. These findings are consistent with contemporary nursing education research demonstrating that Moodle-supported and blended learning approaches significantly improve nursing students' knowledge, critical thinking abilities, academic achievement and learning engagement compared with conventional teaching methods.

The findings of the present study are consistent with those of **Kusumaningsih et al. (2026)**, who demonstrated that Moodle-based e-learning significantly enhances learning quality and knowledge acquisition across different educational levels. Similarly, **Egban and Odong (2025)**, in a study conducted in Nigeria, reported a statistically significant improvement in nursing students' perceptions and performance in the Objective Structured Clinical Examination (OSCE) following the implementation of a Moodle-based e-learning application

A supportive learning environment is essential for promoting continuous professional development and addressing knowledge and practice gaps in nursing education **(Calzone et al., 2026).** Regarding students' clinical practice related to the management of the first stage of labor, the present study demonstrated that there were no statistically

significant differences between the intervention and control groups before implementation of the educational program, confirming the baseline comparability of both groups. However, following the implementation of the Moodle-based learning program, students in the intervention group exhibited highly significant improvements across all practical skills compared with those in the control group, and these improvements were largely maintained during the follow-up assessment ($p < 0.001$). Moreover, only a small proportion of students demonstrated satisfactory practical performance before the intervention whereas the vast majority achieved satisfactory practice levels after completing the Moodle-based learning program. These findings support the second research hypothesis, which proposed that students exposed to Moodle-based learning would demonstrate significantly better clinical practice performance regarding the management of the first stage of labor than those receiving traditional teaching methods. Collectively, these findings indicate that the Moodle-based educational intervention had a substantial positive effect on students' clinical performance.

The observed improvement in clinical practice may be attributed to the educational features incorporated within the Moodle platform. Multimedia demonstrations, instructional videos, interactive clinical scenarios, and repeated opportunities for practice enabled students to strengthen procedural knowledge before clinical application. These educational strategies facilitate psychomotor skill development by allowing repeated observation, self-paced review and immediate reinforcement of learning. Furthermore, blended learning environments have been shown to reduce cognitive load, enhance clinical preparedness, strengthen procedural memory and improve clinical reasoning and decision-making abilities. Consequently, Moodle provides an effective learning environment that enhances students' competency in labor assessment, monitoring, and evidence-based nursing interventions during the first stage of labor.

The present findings are supported by **Perle et al. (2025)**, who reported that technology-enhanced educational approaches significantly improve nursing students' clinical competence and readiness for professional practice. Similarly, **Chen et al. (2023)** found that Moodle-supported learning

environments enhance academic achievement, practical performance, and collaborative learning among nursing students.

Developing critical thinking is fundamental to evidence-based nursing practice and contributes substantially to professional competence **(Silitonga et al., 2026).** Regarding students' clinical competence in managing the first stage of labor, the findings of the present study showed no statistically significant differences between the study and control groups before implementation of the educational intervention in any competency domain, including professional and ethical practice, holistic patient-centered care, safety and quality improvement and interprofessional communication and collaboration. Following implementation of the Moodle-based learning program, students in the intervention group demonstrated highly significant improvements across all competency domains compared with those in the control group and these improvements were largely sustained during the follow-up assessment. These findings support the third research hypothesis, which stated that students exposed to Moodle-based learning would achieve significantly higher clinical competence scores than students receiving traditional teaching methods. The sustained improvement observed among the intervention group indicates that Moodle-based learning positively influenced the development of professional nursing competence.

The researchers believe that the effectiveness of Moodle in enhancing students' competence can be attributed to its ability to integrate theoretical knowledge with practical application through interactive and learner-centered educational experiences. Continuous access to learning materials, repeated practice opportunities, multimedia resources, formative assessments, and collaborative learning activities promote comprehensive competency development by strengthening cognitive, psychomotor, communication, and ethical skills. In addition, Moodle encourages active participation, self-directed learning, reflective practice and critical thinking, all of which are essential components of professional nursing competence. These educational advantages contribute to the development of sustainable competencies required for safe and effective maternity nursing practice.

The findings of the present study are consistent with those of **Makieieva et al. (2025)**, who concluded that Moodle enhances the

stability and accessibility of nursing education while supporting the development of professional competencies and facilitating the integration of theoretical and practical learning. Similarly, **Ahmed et al. (2025)** reported that Egyptian midwifery nursing students who received technology-supported training demonstrated significantly greater psychomotor competence than those receiving conventional instruction. Moreover, **Wu (2025)** found that integrating cooperative learning with situational simulation significantly improved nursing students' academic achievement, technical skills, clinical competence, and confidence while simultaneously reducing stress associated with clinical practice.

Regarding students' satisfaction with the Moodle-based learning strategy for the first stage of labor, the findings of the present study revealed that the majority of students in the intervention group expressed high levels of satisfaction with the educational approach. The highest satisfaction ratings were related to the flexibility of accessing learning materials anytime and anywhere, as well as improved preparation for both theoretical examinations and practical sessions. Most participants also agreed that Moodle facilitated academic achievement, enhanced communication of information, and simplified complex maternity nursing concepts. Nevertheless, a small proportion of students reported challenges associated with increased learning workload and the technological skills required to effectively use the platform. Overall, the findings indicate that Moodle-based learning was well accepted by maternity nursing students and was perceived as an effective, flexible, and supportive approach for learning the management of the first stage of labor. These findings support the fourth research hypothesis, which proposed that students exposed to Moodle-based learning would report significantly higher levels of satisfaction with the educational process than those receiving traditional teaching methods.

The researchers attribute the high level of student satisfaction to the learner-centered characteristics of the Moodle platform, which offers flexibility, accessibility and opportunities for self-paced learning. Continuous access to educational resources enables students to review learning materials whenever needed, thereby accommodating individual learning preferences and promoting independent learning. Furthermore, interactive features such as

multimedia presentations, discussion forums, quizzes, and timely feedback increase students' motivation, engagement, and confidence throughout the learning process. These educational advantages are likely to enhance students' perceptions of the learning experience, leading to greater satisfaction and improved educational outcomes. Contemporary evidence also suggests that blended and technology-enhanced learning environments consistently produce higher levels of student satisfaction than traditional classroom-based instruction.

The findings of the present study are consistent with those of **Kusumaningsih et al. (2026)**, who reported that Moodle-based e-learning significantly improved student satisfaction across different educational settings. Similarly, **Natarajan et al. (2025)** found that nursing students who learned through Moodle demonstrated greater confidence and satisfaction than those receiving traditional hands-on instruction. Regarding the relationship among students' knowledge, clinical practice and satisfaction, the present study demonstrated that no statistically significant correlation existed between knowledge and practice before implementation of the educational intervention, indicating that baseline theoretical knowledge alone was insufficient to predict students' practical performance. However, following implementation of the Moodle-based learning program, statistically significant positive correlations were observed among knowledge, clinical practice, and satisfaction ($p < 0.01$). Students with higher knowledge scores demonstrated better practical performance and reported greater satisfaction with the educational experience. Similarly, improved clinical practice was positively associated with higher satisfaction levels. These findings suggest that Moodle-based learning facilitates the integration of cognitive knowledge with psychomotor skill development while simultaneously enhancing students' educational experiences. The researchers believe that the interactive and learner-centered features of Moodle effectively bridge the gap between theoretical learning and clinical application, resulting in comprehensive improvements in knowledge, competence, and learner satisfaction.

Conclusion

Based on the findings of the present study, it can be concluded that implementing a Moodle-based learning strategy significantly improved maternity nursing

students' competence regarding the management of the first stage of labor. Students who participated in the Moodle-based learning program demonstrated significantly higher levels of knowledge, clinical practice, competence, and satisfaction than those who received traditional teaching methods during the post-intervention and follow-up assessments. Furthermore, significant positive correlations were observed among students' knowledge, clinical practice, and satisfaction following the intervention, indicating that improvements in theoretical understanding were accompanied by enhanced clinical performance and greater satisfaction with the learning process. Accordingly, all research hypotheses were supported, and the study aim was successfully achieved.

Recommendations

Based on the findings of the present study, the following recommendations are proposed:

Integrate Moodle-based learning into undergraduate maternity nursing curricula as a complementary educational strategy alongside traditional classroom instruction and clinical training.

-Utilize Moodle to reinforce evidence-based protocols for the management of normal labor before students commence clinical placements.

-Incorporate interactive educational strategies, including case-based learning, virtual simulations, multimedia demonstrations, and clinical scenarios, within Moodle courses to enhance students' critical thinking and clinical competence.

-Implement competency-based electronic assessments through Moodle to evaluate students' clinical readiness and monitor learning outcomes.

-Provide continuous faculty development programs to enhance nurse educators' competencies in online teaching, instructional design, and digital assessment strategies.

Recommendations for Future Research

Future studies are recommended to compare the effectiveness of Moodle-based learning with other innovative educational approaches, such as virtual reality simulation, augmented reality, artificial intelligence-supported learning, and virtual patient simulation. In addition, multicenter studies using larger probability samples from different nursing faculties are recommended to enhance the generalizability of the findings and further evaluate the long-term impact of Moodle-based learning on

nursing students' competence and clinical performance.

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Impact of Pelvic Tilt Exercises on Pelvic Girdle Pain among Primigravida Women

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Abstract

Background: Pelvic girdle pain represents one of the most frequently reported musculoskeletal disorders during pregnancy and is associated with considerable limitations in daily activities and diminished quality of life. Pelvic tilt exercises are considered a beneficial non-pharmacological intervention that promotes spinal alignment and may help alleviate pregnancy-related lumbopelvic discomfort. **Aim**: This study was conducted to evaluate the impact of pelvic tilt exercises in pelvic girdle pain among primigravida women. **Subjects and Method:** A quasi-experimental study design was utilized, involving a purposive sample of 100 pregnant women experiencing Pelvic Girdle Pain. **Setting**: The research was undertaken in the outpatient clinics of Kafr Elsheikh University Hospitals, Kafr Elsheikh Governorate, Egypt. **Tools**: Data collection was carried out using three instruments: A structured interview questionnaire, the Numeric Rating Scale (NRS) for pain measurement, and the Modified Oswestry Disability Index (MODI) for evaluating functional disability. **Results**: After two weeks of intervention, participants who practiced the sitting pelvic tilt exercise exhibited a highly significant reduction in pain intensity and disability scores compared with those in the control group ($P \leq 0.001$). **Conclusion**: The results demonstrated that sitting pelvic tilt exercises effectively alleviate pelvic girdle pain and improve functional status among pregnant women. **Recommendations**: Integrating pelvic tilt exercises into standard antenatal care programs is strongly recommended. Additionally, educational materials, such as brochures explaining the proper performance and benefits of sitting pelvic tilt exercises, should be developed and provided to pregnant women during routine prenatal visits.

***Keywords*:** Pelvic Girdle Pain, Pelvic Tilt Exercise, and Primigravida Women.

Introduction

Pregnancy is accompanied by profound physiological, anatomical, and hormonal adaptations that are essential for fetal growth and maternal preparation for childbirth. Although these changes are necessary for a healthy pregnancy, they frequently give rise to musculoskeletal discomfort, particularly low back pain and pelvic girdle pain, which can impair physical function, restrict daily activities, and negatively affect pregnant women's quality of life (**Baran et al., 2022**).

Pregnancy-related musculoskeletal pain results from complex interactions between hormonal, biomechanical, and postural changes. Increased ligamentous laxity, maternal weight gain, anterior displacement of the center of gravity, and compensatory postural adaptations increase mechanical loading on the lumbar spine and pelvic girdle. These physiological changes predispose pregnant women to the development of low back pain and pelvic girdle pain, two of the most common musculoskeletal complaints during pregnancy (**Tomaszewska et al., 2021; Spears et al., 2020**).

Pelvic girdle pain affects a substantial proportion of pregnant women worldwide, with epidemiological studies reporting that nearly one-half of pregnant women experience low back pain during pregnancy. Despite their high prevalence, these conditions are frequently regarded as inevitable consequences of pregnancy, resulting in delayed recognition and inadequate management. Persistent pain may reduce physical activity, impair functional capacity, and adversely influence maternal health and pregnancy outcomes **(Huang ., 2020; Yuningsih et al., 2022; Bailly et al., 2021).**

The development of pregnancy-related low back and pelvic girdle pain is influenced by several maternal and lifestyle-related factors, including previous back pain, multiparity, obesity, physically demanding work, sedentary behavior, and other individual characteristics. These factors contribute to increased biomechanical stress and reduced lumbopelvic stability, thereby increasing vulnerability to musculoskeletal pain during pregnancy (**Berber & Satılmış, 2020; De Campos et al., 2021**).

Given concerns regarding the use of pharmacological therapies during pregnancy, current evidence recommends conservative, non-pharmacological interventions as the first-line approach for managing pregnancy-related musculoskeletal pain. Such interventions effectively reduce pain, improve physical function, enhance psychological well-being, and support favorable maternal outcomes. Commonly recommended strategies include patient education, therapeutic exercise, physiotherapy, relaxation techniques, and behavioral interventions (**Ninot, 2021**).

Among conservative interventions, pelvic tilt exercises have emerged as a practical, safe, and cost-effective strategy for managing pregnancy-related pelvic girdle pain. Regular practice of these exercises improves pelvic alignment, enhances lumbopelvic stability, strengthens the deep abdominal and pelvic floor muscles, and reduces mechanical stress on the lumbar spine and pelvic structures. Consequently, pelvic tilt exercises have been associated with reduced pain severity, improved functional mobility, and lower levels of disability among pregnant women (**Sharaby & Abd Ellatef, 2019; Zakaria et al., 2019; Bakara, 2021**).

Maternity nurses play a crucial role in implementing conservative pain management strategies through antenatal education and counseling. By providing guidance on safe physical activity, correct posture, body mechanics, and the appropriate performance of pelvic tilt exercises, nurses promote women's adherence to exercise programs and support effective self-management, thereby improving maternal comfort and functional ability throughout pregnancy (**Klankhajhon & Sthien, 2022**).

Although pelvic tilt exercises are widely recommended for pregnancy-related pelvic girdle pain, evidence regarding their effectiveness remains limited in different clinical and cultural settings. Therefore, further investigation is warranted to strengthen the evidence base for their incorporation into routine antenatal care. Accordingly, the present study was conducted to evaluate the effect of pelvic tilt exercises on pelvic girdle pain among primigravida women.

Significance of the study:

Pelvic girdle pain (PGP) is one of the most prevalent musculoskeletal disorders during pregnancy, affecting approximately half of pregnant women worldwide. The condition is associated with pain, reduced physical function, impaired quality of life, and, in severe cases,

may influence women's preferences regarding the mode of childbirth **(Acharya et al., 2019; Vermani, Mittal, & Weeks, 2010; Meucci, 2020).**

In Egypt**,** pregnancy-related back pain remains a common health problem, with previous research reporting a particularly high prevalence among primigravida women (Baran et al., 2022; Aura, Purwitasari, and Adianti, 2022). Despite the growing evidence supporting non-pharmacological interventions, limited research has evaluated the effectiveness of pelvic tilt exercises among primigravida women attending Kafr Elsheikh University Hospital. Therefore, the present study was conducted to assess the effect of pelvic tilt exercises on pelvic girdle pain among Primigravida women, with the aim of generating evidence to support their integration into routine antenatal care and strengthen maternity nursing practice.

Am of the study:

The current study aimed to evaluate impact of pelvic tilt exercises on pelvic girdle pain among primigravida women**.**

Research Hypotheses:

H I: Pregnant women who practice pelvic tilt exercise will experience less intensity of Pelvic Girdle Pain.

H II: Pregnant women who practice pelvic tilt exercise will experience less disability score in performing daily activities compared to those who do not practice.

Subject and Methods:

Research design

A quasi-experimental research design was adopted to evaluate the effect of pelvic tilt exercises on pelvic girdle pain among primigravida women. A quasi-experimental research design is an intervention study that evaluates the effect of a treatment or program by comparing outcomes between an intervention group and a control group without random assignment of participants. This design is widely used in nursing and clinical research when randomization is impractical or ethically challenging. It enables researchers to determine whether changes in the outcome are attributable to the intervention by comparing measurements obtained before and/or after the intervention in both groups. **(Creswell & Creswell, 2023)**.

Study setting:

The present study was conducted at the antenatal outpatient clinics of Kafr Elsheikh University Hospitals, Kafr Elsheikh Governorate, Egypt. Kafr Elsheikh University Hospitals are among the largest tertiary healthcare institutions and serve as referral centers for women from Kafr Elsheikh city and neighboring governorates. The antenatal clinics

provide comprehensive maternal healthcare services, including routine pregnancy follow-up, health assessment, diagnostic investigations, counseling, and health education. A large number of pregnant women attend these clinics daily from diverse socioeconomic and educational backgrounds, making the setting suitable for recruiting an adequate sample size and ensuring representation of the target population. Furthermore, the availability of private counseling areas and educational facilities facilitated the implementation of the intervention sessions and follow-up procedures.

Study subject:

The target population comprised primigravida women attending the antenatal outpatient clinics at Kafr Elsheikh University Hospitals and experiencing pregnancy-related pelvic girdle pain during the third trimester of pregnancy. Primigravida women were selected because they represent a vulnerable group who often experience musculoskeletal discomfort during pregnancy and may have limited knowledge regarding effective self-management strategies for pain relief.

Sampling Technique and Sample Size:

A purposive sampling technique was utilized to recruit eligible participants who met the predetermined inclusion criteria. Women attending the antenatal clinics during the data collection period were screened for eligibility. Those who fulfilled the inclusion criteria and expressed willingness to participate were invited to join the study. Recruitment continued until the required sample size was achieved.

The sample size was determined using Dawson's statistical formula (2004), taking into consideration a confidence level of 95%, statistical power of 80%, and the estimated mean differences reported in previous studies evaluating pelvic tilt exercises among pregnant women with Pelvic Girdle Pain. Based on these calculations and findings reported by **(Marzouk and Fadel 2020**).

The minimum required sample size was estimated to be 100 pregnant women. Accordingly, the participants were equally allocated into two groups: an intervention group consisting of 50 women who received the pelvic tilt exercise program in addition to routine antenatal care and a control group consisting of 50 women who received routine antenatal care only.

$$n = 2\left[\frac{\left(Z_{\alpha/2} + Z_{\beta}\right) * \sigma}{\mu_1 - \mu_2}\right]^2$$

Eligibility Criteria:

Women were considered eligible for participation if they were primigravida, in the third trimester of pregnancy (28–34 weeks of gestation), carrying a singleton fetus, and experiencing pelvic girdle pain during pregnancy. In addition, participants were required to have a normal pregnancy without any diagnosed medical or obstetric complications and a body mass index not exceeding 24.9 kg/m². Women were also required to be able to communicate effectively and willing to comply with the study procedures.

Women were excluded from participation if they had any medical or obstetric condition that could interfere with exercise performance or influence pain perception. Exclusion criteria included high-risk pregnancy, fibromyalgia, rheumatologic diseases, and neurological disorders affecting mobility, previous spinal surgery, vertebral fractures, and chronic low back pain predating pregnancy for more than three months, trauma-related back pain, and current use of analgesic medications or physical therapy interventions. Women with contraindications to exercise during pregnancy were also excluded.

Tools of data collection:

Three main tools were utilized to collect data for the current study.

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Three main tools were utilized to collect data for the current study.

Tool I: Structured Interview Questionnaire

A structured interview questionnaire was developed by the researchers after an extensive review of current and relevant literature related to pregnancy-associated pelvic girdle pain and its influencing factors (**Ather et al., 2020; Rahmawati et al., 2020; Weis et al., 2020**). The questionnaire was designed in a simple and clear format using closed-ended questions to facilitate data collection and ensure consistency of responses. It comprised two main parts.

Part I: Socio-demographic Characteristics: This section was designed to obtain baseline information regarding the participants' personal characteristics. It included four items assessing age, educational level, occupation, and place of residence.

Part II: Characteristics and Associated Factors of Pelvic Girdle Pain: This section consisted of questions related to the nature and characteristics of pelvic girdle pain experienced by the participants. Information was collected regarding pain location, radiation, quality, onset, duration, frequency, time of maximum intensity, aggravating factors, and relieving factors. In

addition, this section assessed lifestyle and occupational factors that may contribute to Pelvic Girdle Pain, including prolonged standing, repetitive bending, frequent stair climbing, and regular lifting of heavy objects.

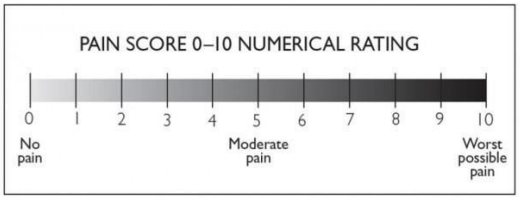
Tool II: Numeric Rating Scale (NRS)

Pain intensity was assessed using the Numeric Rating Scale (NRS), which was adopted from **Jensen and McFarland (1993**). The NRS is one of the most widely used and validated self-report measures for assessing pain intensity in both clinical practice and research settings due to its simplicity, reliability, and ease of administration.

The scale consists of an 11-point continuum ranging from 0 to 10, where **0 indicates no pain** and **10 represents the worst imaginable pain**. Participants were asked to select the number that best reflected the intensity of their pelvic girdle pain at the time of assessment. The NRS provides a subjective measure of pain perception and enables rapid evaluation of treatment outcomes.

For interpretation purposes, pain intensity was categorized as follows: scores of **1–3** indicated mild pain, **4–6** indicated moderate pain, and **7–10** indicated severe pain. Higher scores reflected greater pain intensity.

(Jensen & McFarland, 1993). Increasing the reliability and validity of pain intensity measurement in chronic pain patients. Pain, 55(2), 195-203.



Tool III: Modified Oswestry Disability Index (MODI)

Functional disability resulting from pregnancy-related pelvic girdle pain was assessed using the Modified Oswestry Disability Index (MODI), originally developed by **Fritz and Irrgang (2001)**. The instrument was translated into Arabic by the researchers using forward and backward translation procedures to ensure linguistic equivalence and cultural appropriateness before data collection. The Arabic version was reviewed by experts in maternity nursing and tested during the pilot study.

The MODI is a standardized self-administered instrument designed to evaluate the extent to which pelvic girdle pain interferes with activities of daily living. It consists of ten domains that assess pain intensity, personal care (washing and dressing), lifting, walking, sitting, standing, sleeping, social activities, traveling, employment, and homemaking activities. Each domain contains six response options

describing increasing levels of disability.

Each item is scored on a six-point scale ranging from 0 to 5, where **0** indicates no disability and **5** represents maximum disability. The total score ranges from 0 to 50 and is converted into a percentage by multiplying the obtained score by two. Disability levels were interpreted as follows: **0–20%** indicated minimal disability, **21–40%** moderate disability, **41–60%** severe disability, **61–80%** crippled disability, and **81–100%** bed-bound or complete disability. Higher scores indicated greater functional impairment resulting from Pelvic Girdle Pain.

Operational Design

The operational design consisted of the preparatory phase, validation and reliability testing of the study instruments, pilot study, and fieldwork implementation.

Preparatory Phase

Prior to data collection, an extensive review of contemporary national and international literature was undertaken to establish the theoretical framework of the study and to develop the data collection instruments and educational materials. Relevant scientific articles, textbooks, evidence-based clinical guidelines, and recent peer-reviewed publications addressing pregnancy-related pelvic girdle pain and therapeutic exercise were reviewed.

Before implementing the intervention, the researchers received practical training from physiotherapy specialists regarding the correct performance, teaching techniques, indications, precautions, and contraindications of pelvic tilt exercises to ensure standardized delivery of the intervention throughout the study.

An illustrated educational booklet was specifically designed in simple Arabic language to improve participants' understanding and facilitate home practice. The booklet included information regarding the definition, causes, risk factors, signs and symptoms, preventive measures, and management of pregnancy-related Pelvic Girdle Pain. Detailed instructions regarding sitting pelvic tilt exercises, including their benefits, indications, contraindications, safety precautions, frequency, duration, and correct performance techniques, were also provided. Colored illustrations and sequential photographs were incorporated to simplify exercise instructions and improve participants' adherence. During educational sessions, multiple teaching strategies including interactive lectures, group discussions, demonstrations, re-demonstrations, audiovisual

presentations, and individualized counseling were utilized to maximize learning and skill acquisition.

Ethical Considerations

Ethical approval for conducting the study was obtained from the Research Ethics Committee of the Faculty of Nursing, Kafr Elsheikh University (Approval No.: KFSIRB200-951) Administrative permission was subsequently obtained from the Director of Kafr Elsheikh University Hospitals and the head of the antenatal outpatient clinics before commencing data collection.

Participation in the study was entirely voluntary. Eligible women received verbal and written explanations regarding the purpose, procedures, expected benefits, and potential risks of the study before providing written informed consent. Participants were assured that refusal to participate or withdrawal from the study at any stage would not affect the quality of healthcare services they received. Confidentiality and anonymity were strictly maintained throughout the study by coding all collected data and restricting access to the research team only.

Validity and Reliability

The content validity of all study instruments and educational materials was established through evaluation by a panel of five experts in Obstetric and Gynecological Nursing from the Faculties of Nursing at Kafr Elsheikh University and other Egyptian universities. The experts evaluated each item for relevance, clarity, comprehensiveness, scientific accuracy, wording, and cultural suitability. Recommendations provided by the expert panel were carefully considered, and the necessary modifications were incorporated before the commencement of data collection.

Pilot Study

A pilot study was conducted on 10% of the calculated sample (10 primigravida women) prior to the initiation of the main study. The pilot study aimed to evaluate the feasibility, clarity, readability, and applicability of the study instruments, assess participants' understanding of the educational materials, estimate the average time required for data collection, and identify any logistical or methodological problems that might arise during implementation.

The pilot study demonstrated that all instruments were understandable, culturally appropriate, and feasible for use in the study population. The average time required for completing the assessment was approximately 25–30 minutes. Since no major modifications were required, the pilot participants were excluded

from the final analysis to prevent contamination of the study findings.

The reliability of the standardized instruments had been previously established. The Numeric Rating Scale demonstrated excellent internal consistency with a Cronbach's alpha coefficient of **0.90** (**Jensen & McFarland, 1993**), while the Modified Oswestry Disability Index demonstrated a Cronbach's alpha coefficient of **0.87** (**Fritz & Irrgang, 2001**), confirming their reliability for measuring pain intensity and functional disability among patients with low back pain.

Field Work

The fieldwork was conducted over a period of six months, from the beginning of July 2025 to the end of December 2025, at the antenatal outpatient clinics of Kafr Elsheikh University Hospitals. The researchers attended the study setting three days per week (Saturday, Monday, and Wednesday) from 9:00 a.m. to 2:00 p.m. During each visit, all pregnant women attending the clinic were screened for eligibility according to the predetermined inclusion and exclusion criteria. Eligible women were approached individually while waiting for their routine antenatal consultation.

Initially, the researchers introduced themselves to each participant and established a trusting relationship. The purpose, significance, procedures, expected duration, potential benefits, and voluntary nature of the study were clearly explained. Participants were assured that all collected information would remain confidential and would be used solely for research purposes. Women who agreed to participate signed an informed written consent before enrollment.

After recruitment, baseline assessment (pretest) was performed individually for both the intervention and control groups in a private counseling room to maintain privacy and minimize interruptions. The structured interview questionnaire was completed first, followed by the Numeric Rating Scale (NRS) and the Modified Oswestry Disability Index (MODI). Completion of the baseline assessment required approximately 25–30 minutes for each participant. The obtained data represented the baseline measurements against which post-intervention outcomes were compared.

Intervention Group

Participants assigned to the intervention group were divided into small educational groups consisting of five women to facilitate interaction, discussion, and individualized supervision. According to the total number of participants, twenty subgroups were formed. Each subgroup attended

three structured educational sessions delivered over one week. Each session lasted approximately 30–45 minutes and was conducted in a quiet room within the antenatal clinic equipped with comfortable seating and audiovisual facilities.

The intervention program was designed according to adult learning principles and incorporated interactive teaching methods, including lectures, group discussions, demonstrations, return demonstrations, audiovisual presentations, and individualized counseling. Throughout the sessions, participants were encouraged to ask questions, share their experiences, and discuss any concerns related to pregnancy-associated Pelvic Girdle Pain.

First Session (Theoretical Session)

The first session focused on increasing primigravida women's knowledge regarding pregnancy-related musculoskeletal changes. The researchers explained the anatomical and physiological adaptations occurring during pregnancy, particularly those affecting the lumbar spine, pelvic girdle, abdominal muscles, and pelvic floor muscles. Detailed information was provided regarding the definition of Pelvic Girdle Pain, its prevalence, causes, risk factors, clinical manifestations, aggravating and relieving factors, possible complications, and its impact on physical activity, sleep quality, emotional well-being, and quality of life. Participants also received education regarding proper body mechanics and healthy lifestyle practices that could minimize mechanical stress on the lumbar spine during pregnancy.

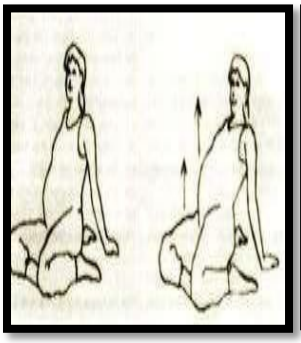
Second Session (Theoretical Session)

During the second session, the researchers introduced pelvic tilt exercises as a conservative, non-pharmacological intervention for pregnancy-related Pelvic Girdle Pain. The physiological mechanism through which pelvic tilt exercises improve lumbar stability and pelvic alignment was explained. Participants were educated about the objectives, benefits, indications, contraindications, and precautions of performing pelvic tilt exercises during pregnancy. The session also covered warning signs that require immediate discontinuation of exercise, including vaginal bleeding, uterine contractions, dizziness, severe abdominal pain, leakage of amniotic fluid, chest pain, severe shortness of breath, or decreased fetal movement. Time was allocated at the end of the session for questions and clarification.

Third Session (Practical Session)

The third session focused entirely on practical training. Initially, the researchers demonstrated the correct performance of the sitting pelvic tilt exercise while providing verbal explanations of each movement. Participants were instructed to sit on a firm chair or the edge of a bed without leaning against the backrest. They were asked to maintain an upright sitting posture with relaxed shoulders, feet resting comfortably on the floor, knees flexed at approximately 90 degrees, and the head maintained in a neutral position while looking straight ahead.

Participants were instructed to gently tilt the pelvis backward by flattening the lumbar curve and slightly lowering the trunk, followed by slowly returning to the neutral position through gentle anterior pelvic tilting without excessive lumbar extension. Controlled breathing was emphasized throughout the exercise, encouraging women to inhale during relaxation and exhale while performing the pelvic tilt exercise. Each movement was performed slowly and smoothly to avoid muscle strain or discomfort.



Pelvic Tilt Exercises

After the demonstration, every participant practiced the exercise individually under direct supervision. The researchers observed each woman's performance carefully and provided immediate feedback to correct posture, movement technique, breathing pattern, and body alignment. Participants repeated the exercise until they demonstrated satisfactory competency. At the end of the practical session, each participant completed a return demonstration to confirm proper understanding and independent performance of the exercise.

To reinforce learning and facilitate home practice, every participant received an illustrated Arabic educational booklet containing detailed written instructions and colored photographs demonstrating each step of the exercise. Participants also watched a short educational video demonstrating the correct exercise technique. The video was replayed whenever clarification was required.

Participants were instructed to perform the sitting pelvic tilt exercise at home **two to three times daily**, completing **ten repetitions during each session**, for **two consecutive weeks**. They were advised to perform the exercises in a comfortable, well-ventilated environment while wearing loose clothing and to discontinue exercise immediately if any warning signs occurred.

To maximize adherence, participants' telephone numbers were obtained after receiving their permission. Follow-up telephone calls were conducted twice weekly throughout the intervention period to monitor compliance, reinforce exercise instructions, answer participants' questions, address any difficulties encountered during home practice, and encourage continued participation. Compliance was further assessed during routine antenatal follow-up visits by asking participants about exercise frequency and reviewing their adherence to the prescribed exercise schedule.

Control Group

Women allocated to the control group received the routine antenatal care provided by Kafr Elsheikh University Hospitals according to the hospital's standard clinical protocol. Routine care included obstetric examination, assessment of maternal and fetal well-being, monitoring of maternal weight and blood pressure, laboratory investigations when indicated, nutritional counseling, iron and folic acid supplementation, health education regarding pregnancy, and scheduling of follow-up appointments.

Participants in the control group did not receive the structured educational sessions, illustrated booklet, exercise demonstration, educational video, or telephone follow-up related to pelvic tilt exercises during the study period. However, to minimize attrition and maintain participant engagement, the researchers maintained regular communication during clinic visits and answered participants' routine health-related questions without providing specific instruction regarding pelvic tilt exercises. Following completion of post-test data collection, women in the control group were provided with the educational booklet and practical demonstration of pelvic tilt exercises to ensure ethical equity.

Evaluation Phase

Outcome evaluation was conducted two weeks after completion of the intervention. Participants in both the intervention and control groups attended the antenatal outpatient clinic for reassessment. Pain intensity was evaluated using the Numeric Rating Scale, and

functional disability was assessed using the Modified Oswestry Disability Index under the same standardized conditions used during baseline assessment.

The researchers who collected the post-intervention data adhered to the same assessment procedures employed during the pretest to minimize measurement bias. The post-intervention findings were compared with baseline measurements to determine the effectiveness of the pelvic tilt exercise program in reducing pelvic girdle pain intensity and improving functional ability among primigravida women.

Statistical Analysis

Data were coded, verified, and entered into IBM Statistical Package for the Social Sciences (SPSS), Version 27. Descriptive statistics, including frequencies, percentages, means, standard deviations, medians, and interquartile ranges, were used to summarize participants' characteristics and study variables. Comparisons between groups were performed using the Chi-square test or Fisher's exact test for categorical variables and the independent samples t-test or Mann–Whitney U test for continuous variables, according to data distribution. Changes over time within and between groups were analyzed using repeated-measures analysis of variance (RM-ANOVA). Cohen's d was calculated to estimate the magnitude of the intervention effect, while partial eta squared (η^2) was used to quantify the proportion of variance explained by the intervention. Multiple linear regression analysis was conducted to identify predictors of pain intensity and disability after controlling for potential confounding variables. Statistical significance was established at a two-tailed p value of <0.05.

Results

Table (1): Presents the socio-demographic characteristics of the studied primigravida women. The findings demonstrated that the intervention and control groups were comparable at baseline. More than half of women in both groups were aged between 21 and <25 years. The majority had attained university-level education, and over half were employed. In addition, more than half of the participants in both groups resided in rural areas. No statistically significant differences were identified between the two groups regarding any of the socio-demographic variables ($p > 0.05$), confirming their baseline homogeneity.

Table (2): Describes the characteristics of pregnancy-related pelvic girdle pain among the studied women. Most

participants in both groups reported pain localized to the lumbar region, with pain commonly radiating to one or both lower extremities. Burning pain was the predominant pain quality reported, while intermittent pain occurring approximately three times per week was the most frequent pain pattern. The majority of women experienced pain onset between 18 and 24 weeks of gestation, and nighttime was the most frequently reported period of greatest pain intensity. Muscular exertion was identified as the principal aggravating factor, whereas complete rest represented the most common relieving factor. None of these pain characteristics differed significantly between the intervention and control groups ($p > 0.05$).

Table (3): Demonstrates the lifestyle activities associated with increased pelvic girdle pain among the participants. Prolonged standing was identified as the most common activity contributing to pain aggravation in both groups, followed by other activities involving repetitive physical effort. No statistically significant differences were observed between the two groups regarding lifestyle factors related to pain ($p > 0.05$).

Figure (1): Clarifies the changes in mean pain scores before and after the intervention. Both groups exhibited similar pain scores at baseline, whereas a marked reduction in pain intensity was observed in the intervention group following two weeks of pelvic tilt exercises compared with the control group. The difference between the two groups after the intervention was highly statistically significant ($p < 0.001$).

Figure (2): Exhibits the distribution of pain severity among participants before and after the intervention. Before implementation of the exercise program, severe pain predominated in both groups. Following the intervention, the proportion of women reporting severe pain markedly decreased in the intervention group, with no participants remaining in the severe pain category, whereas severe pain persisted among a considerable proportion of women in the control group.

Table (4): Compares the Modified Oswestry Disability Index (MODI) domain scores between the intervention and control groups. Prior to the intervention, no statistically significant differences were observed in any disability domain ($p > 0.05$). Following two weeks of pelvic tilt exercises, women in the intervention group exhibited significant improvements across all disability

domains,including pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social activities, travelling, and employment or homemaking, compared with the control group ($p \leq 0.001$).

Figure (3): Elucidates the changes in total Modified Oswestry Disability Index scores before and after the intervention. Baseline disability scores were comparable between the two groups. After two weeks, the intervention group exhibited a pronounced reduction in disability compared with the control group, with the difference reaching a high level of statistical significance ($p < 0.001$).

Figure (4): Depicts the distribution of disability severity among participants before and after the intervention. Before the intervention, severe disability predominated in both groups. Following completion of the exercise program, the proportion of women experiencing severe disability declined markedly in the intervention group, whereas the majority of women in the control group continued to experience severe disability.

Table (5): Presents the correlation between total pain scores and total disability scores in both study groups. A strong positive correlation was observed between pain intensity and disability both before and after the intervention in the intervention and control groups ($p < 0.001$). These findings indicate that increased pain intensity was consistently associated with greater functional disability.

Table (6): Corroborates the results of the linear regression analysis conducted for the control group. Total pain score was identified as a significant predictor of total disability score ($B = 2.953$, $\beta = 0.836$, $p < 0.001$). The regression model explained approximately 71% of the variance in disability scores ($R^2 = 0.71$), indicating that pain intensity was a major determinant of functional disability among women who received routine antenatal care.

Table (7): Validates the linear regression analysis for the intervention group. Total pain score remained a significant predictor of disability following the intervention ($B = 3.420$, $\beta = 0.821$, $p < 0.001$). The regression model accounted for approximately 68% of the variance in disability scores ($R^2 = 0.68$), confirming the strong association between pain reduction and improvement in functional status among women who practiced pelvic tilt exercises.

Table (1): Percentage distribution of the control and study group according to socio-demographic characteristics. (n =100)

Items	Control group n= 50		Study group n=50		X^2	P value
	N	%	N	%		
Age (years)						
Less than 21	5	10.0	5	10.0	306.	.972 mc
21 < 25	27	54.0	29	58.0		
25 < 30	15	30.0	14	28.0		
Above 30	3	6.0	2	4.0		
Education						
Secondary level	19	38.0	16	32.0	396	.529 mc
University level	31	62.0	34	68.0		
Occupation						
House wife	21	42.0	21	42.0	Equal	
worker	29	58.0	29	58.0		
Residence						
Urban	21	42.0	23	46.0	1.44	.317#
Rural	29	58.0	27	54.0		

X^2 is Pearson chi-square test &mc is montercarlo chisqaure test & #= Fisher exact test, $ is independent t test; **P** value is significant <. 05

Table (2): Percentage distribution of the control and study groups regarding to characteristics of low back pain and pelvic girdle pain (before intervention)

Items	Control group n= 50		Study group n=50		X^2	P value
	N	%	N	%		
1- Location of pain (choose all apply)						
Lumbar region	42	84.0	44	88.0	.332	.774#
Thigh	6	12.0	5	10.0	.102	1.000#
Gluteal folds	29	58.0	28	56.0	.041	1.000#
Around sacroiliac joints	22	44.0	23	46.0	.040	1.000#
2- **Radiation of pain**						
Yes	39	78.0	37	74.0	.219	.640#
No	11	22.0	13	26.0		
If radiation yes select site of radiation (choose all apply)						
Abdomen	1	2.6	2	5.4	.404	.525#
One leg	10	25.6	11	29.7	.159	.690#
Both legs	24	61.5	25	67.6	.301	.583#
Buttocks	14	36.8	14	37.8	.008	1.000#
3- Quality of pain						
Burning	20	40.0	25	50.0	5.85	.440mc
Numbness	10	20.0	4	8.0		
Throbbing	0	0	0	0		
Stabbing	6	12.0	3	6.0		
Cramps	14	28.0	18	36.0		
4- **Frequency of pain**						
once/week	2	4.0	2	4.0	1.31	.745mc
twice/week	7	14.0	4	8.0		
3times/week	26	52.0	25	50.0		
Daily	15	30.0	19	38.0		
5- **onset of pain**						
<18- wks of gestation	5	10.0	7	14.0	1.33	.633mc
between 18-24	42	84.0	42	84.0		
>24	3	6.0	1	2.0		

Table (2): (Cont.) Percentage distribution of the control and study groups regarding to characteristics of pelvic girdle pain. (n= 100)

6- Duration						
Intermittent	39	78.0	40	80.0	.060	1.000#
Continuous	11	22.0	10	20.0		
7- Time of worst pain						
Night	31	62.0	30	60.0	.393	.959#
Morning	5	10.0	7	14.0		
Afternoon	2	4.0	2	4.0		
No relationship	12	24.0	11	22.0		
8- **Aggravating factors (more than one answer)**						
Muscular exertion	47	94.0	48	96.0	.211	1.000#
Standing for a long time	31	62.0	32	64.0	.043	1.000#
Lifting heavy objects	16	32.0	14	28.0	.190	.828#
Wearing high-heeled shoes	14	28.0	20	40.0	1.60	.291#
9- Alleviating factors (more than one answer)						
Complete rest	35	70.0	42	84.0	2.77	.153#
Placing hot compresses in the place of pain	20	40.0	11	22.0	3.79	.083#
Avoiding lifting heavy objects	18	36.0	29	50.0	4.85	.045#
Avoiding standing for long periods of time	30	60.0	25	58.0	1.01	.422#
Wear flat shoes and avoid high heel shoes	14	28.0	20	40.0	.404	.525#

X^2 is Pearson chi-square test & ^{mc} is montercarlo chi-square test & $^{\#}$= Fisher exact test; **P** value is significant <. 05

Table (3): Percentage distribution of the control and study groups regarding to their life style activities increasing pelvic girdle pain (n= 100)

Items	Control group n= 50		Study group n=50		X^2	P value
	N	%	N	%		
Life style activities (choose all apply)						
Regular bending	5	10.0	4	8.0	.122	1.000#
Standing long periods	38	76.0	43	86.0	1.62	.308#
Using stairs regularly	16	32.0	18	36.0	.178	.833#
Regular lifting	9	18.0	10	20.0	.056	1.000#

X^2 is Pearson chi-square test & #= Fisher exact test; **P** value is significant <. 05

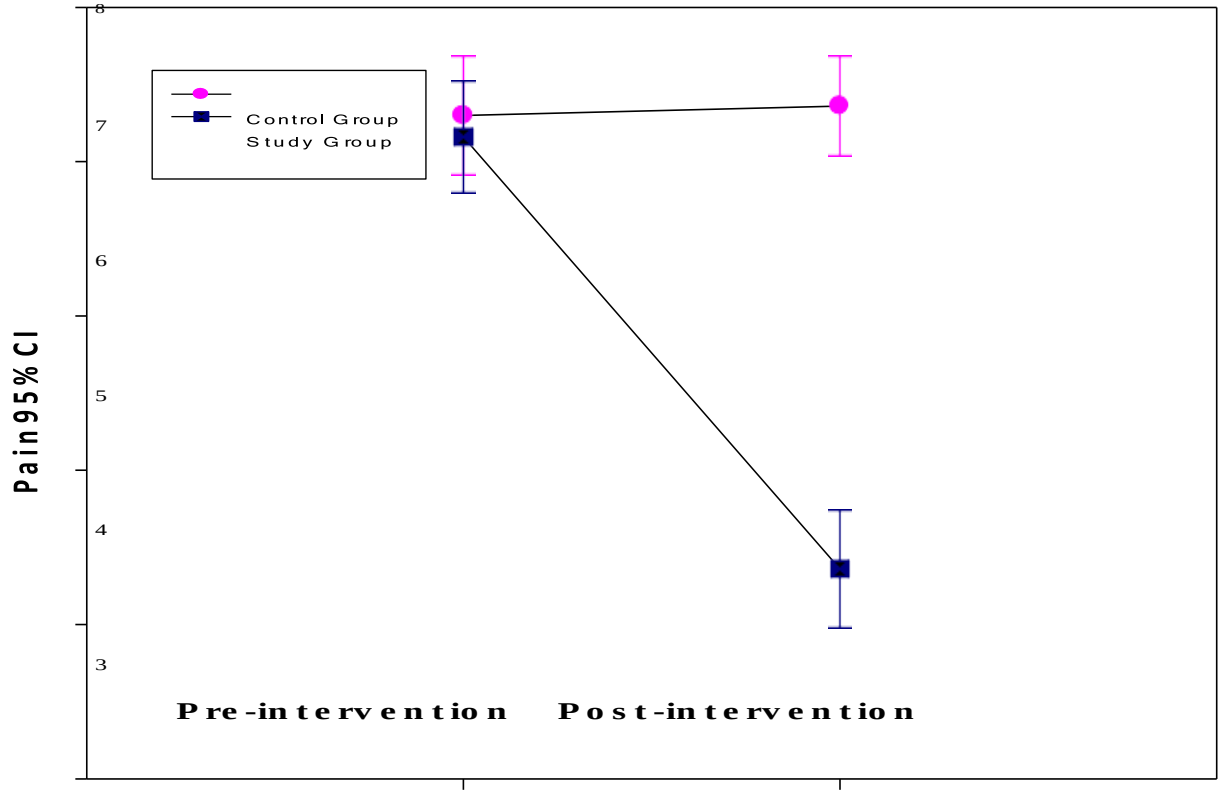


Figure (1): Mean score of total of Pain in the study and control groups before and after 2 weeks of sitting pelvic tilt exercise application (n=100)

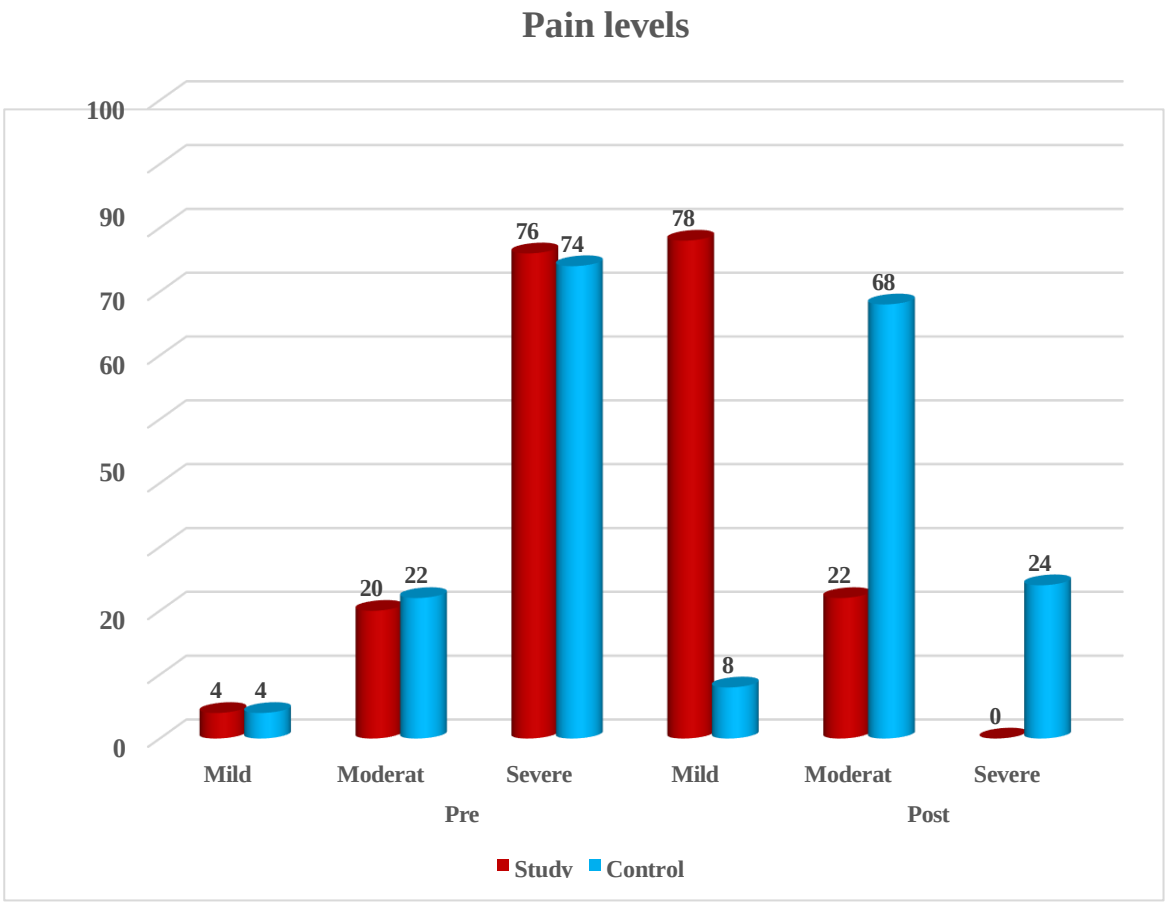


Figure (2): Percentage distribution in the study and control groups according to the Pain severity before and after 2 weeks of sitting pelvic tilt exercise application (n=100)

Table (4): Comparison of mean Modified Oswestry Disability pain score of pregnant women in the control and study groups before and after 2 weeks of sitting pelvic tilt exercise application (n=100)

Outcome / Measure	Control	Study	Sig.[b] &delta
	Mean (SD)	Mean(SD)	
1- Pain Intensity			
Before exercise	3.46(.95)	3.60(.90)	.754(.453),.16
2 weeks after	3.50(.93)	1.92(.95)	9.34(<0.001)& 2.10
Sig.[a], (pvalue) (d2)	1.43 (.159), (.08)	16.04(<.001)&2.27	
2- Personal Care			
Before exercise	1.74(.44)	1.72 (.54)	.203(.239)&.04
2 weeks after	1.80(.40)	.90(.54)	9.39(<.001)&1.65
Sig.[a], (pvalue) (d2)	1.77 (.083), (.25)	12.03 (.569), (1.70)	
3- Lifting			
Before exercise	3.66(.69)	3.68(.68)	.146 (.884)&.03
2 weeks after	3.72(.54)	2.58(.95)	7.39(<0.001)&1.20
Sig.[a], (pvalue) (d2)	1.35 (.182), (.19)	13.40 (.569), (1.90)	
4- **Walking**			
Before exercise	2.44(.50)	2.50(.50)	.556 (.552)&.12
2 weeks after	2.52(.51)	1.96(.20)	7.30(<0.001)&2.83
Sig.[a], (pvalue) (d2)	1.66 (.103), (.24)	7.58 (.569), (1.07)	
5- **Sitting**			
Before exercise	2.32(.47)	2.24(.52)	.808(.421)&.16
2 weeks after	2.40(.50)	1.88(.56)	4.93(<0.001)&.93
Sig.[a], (pvalue) (d2)	1.80 (.086), (.29)	3.53 (.569), (.50)	

Sig.a is paired t test, P value is significant <.05, d is cohens d effect sizee, Sigb is independent t test & delta is Glass delta effect size

Table (4): (cont.) Comparison of mean Modified Oswestry Disability pain score of the studied pregnant women in the study and control groups before and after 2 weeks of sitting pelvic tilt exercise application (n=100)

6- **Standing**			
Before exercise	2.74(.44)	2.72(.54)	.203(.839)&.04
2 weeks after	2.80(.40)	1.84(.55)	9.97(<0.001)&1.75
Sig.[a], (pvalue) (d2)	1.77 (.083), (.25)	18.96 (.569), (2.68)	
7- **Sleeping**			
Before exercise	2.44(.50)	2.46(.58)	.185(.854)&.04
2 weeks after	2.50(.51)	1.76(.43)	7.88(<0.001)&1.72
Sig.[a], (pvalue) (d2)	1.14 (.261), (.16)	9.10 (.569), (1.29)	
8- **Social life**			
Before exercise	1.46(.50)	1.64(.49)	1.08(.07)&.4
2 weeks after	1.54(.50)	1.08(.27)	5.68(<0.001)&1.13
Sig.[a], (pvalue) (d2)	1.43 (.16), (.20)	7.89 (.569), (1.12)	
9- Travelling			
Before exercise	3.14(.86)	3.10(.97)	.218(.828)&.04
2 weeks after	3.10(.84)	1.84(.55)	8.89(<0.001)&2.30
Sig.[a], (pvalue) (d2)	1.77 (.083), (.20)	12.83 (.569), (1.82)	
10- **Employment/Homemaking**			
Before exercise	2.44(.50)	2.56(.58)	1.1(.270)&.2
2 weeks after	2.52(.51)	1.76(.43)	8.09(<0.001)&1.76
Sig.[a], (pvalue) (d2)	1.43 (.159), (.29)	14.00 (.569), (1.98)	

Sig.a is paired t test, P value is significant <.05, d is cohensed effect size, Sigb is independent t test & delta is Glass delta effect size

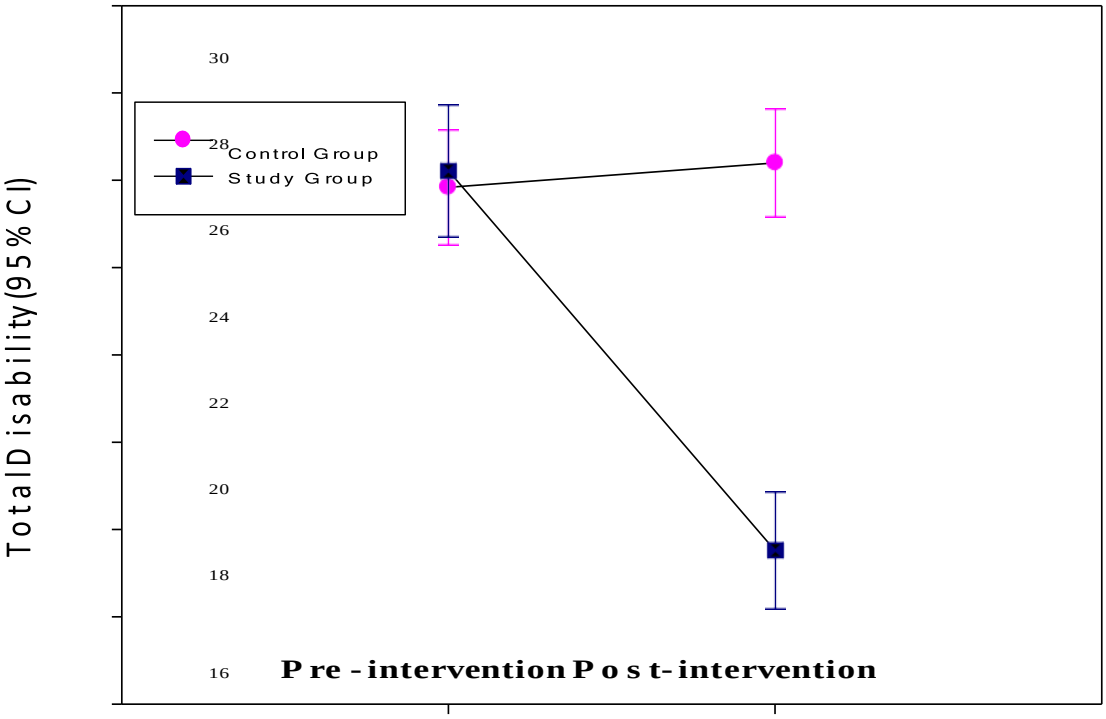


Figure (3): Mean score of total of the Modified Oswestry Disability Pain among pregnant women in both groups before and after 2 weeks' exercise application

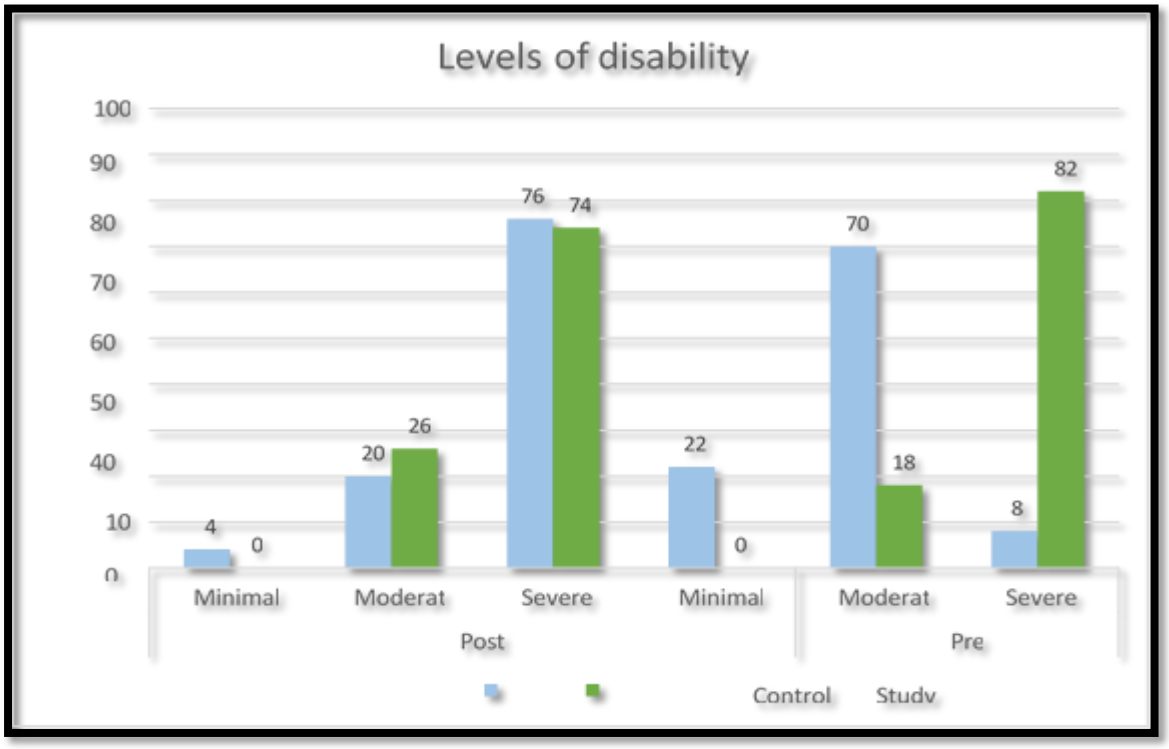


Figure (4): Distribution of the studied pregnant women in the study and control groups according to the Modified Oswestry Disability Pain score before and after 2 weeks of sitting pelvic tilt exercise application (n=100)

Table (5): Correlation between total pain and the total Modified Oswestry Disability score of the study and control groups women before and after 2weeks of sitting pelvic tilt exercise application (n=100)

Items	Timing	Total disability			
		Study (50)		Control (50)	
		r	Sig.	r	Sig.
Total pain	Pre	.836	**<.001**	.821	**<.001**
	Post	.827	**<.001**	.910	**<.001**

r is Pearson correlation test & P is significant <.05

Table (6): Regression analysis between total pain and total disability in control group (n=50)

Dependent factor	Independent Factor	Unstandardized Coefficient		Beta	t	P value	95% CI	
		B	Std.Err					
Total pain	Constant	4.286	2.074		2.066	.044	.116	8.456
	Total disability	2.953	.280	.836	10.56	<0.001	2.390	3.515

t is independent t test & P value is significant (two tailed significance) ≤.05

Table (7): Regression analysis between total pain and total disability in study group (n=50)

Dependent factor	Independent Factor	Unstandardized coefficients		Bet a	t	P value	95% CI	
		B	Std.Er r					
Total pain	Constant	1.731	2.491		.695	.490	- 3.277	6.740
	Total disability	3.420	.343	.821	9.981	<0.001	2.731	4.109

t is independent t test & P value is significant (two tailed significance) ≤.05

Discussion

Pregnancy is associated with profound anatomical, biomechanical, hormonal, and physiological adaptations that predispose women to various musculoskeletal discomforts, particularly Pelvic Girdle Pain. Although often regarded as a normal discomfort of pregnancy, pelvic girdle pain may substantially impair maternal mobility, functional capacity, sleep quality, psychological well-being, work productivity, and overall quality of life. Consequently, identifying simple, safe, inexpensive, and non-pharmacological interventions capable of reducing pain and improving functional status has become an important objective in maternity nursing practice. Sitting pelvic tilt exercise is one such intervention because it strengthens the abdominal and pelvic stabilizing muscles, improves spinal alignment, enhances pelvic mobility, reduces lumbar stress, and promotes postural control throughout pregnancy. **(Baran et al., 2022**). The present study aimed to evaluate the impact of pelvic tilt exercises on pelvic girdle pain among primigravida women.

Characteristics of the studied women

The present study demonstrated that more than half of both the study and control groups were aged 21 to less than 25 years, most had university education, over half were employed, and more than half resided in rural areas. Furthermore, no statistically significant differences were observed between both groups regarding their baseline socio-demographic characteristics, indicating that both groups were homogeneous before implementation of the intervention. Such homogeneity strengthens the internal validity of the study and suggests that the observed post-intervention differences can reasonably be attributed to the pelvic tilt exercises rather than demographic variations.

Characteristics of Pelvic Girdle Pain

The present study demonstrated that most pregnant women experienced lumbar pain with radiation to one or both lower limbs. Burning pain was the predominant pain quality, pain commonly began between 18 and 24 weeks of gestation, occurred intermittently, and was usually aggravated by muscular exertion and prolonged standing while relieved by complete rest.

These findings are consistent with **Mohamed et al. (2020) and**

Tampubolon and Fransysca (2022), who similarly reported lumbar pain as the predominant site, muscular activity as the principal aggravating factor, and rest as the major relieving factor.

These findings can be explained by the physiological adaptations of pregnancy. Progressive uterine enlargement shifts the body's center of gravity anteriorly, leading to exaggerated lumbar lordosis and increased mechanical loading on the lumbar vertebrae. Additionally, hormonal changes, particularly increased secretion of relaxin, progesterone, and estrogen, produce ligamentous laxity and pelvic instability. Simultaneously, weakening of the abdominal muscles and increased body weight further increase stress on the lumbar spine and sacroiliac joints, predisposing pregnant women to persistent Pelvic Girdle Pain. Prolonged standing further increases spinal compression and muscular fatigue, thereby aggravating symptoms.

Effect of sitting pelvic tilt exercise on pain intensity

The principal finding of the present study was that sitting pelvic tilt exercise significantly reduced pelvic girdle pain intensity after only two weeks of intervention. Although baseline pain scores did not differ significantly between groups, women in the intervention group demonstrated a marked reduction in pain intensity compared with the control group following exercise implementation. These findings provide strong evidence supporting the first research hypothesis.

The present findings agree with **Nooman et al. (2023), Kurniyati and Bakara (2021), Wijayani (2022), and Ariendha et al. (2022)**, all of whom demonstrated significant reductions in pain intensity following pelvic tilt or lumbopelvic exercise programs.

The beneficial effect of pelvic tilt exercise may be explained through several physiological mechanisms. Repeated pelvic tilting enhances lumbar flexibility, restores normal spinal alignment, improves pelvic stability, strengthens deep abdominal and gluteal muscles, reduces excessive lumbar lordosis, and decreases mechanical loading on the vertebral joints and surrounding soft tissues. Furthermore, regular exercise improves local blood circulation, reduces muscle spasm, enhances tissue oxygenation, and stimulates endorphin release, collectively contributing to pain relief.

Clinically, the reduction in pain observed after only two weeks'

highlights that pelvic tilt exercise represents an effective, inexpensive, and easily applicable nursing intervention that can be incorporated into routine antenatal education.

Distribution of pain severity

The current study further demonstrated that severe pain was highly prevalent in both groups before intervention. Following two weeks of exercise, no woman in the intervention group continued to experience severe pain, whereas severe pain remained evident among women receiving routine antenatal care.

These findings are supported by **Nengsih et al. (2021) and Nooman et al. (2023),** who similarly observed marked reductions in severe pain following structured pregnancy exercise programs.

The elimination of severe pain among women performing pelvic tilt exercises reflects not only statistical significance but also considerable clinical significance, as reducing pain severity may improve sleep, physical mobility, emotional well-being, occupational functioning, and maternal quality of life.

Effect on functional disability

An equally important finding of the current study was the significant improvement in all dimensions of the Modified Oswestry Disability Index following implementation of sitting pelvic tilt exercises. Significant improvements were observed in pain intensity, personal care, lifting, walking, sitting, standing, sleeping, social life, traveling, and work or homemaking activities. These findings support the second research hypothesis.

Similar findings have been reported by **Marzouk and Fadel (2020), Sureshbabu and Shobana (2022), and Haslia (2022),** all of whom demonstrated that pelvic stabilization exercises significantly reduced disability associated with pregnancy-related low back pain.

Improvement in disability likely resulted from reduced pain intensity, increased spinal flexibility, enhanced muscle strength, improved pelvic stability, and greater confidence in performing daily activities. Consequently, women were better able to accomplish routine household, occupational, and self-care tasks with less discomfort.

From a nursing perspective, these findings emphasize that pelvic tilt exercise should not merely be considered a pain-relieving intervention but rather a comprehensive strategy that improves maternal functional

independence throughout pregnancy.

Relationship between pain and disability

The present study identified strong positive correlations between pain intensity and disability scores before and after intervention in both groups. Moreover, regression analysis demonstrated that pain intensity was a significant predictor of disability, explaining approximately 68–71% of the variability in disability scores.

These findings are consistent with **Abadi et al. (2019) and Lestari (2020)**, who similarly demonstrated significant positive associations between pregnancy-related low back pain and functional disability.

The regression findings provide additional evidence regarding the close relationship between pain and physical functioning during pregnancy. As pain intensity increases, women's ability to perform activities of daily living progressively declines, affecting walking, standing, sleeping, occupational activities, and social participation. Conversely, interventions that successfully reduce pain are likely to produce substantial improvements in functional capacity and overall maternal well-being.

Overall, the findings of the present study provide robust evidence supporting the integration of sitting pelvic tilt exercise into routine antenatal nursing care as an effective, low-cost, safe, and evidence-based intervention for reducing pregnancy-related pelvic girdle pain and improving functional ability among pregnant women. This intervention has the potential to enhance maternal health outcomes while reducing disability and promoting a better quality of life throughout pregnancy.

Conclusion

The findings of the present study demonstrated that sitting pelvic tilt exercise is an effective, safe, and feasible non-pharmacological intervention for managing pregnancy-related Pelvic Girdle Pain. Pregnant women who performed sitting pelvic tilt exercises for two weeks experienced a statistically significant reduction in pain intensity compared with those who received routine antenatal care. Furthermore, significant improvements were observed across all domains of functional disability assessed by the Modified Oswestry Disability Index, including pain intensity, personal care, lifting, walking, sitting,

standing, sleeping, social life, traveling, and work or homemaking activities.

The study also revealed a strong positive relationship between pain intensity and disability, indicating that reductions in pain were associated with meaningful improvements in women's functional performance and daily activities. These findings support the integration of sitting pelvic tilt exercise into routine antenatal care as a simple, low-cost, and evidence-based nursing intervention that can enhance maternal comfort, physical functioning, and quality of life during pregnancy. Accordingly, the study aim was achieved, and both research hypotheses were supported.

Recommendations

Recommendations for Clinical Practice

-Integrate sitting pelvic tilt exercise into routine antenatal care programs as a standard non-pharmacological intervention for preventing and managing pregnancy-related Pelvic Girdle Pain.

-Develop and distribute culturally appropriate educational booklets, brochures, posters, and digital educational materials illustrating the correct performance of sitting pelvic tilt exercises for pregnant women attending antenatal clinics.

Recommendations for Nursing Education

-Integrate evidence-based non-pharmacological pain management strategies, particularly pelvic tilt exercises, into undergraduate and postgraduate maternity nursing curricula.

-Enhance nurses' competencies in assessing pregnancy-related pelvic girdle pain and selecting appropriate exercise interventions based on individual maternal needs.

Recommendations for Research

-Compare pelvic tilt exercises with other conservative interventions, such as prenatal yoga, aquatic exercise, core stabilization exercises, pelvic support belts, and physiotherapy programs.

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