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## Nursing Staff Social Intelligence and its Relation to their Organizational Communication

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### Abstract

**Background:** Nursing staff social intelligence and communication are crucial for providing compassionate, patient-centered care and building strong professional relationships with patients and healthcare teams. **Aim of the study:** To assess nursing staff's perception of social intelligence and organizational communication. **Subjects and Method: Design:** A descriptive correlational design was used. **Subjects:** Nursing staff (n=318) working at Tanta Emergency Hospital affiliated with the Ministry of Higher Education and Scientific Research. **Tools:** Two tools were used: Nursing staff's perception of the social intelligence questionnaire and Nursing staff's organizational communication scale. **Results:** Show that more than half (56.3%) of nursing staff had moderate social intelligence. Also, nearly half (47.2%) of nursing staff demonstrated moderate organizational communication. **Conclusion:** There was a highly significant positive correlation between nursing staff's perceptions of social intelligence and their organizational communication. **Recommendations:** Healthcare facility management should provide educational programs, for nursing staff about social intelligence and organizational communication. Also, modify hospital policies to allow nursing staff to communicate effectively.

**Keywords:** Nursing staff, organizational communication, social intelligence.

## Introduction

The nursing workforce constitutes the largest personnel in the healthcare organization. The rapid changes in nursing staff roles and responsibilities, such as gaining more autonomy in providing healthcare services, mean they face unprecedented administrative and management challenges within the nursing workplace. Many of the most pressing issues of a workforce are complex and formidable, these problems may generally be resistant to change (**Mohamed, 2021**). Applying the concept of social intelligence to the nursing workforce can offer a proactive approach to ameliorate, if not completely avoid, these pressing issues. Clarification of social intelligence concepts in the context of the nursing workplace is the tenet of its successful application in nursing management (**Reddy, 2021**).

Social intelligence is particularly important to the interpersonal aspect of the nursing profession. Nurses constantly interact with patients, families, and colleagues, requiring them to be perceptive to others' needs and emotions (**Gukssa, 2023**). Social intelligence skills help nursing staff to anticipate patient concerns, respond empathetically, and create a supportive environment for both patients and colleagues. In order to improve patient care, these skills create a positive work environment and reduce stress and burnout among healthcare workers (**Katou, Budhwar, & Patel, 2021**). Additionally, one of humanity's virtues is social intelligence, which is

the capacity to comprehend nursing staff's and other professionals' intentions, feelings, and thoughts. It is the unique human ability to manage and navigate interpersonal relationships and interactions within organizations (**Dhelim et al., 2021**). Social intelligence is a complicated concept that includes several elements, such as social information processing, social skills, and social awareness that help nursing staff successfully negotiate difficult interpersonal circumstances. The capacity to comprehend the emotions of others and forecast their actions is known as **social information processing**. It is described as the collection of information and experiences about the group that nursing staff deal with in the workplace, including the patient, the customs and laws that govern the group, their gender, and their religion (**Qusti & Alshaibani, 2021**).

**Social skills** also involve building and maintaining positive relationships, acting properly with different levels in an organization, dealing with problems without demeaning teamwork, as well as negotiating and managing conflict with tact and diplomacy (**Bishop, 2022**). **Social awareness** refers to the nursing staff's ability to collect information important for diagnosing and formulating clients' problems. It encompasses not only the identification of issues and their underlying causes but also the ability to determine the most effective course of action. Social awareness reflects the nursing staff's capacity to comprehend and interpret situations,

understand the social context that influences the behavior of others, and choose the most appropriate strategies to address each situation (**Zhuge, 2020**).

Socially intelligent nurses are better able to convey information, collaborate with team members, and advocate for patient needs, all of which are essential components of organizational communication (**Dhelim et al., 2021**). Organizational communication strikes a balance between constraint and creativity, enabling nursing staff to utilize communication to achieve goals and tasks effectively (**Aunger et al., 2021**). Through assisting nursing staff to comprehend and control the social dynamics that affect communication processes, social intelligence may affect a nursing staff member's capacity for effective communication within an organization.

Additionally, socially intelligent nursing staff members are better at reading nonverbal clues, sympathizing with coworkers, and handling interpersonal conflicts, all of which lead to more successful communication. Improved teamwork, a more unified corporate culture, and eventually improved patient care are the results of this (**Esposito, 2022**). Interactions between healthcare professionals who are pursuing shared objectives within an organization are referred to as organizational communication. It is made up of the exchanges that occur to collaborate on these objectives. Successful organizational operations can be facilitated using efficient

organizational communication techniques and tactics (**Burgener, 2020**). Furthermore, organizational communication is a structured process through which information, ideas, and messages are exchanged within and across different levels and units of health care organizations. It plays a pivotal role in ensuring that all members are aligned with the organization's objectives, fostering collaboration, and enhancing overall efficiency (**Zito et al., 2021**). Organizational communication is essential to obtain healthcare organization goals because it facilitates the flow of ideas, information, and instructions between different organizational levels. It is crucial for increasing productivity, encouraging teamwork, and developing a healthy workplace culture. Notwithstanding its benefits, organizational communication is hampered by issues including cultural disparities and organizational hierarchy. Overcoming these barriers involves intentional efforts to establish open communication cultures and help in developing communication skills (**Lee, et al. 2024**). There are two types of internal organizational communication: vertical (upward downward) and horizontal. **Vertical communication** is a type of work-related communication that flows up and down the organizational hierarchy, involving superiors and subordinates. The information that moves from management to nursing staff is known as downward communication. Conversely, upward communication refers to the information that

managers get from nursing personnel. This can include nursing personnel providing input on workplace issues or reporting to their bosses. Furthermore, interactions between people at the same level within an organization are referred to as **horizontal communication**. This also can include health care professionals from many departments collaborating to deliver health care services at an optimal level (**Misra & Singh, 2021**).

An organization's ability to function depends on its ability to communicate. In structured systems, it includes interactions between nursing staff members who work together to achieve shared goals. This procedure makes it easier for information to flow freely, guaranteeing flexibility in response to changes both inside and outside the organization. While managing healthcare teams, coordinating patient care, and preserving operational effectiveness all depend on effective organizational communication (**Musheke & Phiri, 2021**). As the main point of contact for patients and other healthcare professionals, nursing staff frequently occupy the core of communication networks in hospitals and clinics. Error prevention, service continuity, and interdisciplinary teamwork all depend on clear, succinct, and accurate communication (**Raposo & Terra, 2021**).

### **Significance of study:**

Nursing staff need a unique set of skills, including social intelligence, which enables them to build positive

relationships with others, handle social life issues, and communicate effectively by listening, understanding, and assessing their own and other health care professionals' conduct (**Uygun & Aribas, 2020**). The profession of nursing as a whole, a culture of safety in healthcare settings, and improved patient outcomes can all be achieved by nursing staff through the development of their social intelligence abilities (**Alsughayir, 2021**). Effective communication has a positive effect on a variety of organizational outcomes. Evidence indicates that organizations with successful communication strategies have better nursing staff engagement and job satisfaction (**Zito et al., 2021**). This study aims to provide a clear understanding of nursing staff perspectives regarding their social intelligence to help improve organizational communication.

### **Aim of the study**

Assess the nursing staff's social intelligence and its relation to their organizational communication.

### **Research Questions:**

1. What are the levels of nursing staff opinion regarding social intelligence and their organizational communication?
2. What is the relationship between nursing staff social intelligence and their organizational communication?

### **Subjects and Method**

#### **Design:**

A descriptive correlation study design was used in the present study.

**Setting:**

The study was conducted at all departments of Tanta Emergency Hospital, which is affiliated with the Ministry of Higher Education and Scientific Research in the following department Emergency ICU, Anesthetic ICU, Burn Unit, Orthopedic Operation, Blood Vessel Surgery, Surgical Department, and Internal Medical Department.

**Subjects:**

The subjects of this study included two groups. First, all head nurses (n=40) included at the previously mentioned setting. Second, staff nurses (n=278 nurses), the sample was proportional according to the staff nurses' number in each department.

**Tools:** Two tools were utilized:

**Tool I: Nursing Staff's Social Intelligence Structured Questionnaire**

This tool was developed by **Frankovský and Birknerová (2014); Bennett (2015)** and modified by the researchers based on related literature (Hashem, 2021; EL-Shaer1, & Gaber, 2020) to assess nursing staff opinion regarding social intelligences. It contains two parts as follows:

**Part one:** Personal data of nursing staff involving age, department, marital status, qualification, years of experience, and position.

**Part two: Nursing Staff Social Intelligence Structured Questionnaire.** It included 22 items divided into three dimensions:

- Social information processing included 7 items.
- Social skills included 7 items.

- Social awareness included 8 items.

**Scoring system:**

Nursing staff responses were measured on a five-point Likert Scale ranging from: 5 to 1 as always = 5, sometimes = 4, often = 3, rarely = 2, and never = 1. The total score is calculated by summing all categories. The total scores represent varying levels according to cut-off points as follows:

- High level of nursing staff social intelligences >75%.
- Moderate level of nursing staff social intelligences 60% -75%.
- Low level of nursing staff social intelligences < 60%.

**Tool II: Nursing Staff Organizational Communication Questionnaire:**

This tool was developed by researchers and guided by **Rozilah et al. (2013); Bakar and Mustafa (2013)** to assess nursing staff's view regarding organizational communication. It included 49 items divided into two dimensions:

- Vertical (up and down) communication included 28 items.
- Horizontal communication included 21 items from.

**Scoring system:**

Nursing staff responses were measured on a five points Likert Scale ranging from: (5-1) where, strongly agree (5), agree (4), neutral (3), disagree (2) and strongly disagree (1). The total scores were calculated by summing all categories. The total scores represent varying levels according to cut-off points as follows:

- High level of nursing staff organizational communication >75%.
- Moderate level of nursing staff organizational communication 60% - 75%.
- Low level of nursing staff organizational communication < 60%.

## Method

1. An official permission to conduct the study was obtained from the Dean of the Faculty of Nursing at Tanta University to the Administrator of Tanta Emergency Hospital.

### 2. Ethical considerations:

- Consent of the ethical committee of the Faculty of Nursing was obtained (No. 65-5-2022).
- The nature of the study didn't cause any harm or pain to the nursing staff.
- Nursing staff consent to participate in the study was obtained after an explanation about privacy and the confidentiality of information obtained from them, the nature of the study and their right to withdraw from the study at any time.
- Confidentiality and privacy were taken into consideration regarding data collection. A code number is used instead of names.

3. Tools I and II were translated into Arabic and reviewed with the supervisors and submitted to five experts in the area of specialty to check their content validity and clarity of questionnaire.

4. The five experts were from the Faculty of Nursing at Tanta

University; five experts were 5 assistant professors from nursing administration. The experts' responses were represented in four-point Likert scale ranging from (1-4); 1 = not relevant, 2 = little relevant, 3 = relevant and 4 = strongly relevant.

5. Necessary modification was done including clarification and omission of certain items and adding others and for simplifying work-related words. The face validity value of tool (I), part (II), nursing staff's perception of social intelligence skills were 71.3%, and tool (II) nursing staff' organizational communication skills were 72.1%.

6. Reliability of tools was tested using the Cronbach Alpha Coefficient test. Reliability of tool (I) nursing staff's perception of social intelligence skills = 0.813, and reliability of tool (II) nursing staff' organizational communication skills = 0.881.

7. A pilot study was carried out on a sample (10%) of nursing staff (n= 32) nurses were excluded from the main study sample during the actual collection of data. The pilot study was done to test clarity, sequence of items, applicability, and relevance of the questions and to determine the time needed to complete the questionnaire.

8. Data collection phase: the data were collected from nursing staff by the researcher. The researcher met the respondents' nursing staff in different areas under study during working hours to distribute the questionnaire. The subjects



recorded the answer in the presence of the researcher to ascertain that all questions were answered. The data was collected over six months from 1/9/2022 until 28/2/2023.

9. The estimated time needed to complete the questionnaire items from nursing staff was (20 -30) minutes.

### **Statistical analysis of the data:**

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percentage. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean, standard deviation and median. Significance of the results obtained was judged at the 5% level. The tests used were:

- Mann Whitney test for abnormally distributed quantitative variables, to compare between two categories studied.
- Kruskal Wallis test used abnormally distributed quantitative variables, to compare between more than two categories studied.
- Spearman coefficient correlates between two distributed abnormally quantitative variables.
- Reliability Statistics were assessed using Cronbach's Alpha test.

### **Results**

**Table (1):** Illustrates nursing staff regarding personal characteristics. It reveals that more than half (53.1%)

of nursing staff ranged in age from 20 to 35 years and majority of them (87.4%) were staff nurses. In addition, nursing staff were distributed across different departments, each department had representation ranging from 14.2% to 14.5%. Regarding years of experience, almost three fifths (59.4%) of them had between 5 to 10 years of experience. According to their marital status, majority of them (87.4%) were married. Concerning qualifications, slightly more than half of nursing staff (50.3%) hold a Bachelor of Nursing.

**Table (2):** Declares nursing staff opinions mean and levels regarding social intelligence. It shows that more than half (56.3%) of nursing staff had moderate social intelligence, more than one quarter (28.0%) of nursing staff had low social intelligence, while less than one fifth (15.7%) of them had high level. Furthermore, nursing staff social intelligence mean was  $79.97 \pm 9.29$ , and the average score was  $3.64 \pm 0.42$ .

**Table (3):** Represents nursing staff opinion levels regarding social intelligence dimensions. It clarifies that about two thirds (65.7%) of nursing staff had low level of social awareness dimension. In addition, more than half (53.1%) of nursing staff had moderate level of social information processing and social skills dimensions. While about one third (31.4%) of nursing staff had high level of social information processing dimension.

**Table (4):** Indicates the nursing staff opinion means and levels regarding organizational communication

dimensions. It reveals that nearly half (47.2%) of nursing staff demonstrated moderate communication. A little over one-third (31.1%) of nursing staff had low organizational communication, while less than one quarter (21.7%) of nursing staff exhibited high organizational communication. Furthermore, nursing staff organizational communication had an overall mean  $179.0 \pm 18.64$ , with the average score was  $3.65 \pm 0.38$ .

**Table (5):** Indicates nursing staff opinion levels regarding organizational communication dimensions. It represents that more than half (53.1%) of nursing staff had moderate horizontal communication.

Furthermore, less than half (43.7%) of nursing staff had low vertical (up and down) communication. While more than one third (37.7%) of nursing staff had moderate vertical (up and down) communication. In addition, more than one third (34.3) of nursing staff had high horizontal communication.

**Figure (1):** Show correlation between total nursing staff social intelligence and organizational communication. It reveals that there is significant positive correlation between all nursing staff opinions regarding social intelligence and their opinion about organizational communication at ( $P < 0.001$ ), ( $r=0.420$ ).

**Table (1): Nursing staff regarding their personal characteristics (n=318)**

Personal characteristics	Nursing staff	
	No	%
<b>Age</b>		
20-35	169	53.1
35-45	119	37.4
45+	30	9.4
<b>Position</b>		
Head nurse	40	12.6
Staff nurse	278	87.4
<b>Departments</b>		
Anesthetic ICU	46	14.5
Burn	46	14.5
Orthopedic operation	45	14.2
Internal medical	45	14.2
Blood vessels surgery	45	14.2
Surgical	45	14.2
<b>Years of experience</b>		
5-<10	189	59.4
10-<20	99	31.1
20-30+	30	9.4
<b>Marital status</b>		
Married	278	87.4
Unmarried	40	12.6
<b>Qualification</b>		
Nursing Diploma	40	12.6
Technical Nursing Institute Diploma	79	24.8
Bachelor of Nursing	160	50.3
Post Graduate Studies	39	12.3

**Table (2): The nursing staff opinions mean and levels regarding social intelligence (n= 318)**

Nursing staff social intelligence	No	%
High	50	15.7
Moderate	179	56.3
Low	89	28.0
<b>Total score (22 –110)</b>		
Min. – Max.	61.0 – 99.0	
Mean $\pm$ SD.	79.97 $\pm$ 9.29	
Median	80.0	
<b>Average score (1 – 5) (Mean <math>\pm</math> SD.)</b>	<b>3.64 <math>\pm</math> 0.42</b>	

**Table (3): Nursing staff opinion levels regarding social intelligence dimensions (n = 318)**

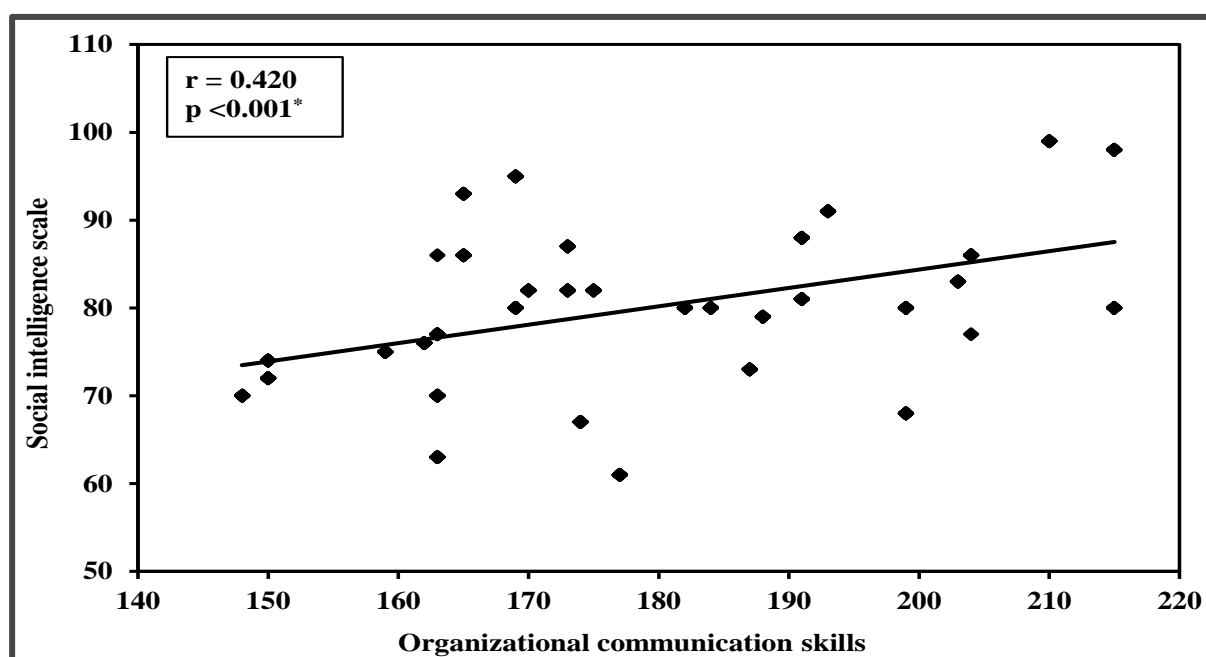
Social intelligence dimension	Nursing staff social intelligence					
	High		Moderate		Low	
	No.	%	No.	%	No.	%
Social information processing	100	31.4	169	53.1	49	15.4
Social Skills	90	28.3	169	53.1	59	18.6
Social awareness	49	15.4	60	18.9	209	65.7

**Table (4): The nursing staff opinion means and levels regarding organizational communication (n=318)**

Nursing Staff Organizational Communication	No	%
High	69	21.7
Moderate	150	47.2
Low	99	31.1
<b>Total score (49 – 245)</b>		
Min. – Max.	148.0 – 215.0	
Mean $\pm$ SD.	179.0 $\pm$ 18.64	
Median	174.50	
<b>Average score (1 – 5) (Mean <math>\pm</math> SD.)</b>	<b>3.65 <math>\pm</math> 0.38</b>	

**Table (5): Nursing staff opinion levels regarding organizational communication dimensions (n = 318)**

Nursing staff organizational communication dimensions	High		Moderate		Low	
	No.	%	No.	%	No.	%
Vertical (up and down) Communication	59	18.6	120	37.7	139	43.7
Horizontal communication	109	34.3	169	53.1	40	12.6

**Figure (1): Correlation between total nursing staff social intelligence and their organizational communication (n = 318)**

### Discussion

Nurses' ability to navigate interpersonal relationships and organizational structures is critical in the dynamic and emotionally demanding healthcare field. Nurses' social intelligence has emerged as the most important competency for nursing professionals (Tiryaki et al., 2025). Hence, organizational communication is equally vital for effective nursing practice. Effective communication advances

collaboration, ensures patient safety, and enhances job satisfaction (Atalla et al., 2024).

The current study revealed that over half of the nursing staff exhibited moderate social intelligence, while the minority displayed a high level of social intelligence. This result may be due to a confluence of elements inherent to the nursing profession, such as nurse exposure to high-stress environments, time limits, emotionally taxing situations, and

insufficient formal nurse training in social intelligence abilities. Likewise, a study conducted by **Tonguç and Karakaş (2025)** reported an average social intelligence score suggesting a predominantly. Also, **Bai et al. (2024); Hassan et al. (2022)** addressed that the average social intelligence indicates moderate social intelligence levels among nursing populations.

On the other hand, **Monis et al. (2024)** found that most nurses scored a low range of social intelligence. Also, **PP and Babu (2021); Özdemir and Adıgüzel (2021)**, observed that the highest percentage of nurses were equipped with good levels of social intelligence.

The current study result indicated that the social information processing aspect of nursing staff social intelligence showed the highest mean score. While nursing staff manifest the lowest mean score in the area of social awareness. This result may be due to nursing staff being taught and expected to swiftly understand an act on patient information, thereby enhancing their capacity to process social cues and respond appropriately.

A study conducted by **Nwodo et al. (2025)** highlighted that social information processing was a highly valued factor, particularly because it cultivates a sense of purpose and motivation among staff. Similarly, **Yanik et al. (2022)** affirmed that social information processing was the most pronounced component of social intelligence among health care workers. On the contrary, a study conducted by **Akbarian and**

**Mazraehshadi (2022)** stated that social awareness was comparably the highest. Conversely, a study conducted by **Mohamed (2021)** noticed that the social skills subscale of social intelligence had the lowest mean score.

According to the current study, the majority of nursing staff had a low level of social awareness. As evidence, most of the nursing staff sometimes understand the choices made by their colleagues. This could be caused by the nursing staff's unsustainable work environment and limited possibilities for personal development. Likewise, the current study consistent with **Nwachukwu (2024)**, reported that nurses' social awareness skills were low, and this did not significantly influence their job performance, suggesting many nurses struggled to accurately perceive patients' emotions and social cues. In the opposite line, **Tiryaki et al. (2025)** found that most nurses indicated moderate to high social awareness abilities.

Pertaining to the nursing staff's opinions on levels of organizational communication, the present study revealed that a large number of nursing staff had low organizational communication. This may be due to heavy nursing workloads and staffing shortages that limit opportunities for clear interaction among nurses. Furthermore, this result may also reflect a hierarchical management style that discourages open dialogue, or poorly maintained digital platforms can hinder timely information sharing.

In the same line, **Hossny et al. (2023)** reported that more than half of nurses demonstrated high levels of organizational silence, effectively indicating low communication, while only about one quarter of them were at the moderate level. As well, the present study result disagreed with those of **Pan and Lin (2022)**, who noticed high organizational communication among most nurses.

On the other hand, **Ha et al. (2025)** found that most nurses clustered around moderate-to-average organizational communication levels. Also, the current result was incongruent with **Alosaimi (2022)**, who reported a moderate level of communication between nursing managers and staff nurses.

As regards nursing staff opinions related to organizational communication dimensions, it was displayed that nursing staff vertical communication had the highest total mean, while nursing staff horizontal communication had a lower mean. This may be attributed to the hierarchical structure, which is commonly found in healthcare organizations, where communication tends to flow more effectively from top to bottom rather than laterally among peers.

In this concern, **Schmelzer et al. (2025)** revealed that effective horizontal communication is crucial for teamwork and patient care continuity. The study highlighted that reliance on explicit communication among temporary staff could hinder the development of implicit understanding, which is vital for efficient team functioning. On the

other hand, **Darcho et al. (2024)** found in a study that healthcare providers' communication skills were significantly influenced by their working units, which involve more vertical communication.

Consistently, **Yazew et al. (2021)** indicated that vertical communication significantly predicts organizational identification among hospital nurses and suggested that effective top-down communication enhances staff alignment with organizational goals. Conversely, **Noviyanti et al. (2021)** stated that higher communication satisfaction, which includes horizontal communication, was associated with better patient safety outcomes.

Additionally, the current study demonstrated that the majority of nursing staff possessed a moderate level of horizontal communication, as evidenced by their opinions regarding organizational communication. Also, most of the nursing staff strongly agreed that they listen carefully to their colleagues while they are talking, and they give their colleagues enough opportunity to speak. This may be due to their high awareness about the importance of effective communication during nursing endorsement and other collaborative activity between different departments within the health care organization.

Likewise, the present study result was supported by **Mohammed and Adea (2022)**, who reported that the overall mean for nurses' interpersonal communication was moderate, they concluded that

horizontal interactions tended to cluster in the moderate range.

The present study results revealed that there was a significant positive correlation between nursing staff's opinion regarding social intelligence and their organizational communication. Nurses with higher social intelligence are more adept at perceiving, understanding, and managing interpersonal interactions, which is an essential component of effective organizational communication.

This result coincided with a study conducted by **Mahdy et al. (2021)**, who found that there was a strong positive association between organizational intelligence and nurses' soft skills, including communication and emotional intelligence. Also, this result was in harmony with a study conducted by **Tegegne and Wondimu (2024)**, which found a significant, moderate-to-strong positive correlation between emotional social intelligence and nurses' ratings of organizational communication quality.

### **Conclusion**

Based on the findings of the current study, it can be concluded that more than half of nursing staff at Tanta Emergency Hospitals had a moderate level of social intelligence while less than one fifth of them had a high level. As well, nearly half of nursing staff had a moderate level of organizational communication while a little over one third had a low level. There was a highly statistically significant positive correlation between nursing staff social

intelligence and their organizational communication.

### **Recommendations**

Based on the results obtained from the present study, the following are recommended:

#### **For the health care facility's management**

- Provide educational programs and workshops for nursing staff to update their knowledge and practice about social intelligence and organizational communication.
- Conduct regular assessments of organizational communication effectiveness to explore challenges and obstacles of vertical and horizontal communication.

#### **For nurse managers:**

- Ensure that everyone from the nursing staff is treated as equals.
- Provide a cooperative work environment to improve belongingness and connectivity.

#### **For nursing staff:**

- Attend seminars and workshop programs to be up to date regarding social intelligence and organizational communication.
- Maintain comprehensive awareness about organizational communication channels.

#### **For future research**

- Confirm the current study findings in different health care settings.
- Assess nursing students' social intelligence level.

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## Knowledge and Attitude of Secondary School Students Regarding Bullying

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### Abstract

**Background:** Bullying is a common issue in secondary schools, involving repeated harmful behaviors such as physical aggression, verbal abuse, or social exclusion. It can negatively effect on students' mental health, academic performance, and overall well-being. **Aim of study:** assessing the knowledge and attitude of secondary school student's regarding bullying. **Research design:** A cross-sectional descriptive design. **Sample:** convenience sample for all students at male school and female school at fayoum governorate. **Tool:** Self-Administered Questionnaire consisted of three parts. **Part I:** socio-demographic Questionnaire. **Part II:** student`s knowledge self-administered questionnaire. **Part III:** student attitude self-administered questionnaire form, divided into three parts. **Part (A)** to assess the attitude of bully **Part (B)** to assess the attitude of victim. **Part (C)** to assess the attitude of witness. **Results:** More than half of the students (54.0%) have average level of knowledge, while more than third of them (35.5%) exhibited good knowledge. However, (10.5%) of them had poor level of knowledge. The majority of students (80.5%) displayed appropriate attitudes toward bullying as a bully, while less than three quadrants (73.5%) of them as a victim and 39.5% as a witness exhibited risk-prone attitudes. **Conclusion:** The secondary school students demonstrated moderate to good levels of knowledge about bullying. Most of the students showed appropriate attitudes as bullies. However, victims and witnesses did not. **Recommendations:** Implement Comprehensive Anti-Bullying Programs that clearly define bullying, its types.

**Keywords:** knowledge, attitude, Secondary School Students, Bully.

## Introduction

Bullying is a repeated aggressive behaviour, where one person or a group of people, intentionally harms, intimidates or controls another person who is perceived as weaker or unable to defend themselves. It can take many forms, including physical attacks, verbal insults, social exclusion or harassment through digital platforms. What makes bullying different from a simple disagreement or conflict is the imbalance of power, whether that power comes from physical strength, popularity or access to embarrassing information (**Bucur, 2022**).

There are several types of bullying that secondary school students may face. Physical bullying involves hurting someone's body or possessions, such as hitting, pushing, tripping or damaging personal belongings. Verbal bullying includes name-calling, teasing, threats or offensive comments meant to humiliate the victim. Both of these types are more visible, making them easier to notice by teachers or peers (**Markkanen et al., 2021**).

School nurses play an important role in identifying and addressing bullying. They are often the first to see physical signs of abuse, such as unexplained injuries or emotional signs like anxiety and frequent visits to the health office. Because they interact with students in a confidential setting, nurses can be a trusted adult for victims to confide in (**Celdrán-Navarro et al., 2023**).

### Significance of the study:

Bullying remains a widespread issue among adolescents, with serious

implications for mental health, academic performance and overall well-being. According to the National Center for Education Statistics **NCES (2022)**, approximately 19.2% of students report being bullied at school, with middle school students experiencing higher rates (26.1%) than high school students (14.6%). These figures highlight which reflects one of two possibilities: a lack of reporting of bullying cases or high students perceiving to the bullying which create the need to extrapolate what they know about it, how they define it and how they respond to it (**National Center for Education Statistics. 2024**).

Students' attitudes toward bullying are equally critical, as they influence whether individuals intervene, ignore or perpetuate harmful behaviours. Alarming, 41.3% of bullied students believe the bullying will happen again and only 44.2% report incidents to a trusted adult, suggesting a lack of confidence in support systems. Understanding students' attitudes can help schools foster a culture of empathy, accountability and peer support. This study is significant because it provides data-driven insights that can inform anti-bullying policies, awareness campaigns and educational programs-ultimately aiming to reduce bullying prevalence and its long-term psychological effects (**National Center for Education Statistics, 2022**).

### Aim of the Study:

The overall goal of the study is to assess the knowledge and attitude of

secondary school student`s regarding the bullying.

**It will be achieved through:**

- Assess the knowledge of the students.
- Assess the attitude of the students.

**Research questions:**

1. What is the knowledge of the secondary school student`s regarding the bullying?
2. What is the attitude of the secondary school student`s regarding the bullying?

**Subjects and Method:**

**I. Technical Design:**

Includes research design, setting of the study, subjects of the study and tools for data collection.

**A. Research design:**

A descriptive cross-sectional research design will be utilized in this study.

**Setting:**

There are seven secondary technical nursing schools at fayoum governorate two of them are male schools and five for female. The total number of students around 900 students. The current study was conducted at two schools; the study program is divided into three levels inside the school. Then the student has to complete the fourth and fifth level at fayoum technical institute for nurses. the first part of the sample was collected from the Secondary Technical School of female nurses which is containing of 112 female student which is located inside Sinnuris Central Hospital at Sinnuris town and the second part of the sample were collected from the Secondary Technical School of male nurses which is containing of 100 male student and located inside

Matertaris health unite at Matertaris Village.

**Sample Size:**

The sample consisted of 200 students, from both genders.

**Sample type:**

Convenience sample including all (male - female) available in both school from Fayoum governorates

**Tools of Data Collection:**

Data will be collected though **self-administered questionnaire** was adopted by the researcher from **Olweus, (1994)** and **González et al. (2021)** then translated into Arabic language to suit the students' language. Divided into three parts by the following tools:

**Part (I): Socio-Demographic Questionnaire Form** consisted of 10 items such as personal characteristics; it included ten items as the students' age, gender, school grade, father education, father job & mother education and mother job, etc.

**Part (II): Student's Knowledge Self-administered Questionnaire Form.** It consisted of questions (16 items) related to knowledge of the students regarding bullying, as do you know what is bullying, in which grade bullying most common, Bullying involves a power imbalance where the bully wants to be the stronger one, the frequency of seeing bullying at school & most places of bullying in the school, etc. the student should choose agree 2 point, sometimes 1 point agree or disagree 0 point.

**Scoring system:**

**Key Items**

- **Good knowledge (85%- 100 %):**

- **Average knowledge** (75% - 84.9%)

- **Poor knowledge** (less than 75%)

**Part III: Student Attitude Self-Administered Questionnaire Form;** include (36) items divided into three parts. **Part (A)** to assess the attitude of bully including of (13) item such as, It's okay to push another student out of the way as a joke, It's okay to bother someone if other students are doing it too, etc. **Part (B)** to assess the attitude of victim including of (14) item such as Mocking others is generally an inappropriate behavior, you wouldn't inform your parents if you were bullied at school, etc. and **Part (C)** to assess the attitude of witness including (9) item such: as I have seen a classmate being bullied at school multiple time, if you see a student bullying a classmate, you would advise the bully to stop, etc. The student should choose Agree 2 points, sometimes agree 1 point, or disagree 0 point.

#### **Scoring system Part III:**

**Part (A)** Students' attitude regarding **Bullying: (bully)**

##### **Key Items**

- **Appropriate** (85%-100 %).
- **Ambiguous** (70%- 84.9%).
- **Risk indicated** (less than 70%).

**Part (B)** Students' attitude regarding **Bullying: (victim)**

##### **Key Items**

- **Appropriate** (85%-100 %)
- **Ambiguous** (70%- 84.9%)
- **Risk indicated** (less than 70%)

**Part (C)** Students' attitude regarding **Bullying: (Witness)**

##### **Key Items**

- **Appropriate** (85%-100 %)
- **Ambiguous** (70%- 84.9%)

- **Risk indicated** (less than 70%)

#### **B. Operational Design:**

Includes preparatory phase, content validity, pilot study and field work.

##### **a) The preparatory phase:**

This phase starts prior to the development of the **self-administered structured questionnaire** by reviewing up-to-date literature from national and international resources (books, magazines, the internet, and research) related to the study. For data collection and to get acquainted with the various aspects of the research problem.

##### **b) Content validity:**

Revision of the tools was done by a panel of experts composed of (three professors) two professors of Community Health Nursing and one professor of psychiatric Health Nursing to measure the content validity of the tools and the necessary modifications were done accordingly.

##### **c) Pilot study:**

It was carried out on 10% (10) of older adults under the study to test the applicability, clarity, and efficiency of the tools. There were no modifications found after the pilot study. The pilot showed high levels of reliability. Alpha Cronbach Reliability Analysis of the Used Tool.

##### **Field work:**

The fieldwork of this study was executed over one month, the first and second week was at female school the study processed over five days and the third and fourth week was at male school the study processed over five days, all the data

was collected from the study subjects.

The investigator started by introducing himself to the students; the aim of the study and the components of the tools were explained to the students of every level inside the class at the beginning of data collection, and they were assured that the information collected would be treated confidentially and that it would be used only for the purpose of the study.

The investigator was available during the study day (8 a.m. – 2 p.m.).

To complete the questionnaire sheet, at first week the investigator visited the school and arranged with the administration and arranged the paper needed for the permission then during the second week the investigator collected all available students at first level at together at day one then students at second level was collected at day two then last day was for the third level. One questioner sheet provided to each student and give them 30 minutes to complete the sheet.

#### **C. Administrative Design:**

An oral permission for data collection was obtained from school managers and also from the hospital manger. Meetings and discussions were held between the researcher and the school manager personnel to make them aware of the aims and objectives of the research, as well as to get cooperation during the phases of the research.

#### **Ethical considerations:**

Prior the pilot study, Ethical approval was obtained from the Central Agency for Public Mobilization & Statistics then ethical approval obtained from Fayoum University Supreme Ethical Committee

for Scientific Research Ethics. Students. Oral approval was acquired after a full explanation of the aim of the study and its procedure. Students were given the opportunity to refuse participation and were informed that they could withdraw at any time during data collection. They were also assured that any information obtained would be confidential and used for research purposes only. The investigator assured the public that all collected data was kept anonymous and confidential.

#### **D. Statistical Design:**

The data was collected, coded and entered to a personal computer. It was analyzed with the program statistical package for social science (SPSS) version 20. The collected data were organized, revised, analysed and presented in numbers and percentage in tables, figures. Proper and suitable statistical tests were used to test the significance of results obtained.

The hypothesis that the row and column variables are independent, without indicating strength or direction of the relationship. Pearson chi-square and likelihood-ratio chi-square.

#### **Spearman correlation coefficient:**

The Spearman's rank coefficient of correlation is a nonparametric measure of rank correlation (statistical dependence of ranking between two variables) >0.05 non-significant, <0.05\* significant, <0.001\*\* high significant.

#### **Results**

In term of Socio – demographic characteristics of studied sample, **Table (1)** highlights the sociodemographic characteristics of the studied students. 38.5 were in



their third year of education. Regarding parental education, 67.5% of fathers and 64.5% of mothers had secondary education. Additionally, 58.0% of the fathers were employed, and 60.5% were housewives. Monthly income was sufficient for 77.5% of families.

**Table (2)** illustrates the distribution of students' responses regarding their knowledge of bullying. The data reveals that 88.0% of students correctly identified bullying as targeting a specific individual repeatedly, highlighting a generally high level of awareness. Moreover, 83.0% acknowledged that sending abusive messages via social media constitutes bullying. However, misconceptions persist, with only 15.0% identifying theft of belongings as bullying, and only 6.0% recognized that raising one's voice during a discussion does not constitute bullying.

**Figure (1)** summarizes the total scores of students' attitudes toward bullying (The Bully). The findings indicate that, 86.0% of students displayed appropriate attitudes, reflecting a general rejection of bullying behaviors. However, 14.0% of students exhibited inappropriate attitudes.

**Figure (2)** illustrates the total attitudes of students as a victim of bullying. Alarming, 92.0% exhibited inappropriate attitudes, suggesting significant challenges in coping with their experiences. Only 8.0% demonstrated appropriate attitudes.

**Figure (3)** examines the total attitudes of students toward bullying as a witness. 62.0% of students exhibited inappropriate attitudes. Only 38.0% of students demonstrated appropriate attitudes.

**Table (3)** examines the relationship between knowledge levels and

demographic characteristics. No statistically significant differences were found with gender, educational level, or parental education. However, students from families with higher monthly income tended to exhibit better knowledge, suggesting that socioeconomic factors may play a role in awareness levels. The table also showed a statistically significant difference between mother occupation and students level of knowledge with p-value  $< 0.05$ .

**Table (4)** showed that there were no statistically significant differences between attitude and gender, educational level, or parental education. While there was a statistically significant difference were observed between family composition and attitudes ( $p < 0.05$ ).

**Table (5)** explores that There were no statistically significant differences between student knowledge and their attitude as a bully and victim ( $p > 0.05$ ), while There was a statistically significant difference between student knowledge and their attitude as a witness ( $p < 0.05$ ).

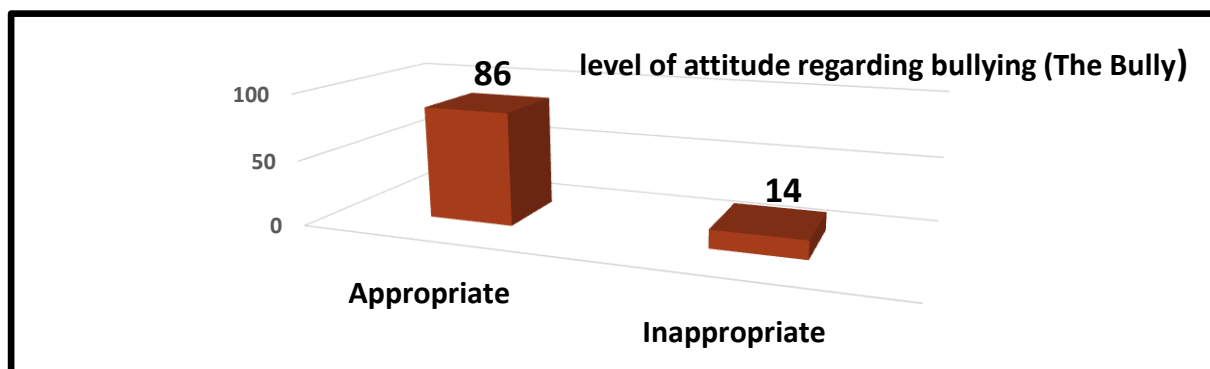
**Table (6)** presents correlations between students' total knowledge and attitude scores. Significant positive association were observed between students' knowledge and their attitudes as a bully ( $r = 0.221$ ,  $p < 0.05$ ) and as a witness ( $r = 0.198$ ,  $p < 0.05$ ). Moreover, there was a significant positive association between students' knowledge and their total attitudes ( $r = 0.224$ ,  $p < 0.01$ ), which indicated that an increase in student knowledge will lead to an increase in student attitude.

**Table (1): Numbers and percentage distribution of the studied students according to their socio-demographic characteristics (n=200)**

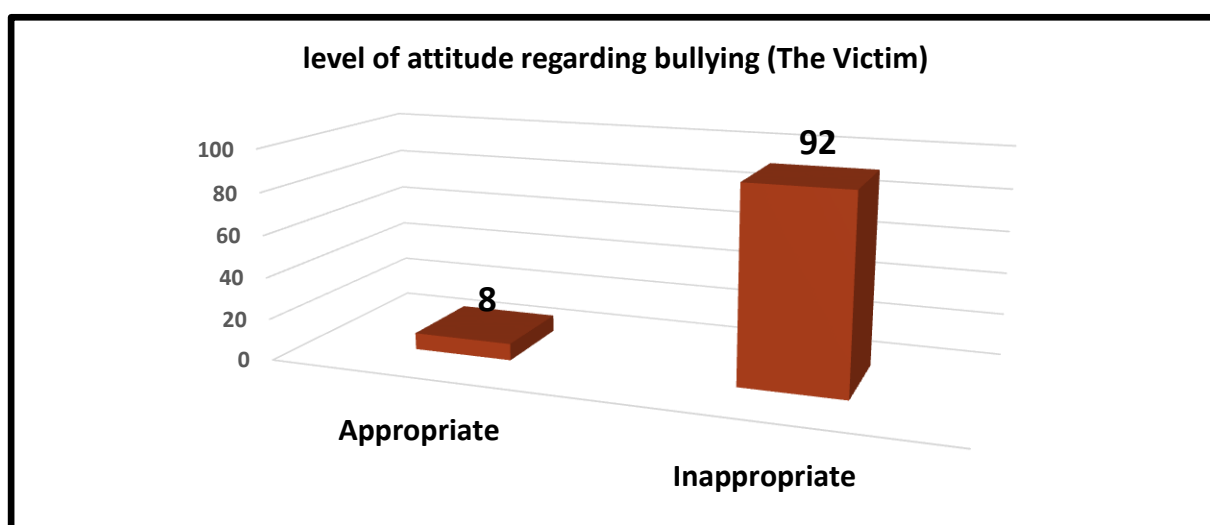
<b>Student's Characteristics</b>	<b>No.</b>	<b>%</b>
<b>Gender</b>		
– Male	<b>100</b>	<b>50.0</b>
– Female	<b>100</b>	<b>50.0</b>
<b>Educational level</b>		
– First	<b>52</b>	<b>26.0</b>
– Second	<b>71</b>	<b>35.5</b>
– Third	<b>77</b>	<b>38.5</b>
<b>Father education</b>		
– Illiterate	<b>7</b>	<b>3.5</b>
– Secondary	<b>135</b>	<b>67.5</b>
– University	<b>43</b>	<b>21.5</b>
– Higher education	<b>3</b>	<b>1.5</b>
– Others	<b>12</b>	<b>6.0</b>
<b>Father occupation</b>		
– Not working	<b>5</b>	<b>2.5</b>
– Employer	<b>116</b>	<b>58.0</b>
– Farmer	<b>6</b>	<b>3.0</b>
– Other	<b>73</b>	<b>36.5</b>
<b>Mother education</b>		
– Illiterate	<b>19</b>	<b>9.5</b>
– Secondary	<b>129</b>	<b>64.5</b>
– University	<b>41</b>	<b>20.5</b>
– Higher education	<b>6</b>	<b>3.0</b>
– Others	<b>5</b>	<b>2.5</b>
<b>Mother occupation</b>		
– House wife		
– Employer	<b>121</b>	<b>60.5</b>
– Other	<b>68</b>	<b>34.0</b>
	<b>11</b>	<b>5.5</b>
<b>Monthly income</b>		
– Enough	<b>155</b>	<b>77.5</b>
– Not enough	<b>24</b>	<b>12.0</b>
– Enough and save	<b>21</b>	<b>10.5</b>
<b>Number of brothers</b>		
– 1	<b>16</b>	<b>8.0</b>
– 2	<b>37</b>	<b>18.5</b>
– 3	<b>88</b>	<b>44.0</b>
– >3	<b>59</b>	<b>29.5</b>
<b>Residence place</b>		
– Urban	<b>96</b>	<b>48.0</b>
– Rural	<b>104</b>	<b>52.0</b>
<b>Family component</b>		
– Father, mother and brothers	<b>182</b>	<b>91.0</b>
– Father and mother only	<b>5</b>	<b>2.5</b>
– Father only	<b>4</b>	<b>2.0</b>
– Mother only	<b>9</b>	<b>4.5</b>

**Table (2): Distribution of the studied students' knowledge regarding bullying (n=200)**

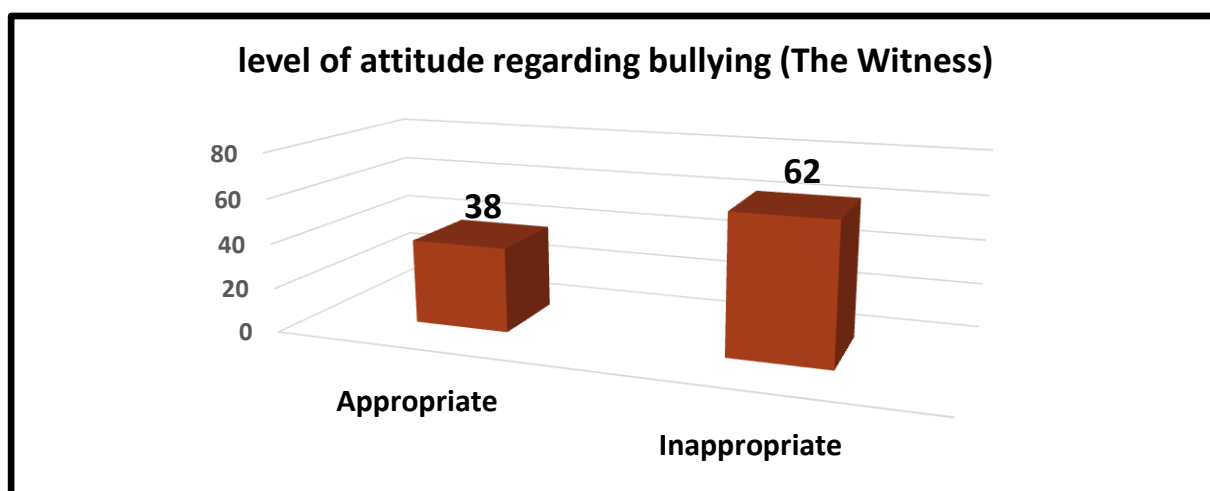
Items	Agree		Sometimes Agree		Not agree	
	N	%	N	%	N	%
1. Do you know the difference between having a disagreement with someone and bullying them?	161	80.5	30	15.0	9	4.5
2. Bullying is targeting a specific person and harassing them repeatedly.	176	88.0	15	7.5	9	4.5
3. Does raising your voice during a discussion with a colleague not count as bullying?	12	6.0	45	22.5	143	71.5
4. Bullying involves a power imbalance where the bully wants to be the stronger one.	133	66.5	50	25.0	17	8.5
5. Bullying is not when your boss, teacher, friend, or parents reprimand you for something you shouldn't have done.	20	10.0	21	10.5	159	79.5
6. Bullying occurs when someone intentionally tries to hurt you by doing or saying something.	174	87.0	19	9.5	7	3.5
7. Sending abusive messages to a student or sharing inappropriate photos of them on social media is considered bullying.	166	83.0	23	11.5	11	5.5
8. Stealing a student's belongings considered bullying?	30	15.0	45	22.5	125	62.5
9. are bullies suffer from behavioral issues and have low self-esteem?	155	77.5	24	12.0	21	10.5
10. Have you ever received a lecture on bullying at any previous educational stage?	106	53.0	23	11.5	70	35.0
11. Do your parents and siblings often not raise their voices in front of you at home?	62	31.0	46	23.0	92	46.0
12. Bullying not only happens at school.	17	8.5	23	11.5	160	80.0
13. Bullying often occurs during the commute to and from school.	76	38.0	86	43.0	38	19.0
14. It usually happens during breaks time between classes.	91	45.5	84	42.0	25	12.5
15. Bullying often targets first-grade students or younger classes in school.	88	44.0	75	37.5	37	18.5



**Figure (1) Distribution of studied student' attitude level regarding bullying (The Bully) (n=200)**



**Figure (2) Distribution of studied student' attitude level regarding bullying (The Victim) (n=200)**



**Figure (3) Distribution of studied student' attitude level regarding bullying (The Witness) (n=200)**

**Table (3): Relations between the studied student' attitude level regarding bullying and their characteristics (n=200)**

	Total Attitude level								
	Appropriate (N=32)		Ambiguous (N=127)		Risk indicated (N=41)		Total	Chi-square	
	N	%	N	%	N	%	N	X <sup>2</sup>	P-value
<b>Gender</b>									
Male	15	15.0	63	63.0	22	22.0	100	1.665	0.001
Female	20	20.0	64	64.0	16	16.0	100		
<b>Educational level</b>									
First	8	15.8	36	68.4	8	15.8	52	7.867	0.098
Second	11	15.5	38	53.5	22	31.0	71		
Third	14	18.1	52	67.5	11	14.2	77		
<b>Father education</b>									
Illiterate	0	0.0	6	85.7	1	14.3	7	7.395	0.495
Secondary	19	14.0	85	63.0	31	23.0	135		
University	11	25.6	25	58.1	7	16.3	43		
Higher education	0	0.0	2	66.7	1	33.3	3		
Others	2	16.7	9	75.0	1	8.3	12		
<b>Father occupation</b>									
Not working	0	0.0	4	80.0	1	20.0	5	1.500	0.960
Employer	20	17.2	71	61.2	25	21.6	116		
Farmer	1	16.7	4	66.6	1	16.7	6		
Other	11	15.1	48	65.7	14	19.2	73		
<b>Mother education</b>									
Illiterate	2	10.5	15	79.0	2	10.5	19	8.621	0.375
Secondary	21	16.3	83	64.3	25	19.4	129		
University	9	22.0	22	53.7	10	24.3	41		
Higher education	0	0.0	3	50.0	3	50.0	6		
Others	0	0.0	4	80.0	1	20.0	5		
<b>Mother occupation</b>									
House wife	19	15.7	82	67.8	20	16.5	121	6.172	0.187
Employer	12	17.6	40	58.8	16	23.4	68		
Other	1	9.0	5	45.5	5	45.5	11		
<b>Monthly income</b>									
Enough	28	18.1	99	63.8	28	18.1	155	4.387	0.356
Not enough	3	12.5	14	58.3	7	29.2	24		
Enough and save	1	4.8	14	66.7	6	28.5	21		
<b>Number of brothers</b>									
1	4	25.0	7	43.8	5	31.2	16	5.123	0.528
2	4	10.8	27	73.0	6	16.2	37		
3	16	18.2	53	60.2	19	21.6	88		
>3	8	13.6	40	67.8	11	18.6	59		
<b>Residence place</b>									
Urban	16	16.7	58	60.4	22	22.9	96	0.854	0.653
Rural	16	15.4	69	66.3	19	18.3	104		
<b>Family component</b>									
Father, mother and brothers	26	14.3	119	65.4	37	20.3	182	13.079	0.042*
Father, mother	3	60.0	2	40.0	0	0.0	5		
Father only	1	25.0	3	75.0	0	0.0	4		
Student only	2	22.2	3	33.4	4	44.4	9		

**Table (4) Relations between the studied students' knowledge level regarding bullying and their characteristics. (n=200)**

	Total Knowledge level								
	Good (N=70)		Average (N=108)		Poor (N=21)		Total	Chi-square	
	N	%	N	%	N	%	N	X <sup>2</sup>	P-value
<b>Gender</b>									
Male	35	35.0	52	52.0	13	13.0	100	0.006	0.001
Female	35	35.0	58	58.0	7	7.0	100		
<b>Educational level</b>									
First	20	38.4	28	53.8	4	7.7	52	7.867	0.098
Second	11	15.5	38	53.5	22	31.0	71		
Third	13	16.8	52	67.5	12	15.5	77		
<b>Father education</b>									
Illiterate	2	28.6	5	71.4	0	0.0	7	9.553	0.298
Secondary	48	35.6	70	51.9	17	12.7	135		
University	14	32.6	28	65.1	1	2.3	43		
Higher education	1	33.3	1	33.3	1	33.4	3		
Others	6	50.0	4	33.3	2	16.7	12		
<b>Father occupation</b>									
Not working	1	20.0	4	80.0	0	0.0	5	1.914	0.927
Employer	43	37.1	61	52.6	12	10.3	116		
Farmer	2	33.3	3	50.0	1	16.7	6		
Other	25	34.2	40	54.8	8	11.0	73		
<b>Mother education</b>									
Illiterate	6	31.6	10	52.6	3	15.8	19	8.189	0.415
Secondary	45	34.9	73	56.6	11	8.5	129		
University	18	43.9	19	46.3	4	9.8	41		
Higher education	1	16.7	4	66.6	1	16.7	6		
Others	1	20.0	2	40.0	2	40.0	5		
<b>Mother occupation</b>									
House wife	40	33.1	70	57.8	11	9.1	121	9.831	0.043*
Employer	27	39.7	35	51.5	6	8.8	68		
Other	4	36.4	3	27.2	4	36.4	11		
<b>Number of brothers</b>									
1	5	31.3	9	56.3	2	12.4	16	3.852	0.697
2	9	24.4	22	59.4	6	16.2	37		
3	35	39.8	45	51.1	8	9.1	88		
>3	22	37.3	32	54.2	5	8.5	59		
<b>Residence place</b>									
Urban	31	32.3	53	55.2	12	12.5	96	1.289	0.525
Rural	40	38.5	55	52.8	9	8.7	104		

**Table (5) Relations between the studied student' knowledge and attitude level regarding bullying (n=200)**

Attitude level	Total Knowledge level						
	Satisfactory (N=119)		Unsatisfactory (N=81)		Total	Chi-square	
	N	%	N	%	N	X <sup>2</sup>	P-value
<b>The Bully</b>							
Appropriate	107	62.2	65	37.8	172	3.742	0.053
Inappropriate	12	42.9	16	57.1	28		
<b>The Victim</b>							
Appropriate	10	62.5	6	37.5	16	0.065	0.799
Inappropriate	109	59.2	75	40.8	184		
<b>The witness</b>							
Appropriate	54	71.1	22	28.9	76	6.789	0.009
Inappropriate	65	52.4	59	47.6	124		

**Table (6) Correlation between studied students' total level of knowledge and their level of attitude regarding bullying (n=200)**

Attitude score	Total Knowledge score	
	r	P-value
<b>The Bully</b>	0.221	0.002**
<b>The Victim</b>	0.009	0.900
<b>The witness</b>	0.198	0.005**
<b>Total attitude score</b>	0.224	0.001**

**Discussion:**

The socio-demographic data of the studied students reveal that, while a large majority lived within nuclear family (both parents and siblings). More than half came from rural areas. These characteristics may influence their perceptions and experiences related to bullying this data aligned with (Demirbağ et al., 2017) who's reported 78.7% was living in a nuclear family, 99.2% has their parents alive, 54.5% has middle level of income, the mean number of siblings was  $2.25 \pm .99$  and the mean

number of people living in the family was  $4.69 \pm 1.20$ .

The current study revealed that, more than half of the studied students were urban and less than half were rural. This nearly equal ratio between urban and rural residence is a very interesting and significant. This finding can reflect on the level of knowledge and attitude of the students regarding the bullying. This results crossing with a study by Edet & Ikwunze, (2025), who emphasize that access to tertiary education has dramatically improved in rural areas

due to online learning, the establishment of regional universities, and better transportation infrastructure.

### **Level of students' knowledge regarding bullying:**

The findings of current study referring that, the majority of the studied students have a good to average level of knowledge, specially the basic concepts of bullying, indicating high level of awareness. For example, the significant majority of the students agreed with, bullying is targeting a specific person and harassing them repeatedly. And also agreed with, bullying occurs when someone intentionally tries to hurt you by doing or saying something. Likewise, more than three quarters of the students agreed that online harassment, such as abusive messages or inappropriate photos, consider as bullying.

These findings were aligning with study by **(Smith et al., 2016)**, **Chan & Wong (2015)**. They mentioned that, a generally high level of awareness, especially on fundamental concepts to the studied students in their sample. The findings in the current study I agree with study by **Gonzales & Madrigal (2020)**, on high school students in Antique who revealed that, students had a generally high level of awareness regarding bullying, consistent across various demographic groups. From the researcher point of view, this awareness comes from the social medial effect and some campaign on

the television that becomes easy to reach by most of population.

The current study lighting that, a nearly two-thirds of the students disagree with stealing student's belongings considered bullying. Despite that there was big fraction disagreed with the idea that raising one's voice during a discussion consider as bullying—showing confusion about verbal aggression versus assertive communication. This reflects misunderstanding about the unclear concepts of bullying. This finding agreed with **(Volk et al., 2021)**, who refers in his study that Stealing belongings is a direct example of tangible resource control, yet students often misclassify it as bullying, failing to see the power dynamic and systematic harm. Their framework explains why such acts are core bullying but frequently overlooked.

In the current study, more than three quarters of the studied students understood that bullies might suffer from behavioral issues and low self-esteem. This aligning with the study by **(O'Moore & Kirkham 2001)**, which indicating that children of both primary and post-primary age who were involved in bullying as victims, bullies, or both had significantly lower global self-esteem than children who had neither bullied nor been bullied. This finding regarding the behavioral issue for the bullies also agreed with **Hellström & Beckman (2021)**, who reported that the students often rely on peer



norms to judge behavior. If shouting is common within a peer group or perceived as a normal way to "win" an argument, it is less likely to be considered as bullying, regardless of the target's distress or power imbalance. This normalization hinders recognition.

#### **Attitude of the studied students regarding bullying (as the bully):**

In the current study, regarding to student's attitudes toward bullying (as the bully), reveal a generally strong rejection of aggressive and harmful conduct among the majority of respondents. For example, in the current study, more than three-quarters of students disagreed with statements endorsing bullying behaviors such as mocking others, spreading rumors, or being mean to fit in with a group. This suggests a solid foundation of moral awareness and social responsibility. However, concerning levels of agreement still exist, particularly regarding normalized behaviors. These findings is supported by (Pagara 2014), who found that, the majority of high school students in the Philippines demonstrated high awareness and disapproval of explicit bullying acts.

The current study reveals that, one-fifth of the students believed that, it was acceptable to push others as a joke, and nearly one-quarter viewed teasing within families as normal, highlighting areas where social boundaries may be misunderstood or minimized. Additionally, more than one-fifth of studied students showed

ambiguity by selecting "sometimes agree" for several bullying behaviors. This pattern of bullying is supported by (Pagara 2014), who found that, however the majority of high school students demonstrated high awareness and disagreeing of direct bullying acts, they still showed ambiguity or partial acceptance toward indirect behaviors such as teasing or exclusion particularly when framed as humor or cultural norms.

These mixed attitudes indicate that while clear bullying is largely unaccepted, certain behaviors are still seen as acceptable under the cover of joking or group acceptance, that has appeared with a big proportion of the students. For example, one-fifth of the students agreed to push another student out of the way as a joke and more than one-fifth of the students sometimes agreed. This finding emphasizing the need for clearer guidance on what could be considered a bullying in all its forms. This finding supported by (Pozzoli et al., 2022) who mentioned that study done at seven countries, 68% of bystanders admitted not intervening in aggression reframed as "jokes," fearing social exclusion. This was highest in collectivist cultures (China: 73%; Japan: 77%).

From the researcher point of view this attitude under the cover of juke may be due to the student's desire to be member of group of friends, almost more than the ability to respect the moral aspect in this level of age.

**Attitude of the studied students regarding bullying (as the victim):**

In the current study, the attitudes of students who identify as victims of bullying reveal to a complex mix of awareness, emotional impact, and coping challenges. While a large majority of the studied students recognized that, mocking others is inappropriate behavior, there responses to other items suggesting emotional distress and unlike to seek help. Notably, half admitted to thoughts of revenge, and nearly half said they would not inform their parents if bullied, reflecting internalized stress and fear of speaking up. That's confirming the findings which mentions mixed attitude for the students as victim. These findings are agreed with study by (**Tenenbaum et al., 2011**), which revealed that, victims' self-reported coping strategies did not always fit into the distinct categories of emotion-focused and problem-focused coping and that children often implemented multiple strategies simultaneously.

In the current study a significant portion nearly two-thirds of the students reported physical and verbal abuse. This finding is agreed with study by (**Onukwufor J. N. 2013**) in Obio/Akpor local government Area of Rivers State, the study was made up of 360 secondary school students drawn from three schools, their study showed that, the prevalence of verbal aggression among senior secondary school students was 56.7%.

In the current study more than one-third of the students acknowledging psychosomatic symptoms like headaches or stomach-aches. This agrees with study by (**Bjereld et al., 2023**) of 213 students, which revealed that, 42.7% were involved in bullying as victims; the study also mentioned a consistent positive association between victimization and somatic complaints. The most common physical symptoms reported by victims included headache 60.7%, chest pain 35.7%, stomach pain 33.9%, weakness (30.4%), and pain in arms and legs 19.6%.

This finding also agreed with study by (**Miskimon et al., 2023**) included 676 secondary school students from the Southeast region of the USA which indicated that the significant indirect effect of academic performance on the association between traditional and cyber victimization and mental health. Additionally, (**Galal et al., 2019**) in their study Prevalence and Correlates of Bullying and Victimization Among School Students in Rural Egypt confirmed that, bullying victims often suffer from psychosomatic complaints such as headaches and abdominal pain, and experience emotional effects including anxiety, depression, and social withdrawal. These students also report reduced school engagement and academic underperformance.

From the researcher point of view, this finding regarding the psychosomatic symptom highlighting

the great harms that can be happen to the students whose have been bullied and the emphasize on the vital role to school health nurse through assessment of the victim after exposure to bullying.

**Attitude of the studied students regarding bullying (as the witness):**

The attitudes of students who witness bullying suggest a mix of awareness, empathy, and concern, yet also highlight significant gaps in safety perception and institutional trust.

In the current study a high proportion of students reported witnessing bullying multiple times. This finding not align with the study done in Ethiopia by **Eijigu T. D & Teketel S. Z. (2021)**, for 612 students aged 12–16 years attending five primary schools in grades 7 and 8 and five general secondary schools in grades 9 and 10, the study showed that Out of 511 participants who reported witnessing a single bullying incident The current study revealed that, a strong majority agreed that physical assault, even as a joke is wrong and that it bothers them to see such incidents. Encouragingly, many also expressed a willingness to intervene—for example around two-thirds of the students said they would step in when witnessing bullying and mor than three-quarters of the students would advise the bully to stop. However, less than half believed their school effectively addresses bullying.

This finding completely agreed with by **Eijigu T. D & Teketel, S. Z.**

**(2021)** who revealed that a larger proportion of students remained passive upon witnessing school bullying. Fifty-five percent of bystanders were involved in passive bystanding behavior, and 38% of them involved in defending behavior. From the researcher point of view, this behavior of the witness depends on many factors such as self-stem, feeling of power balance with bully and the strength moral aspects.

However, in the current study more than one-quarter felt safe from bullying in their school environment, still nearly half of the student still doesn't see the school as safe environment and more than quarter of the students feeling doubt about safety of the environment that`s suggesting institutional efforts may be falling short. These results agreed with study by **(Fredrick et al., 2021)** in a sample of 313 students. There were 109 males 35% and 189 females 60% which reported that Overall, findings indicated that male and female boarding students who perceived high levels of bullying at their school felt less emotionally and physically safe.

The overall distribution of students' attitudes toward bullying, across the roles of bully, victim, and witness, reveals significant contrasts in perception and response. The majority showed appropriate attitudes in the role of the bully, indicating a strong general disapproval of engaging in bullying behavior.

However, attitudes were far less constructive in the roles of victim and witness. Alarming, only a small minority of students exhibited appropriate attitudes as victims, with nearly three-quarters indicating risk-prone attitudes—suggesting emotional distress, negative coping strategies, or reluctance to seek help. Witnesses fared slightly better, with just over one-quarter showing appropriate attitudes, but nearly two-fifths still fell into the risk category, reflecting a troubling tendency toward passivity or tolerance of bullying which is aligne with **Cohane S. K & Schneider B. H. (2024)** who reported that Only 24–28% of witnesses consistently supported victims.

#### **Relations between the studied students' knowledge level regarding bullying and their characteristics.**

The relationship between students' knowledge levels regarding bullying and their sociodemographic characteristics shows no statistically significant differences across the student gender and father occupation. This finding not agrees with (**Smith et al., 2019**). Study consistently finds that girls tend to perceive relational and verbal bullying (e.g., social exclusion, gossip, verbal threats) as more severe and harmful than boys do. Boys, on the other hand, often perceive physical bullying as more serious.

In the current study there was no significant relation between the

family income and the student's knowledge these findings not agreed with the study by **Gonzales and Madrigal (2020)** on high school students in Antique, Philippines, with many students coming from families with stable, enough income backgrounds and traditional structures, which influenced their awareness and experiences of bullying.

From the researcher point of view regarding to the level of family income was just enough to Majority of the sample indicate that most of fathers may spend a lot of their time out of home for work which is make the mother is the first factor that can effect on the student knowledge

Regarding to place of residence in relation to the student's knowledge, the study reveal that, no significant differences suggested. The findings was agreed with (**Badarch J., 2022**), who found that, no significant rural-urban difference in bullying prevalence after controlling for school climate factors. On the other hand the finding in current study not agreed with study by (**Stockdale et al., 2002**), which included 739 students from 7 schools participated in the study and reported a high prevalence of bullying in the rural public schools.

From the researcher point of view, the knowledge about bullying in our Arabic communities' desire some of religious and moral perception which defer form place to place inside the same community.

However, a statistically significant relationship was found with the mother's occupation, suggesting that students whose mothers are employed may have higher knowledge levels, possibly due to increased exposure to external information sources or open discussions at home. This finding is agreed with study by (Galal et al., 2019), conducted a study in rural Egypt and found that higher maternal education was a significant predictor for lower involvement in bullying behaviors. This suggests that not only education but also the broader involvement and exposure of mothers to external social settings may enhance children's social awareness and knowledge, including issues like bullying.

From the researcher point of view, mother education and occupation highlights the potential influence of maternal engagement outside the home on children's awareness and understanding of social issues like bullying, emphasizing the role of family dynamics and parental involvement in shaping students' perceptions. It also indicates more effort to improve the perception of non-working mothers regarding the bullying.

### **Relations between the studied student's attitude level regarding bullying and their characteristics.**

The analysis of students' attitudes toward bullying in relation to their sociodemographic characteristics reveals a different finding across the variables as:

In the current study there was ambiguous student attitude in relation with parental education, both parental occupation indicates the vast effect to the community involvement and social participation on the parents influence on the student attitude. This finding also partially consistent with the literature by (Magklara et al., 2012), they found that, among Greek students, bullying victims are significantly more likely to have unemployed mothers. This highlights the potential role of family dynamics and stability in shaping students' emotional responses and coping strategies when confronted with bullying, emphasizing the importance of supportive home environments in reinforcing positive behavioral attitudes.

In the current study, there was significant relation between the number of siblings inside the family and the attitude, revealing to around two-thirds of students whose have more than three brothers had ambiguous attitude. This finding partially consistent with study by (Guo et al., 2024), which emphasized that, the role of relational environments (home and school) in shaping adolescents' psychosocial responses to bullying, reinforcing the idea that supportive family dynamics are crucial in fostering resilience and appropriate behavioral attitudes among youth.

From the researcher point of view, the relationship with the family component, indicating those students'

living arrangements may influence their attitudes toward bullying. Specifically, those living with both parents and siblings were more likely to exhibit appropriate attitudes, while those from single parent or non-traditional family structures showed higher rates of risk-indicated or ambiguous attitudes.

Regarding the place of residence, the current study did not show statistically significant associations with attitude levels. These suggestions not aligned with multiple studies. For example, **Xie et al., (2022)** who reported how bullying manifests within rural communities less than urban communities. From the researcher point of view, the rural area still has a lot of moral aspect, which transfer from generation to generation by direct communication through the family and neighbor and effect on the students' perception and attitude regarding the bullying.

In the current study, there was no significant difference between the three levels of school and the knowledge level. This finding not aligning with the study done at one of the Russian sites by (**Rychkova et al., 2021**), included 307 urban schoolchildren aged 11 years and revealed that Young adolescents, suffering from school bullying. The current study also not agree with study by (**Malta et al., 2019**), who reported that, possibly older adolescents were less likely to be victims of bullying in his study. From the researcher point of view, this may

be due to low self-esteem or low life experience and sometimes low power balance.

### **Relations between the studied students' knowledge and attitude level regarding bullying:**

The relationship between students' knowledge and attitude levels toward bullying reveals varied patterns across the roles of bully, victim, and witness. While the association between knowledge and attitudes as bullies approached statistical significance, it was not definitive, suggesting a possible trend where higher knowledge may correspond with more appropriate attitudes. In contrast, no significant relationship was found between knowledge and victim-related attitudes, indicating that being informed about bullying does not necessarily influence how victims cope or respond emotionally.

However, a statistically significant relationship was identified in the witness role, where students with satisfactory knowledge were more likely to display appropriate attitudes when observing bullying. This finding underscores the importance of increasing students' knowledge, as it appears to empower witness to take a more proactive and supportive stance. Educational interventions, therefore, may be particularly effective in enhancing the role of witnesses in bullying prevention and response.

This analysis is agreed with **Fernández-Gutiérrez & Mosteiro-Díaz (2021)** whose emphasized that, bullying in educational settings is a

systemic issue, and that interventions, including awareness and education, can reduce its incidence and severity. Their integrative review advocates for educational programs to strengthen students' capacity to act as informed witnesses and reduce tolerance toward bullying behaviors

In this study the correlation analysis between students' total knowledge and attitude scores regarding bullying reveals statistically significant positive associations in most areas. A moderate but meaningful correlation was found between knowledge and attitudes as a bully and as a witness, indicating that higher knowledge levels are associated with more appropriate, informed attitudes in these roles. Additionally, the total attitude score showed a similar significant correlation with knowledge, reinforcing the overall importance of knowledge in shaping constructive views toward bullying. Interestingly, no significant correlation was observed between knowledge and attitudes in the victim role.

The researcher suggesting that, victims' responses may be more influenced by emotional experiences or psychological distress rather than knowledge alone. These findings emphasize the critical role of education in empowering students—especially potential bullies and witnesses—to adopt more empathetic and responsible behaviors, while highlighting the need for emotional

and psychological support for victims.

The correlation analysis between students' total knowledge and attitude scores toward bullying, as presented in the current study, can be strongly agreed by findings of study (**Chen et al., 2023**) demonstrated that adolescents' competitive game motivation and trait aggression are mediated by cognitive and emotional factors, emphasizing the impact of internalized knowledge structures on behavior. They confirmed through the General Aggression Model that higher awareness (knowledge) could shape less aggressive (more appropriate) behavioral patterns, which parallels the observed association in your study between increased knowledge and better attitudes in the roles of bully and witness.

### **Conclusion**

In conclusion, the study revealed that while a majority of secondary school students demonstrated moderate to good levels of knowledge about bullying, their attitudes varied significantly depending on their role as bullies, victims, or witnesses. Most students showed appropriate attitudes as bullies, indicating a general disapproval of aggressive behaviors. However, attitudes were less constructive among victims and witnesses, with a large proportion displaying risk-prone or ambiguous responses. A significant correlation between knowledge and attitudes was observed in the roles of bullies and

witnesses, underscoring the positive impact of awareness on behaviour.

### Recommendations:

- Implement comprehensive anti-bullying programs.
- Strengthen the role of school counselors and nurses.
- Conduct regular awareness campaigns.

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## Effect of Comprehensive Nursing Care Protocol on Nurses' Performance regarding Ectopic Pregnancy

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### Abstract

**Background:** Ectopic pregnancy is still one of the main causes of maternal morbidity and mortality as a result of tubal rupture, life-threatening internal hemorrhage and subsequent hemodynamic instability. Nurses have a pivotal role in the early identification, clinical management, and psychological support of women experiencing ectopic pregnancy. *The study aimed* to determine the effect of comprehensive nursing care protocol on nurses' performance regarding ectopic pregnancy. **Subjects and method: Design:** A quasi-experimental research design was used. **Setting:** The study was conducted at antenatal in-patient unit of Obstetric and Gynecological Department at Tanta University Hospitals. **Sample:** All nurses (50 nurses) in the previously mentioned study setting were included in the study. **Two tools** were used: **Tool (I):** Nurses' knowledge regarding ectopic pregnancy, consisting of two parts: **Part (1):** Socio-demographic characteristics of the studied nurses. **Part (2):** Nurses' knowledge regarding ectopic pregnancy. **Tool (II):** Nurses' practices regarding ectopic pregnancy observational checklists. **Results:** the vast majority of the studied nurses experienced a high level of knowledge and satisfactory practices regarding methotrexate administration, pre- and post-operative care in case of ectopic pregnancy immediate and one-month post-comprehensive nursing care protocol implementation in contrast to low and unsatisfactory practices pre-protocol implementation. **Conclusion:** The comprehensive nursing care protocol provided to the studied nurses achieved a significant enhancement in their performance regarding ectopic pregnancy and the research hypothesis has been ascertained. **Recommendation:** Adopt a nursing care protocol based on the evidence-based practice principles at obstetrics units for standardizing nursing practices regarding ectopic pregnancy management.

**Key words:** Nursing Care Protocol, Performance, Ectopic Pregnancy.

## Introduction

Ectopic pregnancy (EP) is among the most serious complications encountered in early pregnancy (Ayenew, 2022; Wang, Chen, Tao, & Luo, 2024). Ectopic pregnancy is described as an abnormal pregnancy where the blastocyst is implanted and develops outside the uterus's endometrial lining, most commonly in the fallopian tube (tubal pregnancy). The World Health Organization (WHO) reported that the global incidence of EP represents around 1% to 2% of all clinically reported pregnancies (Ali, Abdelsamad, & Ragab, 2024; Sivalingam et al., 2021).

Ectopic pregnancy is still one of the main causes of maternal morbidity and mortality particularly in cases of delayed diagnosis because of tubal rupture, life-threatening internal hemorrhage and subsequent hemodynamic instability (Ali et al., 2024; Kirk et al., 2022). It constitutes approximately 6–10% of pregnancy-related deaths in developed countries and up to 20% in resource-limited settings (Sivalingam et al., 2021; World Health Organization, 2023).

Ectopic pregnancy is classified into several types depending on the site of implantation, including tubal, ovarian, abdominal, cervical, cesarean scar pregnancy, rudimentary horn, and heterotopic ectopic pregnancies. Each type of EP requires distinct diagnostic consideration and tailored intervention strategies to minimize maternal morbidity while preserving fertility when possible. (Houser,

Kandalafi, & Khatai, 2022; Wang et al., 2024).

Several mechanisms contribute to EP as tubal damage, whether due to pelvic infections, surgical scarring, or inflammation, which can impair both ciliary activity and muscular peristalsis, leading to delayed or arrested movement of the embryo. Also, altered tubal secretions and hormonal imbalances, particularly involving progesterone and estrogen, may permit premature adhesion and trophoblastic invasion outside the endometrium (Shaw et al., 2021).

Ectopic pregnancy is associated with a wide range of risk factors that can be modifiable and non-modifiable factors. Non-modifiable risk factors such as a history of previous EP, congenital anomalies of the fallopian tubes or septate or unicornuate uterus, and advanced age > 35 years (Rogne, Liew, Hernáez, Brumpton & Magnus, 2022).

On the other hand, modifiable risk factors comprise assisted reproductive technology (ART), pelvic inflammatory disease (PID), previous tubal surgeries, use of intrauterine devices (IUDs), and smoking (Schreiber & Sonalkar, 2025; Liu et al., 2025).

The clinical presentation of EP depends on the site of implantation and gestational age. "Amenorrhea (6-8 weeks), lower abdominal in one side or pelvic pain, and vaginal bleeding" are the classic triad in approximately 50% of EP cases (Linnard-Palmer, & Coats, 2025).

The most common complication of EP is internal hemorrhage, resulting

from rupture of the fallopian tube, which may rapidly progress to hypovolemic shock and maternal death if not promptly managed. Additionally, EP is associated with infertility caused by the fallopian tubes' damage or surgical removal (Cunningham et al., 2022; Ren et al., 2023).

The diagnosis of EP relies on the clinical assessment, which remains the cornerstone in the initial diagnosis of EP. A thorough history, physical & pelvic examination, laboratory tests as well as imaging techniques are utilized for EP diagnosis. Measurement of serum  $\beta$ -human chorionic gonadotropin quantitatively is the most widely used biochemical marker for EP (Solomon, Jemal, Ahmed, Tesfaye, & Alemayehu, 2024). Additionally, transvaginal ultrasound (TVUS), is considered the gold standard for non-invasive diagnosis. While the definitive diagnostic tool of EP is laparoscopy, when non-invasive methods are inconclusive. Additionally, Computed Tomography (CT) and Magnetic resonance imaging (MRI) are essential for verifying EP diagnosis. Hence, these multimodality imaging techniques facilitate accurate diagnosis and determine the type of EP management (Hong, Park, Park, Lee, & Kim, 2024; Kirk et al., 2022; NHS, 2023).

The management of EP is determined by several clinical parameters, including the woman's clinical and hemodynamic stability, serum  $\beta$ -hCG levels, ultrasound findings, as well as fertility desires. The main

management approaches include expectant, medical, and surgical management (Houser et al., 2022).

The medical management of EP includes intramuscular Methotrexate (MTX) administration, which is a folic acid antagonist and the primary agent used in medical management for EP. It stops fast-dividing trophoblastic cells from synthesizing DNA. Candidates for MTX therapy should be hemodynamically stable, no signs of tubal rupture and meet specific laboratory and imaging criteria, including a  $\beta$ -hCG level generally <5,000 IU/L, a size of ectopic pregnancy of less than 4 cm, and absence of fetal cardiac activity. MTX can be administered in single-dose, two-dose, or multidose protocols depending on the woman's response and initial  $\beta$ -hCG levels (Grynberg et al., 2020).

Surgical management is indicated when there is a tubal rupture, failed medical management, contraindications to MTX, or a desire for immediate resolution. The two common approaches for the management of EP via laparoscopic or laparotomic surgery are salpingostomy and salpingectomy (Mullany, Minneci, Monjaze, & C. Coiado, 2023).

Nurses have a crucial role in the EP identification and management (Choudhary et al., 2025). Their role in MTX administration involves pre-procedure tasks, procedure tasks as don't rub or massage the injection site to reduce irritation and post-procedure tasks as avoid pregnancy for three months after methotrexate

administration (**Ahmed et al., 2023; Dooley et al., 2025; Manglik, 2024**). While their preoperative care role in the case of surgical management includes: monitoring vital signs, assessing pain characteristics and bleeding, securing intravenous access for fluid resuscitation and blood transfusions, as well as obtaining written consent from the woman, and fasting preparation before the surgery (**Jiang, Jiang, Gao, Ye, & Kuang, 2025; Zhong, Zhao, & Zhu, 2021**). On the other hand, the nurses' post-operative role includes: performing post-operative assessment, giving prescribed IV fluids and blood transfusion if needed, and using non-pharmacological pain management techniques. Also, care of the operation site, provide emotional support about grieving for pregnancy loss, and referral if needed. As well as a follow-up visit in 7-10 days after surgery if there are no complications, and the importance of serial  $\beta$ -hCG follow-up until it is undetectable (**Linnard-Palmer, & Coats, 2025; Shaw et al., 2021**).

### **Significance of the study**

The most frequent cause of pregnancy-related deaths during the first trimester is ectopic pregnancy (**Hendriks, Rosenberg & Prine, 2020; Zhong et al., 2021**). The vast majority of EP cases are initially misdiagnosed and can progress to life-threatening hemorrhage, resulting in maternal morbidity and mortality, especially among developing countries, where tubal rupture and hemodynamic instability are detected at a later date. As nurses contribute

significantly in EP identification and management. Consequently, they must be equipped with the necessary knowledge and practical skills to respond timely and efficiently in order to preserve the lives of women with Ep (**Mohamed, Fayed, Abd El Meneam, & El-Sayed 2019; Punches, Johnson, Gillespie, Acquavita, & Felblinger, 2018**). Based on the current study's findings, work was the primary source of knowledge regarding EP that emphasizes the importance of conducting this study for nurses at their workplace to empower them with evidence-based training protocols for ensuring timely and high-quality care for women with ectopic pregnancies.

### **Aim of study:**

**The aim of this study was to:**

Determine the effect of comprehensive nursing care protocol on nurses' performance regarding ectopic pregnancy.

### **Research hypotheses: -**

- Nurses' knowledge is expected to be improved after implementation of comprehensive nursing care protocol regarding ectopic pregnancy.
- Nurses' practices are expected to be improved after the implementation of comprehensive nursing care protocol regarding ectopic pregnancy.

### **Subjects and method:**

#### **Study Design:**

This study employed a quasi-experimental research design. This research design aimed to identify the

effect of a particular intervention, programme, or event (a treatment).

**Setting:**

The study was carried out at antenatal in-patient unit of Obstetric and Gynecological Department at Tanta University Hospitals (Main Hospital) which is affiliated with the Ministry of Higher Education and Scientific Research. The department consists of outpatient clinics and inpatient units. The inpatient units consist of antenatal, labor, gynecological, and operating units, as well as an ultrasound and fetal medicine unit. The antenatal in-patient units comprise three rooms with a capacity of 52 beds.

**Subjects:** All nurses (50 nurses) who were employed in the aforementioned study setting were incorporated into this study.

**Data collection Tools:** To achieve the aim of the study, two tools were used.

**Tool (I) Nurses' knowledge regarding ectopic pregnancy:** the researcher developed this tool after reviewing the recent relevant literatures (Hendriks et al., 2020; Jiang et al., 2025; Mohamed et al., 2019; Nofal, & Morsi, 2025; Zhong et al., 2021). It was divided into two parts as follows:

**Part(1):Socio-demographic characteristics of the studied nurses:** This part was utilized to collect nurses' basic data included; age, marital status, educational level, residence, experience years, and attendance of previous training program regarding EP.

**Part (2): Nurses' knowledge regarding ectopic pregnancy:** It was

used to assess nurses' knowledge regarding EP.

**The scoring system for nurses' knowledge regarding ectopic pregnancy was categorized as follows:**

- Correct and complete answers were given a score of (2).
- Correct and incomplete answers were given a score of (1).
- Incorrect and/or don't know was given a score of (0).

**The total knowledge score was calculated and converted to percent as follows:**

- **High level of knowledge** 80% - 100% (32-40) from the total score.
- **Moderate level of knowledge** 60% - <80% (24-31) from the total score.
- **Low level of knowledge** <60% (0-23) from the total score.

**Tool (II): Nurses' practices regarding ectopic pregnancy observational checklists:** the researcher developed this tool after reviewing the relevant related literatures (Ahmed et al., 2023; Gharib, El-Nagar & El-sayed, 2022; Bryant-Smith, As-Sanie, Lloyd, & Wong, 2021; Mohamed et al., 2019; Zhong et al., 2021) to assess nurses' practices regarding EP. It was comprised of three procedures: Methotrexate administration procedure, preoperative care and postoperative care procedures in case of ectopic pregnancy.

**The scoring system for nurses' practices was described as follows:**

- Done correctly and completely was scored as (2).

- Done correctly but incompletely was scored as (1).
- Done incorrectly or not done was scored as (0).

**The total score of practices was summed up and converted into percent score as follows:**

- Satisfactory practice: 80% -100% from the total score.
- Unsatisfactory practice: < 80% from the total score.

### **Method:**

**The study was carried out according to the following steps: -**

1. A formal letter clarifying the purpose of the study was obtained from the Faculty of Nursing, Tanta University and submitted to the responsible authorities of the selected setting for permission to carry out the study.
2. **Ethical considerations:**
  - An approval of the Scientific Ethical Research Committee, Faculty of Nursing, was obtained (code 374/2/2024).
  - All participants gave their informed consent after explaining the purpose of the study. They were informed about their freedom to leave the study at any time.
  - The researcher ensured that the study's nature did not cause any suffering for the overall sample.
  - Confidentiality and privacy were taken into consideration regarding data collection.
3. **Tool I and Tool II** were developed by the researcher after reviewing the recent related literature. **Tool I** was developed

and translated into the Arabic language, and **Tool II** was developed in English. Then, the study tools were tested for face and content validity by a jury of 5 experts in obstetric and gynecological nursing field. The questionnaire's face validity was calculated based on experts' opinions, and it was 96%. The content validity index was 97% for nurses' knowledge questionnaire and 95% for nurses' practices regarding EP observational checklists with tools' total content validity index was 96%.

4. After the development of the tools, a **pilot study** was conducted before the actual data collection on 10% (5) of the studied nurses from the previously mentioned setting to test the clarity, feasibility, and applicability of the developed tools. After the implementation of the pilot study, no necessary modifications were made according to its results. So, data gathered from the pilot study were included in the current study sample.
5. The reliability of the study tools that tested by using Cronbach's Alpha test was (0.904 and 0.839, respectively) for the knowledge questionnaire and practices observational checklists tools, which indicates high reliability of the study tools.
6. The time frame for data collection was within seven months, from the beginning of June 2024 to the end of December 2024.



7. Comprehensive nursing care protocol was conducted via four phases (Assessment, planning, implementation, and evaluation) as follows:

**Phase I: Assessment phase (Pre-test):**

- During this phase, the researcher explained the purpose of the comprehensive nursing care protocol for the studied nurses and took their consent to participate in the study.
- Data was gathered by the researcher by using **Tool I part (1)** to collect nurses' socio-demographic data and **part (2)** to assess nurses' knowledge regarding EP.
- **Tool II** was used by the researcher to assess nurses' practices regarding EP (methotrexate administration, preoperative and postoperative care procedure tasks) before implementation of the comprehensive nursing care protocol.

**Phase II: Planning phase: -**

**a. Preparation of the comprehensive nursing care protocol sessions:**

- The total nurses' numbers (50 nurses) were divided into 7 groups (six groups involved 7 nurses and one group included 8 nurses).
- The comprehensive nursing care protocol included four sessions for each group (one session for the theoretical part and three sessions for the practical part); this was carried out in the previously mentioned study setting.

- The comprehensive nursing care protocol sessions were conducted at morning and afternoon shifts, over 4 days per week.
- Each session lasted from 30 to 45 minutes, including periods of discussion.
- A suitable model for demonstration and re-demonstration of all procedures was used during the practical sessions.

**b. Setting the goal of the comprehensive nursing care protocol:**

**The comprehensive nursing care protocol's goal** was to enhance nurses' performance (knowledge and practices) regarding ectopic pregnancy.

**The objectives of the comprehensive nursing care protocol were to:** After the comprehensive nursing care protocol implementation, the studied nurses were able to: -

- **Define** EP and **identify** the normal site of blastocyst implantation, places, risk factors, and causes of EP.
- **Determine** early warning symptoms and signs of EP and its onset.
- **Differentiate** between ectopic pregnancy and abortion.
- **Illustrate** complications of EP, symptoms of tubal rupture, investigations for diagnosis, and prevention of EP.
- **Demonstrate** management for women with EP.

**c. Prepare the content of the comprehensive nursing care protocol:**

- The researcher developed an educational colored booklet (including theoretical and practical parts regarding EP) in Arabic language based on the nurses' needs (assessment phase of their knowledge and practices regarding EP).
- The booklet was given to each nurse to be adopted as a guide for self-learning and retention of information.
- Different methods of teaching were used, such as group discussion, lecture, role playing, posters, PowerPoint, demonstration, and re-demonstration by using model and video scenarios presentation.

**Phase III: Implementation phase:**

The comprehensive nursing care protocol was implemented in 4 sessions as follows:

**The first session (theoretical):**

- This session aimed to explain the purpose of the study and provided the studied nurses with knowledge regarding EP such as definition, normal site of blastocyst implantation, early warning symptoms and signs, differentiation between ectopic pregnancy and abortion, complications, symptoms of tubal rupture, investigations for diagnosis, prevention of EP, medical management, available medical management, mechanism of action of MTX, types of surgical management, non-

pharmacological methods for pain relief and methods reduce risk of recurrence of EP.

**The second practical session:**

- This session aimed to provide the nurses with the proper and required practical skills regarding the MTX administration procedure.

**A. Pre-procedure tasks comprised:**

- **Preparation of the equipment**, which included: preparation of a disposable syringe, methotrexate prefilled syringe or vial of methotrexate, cotton swab, gloves, protective equipment "protective eyewear or safety glasses, mask and apron", soap & tissue paper, and record.
- **Preparation of the woman**, which included: identifying and greeting the woman, explaining the procedure to the woman, ensuring that the woman meets all selection criteria for MTX administration, and obtaining written informed consent from the woman.
- **Preparation of the environment**, which included ensuring a comfortable environment and providing privacy, providing adequate light and educational materials, about EP.
- **Preparation of the nurse**, which included: hand washing with antiseptic solution, wearing gloves and safety glasses, a mask, and an apron (Carryout infection control measures).

**B. Procedure tasks included: -**

- **MTX administration IM injection as follows:** disinfect the

injection site, remove needle protective sheath, gently stretch skin of injection site, insert needle at a 90-degree angle quickly, slowly inject MTX into the buttock muscle, quickly remove syringe and apply pressure to the injection site with the cotton swab, and do not rub or massage the injection site.

- **Health education after MTX administration** included: advise the woman to avoid taking herbal or vitamin supplements, avoid exposure to the sun in order to limit MTX dermatitis, and avoid pregnancy for three months after MTX administration.

**C. Post-procedure tasks** included: put the woman in a comfortable position, remove & clean the equipment, remove the gloves & hand washing, and document the findings. Instruct the woman that the Quantitative  $\beta$ -hCG is followed up on the fourth and seventh day whereas if there is a decrease in  $\beta$ -hCG about 15% or more, then the MTX administration is successful and if the decrease is less than 15%, a second dose of MTX 50 mg/m<sup>2</sup> was given, as well as weekly measurements are investigated until the  $\beta$ -hCG is undetectable.

#### **The third practical session:**

This session aimed to provide the nurses with the proper and required practical skills regarding **pre-operative care for women with EP**. It included:

- Hand washing.

- Admission procedure and take a comprehensive history.
- Anti-shock measures in case of hypovolemic shock as assessing airway, breathing, and circulation, put the woman in a flat position, give oxygen by mask at 10-15 liters/minutes, insert an IV line, and maintain IV fluids.
- Ensuring that the environment is comfortable, providing adequate light, and privacy.
- Assessing the woman's psychological status and providing emotional support.
- Preoperative assessment as assessing the level of consciousness, vital signs, pain characteristics, and bleeding.
- Conduct preoperative screening tests, including obtaining a blood sample for hemoglobin, hematocrit, blood grouping, and serial  $\beta$ -hCG.
- Instruct the woman to fast 8 hours prior to time of operation if planned.
- Mechanical bowel preparation.
- Helping the woman to take a shower before surgery, perform skin preparation for the abdominal site of surgery, and perform perineal care.
- Bladder preparations.
- Finally put the woman in a comfortable position, wash hands and documentation of the findings.

#### **The fourth practical session:**

This session aimed to provide the nurses with practical skills regarding **post-operative care for women with EP**. It included the following:

##### **A. Post-operative assessment of:**

- Level of consciousness.
- Vital signs.
- The presence of immediate nausea and number of vomiting episodes.
- Post-operative pain characteristics.
- The incision site.
- The IV line for patency and infiltration.
- The urinary catheter.

**B. Postoperative Care included: -**

- Put the woman in the lateral recovery position.
- Early IV fluid intake.
- Control nausea and vomiting if present.
- Measures to relief post-operative pain.
- Enhancement of early ambulation.
- Promoting gastrointestinal tract function and nutrition.
- Removal of the urinary catheter as early as possible.
- Care of the operation site.
- Psychological support and encourage the woman to express her feelings.
- Referral if needed.
- Postoperative education regarding care at home, post-laparoscopic education, and follow-up visits.
- Documentation of all findings.

**Phase IV: Evaluation phase (Post-test):**

- After implementing the comprehensive nursing care protocol sessions, the researcher used **Tool I part (2)** to evaluate the effect of the comprehensive nursing care protocol on nurses' knowledge regarding EP immediately and one month later after protocol implementation.

- Nurses' practices were also assessed using **Tool II (observational checklist)** immediately and one month later after implementation of the comprehensive nursing care protocol.
- Comparison was done for nurses' knowledge and practices regarding EP before, immediately, and one month later after protocol-implementation.

**Statistical analysis:**

- SPSS Statistical Package for Social Science, version 25 (IBM Corporation, Armonk, NY, USA) was used to code, enter, tabulate, and analyze the data that was gathered.
- The range, mean, and standard deviation were calculated for quantitative data which describes a categorical set of data by frequency, percentage, or proportion of each category, comparisons between two groups and more were done using the Chi-square test ( $\chi^2$ ).
- The Z value of the Mann-Whitney test was used for comparison between means of two groups of non-parametric data of independent samples. Z value of Wilcoxon Signed Ranks Test was applied for comparison between means of three related groups (before, immediate after and one month after Comprehensive Nursing Care Protocol) of non-parametric data. For comparison between more than two means of non-parametric data, Freedman test ( $\chi^2$  value) was calculated. Correlation between variables was evaluated using

Pearson's Correlation Coefficient (r). Significance was adopted at  $p < 0.05$  for the interpretation of results of tests.

## Results

**Table (1):** Shows that nearly two fifths (**38.0%**) of the studied nurses aged 20–30 years old and more than half had Diplom in Nursing Technician and were from an urban area. In addition, slightly less than half of them had >15 years of experience, and none of the studied nurses attended any previous training program regarding EP.

**Figure (1):** Shows that four fifths of the studied nurses reported a low level of knowledge regarding EP before the comprehensive nursing care protocol implementation, whereas their knowledge improved to **96.0% and 86.0% respectively** immediate and one month post protocol-implementation.

**Figure (2):** Indicates that slightly more than three quarters (**76.0%**) of the studied nurses mentioned that work was the primary source of knowledge regarding EP, followed by mass media and study which were recalled by (**38.0% and 24.0% respectively**) as other sources of knowledge regarding EP.

**Table (2):** Reveals that the total practices mean score regarding MTX administration tasks was (**21.12±10.92**) before implementation of the comprehensive nursing care protocol, while it was significantly increased to (**46.64±5.29**) immediately and slightly decreased to (**44.36±10.81**) one month after protocol implementation. The

difference was statistically significant ( $\chi^2=79.666$ ,  $p=0.0001^*$ )

**Table (3):** Shows that the mean scores of admission procedure during pre-operative care in case of EP, applying anti-shock measures in case of hypovolemic shock and preoperative assessment were (**4.46±1.70, 3.36±4.60 and 2.36±2.46 respectively**) before implementation of the comprehensive nursing care protocol, while, they were significantly increased to (**7.28±1.28, 14.80±2.42 and 7.22±1.40 respectively**) immediately after and slightly decreased to (**7.12±1.32, 13.16±5.10 and 6.90±2.11 respectively**) one month after implementation of the comprehensive nursing care protocol. The difference was statistically significant ( $p = 0.0001^*$ ).

The table also clarified that the total practices mean score of pre-operative care procedure tasks was (**23.28±12.98**) before implementation of the comprehensive nursing care protocol, which increased to (**59.48±7.98 and 55.52±14.93 respectively**) immediately and one month after the comprehensive nursing care protocol implementation. The difference was statistically significant ( $\chi^2 = 78.080$ ,  $p = 0.0001^*$ ).

**Table (4):** Demonstrates that the total practices mean score of post-operative care procedure tasks in case EP was (**34.42±20.47**) before implementation of the comprehensive nursing care protocol, which increased to (**89.76±12.51**) immediate and slightly decreased to (**85.08±22.68**) one month after protocol implementation. The

difference was statistically significant ( $\chi^2 = 80.928$ ,  $p = 0.0001^*$ ).

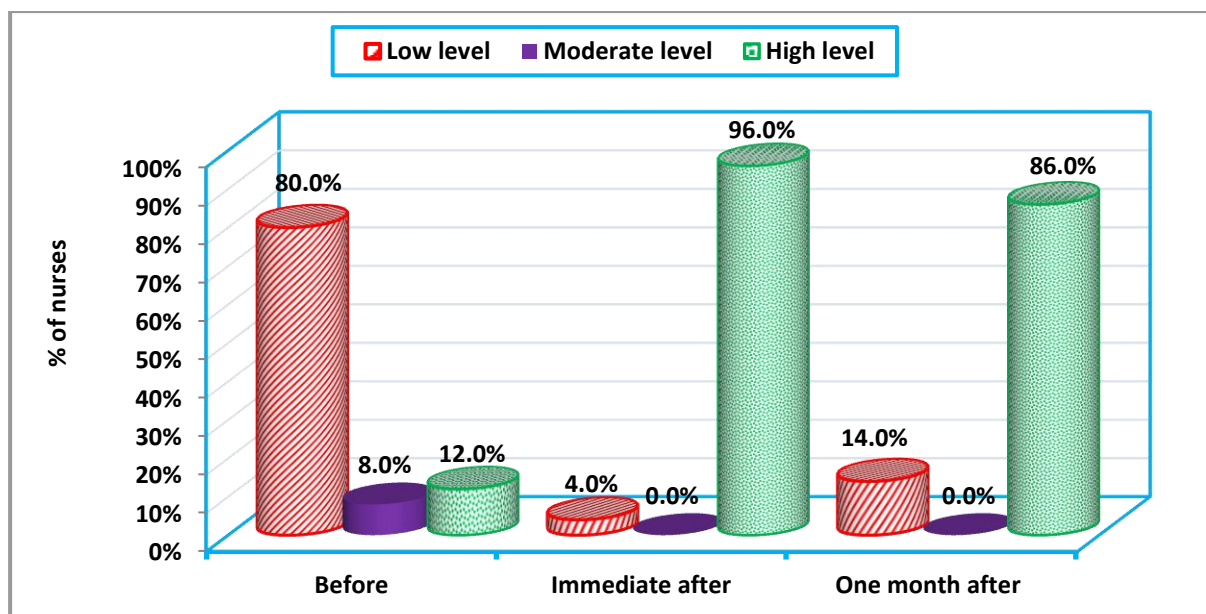
**Figure (3):** the vast majority (**96% and 90% respectively**) of the studied nurses demonstrate satisfactory practices score level regarding MTX administration, pre-operative care and post-operative care in case of ectopic pregnancy immediate and one month after implementation of the comprehensive nursing care protocol in contrast to the majority (**88%**) of

them who had unsatisfactory practices score level pre-implementation of the comprehensive nursing care protocol.

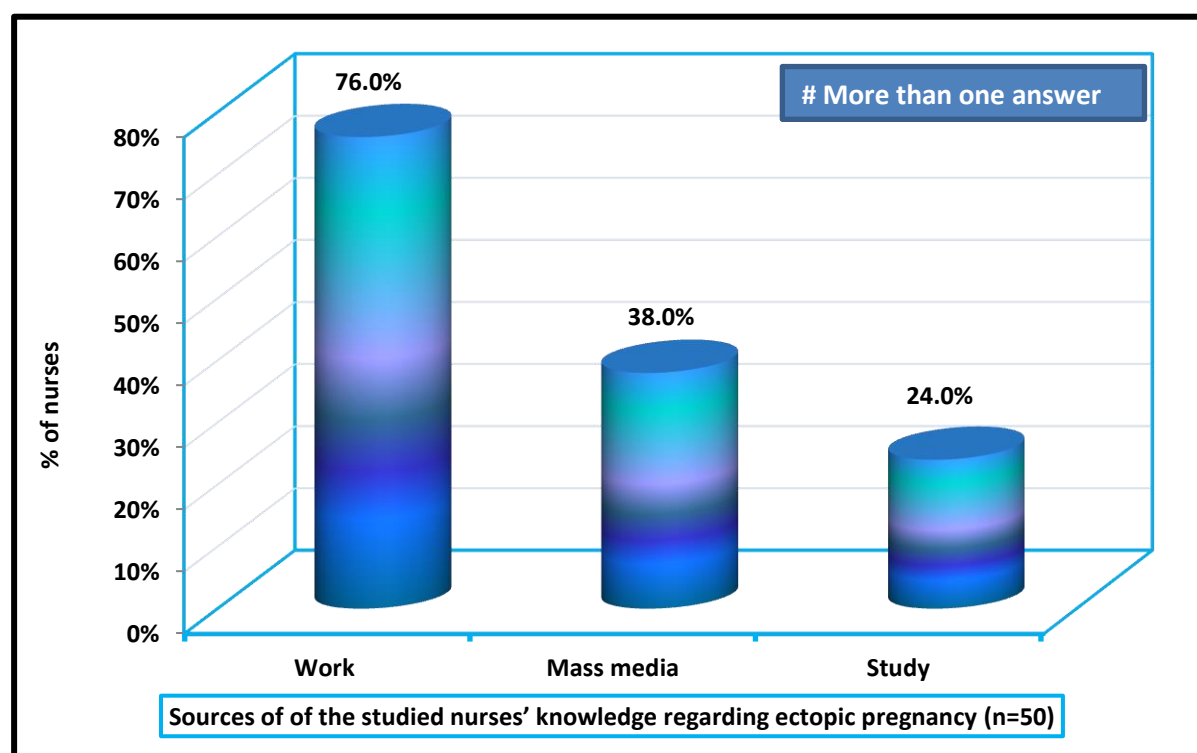
**Figure (4), (5) and (6):** Indicates that there was a strong positive correlation between the studied nurses' total knowledge scores and total practices scores regarding EP before, immediately one month after implementation of the comprehensive nursing care protocol  $P=0.0001^*$

**Table (1): Socio-demographic characteristics of the studied nurses (n=50).**

Socio-demographic characteristics	The studied nurses (n=50)	
	N	%
<b>Age (years)</b>		
20-30	19	38.0
>30-40	14	28.0
>40-55	17	34.0
Range	22-55	
Mean±SD	35.76±9.74	
<b>Marital status</b>		
Single	5	10.0
Married	37	74.0
Divorced	3	6.0
Widow	5	10.0
<b>Educational Level</b>		
Diplom in Nursing Technician	26	52.0
Technical Nursing Institute	24	48.0
<b>Residence</b>		
Urban	27	54.0
Rural	23	46.0
<b>Years of experience</b>		
<5	8	16.0
5-10	14	28.0
11-15	4	8.0
>15	24	48.0
Mean±SD	13.44±5.46	
<b>Attendance of previous training program regarding ectopic pregnancy</b>		
No	50	100



**Figure (1): Total knowledge score level of the studied nurses regarding ectopic pregnancy before, immediate and one month after implementation of the comprehensive nursing care protocol (n=50)**



**Figure (2): Sources of the studied nurses' knowledge regarding ectopic pregnancy (n=50)**

**Table (2): Total practices mean scores of the studied nurses regarding methotrexate administration in case of ectopic pregnancy before, immediate and one month after implementation of the comprehensive nursing care protocol (n=50)**

Nurses' practices regarding methotrexate administration procedure tasks (Each item scored 0-2)	No. of questions (Score)	Practices mean scores of the studied nurses before, immediate and one month after implementation of the comprehensive nursing care protocol (n=50)			$\chi^2$ value	P value
		Before	Immediate	One month after		
		Range Mean $\pm$ SD	Range Mean $\pm$ SD	Range Mean $\pm$ SD		
<b>I-Pre-Procedure Tasks</b>						
I-Preparation of the equipments	1 (0-2)	0-2 0.82 $\pm$ 0.72	0-2 1.74 $\pm$ 0.53	0-2 1.84 $\pm$ 0.42	61.232	0.0001*
II-Preparation of the woman	5 (0-10)	0-10 4.40 $\pm$ 2.45	6-10 9.44 $\pm$ 1.09	2-10 8.96 $\pm$ 1.92	80.990	0.0001*
III-Preparation of the environment	3 (0-6)	0-6 2.12 $\pm$ 1.95	0-6 5.56 $\pm$ 1.16	0-6 4.92 $\pm$ 1.95	67.684	0.0001*
IV-Preparation of the nurse	1 (0-2)	0-2 1.12 $\pm$ 0.82	0-2 1.82 $\pm$ 0.56	0-2 1.88 $\pm$ 0.48	43.120	0.0001*
Pre-procedure practices mean score of methotrexate administration	10 (0-20)	2-20 8.46 $\pm$ 4.38	9-20 18.56 $\pm$ 4.38	5-20 17.60 $\pm$ 4.17	78.228	0.0001*
<b>II-Procedure Tasks</b>						
A-Methotrexate administration IM injection	9 (0-18)	4-18 8.24 $\pm$ 3.82	4-18 16.56 $\pm$ 2.77	4-18 16.08 $\pm$ 4.04	73.075	0.0001*
B-Health education after methotrexate administration	1 (0-2)	0-2 0.56 $\pm$ 0.79	1-2 1.88 $\pm$ 0.33	0-2 1.70 $\pm$ 0.58	70.367	0.0001*
Procedure practices mean score of methotrexate administration	10 (0-20)	4-20 8.80 $\pm$ 4.46	5-20 18.44 $\pm$ 2.96	4-20 17.78 $\pm$ 4.48	72.136	0.0001*
<b>III-Post-Procedure Tasks</b>						
	5 (0-10)	0-10 3.86 $\pm$ 2.82	7-10 9.64 $\pm$ 0.72	1-10 8.98 $\pm$ 2.49	80.140	0.0001*
Total practices mean score regarding methotrexate administration tasks	25 (0-50)	7-47 21.12 $\pm$ 10.92	22-50 46.64 $\pm$ 5.29	14-50 44.36 $\pm$ 10.81	79.666	0.0001*

\*Statistically significant (P<0.05)



**Table (3): Total practices mean scores of the studied nurses regarding pre-operative care in case of ectopic pregnancy before, immediate and one month after implementation of the comprehensive nursing care protocol (n=50)**

Nurses' practices regarding pre-operative care procedure tasks ( Each item was scored 0-2)	No. of questions (Score)	Practices mean scores of the studied nurses before, immediate and one month after implementation of the comprehensive nursing Care protocol (n=50)			$\chi^2$ value	P Value
		Before	Immediate	One month after		
		Range Mean $\pm$ SD	Range Mean $\pm$ SD	Range Mean $\pm$ SD		
I-Hand washing	1 (0-2)	0-2 0.92 $\pm$ 1.01	0-2 1.96 $\pm$ 0.28	0-2 1.76 $\pm$ 0.66	43.144	0.0001*
II-Admission Procedure	4 (0-8)	0-8 4.46 $\pm$ 1.70	3-8 7.28 $\pm$ 1.28	4-8 7.12 $\pm$ 1.32	65.671	0.0001*
III-Apply anti-shock measures in case of hypovolemic shock	8 (0-16)	0-16 3.36 $\pm$ 4.60	6-16 14.80 $\pm$ 2.42	0-16 13.16 $\pm$ 5.10	85.426	0.0001*
IV- Environmental preparations	1 (0-2)	0-2 0.84 $\pm$ 0.91	0-2 1.70 $\pm$ 0.65	0-2 1.82 $\pm$ 0.52	41.052	0.0001*
V-Preoperative psychological preparations (teaching and support)	2 (0-4)	0-4 1.16 $\pm$ 1.61	0-4 3.76 $\pm$ 0.87	0-4 3.20 $\pm$ 1.56	60.936	0.0001*
VI-Preoperative assessment	4 (0-8)	0-8 2.36 $\pm$ 2.46	0-8 7.22 $\pm$ 1.40	0-8 6.90 $\pm$ 2.11	76.143	0.0001*
VII-Routine preoperative screening tests	2 (0-4)	0-4 2.46 $\pm$ 1.80	2-4 3.92 $\pm$ 0.39	2-4 3.92 $\pm$ 0.39	41.604	0.0001*
VIII-Preoperative fasting instructions	1 (0-2)	0-2 1.68 $\pm$ 0.74	0-2 1.96 $\pm$ 0.28	2 2.00 $\pm$ 0.00	13.385	0.0001*
IX-Care of valuables and attire / grooming	1 (0-2)	0-2 1.08 $\pm$ 1.01	0-2 1.92 $\pm$ 0.39	0-2 1.84 $\pm$ 0.55	34.225	0.0001*
X- Omission of mechanical bowel preparation before surgery.	1 (0-2)	0-2 1.20 $\pm$ 0.99	0-2 1.92 $\pm$ 0.39	0-2 1.76 $\pm$ 0.66	23.379	0.0001*
XI-Skin preparations and cleansing	3 (0-6)	0-6 1.48 $\pm$ 1.89	0-6 5.56 $\pm$ 1.34	0-6 5.16 $\pm$ 1.94	83.409	0.0001*
XII-Bladder preparations	1 (0-2)	0-2 0.80 $\pm$ 0.99	0-2 1.92 $\pm$ 0.39	0-2 1.72 $\pm$ 0.70	46.053	0.0001*
XIII- Post procedure tasks	3 (0-6)	0-6 1.48 $\pm$ 1.89	0-6 5.56 $\pm$ 1.34	0-6 5.16 $\pm$ 1.94	83.409	0.0001*
Total practices mean score of pre-operative care procedure tasks	32 (0-64)	11-60 23.28 $\pm$ 12.98	21-64 59.48 $\pm$ 7.98	14-64 55.52 $\pm$ 14.93	78.080	0.0001*

\*Statistically significant (P&lt;0.05)

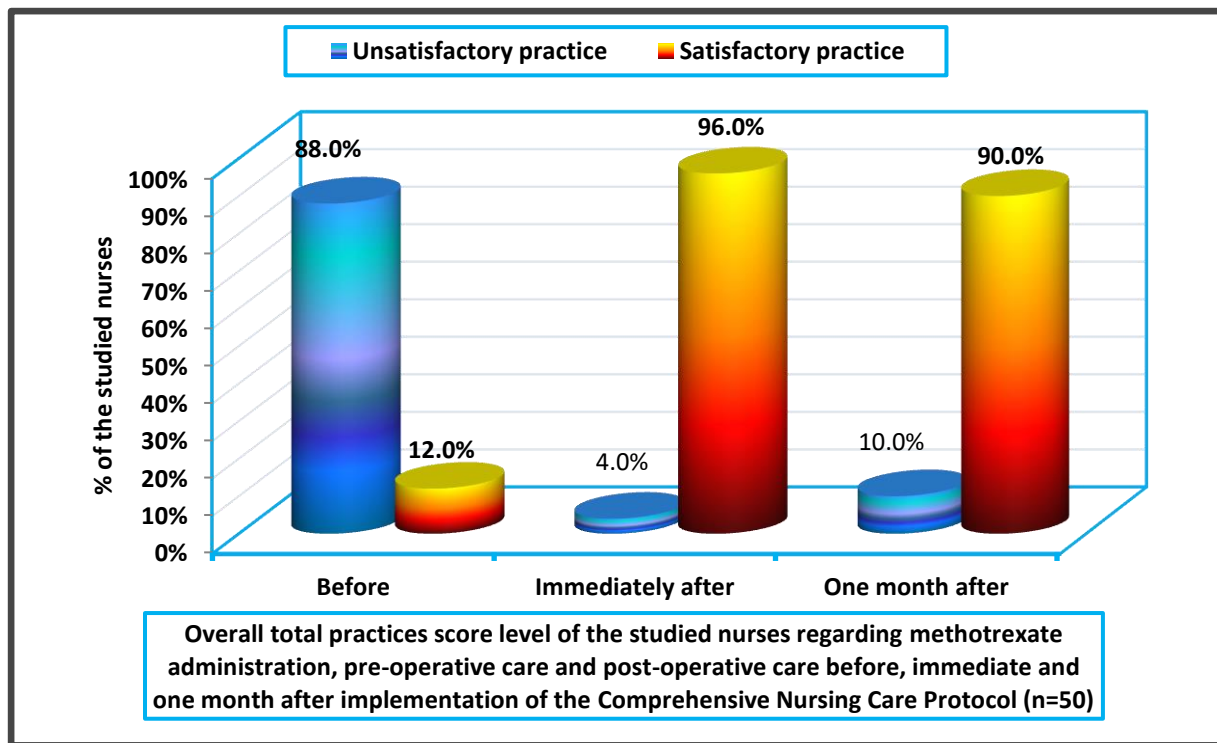
**Table (4): Total practices mean scores of the studied nurses regarding post-operative care in case of ectopic pregnancy before, immediate and one month after implementation of the comprehensive nursing care protocol (n=50)**

Nurses' practices regarding post-operative care procedure tasks (Each item was scored 0-2)	No. of questions (Score)	Practices mean scores of the studied nurses before, immediate and one month after implementation of the comprehensive nursing care protocol. (n=50)			$\chi^2$ value	P value
		Before	Immediate	One month after		
		Range Mean $\pm$ SD	Range Mean $\pm$ SD	Range Mean $\pm$ SD		
<b>A-Postoperative Assessment</b>	<b>8 (0-16)</b>	<b>3-16 8.46<math>\pm</math>2.89</b>	<b>6-16 15.00<math>\pm</math>2.14</b>	<b>4-16 14.44<math>\pm</math>3.21</b>	<b>74.743</b>	<b>0.0001*</b>
<b>B-Postoperative Care</b>						
<b>I-Patient position.</b>	<b>1 (0-2)</b>	<b>0-2 1.32<math>\pm</math>0.96</b>	<b>0-2 1.78<math>\pm</math>0.61</b>	<b>0-2 1.80<math>\pm</math>0.61</b>	<b>11.907</b>	<b>0.003*</b>
<b>II- Early IV fluid intake.</b>	<b>1 (0-2)</b>	<b>0-2 0.92<math>\pm</math>1.01</b>	<b>0-2 1.88<math>\pm</math>0.48</b>	<b>0-2 1.96<math>\pm</math>0.28</b>	<b>50.730</b>	<b>0.0001*</b>
<b>III-Control nausea and vomiting if present.</b>	<b>4 (0-8)</b>	<b>0-8 2.00<math>\pm</math>2.52</b>	<b>0-8 6.96<math>\pm</math>1.90</b>	<b>0-8 6.64<math>\pm</math>2.54</b>	<b>72.826</b>	<b>0.0001*</b>
<b>IV-Measures to relief post-operative pain.</b>	<b>4 (0-8)</b>	<b>0-8 2.46<math>\pm</math>2.48</b>	<b>0-8 7.46<math>\pm</math>1.61</b>	<b>0-8 7.00<math>\pm</math>2.36</b>	<b>76.810</b>	<b>0.0001*</b>
<b>V-Enhancement of early ambulation.</b>	<b>1 (0-2)</b>	<b>0-2 1.04<math>\pm</math>0.97</b>	<b>0-2 1.84<math>\pm</math>0.55</b>	<b>0-2 1.84<math>\pm</math>0.55</b>	<b>35.271</b>	<b>0.0001*</b>
<b>VI-Promoting GIT function and nutrition.</b>	<b>2 (0-4)</b>	<b>0-4 2.54<math>\pm</math>1.75</b>	<b>2-4 3.92<math>\pm</math>0.39</b>	<b>2-4 3.96<math>\pm</math>0.28</b>	<b>43.940</b>	<b>0.0001*</b>
<b>VII-Removal of the urinary catheter as early as possible.</b>	<b>1 (0-2)</b>	<b>0-2 0.60<math>\pm</math>0.92</b>	<b>0-2 1.96<math>\pm</math>0.28</b>	<b>0-2 1.80<math>\pm</math>0.61</b>	<b>69.082</b>	<b>0.0001*</b>
<b>VIII-Care of the operation site.</b>	<b>13 (0-26)</b>	<b>0-26 5.96<math>\pm</math>8.75</b>	<b>0-26 24.60<math>\pm</math>4.18</b>	<b>0-26 22.96<math>\pm</math>7.71</b>	<b>76.385</b>	<b>0.0001*</b>
<b>IX-Psychological support.</b>	<b>3 (0-6)</b>	<b>0-6 1.88<math>\pm</math>2.19</b>	<b>0-6 5.64<math>\pm</math>1.32</b>	<b>0-6 5.36<math>\pm</math>1.69</b>	<b>76.073</b>	<b>0.0001*</b>
<b>X-Referral if needed.</b>	<b>1 (0-2)</b>	<b>0-2 0.16<math>\pm</math>0.55</b>	<b>0-2 1.92<math>\pm</math>0.39</b>	<b>0-2 1.48<math>\pm</math>0.89</b>	<b>86.343</b>	<b>0.0001*</b>

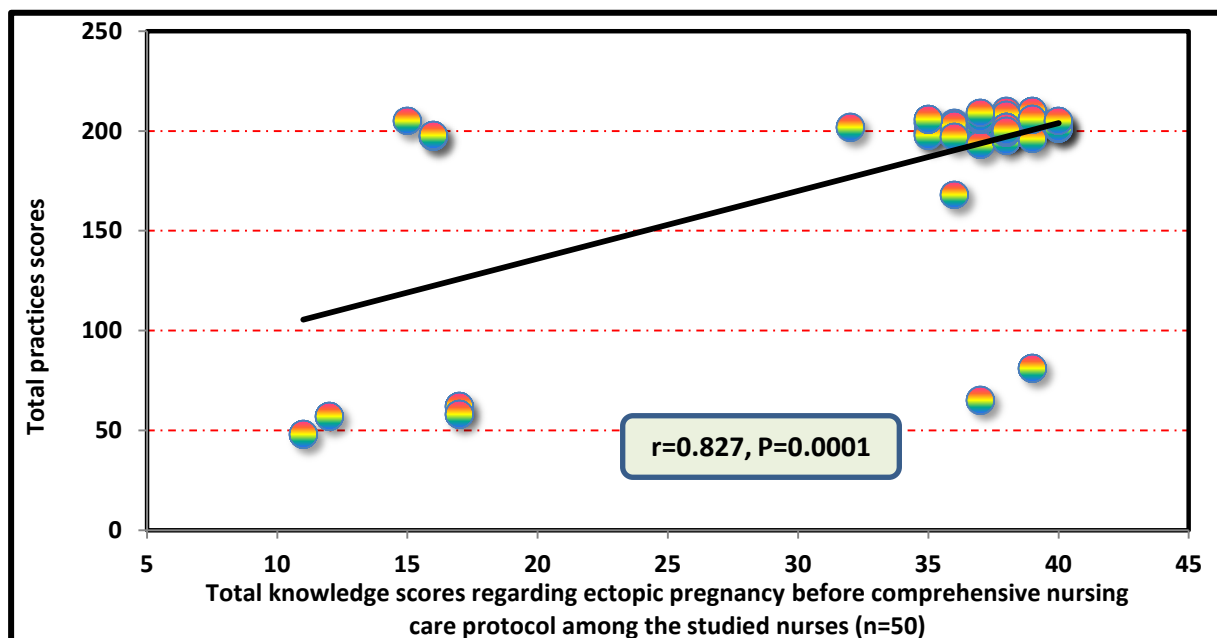
Table (4): Continue.

Nurses' practices regarding post-operative care procedure tasks (Each item was scored 0-2)	No. of questions (Score)	Practices mean scores of the studied nurses before, immediate and one month after implementation of the comprehensive nursing care protocol. (n=50)			$\chi^2$ value	P value
		Before	Immediate after	One month after		
		Range Mean $\pm$ SD	Range Mean $\pm$ SD	Range Mean $\pm$ SD		
<b>XI-Postoperative education regarding:-</b>						
a. A-Care at home.	3 (0-6)	0-6 1.50 $\pm$ 1.92	1-6 5.26 $\pm$ 1.32	0-6 5.14 $\pm$ 1.68	69.432	0.0001*
b. B. Post laparoscope education.	1 (0-2)	0-2 0.40 $\pm$ 0.81	0-2 1.88 $\pm$ 0.48	0-2 1.64 $\pm$ 0.78	69.179	0.0001*
c. C-Follow up visits.	2 (0-4)	0-4 1.08 $\pm$ 1.43	0-4 3.88 $\pm$ 0.63	0-4 3.52 $\pm$ 1.18	87.785	0.0001*
<b>Postoperative education tasks mean scores</b>	6 (0-12)	0-12 2.98 $\pm$ 3.51	3-12 11.02 $\pm$ 1.96	0-12 10.30 $\pm$ 3.31	71.655	0.0001*
<b>XII-Before discharge</b>	2 (0-4)	0-2 2.44 $\pm$ 1.58	0-2 3.80 $\pm$ 0.83	0-2 3.56 $\pm$ 1.23	36.062	0.0001*
<b>XIII-Documentation of the following: ( vital signs, intake and output, medication given, condition of the operation site and its dressing, date of next visit)</b>	1 (0-2)	0-2 1.48 $\pm$ 0.68	1-2 1.98 $\pm$ 0.14	1-2 1.98 $\pm$ 0.14	41.023	0.0001*
<b>Practices mean scores of Postoperative Care Steps</b>	40 (0-80)	12-76 25.96 $\pm$ 18.37	17-80 74.76 $\pm$ 10.96	16-80 70.64 $\pm$ 19.59	81.038	0.0001*
<b>Total practices mean score of post-operative care procedure tasks</b>	48 (0-96)	17-96 34.42 $\pm$ 20.47	26-96 89.76 $\pm$ 12.51	19-96 85.08 $\pm$ 22.68	80.928	0.0001*

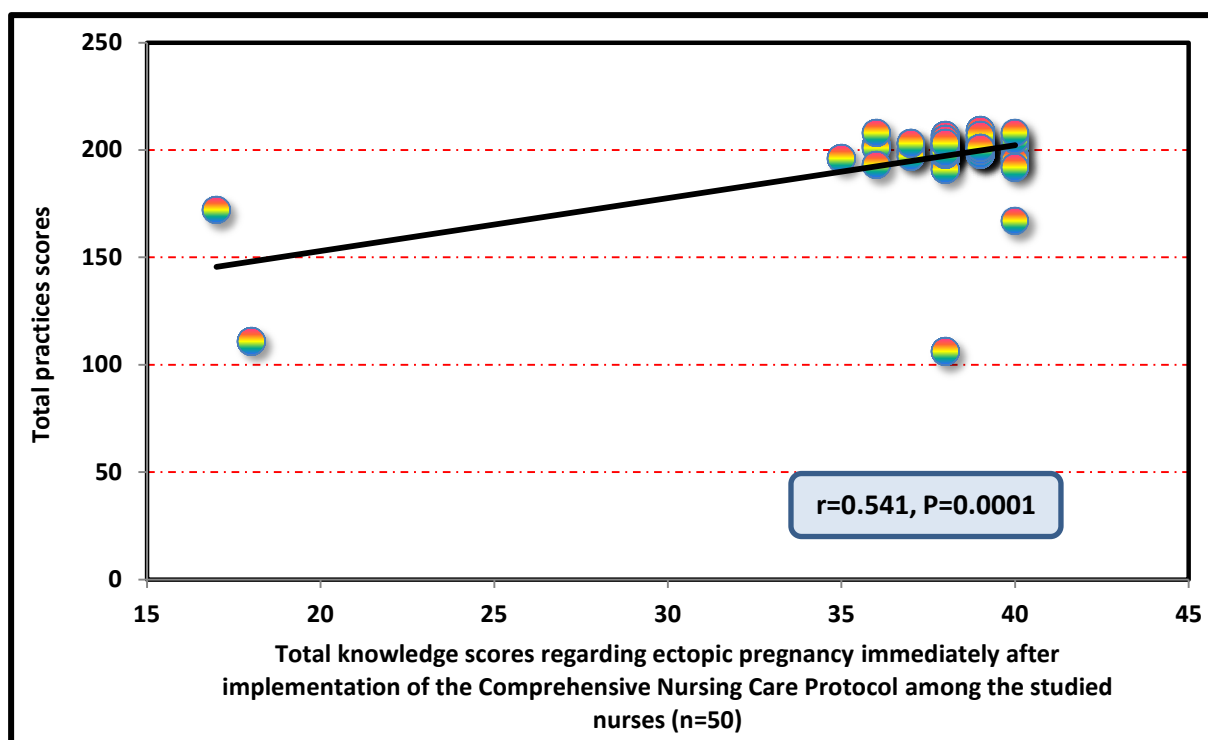
\*Statistically significant (P&lt;0.05)



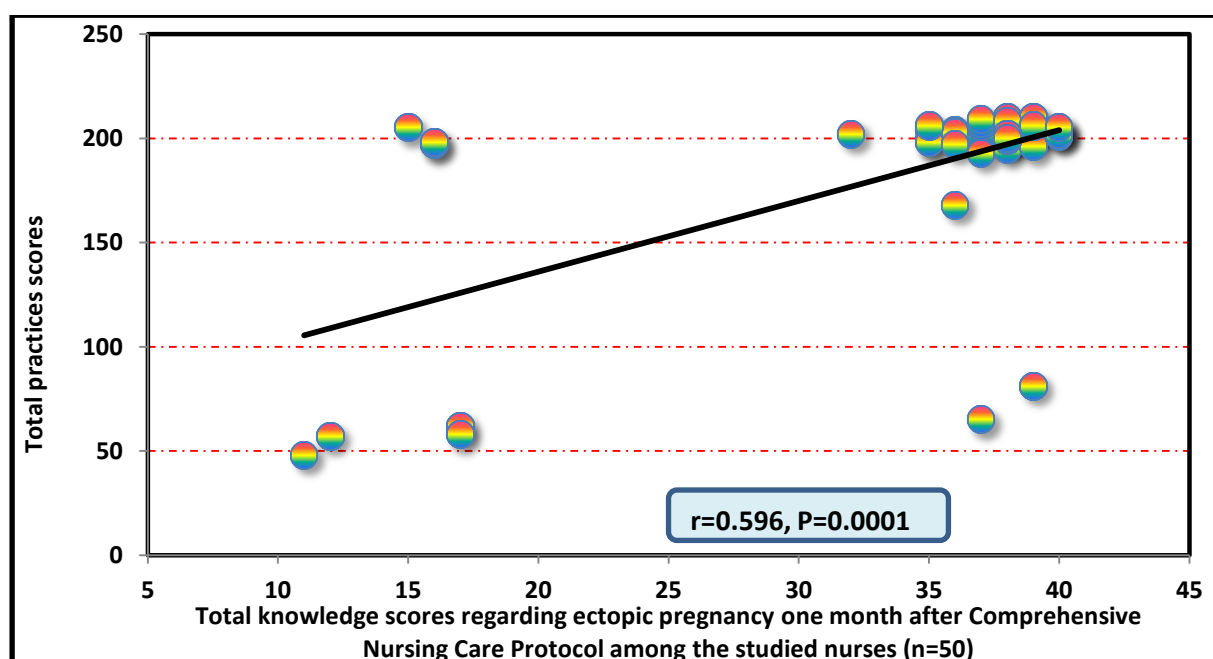
**Figure (3): Overall total practices score level of the studied nurses regarding methotrexate administration, pre-operative care and post-operative care in case of ectopic pregnancy before, immediate and one month after implementation of the comprehensive nursing care protocol. (n=50)**



**Figure (4): Correlation between the studied nurses' total knowledge scores and total practices scores regarding ectopic pregnancy before implementation of the comprehensive nursing care protocol**



**Figure (5): Correlation between the studied nurses' total knowledge scores and total practices scores regarding ectopic pregnancy immediately after implementation of the comprehensive nursing care protocol**



**Figure (6): Correlation between the studied nurses' total knowledge scores and total practices scores regarding ectopic pregnancy one month after implementation of the comprehensive nursing care protocol**

## Discussion

Ectopic pregnancy is a critical obstetric emergency and a major cause of maternal mortality (**Obeagu et al., 2023; Thang, Anh, & Thanh, 2021**). Nurses have a vital role in the early recognition and management of women with EP. Their responsibilities encompass the accurate and thorough assessment of the pregnant woman, preparation for medical (MTX administration) or surgical management (including pre-operative and post-operative care), as well as providing emotional support (**Lashin, Alabiad & Abdelsalam, 2020**).

*Concerning the studied nurses' socio-demographic characteristics*, nearly two fifths of the nurses aged 20–30 years old and more than half had Diplom in Nursing Technician and were from an urban area. In addition, slightly less than half of them had >15 years of experience, and none of them participated in any training program regarding EP, which highlights a significant gap in continuing nursing education that needs to be addressed.

Improving nurses' knowledge concerning EP is a critical aspect for minimizing its preventable complications, influencing the speed and appropriateness of care provided, thereby reducing maternal morbidity and mortality and ensuring favorable maternal outcomes (**Bouyer et al., 2022; Othman et al., 2021**). *Concerning, the total knowledge score level of the studied nurses regarding EP before, immediate and one month after the comprehensive nursing care protocol*

*implementation* four fifths of the studied nurses reported low level of knowledge regarding EP pre-comprehensive nursing care protocol implementation, whereas the vast majority and the majority of them exhibited high level of knowledge immediate and one month post implementation of the comprehensive nursing care protocol respectively.

The current study's findings are compatible with **Naikar (2018)**, who assessed the effectiveness of a structured educational programme on knowledge regarding hemorrhage in early pregnancy and its management among staff nurses in Bangalore, India and found that the overall knowledge score level in the pre-test was (**52.85%**) and enhanced to (**82.9%**) in the post test.

Also, these study's findings strongly agree with **Mohamed et al., (2019)**, who evaluated the effect of implementing nursing guidelines on nurses' performance in caring for women with EP. They found that nearly four-fifths of the nurses under study reported inadequate knowledge before programme, which improved to the majority of them who reported adequate knowledge after program. In the same line, these findings are consistent with **Sabatina, Shah, Gothard, & Ballas, (2019)** in his study that studied simulation-based training in ectopic pregnancy and salpingostomy.

Moreover, **Zeinab et al., (2017)** who investigated the effect of an instructional package on nurses' performance regarding obstetrical emergencies reported that very low percentage of nurses had good level

of knowledge regarding obstetrical emergencies including EP before the instructional package implementation and that percentage increased to slightly more than four fifths immediately after implementation of the instructional package and slightly declined to more than two thirds at the package implementation follow-up phase.

Furthermore, the current study's results were also in alignment with **Abd-Elhady (2024)**, who studied the effect of an educational programme on nurses' performance regarding obstetrical emergencies during pregnancy. They illustrated that there was a significant enhancement of all general knowledge items scores regarding obstetrical emergencies, including EP immediately as well as three months after the educational programme implementation, than before the program implementation.

In addition, **El Sharkawy et al., (2020)** who assessed the effect of a simulation-based educational programme on maternity nurses' performance regarding obstetrical emergencies during pregnancy, reported a highly statistically significant enhancement concerning all nurses' subtotal knowledge items regarding obstetrical emergencies, including EP immediately after the intervention and eight weeks after the program application, compared to pre-program application.

**Yarnprasert & Khetpanya (2024)** necessitate that nurses who are the closest caregivers to patients with EP need to have a very high knowledge level regarding this obstetric emergency management.

From the researcher's perspective, the low level of knowledge regarding EP among the studied nurses before the comprehensive nursing care protocol implementation in the current study could be justified as; none of the studied nurses attended any previous training program regarding EP and slightly more than half of them had Diplom in Nursing Technician as well as graduated a long time ago which in turn affect their retention of knowledge. Whereas, the knowledge improvement regarding EP after the nursing care protocol implementation may be attributed to the effect of the protocol and the distribution of a booklet to nurses to be used as an ongoing reference.

***In regard to sources of the studied nurses' knowledge regarding EP,*** slightly more than three quarters of the studied nurses stated that their work was the primary knowledge source regarding EP, followed by mass media as another source of knowledge regarding EP. From the viewpoint of the researcher, these findings highlight the critical role of workplace-based learning in enhancing nurses' knowledge regarding EP. Conversely, this result contradicts with **Mohamed et al., (2019)**, who found that less than half of the nurses in their study acquired their knowledge from mass media.

Since ectopic pregnancy remains a significant challenge in reproductive healthcare, with its potential for severe complications, enhancing nursing practices through continued professional training and educational programs is essential to maintain high levels of practice in caring for

women with EP. Investing in nurses' practices not only improves their care quality but also aligns with the global efforts to reduce complications from EPs (**Kalumba et al., 2023; Rathnayak and Karunarathna, 2025**). In the current study, the studied nurses' practices in case of EP were divided for educational and analytic purposes into their practices in case of methotrexate administration, and their pre-operative care and post-operative care roles in case of surgical management of EP.

Regarding *the overall total practices score level of the studied nurses regarding methotrexate administration, pre-operative care and post-operative care in case of EP before, immediate and one month after the comprehensive nursing care protocol implementation*, the majority of the studied nurses had unsatisfactory practices score level regarding MTX administration, pre-operative care and post-operative care before the nursing care protocol implementation in contrast to the vast majority of them who demonstrated satisfactory practices score level immediately and one month after implementation of the nursing care protocol.

These findings are matching with **Hepburn, Moore, Shade, and Rowland (2025)**, who studied the new situation-specific theoretical framework to guide ectopic pregnancy research in nursing. They demonstrated that nurses with higher knowledge scores consistently delivered more accurate, timely, and complete practices, especially in

areas such as MTX administration, shock prevention, and pre-operative monitoring.

In addition, these findings are compatible with **El-Hadidy and Youssef (2020)**, who assessed the effect of a structured protocol on nurses' knowledge and practices regarding obstetric emergencies. They highlighted that protocol-based training programs significantly improved the practices among nurses dealing with obstetric emergencies. Once more, these results are in congruence with **Abd El-Hakam and Refaat (2017)**, who developed a nursing management protocol for maternity nurses regarding emergency obstetric care. There was a significant enhancement in nurses' practices post-protocol application in contrast to pre-application of the nursing management protocol. While **Hussein and Helmy (2021)** assessed nurses' knowledge and practices regarding gynecological emergencies in the emergency departments concluded that knowledge gaps exist among nurses, which contributed significantly to errors in drug administration and poor operative care outcomes.

From researcher point of view, the unsatisfactory practices regarding MTX administration, pre-operative care and post-operative care in case of EP before implementation of the comprehensive nursing care protocol at the current study or before the implementation of the clinical guideline or the nursing management protocol in the other studies may be due to poor knowledge level, none attendance any previous training



program regarding EP, insufficient in-service training for newly employed nurses or absence of a system for ongoing supervision and evaluation of nursing practices. While the improvement after the implementation of different protocols may be due to the effect of these nursing care protocols, providing better supplies and facilities that foster a learning environment, the use of different audiovisual material, colored booklets, and PowerPoint presentations. However, one month later, the nurses' practice score level was somewhat reduced but still significant in the current study, which might be due to systemic challenges such as high workload, lack of supervision, and inconsistent reinforcement of training as well as education for nursing staff.

**Ultimately, concerning the correlation between the studied nurses' total knowledge scores and total practices scores regarding EP before, immediately and one month after the comprehensive nursing care protocol implementation,** it was found that there was a strong positive correlation between total knowledge' scores and total practices' scores before, immediately and one month after the comprehensive nursing care protocol implementation.

These results align with **Abdelrahman, Fathy, and Saleh (2021)** who explored the knowledge and practice of midwives regarding early detection of EP in primary healthcare settings, identified a moderate positive correlation between midwives' knowledge level and their practices in managing high-

risk obstetric cases, emphasizing that theoretical grounding is a prerequisite for timely and accurate clinical responses.

Moreover, these findings are consistent with **Salem and Taha (2022)**, who assessed the correlation between knowledge and practices among nurses managing obstetric emergencies, emphasizing that knowledge predicts performance and finding a direct correlation between nurses' theoretical understanding and their compliance with obstetric emergency care protocols.

**Finally,** the implementation of a comprehensive nursing care protocol regarding EP proved to be a valuable tool that significantly enhanced the nursing care quality in EP management. **So,** based on the results of the current study, the research hypotheses have been ascertained after implementation of a comprehensive nursing care protocol regarding EP, which resulted in statistically significant enhancement of nurses' performance immediately and one month later compared to pre-protocol implementation.

### **Conclusion**

**Based on the findings of the current study,** it can be concluded that:

- The comprehensive nursing care protocol provided to the studied nurses achieved significant enhancement in their performance regarding ectopic pregnancy, and the research hypothesis has been ascertained.

## Recommendations

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

- Adopt a nursing care protocol based on the evidence-based practice principles at obstetrics units for standardizing nursing practices regarding ectopic pregnancy management.
- Periodic assessment of nurses' knowledge and practices to address their educational needs regarding the care provided in case of ectopic pregnancy.
- In-service training programs for all nurses, especially newly appointed ones, based on their educational needs assessment to improve their knowledge and practices regarding ectopic pregnancy.

## Further studies are needed in this field to assess:

- The effect of a comprehensive nursing care protocol on maternal outcomes regarding ectopic pregnancy.
- The impact of an education program on women of reproductive age s' knowledge regarding the early symptoms of ectopic pregnancy.

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## Effect of Health Education Regarding Retinal Detachment Surgery on Quality of life and Patients Clinical Outcomes

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### Abstract

**Background:** Retinal detachment describes an emergency situation that involves lose a portion or all of the vision, resulting in a significant reduction in visual performance and an inability to function and other activities. **Aim** to evaluate the effect of health education regarding retinal detachment surgery on quality of life and patients clinical outcomes. **Design:** quasi experimental research. **Setting:** It conducted at ophthalmology department and outpatient clinics at Tanta University Hospitals. **Subject:** It consisted of a convenience sampling of (60) adult patients selected and divided into 2 equal groups, study group managed by implementing health education and control group received routine nursing hospital care. **Tools:** Three tools used for data collection as follows: **Tool I:** Structured Interview retinal detachment questionnaire: It was consisted of three parts:-Part (A): Patients` Socio-Demographic characteristics. Part B: Patient's clinical data. Part (C): Patient's Knowledge regarding retinal detachment. **Tool II:** Quality of life measured by activities of daily vision scale. **Tool III:** Clinical Outcome: This tool divided into two part:-Part (A); Visual Function Questionnaire. Part (B): Visual Analogue Pain Scale. **Results:** There were highly statically significance difference among study group regarding their total knowledge, Quality of life, visual function and pain score ( P value <0.001\*\* ) immediately and after 3 month implementing health education than control groups are less significant. **Conclusion:** Application of health education had a positive effect on their clinical outcomes. **Recommendations:** Health education should carry out as a routine care for patients undergoing retinal detachment.

**Keywords:** Clinical outcomes, Health education, Retinal detachment.

## Introduction

Retinal detachment is a serious medical condition that describes an emergency situation where the thin layer of tissue (the retina) at the back of the eye pulls away from its normal position, often accompanied by flashes and floating movements (**Lin, Narayanan, Philippakis, Yonekawa, & Apte 2024**). RD separates the retinal cells from the blood vessel layer that provides the eye with oxygen and nutrition. The longer a retinal detachment goes untreated, the greater risk of permanent vision loss in the affected eye (**Vidal-Oliver, et al., 2025**).

The annual international incidence of rhegmatogenous retinal detachment (RRD) was estimated to be 9.62 (95% confidence interval 6.81–13.57) per 100,000 population (**Ge, et al., 2024**). In Egypt, retinal detachment was found in 6.3% of eyes and retinal fracture in 4.7 %. , followed by stiffened fundus, found in 59.1. Incidence of retinal detachment in Tanta approximately 1 in 10000, total target population approximately 100 per years according to review of Tanta educational hospital stat static record in past years (2022) (**Elnahry, Khafagy, Esmat & Mortada, 2024**). There are many variations in the underlying pathogenesis of retinal detachment. They include developmental factors (eg, myopia and Marfan syndrome) that affect the overall size and shape of the globe, vitreoretinal disorders as retinal dysplasia, metabolic diseases (eg, diabetic retinopathy), vascular

diseases (eg, sickle cell disease), trauma, inflammation, degenerative conditions and neoplasms.( **Lewis& Kreiger, 2024**).Retinal detachments can be classified as **rhegmatogenous** caused by a tear or hole in the retina. The fluid accumulates underneath the retina, causing the retina to peel away from the back of the eye. A “**tractional**” detachment; It is occurs when vitreous pulls on the retina over time, gradually causing the retina to tent up off the back of the eye. It does not occur suddenly and are not associated with retinal tears. And non-rhegmatogenous is “exudative” detachment occurs when fluid leaks out of blood vessels within or underneath the retina. This can occur in inflammatory conditions such as uveitis and scleritis, certain collagen vascular or autoimmune diseases, tumors of the eye, and congenital diseases, so treatment rapidly supports vision and prevents vision loss (**Xiong, Tran, Waldstein, & Fung 2025**).

Nurses should be alerted to health education for patients and families about postoperative day patient care units and provide personalized instructions such as surgical eye safety protection, do not rub the surgical eyes, do not disassemble or wet the dressing on the day of surgery and ensure good nitration to prevent infection (**Safari, Khabazkhoob, Abbaszadeh & Moosavi 2025**). Nursing staff should clearly inform patients about possible postoperative complications and treatment plans after discharge so that patients understand the key



points of postoperative self-monitoring, also, nurses help patients adapt to new and ongoing lifestyle-changing conditions. Ophthalmic nurses should therefore commit to continuing education, which is essential to developing and maintaining a high standard of care (**Safari, 2025**).

Occurrence of non-traumatic retinal detachment as a whole the population is about 1 in 10,000 persons per year (0.01 percent) in Egypt, and traumatic retinal detachment increases this percentage only a little (**Elsherbiny, Abd Elhafez, Mansour & Alkady 2024**). The incidence of retinal breaks in the general population is about 3.3 percent per year. Therefore, the difference in incidence between retinal fractures and detachment determines that the chance of phakic non-traumatic retinal detachment from most fractures is low (1:330). Rhegmatogenous retinal detachments are bilateral in about 15 percent of cases (**Ge, 2024**).

The estimated annual incidence of primary rhegmatogenous retinal detachment in Scotland is 16.3 per 100,000 populations. Based on this estimate, there are almost 7,300 new cases in the UK each year. Perform daily living activities effectively (**Lee, et al., 2025**). The nurse should educate the patient about helpful ideas such as learning to live (**Ward, Gordon, & Kirkman, 2024**). With the improved anatomic success rate of rhegmatogenous retinal detachment (RD) surgery, increasing attention is focused on the quality of postoperative vision. Even

after successful retinal reattachment, postoperative visual function may be unsatisfactory in some cases. In addition to the traditional objective assessment of patients, such as clinical examinations and laboratory data collection, subjective assessment of patients' daily activities and well-being is becoming increasingly important in contemporary medical practice vision-related quality of life (VR-QOL) (**Machairoudia, et al., 2024**).

### **Significance of the study**

A retinal detachment can have devastating visual consequences. The patient with retinal detachment may lose a portion or all of the vision in the eye involved, resulting in a significant reduction in visual performance and an inability to function at his or her occupation and other activities of daily living. Retinal detachment often requires surgical repair, which has inherent risks (**Lin, 2024**). After surgery for retinal detachment (RD), the retina will be reattached in 95% of treated patients, with useful vision retained in most cases.1–4 Surgical success is assessed based on the postoperative visual acuity, but a patients' appreciation of success in the vision-related quality of life (QoL) often diverges from the surgeon's assessment, so early detection improves patients' visual function and quality of life. The vision-related quality of life is continuous or declined about one year after surgery for RD (**Hayat, Yilmaz, Cayhan, & Ozal, 2025**). Therefore this study aimed to evaluate the effect of effect

of health education regarding retinal detachment surgery on quality of life and patients clinical outcomes.

**The aim of the study is to :** Evaluate effect of health education regarding retinal detachment surgery on quality of life and patients clinical outcomes.

**Research hypothesis:**

- Post implementing of health education the quality of life for patients undergoing retinal detachment will be expected to improve.
- Post implementing of health education the clinical outcome of patients undergoing retinal detachment will be expected to improve. Clinical outcome (improve knowledge, improve visual function and decrease of visual pain).

**Research design:**

A quasi-experimental research design was utilized to conduct the study.

**Study setting:**

This study was conducted at ophthalmology department and the ophthalmology outpatient clinics at Tanta University Hospitals that is affiliated to ministry of Higher education & Research.

**Subject:** A convenience sampling of (60) adult patients of both sex undergoing retinal detachment surgery. The sample size was calculated based on epidemiological information program based on total patient per year (2022) according to review of Tanta educational hospital statistical records.

The sample will be divided randomly into two equal groups each group

consisted of (30) patient as the following:-

**Control group:** it consists of (30) patient, they were received their routine care by hospital nursing staff.

**Study group:** it consists of (30) patients they were received nursing intervention protocol that will be designed and implemented by the researcher in addition to routine care.

**Inclusion criteria:**

Patients from both sexes. Adult conscious patients 21- 60 years. Patient who carry out retinal detachment surgery. Able to communicate effectively.

**Exclusion criteria**

Patients with physical or mental handicapped. Patient with history of ocular or neurological disease or surgery that causes visual loss. Disoriented in level of consciousness.

**Tools for data collection:**

Three tools will be used to evaluate the effect of nursing intervention protocol on quality of life.

**Tools for data collection:**

**Three tools** will be used to evaluate the effect of nursing intervention protocol on quality of life and clinical outcomes of patient undergoing retinal detachment surgery.

**Tool I: Structured Interview Retinal Detachment Questionnaire:**

This tool was developed by the researcher after reviewing recent literatures (Stefansson, Landers, & Wolbarsht, 2022); (Tappeiner, Barthelmes, Abegg, Wolf & Fleischhauer, 2023); (Wakabayashi, et al., 2021). It will consist of three parts:-

**Part (A): Patients' Socio-Demographic characteristics** such as patients' code, age, sex, occupation, level of education, income, marital status, and residence data.

**Part (B): Patient's clinical data** such as patients' chief complaint, health history, medical history, past surgical history and family history, date of admission and procedure, and date of discharge, duration of hospitalization, and types of drug used.

**Part (C): Patient's Knowledge regarding retinal detachment.**

This tool will be developed by the researcher based on literature reviews to assess (Cooper, Endacott, & Jevon, 2019); (Wilkinson, Treas, Barnett, & Smith, 2019); (Lesin, Sundov, Jukic, & Puljak, 2020), to assess patient's knowledge regarding retinal detachment. It includes:

- a. Knowledge regarding retinal detachment which includes; definition, purpose of surgery, indication and contraindications, benefits, risk factors, warning signs of retinal detachment, symptoms, causes, types, immediate and post-surgery complications. **(6 questions)**
- b. Knowledge about a management pre and post-procedure as; treatment, periodic assessment of eye, physical examination, diagnostic studies and lab investigation, preparation, immediate post-surgery care, post-surgery and rehabilitation care as; proper position for operation, eye care, prevention of, infection,

management of pain and postoperative complications, and discharge instructions [eye drop instillation, eye exercise, types of activities, return to work, types of diet, medication schedule, signs of complication and referral places]. **(11 questions).**

**Scoring system of tool (1) part (c) knowledge regarding retinal detachment:**

Three level of scoring for 17 questions would be as the following:

- Correct and complete answer would be scored (2).
- Correct and incomplete answer would be scored (1).
- Don't know or incorrect would be scored (0).

**The total scoring system** of the patient's knowledge would be calculated and classified as the following:-

- High level of knowledge → >75% of the total score
- Moderate level of knowledge → ≥ 50% 75% of the total score
- Low level of knowledge → < 50% of the total score

**Tool II: Quality of life specific health measured by** activities of daily vision scale, which was developed by Mangione, et al., (2018).

**Scoring system:**

These sub scales range from 0 to 100 points, with 100 indicating the highest total scoring function.

**The total scoring system of the-quality of life will be calculated and classified as the following:-**

- High level of quality→ > 75% of the total score.

- Moderate level of quality  $\rightarrow \geq 50\%$  -75% of the total score.
- Low level of quality  $\rightarrow < 50\%$  of the total score.

### **Tool III: Clinical Outcome for Patient Undergoing Retinal Detachment:**

This tool divided into two parts:-

**Part (A);** Visual Function Questionnaire (VFQ-25) This Tool was developed by **Mangione, et al., (2019).**

#### **Scoring system:**

These subscales range from 0 to 100 points, with 100 indicating the highest function.

**The total scoring system of visual function will be calculated and classified as the following:-**

- High visual function  $\rightarrow > 75\%$  of the total score
- Moderate visual function  $\rightarrow \geq 50\%$  - 75% of the total score
- Low visual function  $\rightarrow < 50\%$  of the total score.

**Part (B):** Visual Analogue Pain Scale; It was developed by **Griensven, Strong, & Unruh, (2018).**

#### **Scoring system:**

The total scores of visual analogue pain scale ranged from (0-10), the higher scores reflect the worst pain. It was categorized as the following:

- **0** was considered "no pain".
- **1-3** was considered "mild pain".
- **4-6** was considered "moderate pain".
- **7-9** was considered "severe pain".
- **10** were considered "worst possible pain".

#### **A pilot study method:**

It was conducted on (10%) of total sample of patients undergoing retinal detachment to test the applicability of the tools and to determine any obstacles that may encounter during the period of data collection, accordingly, needed modification were done by the researcher before the main study according to the experience gained from the pilot study. The pilot study of the patient was excluded from the current study.

#### **Validity of the tool:**

All tools were tested for clarity and applicability by seven experts in medical surgical nursing to ensure their validity and modifications were done. It was calculated and found to be = (96%).

**Reliability** of the developed tools was done by using appropriate test analysis. Reliability of knowledge questionnaire, quality of life and clinical outcome were determined using Cronbach's alpha coefficient which was 0.925.

#### **Ethical and legal consideration:**

- Approval of Faculty of Nursing Scientific Research Ethical Committee was obtained, Code number (286\8\2023).
- Confidentiality and Privacy were taken into consideration regarding data collection. A Code number was used instead of names.
- Nature of the study did not cause any harm or pain to the entire subject.
- 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 withdrawal from the study at any time if desired.

### **I. Assessment phase:**

Assessment of the patients was carried out by using tool I, part1 and 2 to collect baseline data at the beginning of the study and Tool I part 3 was used to assess knowledge and Tool II used to assess quality of life specific health used to evaluate activities that were most difficult for people, Tool III visual function questionnaire and visual analogue pain scale to evaluate iimpact of visual problems.

### **II. Planning phase:**

- The health education was designed based on the subject's assessment and reviewing of related literatures, the researcher utilized health education to design the needed information to managed retinal detachment.
- **The general objective** of health education was informing patient's knowledge about retinal detachment to improve knowledge, quality of life and patient's clinical outcomes.
- **The specific objectives** of health education regarding of retinal detachment were determined which includes, patient identify knowledge about retinal detachment, determined quality of life and clinical outcomes.
- Preparing the content of the health education; the content was prepared to meet the objectives. An illustrative structured booklet was prepared and written in

simple Arabic language supported by illustrative pictures as a guide for the patients, different methods was used as Booklet, Video, and group discussion, power point which was prepared by the researcher, demonstration and re-demonstration. The health education was covered in (3) sessions individually for every patient, each session lasts for 1 hour, 2 days per a week.

### **III. Implementation phase: -**

Application of health education was implemented for the study group by the researcher throughout three basic sessions individually for every patient during following periods in the morning shifts, they were provide 2 days a week.

#### **First session:**

**The aim of this session was that,** the researcher gives basic knowledge about retinal detachment.

#### **Content of the session:**

- It includes; definition, purpose of surgery, indication and contraindications, benefits, risk factors, warning signs of retinal detachment, symptoms, causes, types, immediate and post-surgery complications.

#### **Second session**

**The aim of this session was that,** was knowledge about management pre and post-procedure.

#### **Content of the session**

- It included knowledge about management pre and post-procedure as; treatment, periodic assessment of eye, physical examination, diagnostic studies

and lab investigation, preparation, immediate, post-surgery care.

### **Third session**

**The aim of this session was that,** was knowledge about post-surgery and rehabilitation care.

#### **Content of the session:**

- It included knowledge about post-surgery and rehabilitation care as; proper position for operation, eye care, prevention of infection, management of pain and postoperative complications, and discharge instructions [eye drop instillation, eye exercise, types of activities, return to work, types of diet, medication schedule, signs of complication and follow up].

### **IV. Evaluation phase:**

Evaluation was done for every patient in both groups for tool I part C, tool II and tool III were used assess knowledge, activities of daily vision, visual function and visual analogue pain scale, for patients with retinal detachment before, immediately and three months post implementation of health education.

**Data analysis** was performed using the SPSS software (version 25). For determining the normal distribution of quantitative variables was used to Kolmogorov-Smirnov test. Chi-square tests were used to compare nominal variables in the two groups and to examine the relation between qualitative variables. Fisher's exact test was applied on smaller sample sizes, alternative to the chi-square test, when the frequency count is  $< 5$  for more than 20% of cells. For comparing the mean scores in two groups were used to the independent

t-tests for parametric data and mann whitney test for non parametric data, and for comparing the mean scores between more than two different periods within the same group were used to the anova test with repeated measures. Comparison between two groups was done using student t-test and anova test for comparison between more than two groups. Pearson method was used to test correlation between numerical variables. Linear regression was used for multivariate analyses on quality of life as dependent factor, p-value  $< 0.05$  was considered significant, and  $< 0.001$  was considered highly significant.

### **Results**

**Table (1): Distribution of studied groups according to their sociodemographic data.** This table illustrates the sociodemographic characteristics of studied groups undergoing retinal detachment. It reveals that two fifths (40.0%) of the control group and about two thirds (63.3%), of the study group were within age group of (51-60) years old or more, with a mean age of  $(40.73 \pm 1.25 \& 41.10 \pm 1.29)$ , respectively), more than half (60.0% & 53.3%, respectively) of the both groups were females. **Also**, the majority of control group and study group (80.0%, & 66.7%, respectively) were married. Moreover two fifths (40.0%) of control group and about one third (33.3%) of the study group were housewives. **Regarding**, the education level, two fifths (40.0%) of control group were diploma and more than half (56.7%)

of the study group were diploma. **In addition**, more than half of studied groups (66.7% & 60.0%, respectively) were insufficient income. **Finally**, in relation to residence, around the majority of studied group (80.0% & 73.3%, respectively) were living in rural area. There was no statistically significant difference in any of these characteristics.

**Table (2): Comparison of patients' total knowledge about retinal detachment between studied groups pre and post health education periods.** This table demonstrates total knowledge level among patients in studied groups regarding retinal detachment. It reveals that the both groups were pre health education with no differences of statistical significance. However, at the immediate post, and 3 months periods the total knowledge level was a statistically significantly different between them.

There was a significant difference within study group throughout the different study periods.

**Table (3): Comparison of patients' Quality of life specific health between studied groups pre and post health education periods.** This table shows that quality of life specific health between studied groups pre and post health education. **Regarding** driving during the day, watching television and threading a needle without a device post 3 months of health education the highest mean of quality of life was ( $3.90 \pm 0.60$ ,  $3.90 \pm 0.92$  and  $3.90 \pm 0.84$  respectively) of the study group.

**Also**, there was pre health education with no differences of statistical significance. However, at the immediate post, and 3 months periods the quality of life level was a statistically significantly different between them. There was a highly significant difference within study group throughout the different study periods.

**Table (4): Comparison of patients' visual function between studied groups pre and post health education periods.** This table shows that the highest mean of visual function was ( $4.00 \pm 0.69$  &  $4.06 \pm 0.73$ , respectively) regarding color vision as matching clothes, and driving in difficult condition post 3 months of health education. **Also** it was found that the both groups were similar pre health education with no differences of statistical significance. **Additionally**, at the immediate post, and 3 months periods the visual function level was a statistically significantly different between them. There was a highly significant difference within study group throughout the different study periods.

**Table (5): Comparison of patients' total pain intensity between studied groups pre and post health education periods.** This table illustrates total pain intensity among patients in studied groups post retinal detachment surgery. It shows that about less than half (46.7%) of control group was mild Visual expiration compared to more than half (56.7%) of study group was mild Visual expiration. **Also**, it reveals

that less than fifth (15.0% ) of control group was the percent of change in pain intensity, while there was less than half (45.1%) in study group the percent of change in pain intensity, post 3 months of health education. Both groups were similar pre health education with no differences of statistical significance. However, at the post immediate, and 3 months periods the pain intensity was a statistically significantly different between them.

**Table (6): Correlation between total knowledge with total quality of life score, visual function and visual pain intensity as well as regression to QOL post three months of health education implementation.** This table presents that correlation between total knowledge with total quality of life score, visual function and visual pain intensity as well as regression to QOL post three months of health education implementation.

**Regarding** total Knowledge score with total quality of life score there was a highly significant positive correlation between total patients' knowledge with their total quality of life in the studied groups. **And** total Knowledge with visual function score there was a highly significant positive correlation within study groups. **While**, there was negative correlation in the control groups, post 3 months period of health education. **Regarding** total quality of life score with total Knowledge score there was a highly significant positive correlation in the studied groups. **And** total quality of life score with

pain intensity there was a highly significant positive correlation in the study groups. **While**, there was negative correlation in the control groups.

**Regarding** visual function score with total Knowledge there was a highly significant positive correlation in the study groups and there was negative correlation in the control groups. **While**, visual function score with pain intensity there was a highly significant positive correlation in the studied groups. **Regarding** pain score with total quality of life score there was a highly significant positive correlation in the study groups. **And** there was negative correlation in the control groups. **While**, pain score with visual function there was a highly significant positive correlation in the studied groups post 3 months period of health education.

**Table (7): Predictor Variables of quality of life among both control and study groups post three months of health education implementation.** This table presents that quality of life in the control group was best predicted by age, presence of comorbid disease and history of any type of retinal detachment (p value= <0.001<sup>\*\*</sup>, 0.011<sup>\*</sup> and 0.038<sup>\*</sup>, respectively), accounting for 82.7% of the variance of quality of life. While regarding study group it was best predicted by age, total knowledge, visual function and visual pain intensity (p value = 0.007<sup>\*</sup>, 0.009<sup>\*</sup>, 0.041<sup>\*</sup> and 0.047<sup>\*</sup>, respectively), accounting for 64.1% of the variance of quality of life.



**Table (1): Distribution of studied groups according to their socio demographic data (n=30)**

Patients' socio demographic data	Variables	Control group N=30		Study group N=30		X <sup>2</sup> tests P Value	
		No.	%	No.	%	X <sup>2</sup>	P value
Age (year)	21-<31	8	26.7	7	23.3	4.314	0.229 <sup>n.s</sup>
	31-<41	4	13.3	2	6.7		
	41-<51	6	20.0	2	6.7		
	51- 60	12	40.0	19	63.3		
	Mean ± SD	40.73±1.25		41.10±1.29		t= -1.112	0.271 <sup>n.s</sup>
Sex	Male	12	40.0	14	46.7	1.071	FE 0.438 <sup>n.s</sup>
	Female	18	60.0	16	53.3		
Marital status	Not married	6	20.0	10	33.3	1.364	FE 0.382 <sup>n.s</sup>
	Married	24	80.0	20	66.7		
Occupation	Not working	4	13.3	6	20.0	1.915	0.751 <sup>n.s</sup>
	Governmental employee	4	13.3	2	6.7		
	Nongovernmental employee	2	6.7	4	13.3		
	Retired	8	26.7	8	26.7		
	Housewife	12	40.0	10	33.3		
Educational level	Can't read and write	8	26.7	6	20.0	2.148	0.709 <sup>n.s</sup>
	Read and write	2	6.7	1	3.3		
	Primary	4	13.3	4	13.3		
	Preparatory	4	13.3	2	6.7		
	Diploma	12	40.0	17	56.7		
Income (reported by patient)	Insufficient	20	66.7	18	60.0	0.287	FE 0.789 <sup>n.s</sup>
	Sufficient	10	33.3	12	40.0		
Residence	Rural	24	80.0	22	73.3	0.373	FE 0.761 <sup>n.s</sup>
	Urban	6	20.0	8	26.7		

Table (2): Comparison of patients' total knowledge about retinal detachment between studied groups pre and post health education periods (n=30).

Total knowledge	Variables	Control group (n=30)						Study group (n=30)						X <sup>2</sup> test P value (1)	X <sup>2</sup> test P value (2)	X <sup>2</sup> test P value (3)	X <sup>2</sup> test P value (4)
		Pre health education		Immediate post health education )		Post 3 months of health education		Pre health education		Immediate post health education		Post 3 months of health education					
		No	%	No	%	No.	%	No.	%	No.	%	No	%				
Retinal detachment overview	Poor<50%	20	66.7	20	66.7	16	53.3	22	73.3	2	6.7	4	13.4	0.317 0.573 n.s	30.909 <0.001**	17.486 <0.001**	5.151 0.023*
	Average 50%-75%	10	33.3	10	33.3	13	43.3	8	26.7	12	40.0	13	43.3				
	Good > 75%	0	0.0	0	0.0	1	3.4	0	0.0	16	53.3	13	43.3				
Perioperative management of retinal detachment	Poor<50%	6	20.0	6	20.0	3	10.0	6	20.0	0	0.0	0	0.0	0.336 0.845 <sup>n.s</sup>	27.409 <0.001**	10.588 0.005*	6.562 0.038*
	Average 50%-75%	12	40.0	18	60.0	21	70.0	14	46.6	4	13.3	0	0.0				
	Good > 75%	12	40.0	6	20.0	6	20.0	10	33.3	26	86.7	30	100.0				
Eye care post surgery	Poor<50%	8	26.7	8	26.7	5	16.7	8	26.7	0	0.0	0	0.0	0.00 0.1000 n.s	19.733 <0.001**	10.588 0.005*	5.914 0.050*
	Average 50%-75%	10	33.3	12	40.0	21	70.0	10	33.3	2	6.7	0	0.0				
	Good > 75%	12	40.0	10	33.3	4	13.3	12	40.0	28	93.3	30	100.0				
Post discharge instructions	Poor<50%	12	40.0	12	40.0	5	16.7	12	40.0	0	0.0	0	0.0	0.00 0.1000 n.s	25.714 <0.001**	15.000 0.001**	N.A
	Average 50%-75%	6	20.0	12	40.0	18	60.0	6	20.0	0	0.0	0	0.0				
	Good > 75%	12	40.0	6	20.0	7	23.3	12	40.0	30	100.0	30	100.0				

Table (3): Comparison of patients' Quality of life specific health between studied groups pre and post health education periods (n=30)

Quality of life specific health	Control group (n=30)			Study group (n=30)			T test P value (1)	t test P value (2)	t test P value (3)	P value (4)
	Pre health education	Immediate post health education	Post 3 months of health education	(Pre health education )	Immediate post health education )	Post 3 months of health education				
	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$				
Driving at night	2.33 ± 0.81	2.00 ± 1.05	2.40 ± 0.93	2.33 ± 1.50	2.87 ± 0.73	3.57 ± 0.85	0.722 (0.479 <sup>ns</sup> )	-3.710(<0.001 <sup>**</sup> )	-5.043(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Seeing objects moving while driving at night	1.87 ± 0.10	2.40 ± 1.18	2.43 ± 0.10	1.67 ± 1.03	3.07 ± 0.78	3.63 ± 0.85	1.325 (0.201 <sup>ns</sup> )	-4.847 (<0.001 <sup>**</sup> )	- 4.893 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Driving at night with oncoming headlights	2.33 ± 1.11	2.07 ± 0.14	2.53 ± 0.10	1.67 ± 1.03	3.20 ± 0.76	3.67 ± 0.88	1.264 (0.222 <sup>ns</sup> )	- 4.521(<0.001 <sup>**</sup> )	- 4.630(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Reading street signs at night	2.33 ± 1.21	2.00 ± 1.28	2.53 ± 0.13	1.73 ± 1.03	3.53 ± 0.73	3.83 ± 0.64	-1.147 (0.265 <sup>ns</sup> )	-5.677 (<0.001 <sup>**</sup> )	- 5.443 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Driving during the day	1.67 ± 1.03	2.20 ± 1.29	2.63 ± 1.09	1.93 ± 1.33	3.67 ± 0.60	3.90 ± 0.60	0.437 (0.667 <sup>ns</sup> )	- 5.610(<0.001 <sup>**</sup> )	- 5.529(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Driving in unfamiliar areas	2.00 ± 0.89	2.33 ± 1.09	2.63 ± 0.92	2.53 ± 0.99	3.13 ± 1.04	3.53 ± 1.07	1.143 (0.267 <sup>ns</sup> )	- 2.902 (0.005 <sup>*</sup> )	- 3.473 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Reading street signs in daylight	1.83 ± 1.32	2.07 ± 0.14	2.53 ± 1.13	2.33 ± 1.44	3.53 ± 0.90	3.83 ± 0.83	0.730 (0.474 <sup>ns</sup> )	- 5.052(<0.001 <sup>**</sup> )	- 5.051(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Walking down steps in dim light	1.50 ± 1.22	2.40 ± 1.52	2.80 ± 1.34	2.40 ± 1.29	3.73 ± 0.14	3.87 ± 0.93	1.456 (0.162 <sup>ns</sup> )	-3.837 (<0.001 <sup>**</sup> )	- 3.556 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Seeing faces across the street in bright sunlight	1.83 ± 1.32	2.63 ± 1.03	2.73 ± 1.43	2.20 ± 1.29	3.73 ± 0.94	3.87 ± 0.90	1.489 (0.153 <sup>ns</sup> )	- 5.234(<0.001 <sup>**</sup> )	- 4.759(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Watching television	1.67 ± 1.03	2.63 ± 1.03	2.73 ± 1.43	2.27 ± 1.25	3.80 ± 0.99	3.90 ± 0.92	1.644 (0.117 <sup>ns</sup> )	-5.234 (<0.001 <sup>**</sup> )	- 5.008 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Reading numbers on the TV screen	2.33 ± 1.50	2.53 ± 1.12	2.63 ± 1.15	2.13 ± 1.27	3.40 ± 1.03	3.67 ± 0.92	0.335 (0.741 <sup>ns</sup> )	- 4.212(<0.001 <sup>**</sup> )	- 3.821(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Reading ordinary print in	1.67 ± 1.03	2.20 ± 0.86	2.37 ± 0.92	1.87 ± 0.97	2.80 ± 0.76	3.33 ± 1.02	1.213 (0.240 <sup>ns</sup> )	- 4.138 (0.001 <sup>**</sup> )	- 3.823 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>

newspapers										
Reading directions on medicine bottles	2.00 ± 0.89	2.53 ± 1.12	2.63 ± 0.99	2.27 ± 1.14	3.20 ± 0.76	3.47 ± 0.97	1.032 (0.315 <sup>ns</sup> )	- 3.723(<0.001 <sup>**</sup> )	- 3.272(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Reading the ingredients on food cans	1.67 ± 1.03	2.07 ± 1.03	2.37 ± 0.92	1.87 ± 0.97	3.00 ± 0.91	3.63 ± 0.92	0.802 (0.433 <sup>ns</sup> )	- 4.660 (0.001 <sup>**</sup> )	- 5.287 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Writing checks	2.00 ± 0.89	2.10 ± 1.02	2.60 ± 0.93	2.07 ± 1.10	3.60 ± 0.81	3.87 ± 0.68	0.131 (0.897 <sup>ns</sup> )	- 6.263(<0.001 <sup>**</sup> )	- 6.008(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Threading a needle without a device	2.00 ± 1.54	2.53 ± 0.97	2.67 ± 0.72	2.13 ± 1.10	3.60 ± 0.96	3.90 ± 0.84	0.864 (0.398 <sup>ns</sup> )	- 5.465 (0.001 <sup>**</sup> )	- 5.808 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Using a ruler, yardstick, or tape measure	1.83 ± 0.75	2.47 ± 0.90	2.47 ± 0.90	2.17 ± 1.02	3.40 ± 0.96	3.73 ± 0.86	1.758 (0.095 <sup>ns</sup> )	- 4.803(<0.001 <sup>**</sup> )	- 5.549(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Using a screwdriver	2.00 ± 0.89	2.53 ± 0.64	2.63 ± 0.85	2.27 ± 0.98	3.67 ± 0.88	3.87 ± 0.90	1.291 (0.212 <sup>ns</sup> )	- 5.809 (0.001 <sup>**</sup> )	- 5.457 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Preparing meals	2.20 ± 0.77	2.27 ± 0.98	2.57 ± 0.85	2.33 ± 1.36	2.87 ± 1.10	3.57 ± 1.10	-0.286 (0.778 <sup>ns</sup> )	- 2.260(0.028 <sup>*</sup> )	- 3.916(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
playing cards.	1.67 ± 0.51	2.20 ± 0.99	2.43 ± 0.89	1.73 ± 0.59	3.33 ± 1.15	3.73 ± 0.98	0.240 (0.813 <sup>ns</sup> )	-4.070 (<0.001 <sup>**</sup> )	- 5.357 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Total	43.36 ± 14.62	42.66 ± 16.98	51.00 ± 16.17	39.90 ± 9.11	67.13 ± 4.85	74.36 ± 12.03	-1.102 (0.275 <sup>ns</sup> )	-7.588 (<0.001 <sup>**</sup> )	-6.347(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>

**Table (4): Comparison of patients' visual function between studied groups pre and post health education periods**

Visual function	Control group (n=30)				Study group (n=30)			T test P value (1)	t test P value (2)	t test P value (3)	P value (4)
	Pre health education		Immediat e post health education	Post 3 months of health education	(Pre health educatio n )	Immediate post health education )	Post 3 months of health education				
	$\chi^- \pm SD$		$\chi^- \pm SD$	$\chi^- \pm SD$	$\chi^- \pm SD$	$\chi^- \pm SD$	$\chi^- \pm SD$				
General health	2.07 ± 0.94		2.30 ± 0.65	2.63 ± 0.89	2.93 ± 0.86	2.97 ± 0.85	3.97 ± 0.66	0.569 (0.571 <sup>ns</sup> )	-3.409(0.001 <sup>**</sup> )	-6.561(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
General vision	1.87 ± 0.90		2.07 ± 0.86	2.17 ± 0.95	1.80 ± 0.84	2.87 ± 0.62	3.93 ± 0.64	0.296 (0.769 <sup>ns</sup> )	-4.087(0.010 <sup>*</sup> )	- 8.450(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Going downstairs' at night .	Distance vision	2.60± 0.89	2.73 ± 1.01	2.73 ± 1.01	2.66 ± 0.95	3.43 ± 0.56	3.86 ± 0.68	0.262 (0.795 <sup>ns</sup> )	-4.307(<0.001 <sup>**</sup> )	- 6.230(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
reading street signs		2.10± 0.95	2.26 ± 1.08	2.26 ± 1.08	2.13 ± 1.04	2.76± 0.97	3.86 ± 0.68	0.487 (0.628 <sup>ns</sup> )	-2.647(0.010 <sup>*</sup> )	- 7.770 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Going out to movies –plays.		2.16± 1.01	2.73 ± 1.01	2.73 ± 1.01	2.53 ± 1.04	3.00 ± 1.05	3.90 ± 0.71	0.753 (0.454 <sup>ns</sup> )	-3.117(0.003 <sup>**</sup> )	- 6.577(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Reading normal newsprint.	Near vision	1.90± 0.84	2.16 ± 1.01	2.20 ± 0.92	2.06± 0.78	2.40 ± 0.77	3.76± 0.72	0.602 (0.549 <sup>ns</sup> )	-2.396(0.020 <sup>*</sup> )	- 8.102(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Seeing well up close.		2.26± 1.04	2.36 ± 0.92	2.66 ± 1.02	2.46 ± 0.89	3.00 ± 0.89	3.93 ± 0.63	0.802 (0.426 <sup>ns</sup> )	-2.567(0.013 <sup>*</sup> )	- 7.434 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Finding objects on crowded shelf		1.90± 0.84	2.06 ± 0.93	2.13 ± 0.89	2.06 ± 0.78	2.60 ± 0.93	3.90 ± 0.66	0.306 (0.761 <sup>ns</sup> )	-2.517(0.015 <sup>*</sup> )	-10.207(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
peripheral vision as seeing objects off to side	2.73 ± 1.06		2.80 ± 0.92	2.80 ± 0.92	2.60 ± 0.96	2.77 ± 0.62	3.93 ± 0.74	0.818 (0.417 <sup>ns</sup> )	-2.132(0.037 <sup>*</sup> )	-4.307(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
color vision as Matching clothes	2.30 ± 1.02		2.70 ± 1.08	3.07 ± 0.78	2.87 ± 0.81	3.20 ± 0.80	4.00 ± 0.69	0.965 (0.338 <sup>ns</sup> )	-2.024(0.048 <sup>*</sup> )	- 6.869(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Stay home most of time	Visual specific dependency	2.60± 0.89	2.73 ± 1.01	2.73 ± 1.01	2.66 ± 0.95	3.43 ± 0.56	3.86 ± 0.68	0.262 (0.795 <sup>ns</sup> )	-4.307(<0.001 <sup>**</sup> )	- 6.230(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
do not leave home alone		2.10± 0.95	2.26 ± 1.08	2.26 ± 1.08	2.13 ± 1.04	2.76± 0.97	3.86 ± 0.68	0.487 (0.628 <sup>ns</sup> )	-2.647(0.010 <sup>*</sup> )	- 7.770 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Rely too much on others words		2.73± 1.06	2.80 ± 0.92	2.80 ± 0.92	2.60 ± 0.96	2.77 ± 0.62	3.93 ± 0.74	0.818 (0.417 <sup>ns</sup> )	-2.132(0.037 <sup>*</sup> )	-4.307(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>

Accomplish less	Visual specific role limitation	2.70±1.17	2.86± 0.89	2.86± 0.89	2.73 ± 1.01	3.40± 1.03	3.86 ± 0.68	0.539 (0.592 <sup>ns</sup> )	-2.442(0.018 <sup>*</sup> )	- 6.968(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Limited endurance		2.53±0.73	2.56 ± 1.16	2.53 ± 0.73	2.46 ± 0.81	3.23 ± 0.671	3.90 ± 0.71	0.333 (0.741 <sup>ns</sup> )	-2.708(0.009 <sup>*</sup> )	- 8.435 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Frustrated	Visual specific mental health	2.43 ± 1.07	2.56 ± 1.10	3.00 ± 0.74	2.93 ± 0.78	3.13 ± 0.89	3.96 ± 0.71	0.338 (0.737 <sup>ns</sup> )	-2.179(0.033 <sup>*</sup> )	- 6.050 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
No control		2.50 ± 1.13	2.60 ± 1.19	3.00 ± 0.90	3.06 ± 0.86	3.23 ± 1.07	3.06 ± 0.86	-0.290 (0.773 <sup>ns</sup> )	-2.163(0.035 <sup>*</sup> )	- 5.972(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Worry about eyesight		2.13 ± 1.00	2.16 ± 0.87	2.46 ± 0.97	2.53 ± 0.97	2.60 ± 0.49	3.93 ± 0.74	-0.265 (0.792 <sup>ns</sup> )	-2.359(0.022 <sup>*</sup> )	- 8.065 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Embarrassment		2.46 ± 1.10	2.53 ± 1.10	2.86 ± 0.73	2.73 ± 0.78	3.23 ± 0.85	3.93 ± 0.74	0.681 (0.498 <sup>ns</sup> )	-2.739(0.008 <sup>*</sup> )	- 6.038(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Seeing how people react	Social function	2.33 ± 1.09	2.33 ± 0.99	2.73 ± 0.94	2.86 ± 0.89	3.13 ± 0.77	3.96 ± 0.71	-0.560 (0.578 <sup>ns</sup> )	-3.474(0.001 <sup>**</sup> )	- 6.838(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Visiting others		2.23 ± 1.00	2.30 ± 1.08	2.53 ± 0.81	2.60 ± 0.81	2.97 ± 0.92	3.76 ± 0.72	-0.316 (0.753 <sup>ns</sup> )	-2.554(0.013 <sup>*</sup> )	- 6.762 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Driving in daylight	Driving	2.10 ± 1.06	2.46 ± 0.93	2.33 ± 0.95	2.40 ± 0.96	3.10 ± 1.15	3.97 ± 0.66	-0.268 (0.790 <sup>ns</sup> )	-2.332(0.023 <sup>*</sup> )	- 7.975(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Driving in difficult condition.		2.30 ± 1.14	2.46 ± 1.00	2.80 ± 1.06	2.73 ± 1.14	2.93 ± 0.78	4.06 ± 0.73	0.234 (0.816 <sup>ns</sup> )	-2.001(0.050 <sup>*</sup> )	- 7.080 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Amount pain	Ocular pain	2.26 ± 0.98	2.46 ± 1.00	2.60 ± 0.72	2.66 ± 0.71	3.03 ± 0.71	3.86 ± 0.68	-0.360 (0.720 <sup>ns</sup> )	-2.507(0.015 <sup>*</sup> )	- 7.341(<0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
Amount time		2.26 ± 0.90	2.33 ± 0.99	2.80 ± 0.66	2.86 ± 0.62	3.13 ± 0.77	3.76 ± 0.72	-0.399 (0.691 <sup>ns</sup> )	-3.474(0.001 <sup>**</sup> )	- 7.064 (0.001 <sup>**</sup> )	<0.001 <sup>**</sup>
<b>Total</b>		<b>66.26±10.89</b>	<b>66.76±7.04</b>	<b>56.93±20.00</b>	<b>64.66±10.63</b>	<b>74.70±13.15</b>	<b>97.63±15.04</b>	<b>0.576 (0.567<sup>ns</sup>)</b>	<b>-2.911(0.005<sup>*</sup>)</b>	<b>- 8.906(&lt;0.001<sup>**</sup>)</b>	<b>&lt;0.001<sup>**</sup></b>

**Table (5): Comparison of patients' total pain intensity between studied groups pre and post health education periods**

Pain intensity	Control group (n=30)			Study group (n=30)			$\chi^2$ test P value (1)	$\chi^2$ test P value (2)	$\chi^2$ test P value (3)	% of change	
	Pre health education	Immediate post health education	Post 3 months of health educated	Pre health education	Immediate post health education	Post 3 months of health education					
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)				Control	Study
No Visual expirations(0)	0(0.0)	2(6.7)	5(16.7)	0(0.0)	4(13.3)	12(40.0)	2.818 (0.244 <sup>ns</sup> )	8.825 (0.032 <sup>*</sup> )	11.506 (0.003 <sup>*</sup> )	15.04%	45.11%
Mild Visual expiration(1-3)	10(33.3)	11(36.7)	14(46.7)	12(40.0)	20(66.7)	17(56.7)					
Moderate Visual expiration (4-6)	14(46.7)	16(53.3)	11(36.7)	8(26.7)	6(20.0)	1(3.3)					
Severe Visual expiration (7-9)	6(20.0)	1(3.3)	0(0.0)	10(33.3)	0(0.0)	0(0.0)					
Mean $\pm$ SD	3.86 $\pm$ 0.68	3.03 $\pm$ 0.71	2.66 $\pm$ 0.71	2.60 $\pm$ 0.72	2.46 $\pm$ 1.00	2.26 $\pm$ 0.98	T test= 0.360 (0.720 <sup>ns</sup> )	T test= 2.507 (0.015 <sup>*</sup> )	T test= 7.341 (<0.001 <sup>**</sup> )		

**Table (6) Correlation between total knowledge with total quality of life score, visual function and visual pain intensity as well as regression to QOL post three months of health education implementation**

Variables	Studied groups	Total Knowledge score		Total quality of life score		Visual function score		Pain score	
		R	P value	R	P value	R	P value	R	P value
Total Knowledge score	Study group	-	-	0.559	<0.001 <sup>**</sup>	0.832	<0.001 <sup>**</sup>	-0.472	0.008 <sup>*</sup>
	Control group	-	-	0.458	0.001 <sup>**</sup>	0.851	0.027 <sup>*</sup>	-0.293	0.039 <sup>*</sup>
Total quality of life score	Study group	0.559	<0.001 <sup>**</sup>	-	-	0.372	0.043 <sup>*</sup>	-0.655	<0.001 <sup>**</sup>
	Control group	0.458	0.001 <sup>**</sup>	-	-	0.434	0.017 <sup>*</sup>	-0.544	0.002 <sup>*</sup>
Visual function	Study group	0.832	<0.001 <sup>**</sup>	0.372	0.043 <sup>*</sup>	-	-	-0.884	<0.001 <sup>**</sup>
	Control group	0.851	0.027 <sup>*</sup>	0.434	0.017 <sup>*</sup>	-	-	-0.790	<0.001 <sup>**</sup>
Pain	Study group	-0.472	0.008 <sup>*</sup>	-0.655	<0.001 <sup>**</sup>	-0.884	<0.001 <sup>**</sup>	-	-
	Control group	-0.293	0.039 <sup>*</sup>	-0.544	0.002 <sup>*</sup>	-0.790	<0.001 <sup>**</sup>	-	-

**Table ( 7 ): Predictor Variables of quality of life among both control and study groups post three months of health education implementation (n=30)**

Quality of life	Control group					Study group				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta			B	Std. Error	Beta		
(Constant)	1.332	0.135		9.831	<0.001**	1.134	0.344		3.299	0.004
Age	-0.086	0.019	-0.556	-0.4481	<0.001**	-0.114	0.038	-0.564	-2.991	0.007*
Occupation	-0.045	0.053	-0.139	-0.849	0.405	0.045	0.128	0.114	0.349	0.730
Duration of the disease per months	0.018	0.057	0.035	0.319	0.753	-0.092	0.124	-0.230	-0.748	0.463
Presence of comorbid disease	-0.147	0.053	-0.412	-2.774	0.011*	-0.122	0.177	-0.113	-0.690	0.498
History of any type of retinal detachment	-0.027	0.030	-0.136	-2.881	0.038*	-0.008	0.017	-0.051	-0.484	0.633
Total knowledge	0.005	0.003	0.225	1.541	0.138	0.000	0.006	0.014	1.991	0.009*
Visual function	.174	.979	.045	.177	.861	0.037	0.021	0.282	1.776	0.041*
Visual pain intensity	-.032	.035	-.255	-.918	.369	-.394	.539	-.134	-2.073	0.047*
Adjusted R <sup>2</sup> = 0.827					P = <0.001**	Adjusted R <sup>2</sup> = 0.641				
						P = 0.005*				

## Discussion

Retinal detachment is a major disorder which leads to sight loss and irreversible damage. Before retinal detachment surgery, patients complain many physical, social, and emotional problems that affect their life style. So the perioperative care given by the nurse and health education should cover the comprehensive needs of the patient, improving the patient's confidence to face surgery, improve vision function and return to regular life activities (Allen, Straatsma, AptL, & Hall, 2020). This study was designed to effect of health education regarding retinal detachment surgery on quality of life and patients clinical outcomes. The study's findings on the demographic characteristics of the patients revealed that near half of the study group, and about one third of

the control group ranged in the age between 51-60 years old or more .This may be interpreted that retinal detachments are very common in older adults. This finding was in agreement with (Chbat, Morel, & Conrath, 2024), who found that the retinal detachment more common in people above 50 years and increase with average age. Also this finding was in accepted with (Wong, et al., 2021), who found that the mean age of studied patients were 49 - 79 years.

**Regarding comparison of patients' total knowledge about retinal detachment** between control and study groups pre and post health education periods, the current study shows that both groups were similar pre health education with no differences of statistical significance. However, at the post immediate, and 3 months periods the total knowledge



level was a statistically significantly different between them; moreover there was a significant difference within study group throughout the different study periods. Where (100.0% & 100.0%, respectively) had good level of knowledge about post discharge instructions post immediate and 3 months of health education that agreed with result (**Dandona, et al., 2021**) who display knowledge levels to patient high significant.

On the other hand, this result was disagreed by (**Chumbley, 2020**) who reported that only half of the study group interested by the education and did not have an effect on the eye.

**Regarding Comparison of patients' Quality of life specific health** the present study demonstrated that, there was a statistically significantly different between them, moreover there was a highly significant difference within study group throughout the different study periods, after 3 month was highest mean of quality of life than pre, Also this result accepted with (**Okamoto, Okamoto, Hiraoka, & Oshika, 2022**) who reported that no one had retinal detachment during all times of researcher's follow up due to adequate postoperative optimization with appropriate medical treatment and clinically retinal patients.

**Regarding compares visual function among patients** in both control and study groups post retinal detachment surgery. The finding study showed that both groups were similar pre health education with no differences of statistical significance. However, at the post immediate, and 3 months periods the visual function

level was a statistically significantly different between them; moreover there was a highly significant difference within study group throughout the different study periods. This result was similar with (**Carreras, Rodríguez-Hurtado & David, 2022**), who reported that most patients undergoing retinal detachment were significant difference after implementation of education, there are well visual function. Where the highest mean of visual function was ( $4.00 \pm 0.69$  &  $4.06 \pm 0.73$ , respectively) regarding color vision as matching clothes, and driving in difficult condition post 3 months of health education.

**Regarding color vision as matching clothes**, the present study demonstrated that, there was positive significant after implementation of health education there was improve in the color vision regarding study group. This finding was in agreement with (**Sullivan, Kazlauciusas, & Guthrie, 2021**) who demonstrate that half of the study group was positive statistically significant than control group. this study dis agreed with (**Abdullah, .., Moharram, Abdelhalim, Mourad, & Abdelkader, 2020**), who found that Ocular morbidity is associated with low QoL, predominantly in a lot of domains as general vision, near activities and driving, and one might need to consider other vision-related factors also to provide them with social, psychological, and employment benefits. The finding of this study showed that both groups were similar pre health education

with no differences of statistical significance. However, at the post immediate, and 3 months periods the pain intensity was a statistically significantly different between them. The control group had mild Visual expiration compared to study group, with the percent of change in pain intensity among control group was 15.0%, while 45.1% in study group post 3 months of health education due to defect of follow up and treatment. Those results accepted with **Koplin, Ritterband, Schorr, Seedor & Wu, (2022)**, who reported that the majority of patients not experienced pain after retinal detachment surgery. And this result disagreed with **(Mitry, 2022)**, who reported that the majority of patients experienced pain at the site of surgery. This may be explained by the main causes of pain in patients after detachment are the incision area, especially with the movement of the head or patient position.

The finding of this study found that a significant statistical relation between total patient' knowledge in control group with residence post 3 months of health education with p value = (0.031\*) Besides, a significant relation in study group with sex, marital status and residence with post 3 months period of health education this result accepted with **(Kaimbo, Rodríguez-Hurtado & David, 2021)**, who mentioned that a significant relation in study group with age, sex, education and income. The finding of this study disagreed with **(Alasmee & Hasan, 2021)** who mentioned that a significant relation

with smoking, duration and physical activity.

The present study demonstrated that, there was a highly significant positive correlation between total patients' knowledge with their total quality of life in the studied groups implementation post three months of health education. This may be due to that, patient was identified as a positive predictor of their knowledge score, which means that the patients get higher benefits from the health educational of care with study groups compared with control groups. This result was in line with **(Hilton, et al., 2022)**, who reported that increased quality of life was correlated with knowledge scores **(Greenberg, Martidis, Rogers, Duker, & Reichel, 2022)**. There was a highly significant positive correlation in the study groups and there was negative correlation in the control groups. Due to patients are lacking knowledge, and therefore are in need for information that might help patients' participation in achieving successful outcomes of the treatment plan. This result was in line with **(Owsley, & Sloane, 2022)**, who reported the level of learning needs and knowledge was high increase visual Function. Also, this result was in line with **(Daltroy, 2022)**, who reported that developed in total Knowledge patient increase visual function, there was a highly significant positive correlation in the studied groups. This result was in line with **(Marks & Allegrante, 2023)**, who reported that there are significant positive correlation between pain and Visual function.

The present study demonstrated that, there was a highly significant positive correlation between the studied groups, due to effect of health education on the patient participation. This result agreed with (**Deramo, Cox, Syed, Lee & Fekrat, 2021**), who reported that increase knowledge to patient results highly quality of life.

The present study demonstrated that, there was a highly significant positive correlation in the study groups. And there was negative correlation in the control groups. This result was in agreement with (**Lame, Peters, Vlaeyen, Kleef, & Patijn, 2024**), who reported that there are significant relation between pain duration and quality of life, despite in long-term disease, patients experience a considerable decrease in quality of life especially in physical and psychosocial domain.

The finding study presented that quality of life in the control group was best predicted by age, presence of comorbid disease and history of any type of retinal detachment, accounting for 0.827 of the variance of quality of life. While regarding study group it was best predicted by age, total knowledge, visual function and visual pain intensity, accounting for 0.641 of the variance of quality of life. Due to patients are lacking knowledge, and therefore are in need for information that might help patients' participation in achieving successful outcomes of the treatment plan. This justification goes in line with (**Awdeh, Elsing, & Deramo, 2022**), (who reported the level of learning needs was high, whereas,

that of knowledge was low; there were history of retinal detachment and comorbid diseases. Also this study accepted with (**Prokofyeva, & Zrenner, 2022**), who reported that there were history of retinal detachment and defect of health life styles.

### **Conclusion**

The findings of the study indicated that it can be concluded that; health education was effective. The results support the integration of health education as a complementary tool in patient education, offering more interactive, effective learning experiences in patient education and had a positive effect on their quality of life and clinical outcomes.

### **Recommendations:**

#### **For education and training**

- Development of in service training health education for all patients in ophthalmology department about knowledge, diet and eye exercises to improve clinical out-comes.
- Develop an in service audiovisual materials training/education about retinal detachment, retinal disorders and treatment for patients.
- The health education for the patients undergoing retinal surgery can be included in the nursing curriculum.
- Orientation health educations on mass medias for measuring eye function in all adults beginning at age 21 years and every 6 months thereafter, noting that more frequent symptoms may be high risk or dangerous individuals.

#### **For further research studies:-**

- Further studies are needed to increase follow up period for retinal detachment patients
- The study should be replicated on large sample and different hospitals setting in order to generalize the results.

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## Effect of Supine versus Right Lateral Position on Intra-Abdominal Pressure Measurements and Respiratory Dynamics for Critically Ill Patients

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### Abstract

**Background:** Intra-abdominal pressure measurement (IAP) is a critical hemodynamic assessment used in the intensive care unit (ICU) to identify patients at risk for intra-abdominal hypertension and subsequent abdominal compartment syndrome. **Aim:** Assess the effect of supine versus right lateral position on intra-abdominal pressure measurements and respiratory dynamics for critically ill patients. **Design & Setting:** Quasi-experimental research design was carried out in the Surgical Intensive Care Unit of Emergency Tanta University Hospitals which is affiliated to the Ministry of Higher Education and Scientific Research. **Subjects:** A purposive sample of sixty critically ill patients ranging in age from 21 to 60 years. **Tools:** Three tools were utilized **Tool (I): Critically Ill Patients Assessment Tool:** It included 3 parts as the following: **Part (a):** Patients' Demographic Characteristics, **Part (b):** Patients' Clinical Data, and **Part (c):** Patients' Hemodynamic Parameters, **Tool (II):** Intra-abdominal Pressure Measurements Recording Sheet, and **Tool (III):** Respiratory Dynamics Assessment Sheet. **Results:** No a statistically significant difference regarding Intra-abdominal pressure measurements when the head of the bed (HOB) angle had been changed from 0° to 15° in supine position and right lateral position where  $P > 0.05$ . Moreover, lung compliance negatively correlated with IAP with highly statistically significant differences where  $P < 0.01$ . Meanwhile, airway resistance, respiratory rate & BMI positively correlated with IAP with highly statistically significant differences where  $P = 0.000$ . **Conclusions:** There were no significant differences between IAP measurements in the supine position versus right lateral position. **Recommendations:** It can be recommended that further studies are needed to evaluate the various methods of IAP measurements, and the study should be replicated on large probability sample on different setting to generalize results.

**Keywords:** Critically ill patients, intra-abdominal pressure measurements, respiratory dynamics, right lateral position and supine position.



## Introduction

Critically ill patients are those with life-threatening organ dysfunction or at high risk of deterioration and poor outcome either in terms of mortality or morbidity with prolonged hospital stay, which has a great impact on medical cost. In addition, critically ill patients struggle between life and death and may tend to lose their lives anytime. Therefore, they need remarkable observation (**El Khattab Amin, Fawaz, Hana & Elkolfat, 2024; Pais, Rao, Muniyal & Yun, 2024**).

The global incidence of adult critical illness is estimated to be between 30 and 45 million annually, based on the estimation of particular diagnoses from a North American ICU registry to the worldwide population (**Schell et al., 2023**). Moreover, epidemiological studies indicate that up to 70% of patients admitted to the intensive care unit (ICU) ultimately necessitate mechanical ventilation (**Abate et al., 2023**).

In Egypt, the incidence of patients who are required mechanical ventilation in ICUs represents about 40–65%. Patients on mechanical ventilation at the Surgical ICU at Tanta University Hospitals in Gharbia, Egypt, are about 55% of total cases (**Younis et al., 2023**).

Critically ill patients experience rapid changes in their condition during their stay in the ICU. As a result, many indicators change dramatically (**Wang et al., 2024**). In this regard, **Urden et al. (2021)** pointed out that measurement of hemodynamic parameters is considered the most crucial duty of nurses who work in

the ICU. Moreover, monitoring and evaluating intra-abdominal pressure (IAP), same as the other hemodynamic indicators, constitutes the responsibilities of ICU nurses. (**Samimian, Khaleghdoost, Ashraf & Hakimi, 2021**).

Intra-abdominal pressure (IAP) is a critical physiological indicator that indicates the persistent pressure within the cavity of the abdomen, arising from the connection between the abdominal wall and the internal organs (**Tayebi, Wise, Pourkazemi, Stiens & Malbrain, 2022**). Furthermore, variances in intra-abdominal pressure are based upon the respiratory cycle and the resistance of the abdominal wall. In healthy individuals, IAP typically measures below 7 mmHg. Nonetheless, critically ill patients typically exhibit a baseline IAP of around 10 mmHg (**Staelens et al., 2023**). IAP of 12 mmHg or over is classified as intra-abdominal hypertension (**Chen et al., 2023**).

Intra-abdominal pressure may be affected by various factors, including body mass index, abdominal wall movement, the size of intra-abdominal organs, position and respiration. Given that the peritoneal cavity is a sealed space, alterations in any of these factors will elevate the IAP (**Liao et al., 2021; Silva et al., 2021**).

Positioning is a prevalent and essential nursing task conducted in ICU. It often acts as a central element that directs other nursing tasks (**Ismail, Mohammad & Mourad, 2021**). A multicenter analysis revealed considerable variations in

IAP measurements across different head of bed positions. The placement of the transducer at the mid axillary line or at the level of the symphysis pubis may introduce bias (**Depauw et al., 2019**). Moreover, the supine posture (laying on the back) can create challenges for individuals with abdominal pressure (AP), as it can exacerbate abdominal discomfort and respiratory distress (**Li et al., 2023**).

Furthermore, substantial respiratory and circulatory alterations occur when body posture changes (**Elzohry, Abd El Khalik & Ismael Roushdy, 2020**). In a supine position, the diaphragm must contract against the pressure produced by abdomen and intra-abdominal organs to shift and compress lung tissue, resulting in reduced functional residual capacity, reduced heart rate, and diminished peripheral vascular resistance. Also interfere with the native protective mechanism (e.g., cough, mucociliary clearance) and facilitate pulmonary aspiration. Thus, it can contribute to the pathogenesis of ventilator-associated pneumonia (**Arora, Patil, Saif & Khude, 2024; Güner & Kutlutürkan, 2022**).

The lateral position improves ventilation and enhances oxygen saturation. Furthermore, maintaining a lateral position also seeks to avoid spinal compression, so enhancing respiration and reducing pressure on bodily organs. The suggested position is the right lateral position (laying on the side). The oxygen saturation level during sleep is greater in the right lateral position compared to the left in

cardiopulmonary patients (**Agustina, Nurhaeni & Hayati, 2021**).

Moreover, the right lateral position may effectively decrease residual gastric volume, reduce regurgitation and aspiration in adults, and decrease the incidence of ventilator-associated pneumonia (**Farsi, Butler & Zareiyan, 2020; Pozuelo-Carrascosa et al., 2022**). The present study aims to assess the effect of supine versus right lateral position on intra-abdominal pressure measurements and respiratory dynamics in critically ill patients.

### **Significance of the study**

Evaluating intra-abdominal pressure (IAP) in critically ill ICU patients protects these patients from developing serious complications that will result from a pathological increase of IAP from abdominal surgery, major trauma, acute pancreatitis, massive fluid resuscitation or positive fluid balance, and mechanical ventilation (**Silva, Ball, Rocco & Pelosi, 2022**). Consequently, it should consider IAP as the 6th vital sign, alongside heart rate, respiration rate, blood pressure, core body temperature, and peripheral oxygen saturation (**Tayebi et al., 2023**).

The researcher noticed in real-time practice that most critically ill intubated patients did not undergo monitoring of IAP by ICU nurses. It was observed that several ICU nurses lacked understanding regarding significance of IAP measurement. The conditions may result from ICU staff repositioning patients, although they did not assess IAP. However, a few nurses monitor the patient's

hemodynamic status following the administration of nursing care. There is little proof about the impact of right-side posture on IAP. Therefore, this study aims to assess effect of supine versus right lateral position on intra-abdominal pressure measurements and respiratory dynamics for critically ill patients.

### **Aim of the study**

The aim of this current study was to assess the effect of supine versus right lateral position on intra-abdominal pressure measurements and respiratory dynamics for critically ill patients.

### **Research hypotheses**

1. Critically ill patients who are placed at right lateral position are expected to have less alteration of IAP measurements than at supine position .
2. Critically ill patients who are placed at right lateral position are expected to have an improvement in respiratory dynamics than at supine position.

### **Subjects and method**

#### **Subjects**

#### **Research design:**

A quasi- experimental research design was utilized in this study.

#### **Setting:**

The study was conducted in the Surgical ICU of Emergency Tanta University Hospitals, Gharbia Governorate which affiliated to Ministry of Higher Education and Scientific Research. This unit consists of four rooms, each with four beds, resulting in a total of sixteen beds.

#### **Subjects:**

A purposive sample of sixty adult

critically ill patients who met the inclusion criteria was obtained from the mentioned setting. The sample size was determined utilizing the Epi Info 7 Statistical Program, and the total number of individuals admitted annually, as per the analysis of Tanta University Hospital's statistical health records for 2023, was 150 patients and the sample size calculated as the following:

- Total patients are 150 annually
- Confidence level= 99.9%
- Expected frequency= 50%
- Accepted error= 5%
- Confidence coefficient= 95%

### **The subjects were selected according to the following inclusion criteria:**

- Adult patients are twenty-one years and older.
- Both sexes.
- Patients on Synchronized Intermittent Mandatory Ventilation (SIMV) mode with positive end expiratory pressure (PEEP) equal 5 cm H<sub>2</sub>O.
- Having indwelling urinary catheter.

### **Exclusion criteria:**

- Patients with pulmonary edema.
- Pregnant women.
- Patients with neurogenic bladder, bladder rupture and hematuria.
- Patients with pelvic fracture.

### **Tools of data collection: -**

To collect the necessary data, 3 tools were utilized in this study as the following:

#### **Tool I: Critically Ill Patients Assessment Tool: -**

This tool was developed by the researcher after reviewing related literature (Allam, et al.,2023; Hsu, et

al., 2024; Hak et al., 2022; Khalil et al., 2021; Lauridsen et al., 2022; Ramazani & Hosseini., 2022; and Shehab., 2017) to evaluate demographic, clinical data of the critically ill cases and urinary indwelling catheter. It includes 3 parts as the following:

#### **Part (a): Patients' Demographic Characteristics:**

Which was included demographic characteristics of patients such as; patient's code, age, gender, marital status and education level.

#### **Part (b): Patients' Clinical Data:**

It was used to assess clinical data as current medical diagnosis, past medical history, body mass index, type of urinary catheter, size and number of urinary catheter lumens.

#### **Part (c): Patients' Hemodynamic Parameters:**

It was used to assess systolic blood pressure, diastolic blood pressure, mean arterial pressure, respiratory rate, pulse rate and temperature.

#### **Tool II: Intra-abdominal Pressure Measurements Recording Sheet:**

The tool was created by the researcher following a relevant literature review (Rajasurya & Surani., 2020) to detect changes of intra-abdominal pressure at different position and then grading intra-abdominal pressure that was estimated by mean and standard deviation into the following grades.

#### **Scoring system:-**

Grading of IAP	IAP (mmHg)
Normal IAP	>12
IAH Gade I	12-15
IAH Gade II	16-20
IAH Gade III	21-25
IAH Gade IV	>25

#### **Tool III: Respiratory Dynamics Assessment Tool**

This tool was created by the

researcher after reviewing related literature (Kulkarni & Sheela., 2020) and it included an assessment of the following: -

- **Airway Resistance** is the opposition or obstruction to airflow during respiration. Calculated by equation:  $R = (P_{max} - P_{plat}) / V_i$ . While R represents airway resistance,  $P_{max}$  represents maximum airway pressure,  $P_{plat}$  represents plateau pressure,  $v_i$  represents flow rate of gas during inspiration.
- **Lung compliance** is the measure of stretchability or elasticity of the lungs. calculated by equation:  $C_{lt} = v_t / (P_{plat} - PEEP)$ . While  $C_{lt}$  represents lung compliance,  $v_t$  represents tidal volume,  $P_{plat}$  represents plateau pressure, PEEP represents positive end expiratory pressure.

#### **Methods**

**1. An official permission** was obtained from the Dean of the Faculty of Nursing at Tanta University and directed to the director of the Surgical Intensive Care Unit at Tanta Emergency Hospital inside Tanta University Hospitals, to obtain approval for collecting necessary study data from the chosen setting.

#### **2. Ethical considerations:**

- Approval of the Ethical Committee of the Faculty of Nursing Tanta University was obtained (420-3-2024).
- Consent was obtained from the first-degree family member of patients on mechanical ventilation before participation of their patients in this study and posts

clarification the aim of the current study.

- Family members of the studied patient were informed that each participant had the opportunity to withdraw from the study at any point during the study procedure without incurring any penalties.
  - The study did not inflict any harm on the intubated individuals.
  - Confidentiality was preserved through the utilization of a code number instead of a name.
- 3. Tool development:** The researcher constructed the study methods based on a review of pertinent literature.
- 4. Tools validity** was tested for content validity by five experts in the field of specialty such as Critical Care and Emergency Nursing, and Biostatistics.
- 5. Reliability:** Tools were evaluated for reliability and alpha Cronbach's alpha was calculated for standardized items, yielding values of 0.896, 0.848, and 0.900 for tools **I**, **II**, **III** respectively, indicating high reliability.
- 6. A pilot study** was conducted by the researcher on 10% of the subjects to evaluate the tools for clarity, applicability, and to determine potential impediments that may arise during gathering data. Consequently, the researcher reworded and incorporated supplementary terminology before the primary research study. The pilot study was excluded from the total number of study sample.
- 7. Data Collection:**
- Data was collected during a six-

month period, commencing at the beginning of June 2024 and until the end of December 2024.

**- The study was carried out in four phases as follows:**

**A. Assessment phase: -**

- The researcher conducted a primary assessment for all mechanically ventilated patients at the previously mentioned setting to ascertain which patient fulfilled the study's inclusion criteria.
- Evaluation of Patients' demographic data, clinical, urinary catheter and hemodynamic parameters were carried out utilizing the developed tool **I** part (A, B and C).
- Intra-abdominal pressure and respiratory dynamics parameters were measured two times per day in the morning and evening shift at two different positions with 15 minutes interval for each within 48 hours by researcher using the developed tool **II & III**.

**B. Planning phase: -**

This phase was designed based on the assessment phase and a review of the literature. Priorities and expected outcome criteria were considered in the design of patient treatment.

**Expected clinical outcomes include:**

The patients at right lateral position maintain intra-abdominal pressure measurements with less alteration and exhibit an improvement of respiratory dynamics.

**C. Implementation phase:**

This phase included the following:  
The IAP measurement was done

through urinary bladder using manometer, extension tube, clamp, Ryle syringe 50 ml and 0.9% NaCl fluid. Measurements were made with the following steps: -

### **1. Preparation**

**Under sterile conditions, the researcher connected the extension tube to Foley catheter patients as following:**

- The Ryle syringe filled with liquid NaCl 0.9% at 50 ml.
- The manometer connected to extension tube.
- The catheter clamped at the distal part beyond the sample port with a non-crushing clamp.
- Disconnect the catheter from the drainage tubing
- Ensured that urine in the Foley catheter was completely released.
- The researcher instilled 50 ml of sterilized normal saline solution with body temperature gently into the bladder, applying non-crushing clamp.
- Connect extension tube with manometer to the open end of the catheter.

### **2. Intra-abdominal measurement technique at supine and right lateral position:**

- Establish the zero point by drawing a parallel line from the symphysis pubis laterally, and then extend the axillary line medially at the iliac crest region along the mid-axillary line.
- The zero point of water monument adjusted with the marked area.
- After instilling saline, must wait 30-60 seconds to give bladder

muscle time to relax and to create a balance between a patient's body after injecting normal saline solution and adjusting the patients at a head-of-bed angle.

- The patient put in supine position with head of the bed at (0) degree angle and after 5 minutes the patient put at (15) degree angle.
- Then the patient put in right lateral position with head of the bed at a (0) angle and after 5 minutes the patient put at (15) degree angle.
- The researcher Placed hand over abdomen to assess for muscle relaxation.
- The researcher removed the clamp from the Foley probe after 30 seconds to open between the water monometer and the patient then the IAP recorded at end-expiratory after some respirations.
- After measurement of IAP the extension tube disconnected from the catheter and reconnected the drainage bag.
- Each IAP value was obtained by manometer (cmH<sub>2</sub>O) and recalculated in millimeter mercury using the conversion factor (1 cmH<sub>2</sub>O = 0.74 mmHg).

### **D. Evaluation phase:**

Evaluation of intra-abdominal pressure and respiratory dynamics in supine and right lateral position at 0 and 15 degree angle for each position with 15 minutes interval for each by using tool **II** and **III**. This will be performed 2 times with 6 hours interval during morning and afternoon shift within 48 hours.

**Results:**

**Table (1) shows distribution of socio-demographic characteristics among the critically ill patients studied.** It was observed that, more than one third (36.67%) of studied patients aged between 50 to 60 years old with the Mean  $\pm$  SD  $42.70 \pm 12.78$ , more than half (53.33% & 58.33%) of them were males and married respectively. Also, this result showed that more than one third (40.00%) of the subjects had secondary education.

**Table (2) represents distribution of the studied critically ill patients regarding their clinical data.**

Regarding current medical diagnosis, it was showed that, more than one third of patients (38.33%) were diagnosed with post-operative disorder and less than one third (30.00%) of them had poly trauma. **Concerning comorbidities and past medical history**, the current study found that less than half of studied sample (45.00%) had past history for cardiovascular disorders.

**In regarding to BMI**, it was found that more than one third of studied subjects (41.67%) were overweight, with the Mean  $\pm$  SD  $26.55 \pm 4.01$ . While, related the urinary catheter assessment, the result showed that all the patients (100%) had transurethral urinary catheter with double lumen. Additionally, it was found that less than half (48.33% & 45.00%) of the patients were catheterized with 18 Fr or 16 Fr catheter size respectively.

**Table (3) Mean scores of hemodynamic parameters among the studied critically ill patients at 1<sup>st</sup> and 2<sup>nd</sup> days of implementation.**

**Concerning blood pressure**, the result illustrates that A statistically significant difference was observed in systolic blood pressure among the studied patients while in the supine posture at the head of bed (0&15) degree on the 2<sup>nd</sup> day as p value = (0.042). Moreover, there was a statistically significant difference among the subjects regarding SBP, DBP& MAP in the supine versus right lateral position at the head of bed (0&15) degree in the 2<sup>nd</sup> day only as p value = (0.031, 0.019, 0.034, 0.022, 0.028 & 0.023) respectively.

**Regarding respiratory rate**, A significant statistical difference was seen among the studied subjects in the supine and right lateral positions at the head of bed (0&15) degree in the 1<sup>st</sup> day at p value = (0.007 & 0.015) respectively and also in the 2<sup>nd</sup> day at p value (0.018&0.017) respectively. Moreover, there was a highly statistically significant difference among the studied patients in the supine versus right lateral position at the head of bed (0&15) degree on the 1<sup>st</sup> day at p value = (0.000 & 0.000) respectively and also in the 2<sup>nd</sup> day at p value (0.000&0.000) respectively.

**Table (4) represents mean scores of IAP measurements with different body position among the studied critically ill patients at 1<sup>st</sup> and 2<sup>nd</sup> days of implementation.**

**Regarding IAP reading at supine position**, it was found that the mean IAP at the morning at the head of bed at (0) angle was ( $10.12 \pm 3.57$ ) in the 1<sup>st</sup> day compared to ( $10.08 \pm 3.81$ ) in the 2<sup>nd</sup> day respectively. Also, it was found that the mean IAP at the

evening at Head of bed at (0) angle was  $(10.32 \pm 3.69)$  in the 1<sup>st</sup> day compared to  $(10.08 \pm 3.82)$  in the 2<sup>nd</sup> day respectively.

Further, it was found that the mean IAP at the morning at Head of bed at (15) angle was  $(11.12 \pm 3.57)$  in the 1<sup>st</sup> day compared to  $(11.08 \pm 3.81)$  in the 2<sup>nd</sup> day respectively. Also, it was found that the mean IAP at the evening at Head of bed at (15) angle was  $(11.32 \pm 3.69)$  in the 1<sup>st</sup> day compared to  $(11.03 \pm 3.85)$  in the 2<sup>nd</sup> day respectively.

**Concerning IAP reading at right lateral position,** it was found that the mean IAP at the morning at Head of bed at (0) angle was  $(11.40 \pm 3.71)$  in the 1<sup>st</sup> day compared to  $(11.38 \pm 3.94)$  in the 2<sup>nd</sup> day respectively. Also, it was found that the mean IAP at the evening at Head of bed at (0) angle was  $(11.55 \pm 3.79)$  in the 1<sup>st</sup> day compared to  $(11.37 \pm 3.99)$  in the 2<sup>nd</sup> day respectively.

Further, it was found that the mean IAP at the morning at Head of bed at (15) angle was  $(12.40 \pm 3.68)$  in the 1<sup>st</sup> day compared to  $(12.40 \pm 3.89)$  in the 2<sup>nd</sup> day respectively. Also, it was found that the mean IAP at the evening at Head of bed at (15) angle was  $(12.32 \pm 4.07)$  in the 1<sup>st</sup> day compared to  $(12.33 \pm 3.96)$  in the 2<sup>nd</sup> day respectively.

In addition, this table illustrates that there were no significant differences between IAP measurements in supine position versus right lateral position throughout all period of the study in which  $P > 0.05$ .

**Table (5) reveals mean scores of respiratory dynamics measurements of supine versus**

**right lateral position among the critically ill patients studied at 1<sup>st</sup> and 2<sup>nd</sup> days of implementation.**

**Regarding lung compliance,** A significant statistical difference was seen between the critically ill patients studied in the supine and right lateral positions at the head of the bed ( $0^\circ$  and  $15^\circ$ ) on the first day at p value  $(0.010 \& 0.015)$  respectively and also in the 2<sup>nd</sup> day as p value  $(0.009 \& 0.026)$  respectively. Moreover, there was a statistically significant difference among the studied patients in the supine versus right lateral position at the head of bed (15) degree on the 1<sup>st</sup> and the 2<sup>nd</sup> day where p value  $(0.045 \& 0.037)$  respectively.

**Related to airway resistance,** it was found that there was not a statistically significant difference between the subjects in the supine and right lateral position at the head of the bed ( $0 \& 15$ ) degree in the 1<sup>st</sup> day and the 2<sup>nd</sup> day of implementation as p value  $(> 0.05)$ . While, there was a statistically significant difference among the studied patients in the supine versus right lateral position at the head of bed ( $0 \& 15$ ) degree in the 1<sup>st</sup> day at p value  $(0.019 \& 0.001)$  respectively and also in the 2<sup>nd</sup> day as p value  $(0.004 \& 0.003)$  respectively.

**Table (6&7) shows correlation between clinical data of the critically ill patients studied and intra-abdominal pressure measurements at 1<sup>st</sup> & 2<sup>nd</sup> day of implementation.**

This table illustrates that the highest mean score of IAP measurements in supine and right lateral position at head of bed at ( $0 \& 15$ ) angle at 1<sup>st</sup> &



2<sup>nd</sup> day of implementation in cases with acute respiratory distress syndrome. While, the highest mean score of IAP measurements at supine and right lateral position at head of bed at (0&15) degree was seen with the obese patients in the 1<sup>st</sup> & 2<sup>nd</sup> day of implementation. Also, the highest mean score of IAP measurements at supine and right lateral position at head of bed at (0&15) degree was seen in the patients with urinary catheter with 18 fr in the 1<sup>st</sup> & 2<sup>nd</sup> day of implementation.

Moreover, this table shows a highly statistically difference was found in the mean score of IAP& body mass index in the 1<sup>st</sup> & 2<sup>nd</sup> day respectively where P value = 0.000.

**Table (8) represents correlation between intra-abdominal pressure measurements and respiratory dynamics of the studied critically ill patients.**

This table shows that there was a highly statistically significant negative correlation observed among the studied critically ill patients in the supine and right lateral position at degree (0&15) regarding IAP measurements and CLt throughout all the period of the study in which  $P < 0.01$ . While, a highly statistically significant positive correlation was observed among the studied patients in **the supine** at degree (0&15) regarding IAP measurements and Raw throughout all the period of the study in which  $P = 0.000$ . Also, a

highly statistically significant positive correlation was observed among the studied critically ill patients in the **right lateral** position at degree (0&15) regarding IAP measurements and Raw in the 2<sup>nd</sup> day of implementation in which  $P = 0.000$ .

**Table (9) illustrates correlation between hemodynamics and intra-abdominal pressure measurements of the studied critically ill patients.**

This table illustrates that there was a statistically significant negative correlation among the critically ill patients studied regarding IAP measurements and DBP in the supine and right lateral position at degree (0&15) in the 2<sup>nd</sup> day of the study as P value = (0.026, 0.027, 0.015, 0.012, 0.032, 0.033& 0.014) respectively. Also, a statistically significant negative correlation was observed among the studied critically ill patients in the supine at (15) degree regarding IAP measurements and MAP at the morning and evening of the 2<sup>nd</sup> day as P value = (0.042, 0.035) respectively.

In addition, it was found that there was a high statistically significant positive correlation between IAP & RR at the supine and right lateral position at degree (0&15) in the morning and evening of the 2<sup>nd</sup> day with as P value = (0.008, 0.013, 0.004, 0.005, 0.003, 0.003, 0.005& 0.002) respectively.

**Table (1): Distribution of socio-demographic characteristics among the critically ill patients studied**

Characteristics	The studied patients (n=60)	
	N	%
Age (in years)		
▪ (21-<30)	14	23.33
▪ (30-<40)	15	25.00
▪ (40-<50)	9	15.00
▪ (50-60)	22	36.67
Range	(21-59)	
Mean $\pm$ SD	42.70 $\pm$ 12.78	
Gender		
▪ Male	32	53.33
▪ Female	28	46.67
Marital status		
▪ Married	35	58.33
▪ Single	12	20.00
▪ Divorced	4	6.67
▪ Widow	9	15.00
Level of education		
▪ Illiterate	10	16.67
▪ Read and write	6	10.00
▪ Primary education	6	10.00
▪ Secondary education	24	40.00
▪ University educated	14	23.33

**Table (2): Distribution of the studied critically ill patients regarding their clinical data**

Clinical data	The studied patients (n=60)	
	N	%
Current medical diagnosis		
▪ Acute respiratory distress syndrome	2	3.33
▪ Poly trauma	18	30.00
▪ Acute respiratory failure	8	13.33
▪ Post-operative disorder	23	38.34
▪ Cerebrovascular accident	9	15.00
# Past medical history		
▪ None	12	20.00
▪ Cardiovascular disorders	27	45.00
▪ Respiratory disease	12	20.00
▪ Hepatic disorders	3	5.00
▪ Neurological disorders	4	6.67
▪ Endocrine disorders	22	36.67
Weight (in Kg)		
Range	(51-108)	
Mean $\pm$ SD	76.85 $\pm$ 11.82	
Height (in Cm)		
Range	(157-186)	
Mean $\pm$ SD	170.25 $\pm$ 8.39	
Body mass index		
▪ Normal (18.5–24.9)	24	40.00
▪ Overweight (25–<30)	25	41.67
▪ Obese ( $\geq$ 30)	11	18.33
Range	(19.36-37.37)	
Mean $\pm$ SD	26.55 $\pm$ 4.01	
Urinary catheter assessment		
Types		
▪ Transurethral	60	100.00
Size		
▪ 16 fr	27	45.00
▪ 18 fr	29	48.33
▪ 20 fr	4	6.67
Number of catheter lumens		
▪ Double lumen	60	100.00

# More than one answer was chosen

**Table (3): Mean scores of hemodynamic parameters among the studied critically ill patients at 1<sup>st</sup> and 2<sup>nd</sup> days of implementation**

Parameters	The studied patients (n=60)											
	Range											
	Mean $\pm$ SD											
	1 <sup>st</sup> day						2 <sup>nd</sup> day					
	Supine position		t P	Right lateral position		t P	Supine position		t P	Right lateral position		t P
	0-angle	15-angle		0-angle	15-angle		0-angle	15-angle		0-angle	15-angle	
<b>1. Blood pressure</b>												
▪ Systolic (SBP)	(95-147) 119.33 $\pm$ 11.73	(96-150) 122.85 $\pm$ 12.36	1.60 0.113	(93-143) 116.07 $\pm$ 11.20	(94-146) 118.88 $\pm$ 11.56	1.36 0.178	(91-139) 122.08 $\pm$ 9.18	(92-140) 125.67 $\pm$ 9.85	2.06 0.042*	(90-137) 118.57 $\pm$ 8.47	(91-138) 121.53 $\pm$ 9.09	1.85 0.067
Supine Vs Right lateral t, P	1.56 , 0.121	1.82 , 0.072					2.18 , 0.031*	2.39 , 0.019*				
▪ Diastolic (DBP)	(60-90) 72.47 $\pm$ 7.24	(60-90) 74.68 $\pm$ 7.70	1.62 0.107	(59-89) 70.95 $\pm$ 6.66	(60-90) 72.07 $\pm$ 7.04	0.89 0.374	(60-88) 74.35 $\pm$ 6.70	(60-88) 76.22 $\pm$ 7.29	1.46 0.147	(60-87) 71.92 $\pm$ 5.67	(60-88) 73.38 $\pm$ 5.98	1.38 0.171
Supine Vs Right lateral t, P	1.20 , 0.235	1.94 , 0.054					2.15 , 0.034*	2.33 , 0.022*				
<b>2. Mean arterial pressure (MAP)</b>	(72-108) 87.65 $\pm$ 8.26	(73-110) 90.28 $\pm$ 8.63	1.71 0.090	(71-106) 85.72 $\pm$ 7.69	(71-107) 87.33 $\pm$ 8.18	1.11 0.268	(70-105) 89.87 $\pm$ 7.13	(70-105) 92.32 $\pm$ 7.80	1.80 0.075	(70-103) 87.18 $\pm$ 6.05	(70-104) 89.28 $\pm$ 6.58	1.82 0.071
Supine Vs Right lateral t, P	1.32 , 0.188	1.92 , 0.057					2.22 , 0.028*	2.30 , 0.023*				
<b>3. Heart rate (HR)</b>	(74-117) 92.73 $\pm$ 10.56	(71-116) 90.25 $\pm$ 10.87	1.27 0.207	(70-115) 89.22 $\pm$ 10.77	(68-114) 87.03 $\pm$ 11.11	1.09 0.277	(74-123) 89.32 $\pm$ 11.16	(70-121) 86.58 $\pm$ 11.76	1.31 0.194	(71-120) 85.58 $\pm$ 11.62	(68-119) 83.40 $\pm$ 11.95	1.02 0.312
Supine Vs Right lateral t, P	1.81 , 0.074	1.60 , 0.112					1.80 , 0.075	1.47 , 0.144				
<b>4. Temperature (° c)</b>	(36.6-38) 37.29 $\pm$ 0.37	(36.6-38) 37.29 $\pm$ 0.35	0.08 0.939	(36.6-37.8) 37.26 $\pm$ 0.29	(36.6-37.9) 37.27 $\pm$ 0.30	0.16 0.876	(36.5-37.7) 37.23 $\pm$ 0.24	(36.5-37.7) 37.25 $\pm$ 0.23	0.35 0.728	(36.6-37.7) 37.25 $\pm$ 0.20	(36.6-37.8) 37.26 $\pm$ 0.21	0.35 0.725
Supine Vs Right lateral t, P	0.50 , 0.618	0.28 , 0.779					0.41 , 0.684	0.37 , 0.710				
<b>5. Respiratory rate (RR)</b>	(17-27) 21.42 $\pm$ 2.37	(16-25) 20.27 $\pm$ 2.26	2.72 0.007*	(16-24) 19.37 $\pm$ 2.16	(16-23) 18.43 $\pm$ 2.00	2.46 0.015*	(18-29) 20.77 $\pm$ 2.68	(17-27) 19.60 $\pm$ 2.67	2.39 0.018*	(16-26) 18.77 $\pm$ 2.53	(15-25) 17.67 $\pm$ 2.45	2.42 0.017*
Supine Vs Right lateral t, P	4.96 , 0.000*	4.71 , 0.000*					4.20 , 0.000*	4.13 , 0.000*				

\* Statistically significant at level P&lt;0.05

**Table (4): Mean scores of intra-abdominal pressure measurements with different body position among the studied critically ill patients at 1<sup>st</sup> and 2<sup>nd</sup> days of implementation**

Intra-abdominal Pressure Measurements	The studied patients (n=60)											
	Range											
	Mean $\pm$ SD											
	1 <sup>st</sup> day						2 <sup>nd</sup> day					
	Supine position		t P	Right lateral position		t P	Supine position		t P	Right lateral position		t P
	0-angle	15-angle		0-angle	15-angle		0-angle	15-angle		0-angle	15-angle	
1. Morning	(4-21) 10.12 $\pm$ 3.57	(5-22) 11.12 $\pm$ 3.57	1.536 0.127	(5-23) 11.40 $\pm$ 3.71	(6-24) 12.40 $\pm$ 3.68	1.918 0.058	(5-23) 10.08 $\pm$ 3.81	(6-24) 11.08 $\pm$ 3.81	1.441 0.152	(6-24) 11.38 $\pm$ 3.94	(7-25) 12.40 $\pm$ 3.89	1.422 0.158
Supine Vs Right lateral t P	1.93 0.056	1.88 0.063					1.84 0.068	1.88 0.063				
2. Evening	(4-23) 10.32 $\pm$ 3.69	(5-24) 11.32 $\pm$ 3.69	1.483 0.141	(5-25) 11.55 $\pm$ 3.79	(6-26) 12.32 $\pm$ 4.07	1.066 0.288	(5-22) 10.08 $\pm$ 3.82	(6-23) 11.03 $\pm$ 3.85	1.358 0.177	(6-23) 11.37 $\pm$ 3.99	(7-24) 12.33 $\pm$ 3.96	1.333 0.185
Supine Vs Right lateral t P	1.83 0.074	1.41 0.162					1.81 0.074	1.82 0.071				

**Table (5): Mean scores of respiratory dynamics measurements of supine versus right lateral position among the studied critically ill patients at 1<sup>st</sup> and 2<sup>nd</sup> days of implementation**

Respiratory dynamics assessment	The studied patients (n=60)											
	Range											
	Mean $\pm$ SD											
	1 <sup>st</sup> day						2 <sup>nd</sup> day					
	Supine position		t P	Right lateral position		T P	Supine position		t P	Right lateral position		t P
	0-angle	15-angle		0-angle	15-angle		0-angle	15-angle		0-angle	15-angle	
1. Lung compliance (Cl <sub>t</sub> )	(30-88) 55.40 $\pm$ 14.61	(20-96) 62.53 $\pm$ 15.43	2.61 0.010*	(26-83) 50.38 $\pm$ 14.49	(32-91) 56.95 $\pm$ 14.74	2.46 0.015*	(25-92) 56.33 $\pm$ 15.56	(32-101) 63.88 $\pm$ 15.81	2.64 0.009*	(21-87) 51.35 $\pm$ 15.52	(26-96) 57.80 $\pm$ 15.82	2.25 0.026*
Supine Vs Right lateral t, P	1.89 , 0.061	2.03 , 0.045*					1.76 , 0.082	2.11 , 0.037*				
2. Airway Resistance (Raw)	(5.3-12.6) 9.17 $\pm$ 1.67	(4.8-12.1) 8.58 $\pm$ 1.62	1.93 0.056	(6.3-15.3) 10.94 $\pm$ 2.56	(5.8-12.8) 9.64 $\pm$ 1.61	1.75 0.083	(5.3-13.7) 9.02 $\pm$ 1.97	(4.8-12.7) 8.44 $\pm$ 1.91	1.62 0.108	(6.3-15.2) 10.09 $\pm$ 2.03	(5.8-14.2) 9.51 $\pm$ 1.97	1.61 0.110
Supine Vs Right lateral t, P	2.37 , 0.019*	3.56 , 0.001*					2.96 , 0.004*	3.02 , 0.003*				

\* Statistically significant at level P&lt;0.05

**Table (6): Correlation between clinical data of the studied critically ill patients and intra-abdominal pressure measurements at 1<sup>st</sup> day of implementation**

Clinical data	The studied patients (n=60) Intra-abdominal pressure measurements Mean $\pm$ SD 1 <sup>st</sup> day							
	Supine position				Right lateral position			
	0-angle		15-angle		0-angle		15-angle	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
<b>Current medical diagnosis</b>								
▪ Acute respiratory distress syndrome	12.00 $\pm$ 5.66	12.00 $\pm$ 7.07	13.00 $\pm$ 5.66	13.00 $\pm$ 7.07	13.50 $\pm$ 6.36	13.50 $\pm$ 7.78	<b>14.50<math>\pm</math>6.36</b>	<b>14.50<math>\pm</math>7.78</b>
▪ Poly trauma	8.28 $\pm$ 2.68	8.67 $\pm$ 2.68	9.28 $\pm$ 2.68	9.67 $\pm$ 2.68	9.56 $\pm$ 2.81	9.94 $\pm$ 2.78	10.56 $\pm$ 2.81	10.94 $\pm$ 2.78
▪ Acute respiratory failure	10.38 $\pm$ 2.88	10.63 $\pm$ 3.25	11.38 $\pm$ 2.88	11.63 $\pm$ 3.25	11.38 $\pm$ 2.88	11.63 $\pm$ 3.25	12.38 $\pm$ 2.88	12.63 $\pm$ 3.25
▪ Post-operative disorder	10.52 $\pm$ 2.81	10.57 $\pm$ 2.69	11.52 $\pm$ 2.81	11.57 $\pm$ 2.69	11.83 $\pm$ 2.73	11.83 $\pm$ 2.64	12.87 $\pm$ 2.74	12.87 $\pm$ 2.63
▪ Cerebrovascular accident	<b>12.11<math>\pm</math>5.67</b>	<b>12.33<math>\pm</math>6.19</b>	<b>13.11<math>\pm</math>5.67</b>	<b>13.33<math>\pm</math>6.19</b>	<b>13.56<math>\pm</math>6.13</b>	<b>13.56<math>\pm</math>6.52</b>	14.44 $\pm$ 6.00	14.44 $\pm$ 6.41
<b>F , P</b>	2.31 0.069	1.81 0.141	2.31 0.069	1.81 0.141	2.29 0.071	1.67 0.171	2.26 0.074	1.64 0.179
<b>Body mass index</b>								
▪ Normal	7.96 $\pm$ 2.35	8.33 $\pm$ 2.39	8.96 $\pm$ 2.35	9.33 $\pm$ 2.39	9.21 $\pm$ 2.30	9.58 $\pm$ 2.36	10.21 $\pm$ 2.30	10.58 $\pm$ 2.36
▪ Overweight	10.00 $\pm$ 2.42	9.88 $\pm$ 2.56	11.00 $\pm$ 2.42	10.88 $\pm$ 2.56	11.24 $\pm$ 2.60	11.04 $\pm$ 2.67	12.28 $\pm$ 2.62	12.08 $\pm$ 2.68
▪ Obese	<b>15.09<math>\pm</math>3.15</b>	<b>15.64<math>\pm</math>3.26</b>	<b>16.09<math>\pm</math>3.15</b>	<b>16.64<math>\pm</math>3.26</b>	<b>16.55<math>\pm</math>3.48</b>	<b>17.00<math>\pm</math>3.55</b>	<b>17.45<math>\pm</math>3.39</b>	<b>17.91<math>\pm</math>3.48</b>
<b>F , P</b>	<b>29.94</b> <b>0.000*</b>	<b>29.65</b> <b>0.000*</b>	<b>29.94</b> <b>0.000*</b>	<b>29.65</b> <b>0.000*</b>	<b>28.63</b> <b>0.000*</b>	<b>28.59</b> <b>0.000*</b>	<b>28.14</b> <b>0.000*</b>	<b>28.07</b> <b>0.000*</b>
<b>Size of urinary catheter</b>								
▪ 16 fr	10.15 $\pm$ 3.79	10.33 $\pm$ 4.05	11.15 $\pm$ 3.79	11.33 $\pm$ 4.05	11.48 $\pm$ 3.95	11.56 $\pm$ 4.12	12.48 $\pm$ 3.95	12.56 $\pm$ 4.12
▪ 18 fr	<b>10.41<math>\pm</math>3.45</b>	<b>10.59<math>\pm</math>3.53</b>	<b>11.41<math>\pm</math>3.45</b>	<b>11.59<math>\pm</math>3.53</b>	<b>11.69<math>\pm</math>3.58</b>	<b>11.86<math>\pm</math>3.66</b>	<b>12.69<math>\pm</math>3.51</b>	<b>12.86<math>\pm</math>3.58</b>
▪ 20 fr	7.75 $\pm$ 2.50	8.25 $\pm$ 1.89	8.75 $\pm$ 2.50	9.25 $\pm$ 1.89	8.75 $\pm$ 2.50	9.25 $\pm$ 1.89	9.75 $\pm$ 2.50	10.25 $\pm$ 1.89
<b>F , P</b>	0.98 0.381	0.70 0.503	0.98 0.381	0.70 0.503	1.12 0.334	0.83 0.443	1.14 0.327	0.84 0.436

\* Statistically significant at level P&lt;0.0

**Table (7): Correlation between clinical data of the studied critically ill patients and intra-abdominal pressure measurements at 2<sup>nd</sup> day of implementation**

Clinical data	The studied patients (n=60) Intra-abdominal pressure measurements Mean $\pm$ SD 2 <sup>nd</sup> day							
	Supine position				Right lateral position			
	0-angle		15-angle		0-angle		15-angle	
	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
<b>Current medical diagnosis</b>								
▪ Acute respiratory distress syndrome	<b>12.50<math>\pm</math>7.78</b>	<b>13.00<math>\pm</math>7.07</b>	<b>13.50<math>\pm</math>7.78</b>	<b>14.00<math>\pm</math>7.07</b>	<b>14.50<math>\pm</math>9.19</b>	<b>15.00<math>\pm</math>8.49</b>	<b>15.50<math>\pm</math>9.19</b>	<b>16.00<math>\pm</math>8.49</b>
▪ Poly trauma	8.39 $\pm$ 2.50	8.50 $\pm$ 2.83	9.39 $\pm$ 2.50	9.50 $\pm$ 2.83	9.56 $\pm$ 2.41	9.72 $\pm$ 2.70	0.67 $\pm$ 2.40	10.72 $\pm$ 2.70
▪ Acute respiratory failure	10.50 $\pm$ 3.38	10.75 $\pm$ 3.28	11.50 $\pm$ 3.38	11.75 $\pm$ 3.28	11.75 $\pm$ 3.33	12.00 $\pm$ 3.38	12.75 $\pm$ 3.33	12.88 $\pm$ 3.48
▪ Post-operative disorder	10.26 $\pm$ 3.11	10.09 $\pm$ 3.25	11.26 $\pm$ 3.11	10.96 $\pm$ 3.35	11.65 $\pm$ 3.21	11.39 $\pm$ 3.47	12.65 $\pm$ 3.21	12.39 $\pm$ 3.47
▪ Cerebrovascular accident	12.11 $\pm$ 6.03	12.00 $\pm$ 5.77	13.11 $\pm$ 6.03	13.00 $\pm$ 5.77	13.33 $\pm$ 6.25	13.22 $\pm$ 6.00	14.22 $\pm$ 6.12	14.11 $\pm$ 5.84
<b>F , P</b>	1.88 0.127	1.79 0.145	1.88 0.127	1.76 0.151	2.00 0.107	1.81 0.139	1.85 0.133	1.75 0.151
<b>Body mass index</b>								
▪ Normal	8.25 $\pm$ 2.21	8.04 $\pm$ 2.44	9.25 $\pm$ 2.21	9.04 $\pm$ 2.44	9.50 $\pm$ 2.21	9.33 $\pm$ 2.37	10.54 $\pm$ 2.23	10.33 $\pm$ 2.37
▪ Overweight	9.48 $\pm$ 2.92	9.64 $\pm$ 2.63	10.48 $\pm$ 2.92	10.52 $\pm$ 2.73	10.68 $\pm$ 2.93	10.72 $\pm$ 2.81	11.72 $\pm$ 2.89	11.68 $\pm$ 2.82
▪ Obese	<b>15.45<math>\pm</math>3.59</b>	<b>15.55<math>\pm</math>3.50</b>	<b>16.45<math>\pm</math>3.59</b>	<b>16.55<math>\pm</math>3.50</b>	<b>17.09<math>\pm</math>3.78</b>	<b>17.27<math>\pm</math>3.55</b>	<b>18.00<math>\pm</math>3.72</b>	<b>18.18<math>\pm</math>3.46</b>
<b>F , P</b>	<b>26.05</b> <b>0.000*</b>	<b>29.02</b> <b>0.000*</b>	<b>26.05</b> <b>0.000*</b>	<b>28.38</b> <b>0.000*</b>	<b>28.22</b> <b>0.000*</b>	<b>31.63</b> <b>0.000*</b>	<b>27.65</b> <b>0.000*</b>	<b>31.25</b> <b>0.000*</b>
<b>Size of urinary catheter</b>								
▪ 16 fr	9.85 $\pm$ 4.26	9.96 $\pm$ 3.96	10.85 $\pm$ 4.26	10.89 $\pm$ 4.03	11.11 $\pm$ 4.37	11.19 $\pm$ 4.20	12.19 $\pm$ 4.34	12.19 $\pm$ 4.20
▪ 18 fr	<b>10.62<math>\pm</math>3.49</b>	<b>10.59<math>\pm</math>3.81</b>	<b>11.62<math>\pm</math>3.49</b>	<b>11.55<math>\pm</math>3.81</b>	<b>12.00<math>\pm</math>3.64</b>	<b>11.97<math>\pm</math>3.90</b>	<b>12.97<math>\pm</math>3.56</b>	<b>12.90<math>\pm</math>3.84</b>
▪ 20 fr	7.75 $\pm$ 1.71	7.25 $\pm$ 1.26	8.75 $\pm$ 1.71	8.25 $\pm$ 1.26	8.75 $\pm$ 1.71	8.25 $\pm$ 1.26	9.75 $\pm$ 1.71	9.25 $\pm$ 1.26
<b>F , P</b>	1.10 0.341	1.39 0.258	1.10 0.341	1.34 0.269	1.33 0.273	1.61 0.209	1.29 0.283	1.56 0.220

\* Statistically significant at level P&lt;0.05

**Table (8): Correlation between intra-abdominal pressure and respiratory dynamics of the studied critically ill patients**

Intra-abdominal Pressure measurements		The studied patients (n=60) Respiratory dynamics															
		1 <sup>st</sup> day								2 <sup>nd</sup> day							
		Supine position				Right lateral position				Supine position				Right lateral position			
		0-angle		15-angle		0-angle		15-angle		0-angle		15-angle		0-angle		15-angle	
		Clt	Raw	Clt	Raw	Clt	Raw	Clt	Raw	Clt	Raw	Clt	Raw	Clt	Raw	Clt	Raw
1. Morning	R	-0.405	0.514	-0.428	0.515	-0.408	-0.027	-0.058	0.160	-0.485	0.590	-0.486	0.585	-0.490	0.605	-0.480	0.600
	P	0.001**	0.000**	0.001**	0.000**	0.001**	0.835	0.659	0.223	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
2. Evening	R	-0.403	0.510	-0.420	0.514	-0.406	-0.028	-0.069	-0.055	-0.486	0.594	-0.478	0.583	-0.507	0.600	-0.496	0.601
	P	0.001**	0.000**	0.001**	0.000**	0.001**	0.829	0.600	0.674	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**

R: Pearson' correlation coefficient

\* Statistically significant at level P&lt;0.05

\*\* Statistically highly significant at level P&lt;0.01

**Table (9): Correlation between hemodynamic parameters and intra-abdominal pressure of studied critically ill patients**

Parameters		The studied patients (n=60) Intra-abdominal Pressure measurements															
		1 <sup>st</sup> day								2 <sup>nd</sup> day							
		Supine position				Right lateral position				Supine position				Right lateral position			
		0-angle		15-angle		0-angle		15-angle		0-angle		15-angle		0-angle		15-angle	
		Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening	Morning	Evening
1. Blood pressure																	
▪ Systolic	R	0.013	0.006	-0.033	-0.038	0.058	0.040	-0.094	-0.156	-0.131	-0.132	-0.177	-0.178	-0.095	-0.112	-0.148	-0.164
	P	0.922	0.963	0.800	0.771	0.659	0.760	0.476	0.235	0.319	0.316	0.176	0.175	0.468	0.394	0.259	0.211
▪ Diastolic	R	-0.156	-0.153	-0.207	-0.200	-0.144	-0.142	-0.100	-0.111	-0.288	-0.286	-0.312	-0.322	-0.246	-0.277	-0.276	-0.315
	P	0.233	0.242	0.112	0.126	0.272	0.280	0.445	0.397	0.026*	0.027*	0.015*	0.012*	0.058	0.032*	0.033*	0.014*
2. Mean arterial pressure (MAP)	R	-0.094	-0.095	-0.129	-0.125	-0.052	-0.060	-0.094	-0.119	-0.242	-0.237	-0.264	-0.272	-0.203	-0.229	-0.184	-0.207
	P	0.475	0.472	0.326	0.343	0.693	0.650	0.475	0.366	0.063	0.068	0.042*	0.035*	0.120	0.078	0.159	0.113
3. Heart rate (HR)	R	-0.031	-0.041	-0.004	-0.016	-0.006	-0.015	-0.089	0.050	0.053	0.088	0.078	0.121	0.091	0.143	0.094	0.147
	P	0.813	0.757	0.977	0.906	0.964	0.907	0.501	0.705	0.688	0.503	0.555	0.356	0.488	0.275	0.475	0.262
4. Temperature (° c)	R	-0.141	-0.135	-0.141	-0.133	-0.160	-0.150	-0.144	0.074	-0.076	-0.070	-0.059	-0.058	-0.088	-0.103	-0.046	-0.071
	P	0.284	0.305	0.284	0.313	0.221	0.252	0.273	0.572	0.563	0.593	0.654	0.661	0.502	0.433	0.726	0.591
5. Respiratory rate (RR)	R	0.131	0.167	0.171	0.213	0.183	0.226	0.050	0.022	0.338	0.321	0.364	0.354	0.376	0.383	0.360	0.384
	P	0.320	0.177	0.193	0.102	0.162	0.083	0.705	0.865	0.008**	0.013*	0.004**	0.005**	0.003**	0.003**	0.005**	0.002**

R: Pearson' correlation coefficient

\* statistically significant at level P&lt;0.05

\*\* statistically highly significant at level P&lt;0.01

## Discussion

The measurement of intra-abdominal pressure (IAP) is a vital hemodynamic monitoring method used in the ICU to identify patients at risk for intra-abdominal hypertension and subsequent abdominal compartment syndrome. IAP measurement is a rapid, safe, precise, and cost-effective method for diagnosing intra-abdominal hypertension, making it prevalent in clinical practice. In addition, the intra-abdominal pressure varies greatly depending on body position and bed head height (Li et al., 2023; Samimian et al., 2021).

**Regarding age**, the present result found that more than one third of subjects were between the ages of 50 and 60. From the viewpoint of the investigator this could be because of increased incidence of chronic diseases and ICU admission with advanced age. This result was confirmed by the research performed by Chawada, Chavan, Pokharkar, Deshmukh & Jamdade, (2024) who studied " A Cross-Sectional Study for Effect of IAP as A Factor for Abdominal Wound Dehiscence " and revealed that nearly one third of the sample were in 51-60 years old.

This conclusion was opposed by Ahmad, (2023), who investigated the "Effect of head of bed elevation on IAP measurement among mechanically ventilated critically ill patients" and found that nearly one quarter of participants aged in the range between 41-50 years.

**In relation to gender of studied patients**, the recent study revealed that over fifty percent of the studied

sample were male. From the researcher point of sight, male patients are admitted to the ICU more frequently than female patients; likely due to male patients participate in activities that result in elevated rates of illness and injury, such as chronic work-related stressors, smoking, and lifestyle choices. Furthermore, their genetic inheritance, hormonal profiles, and anatomy. This explanation was supported by Hill et al., (2020) who concluded that males were predominated in ICU admissions as they are at higher risk of getting several types of chronic diseases.

These findings also were agreed with the research performed by Ahmad, (2023) who revealed that above half of the subjects were males. Meanwhile, the recent study was incongruent with Plešnik et al., (2025) who concluded that above two thirds of subjects were females.

**Concerning marital status of the studied patients**, the finding of the current study found that more than half of the subjects were married. This may be explained by above one third of the subjects aged between 50 to 60 years old and this age is normally to be married. This result agreed with Zakaria Lutfy Yassien, Hessein Nassr, Abdallah Abdelatief & Mohammed Khalifa Ewees, (2024), who found that three quarters of the subjects were married.

**Related to level of education**, the present study revealed that more than one third of the subjects had secondary education. This finding was agreed with Zakaria Lutfy Yassien, Hessein Nassr, Abdallah



**Abdelatif & Mohammed Khalifa Ewees, (2024)**, who found that less than one third of the study sample had secondary educational level.

Meanwhile, this finding disagreed with **Qurany Ahmed, Elsayed Mahdy, Nadr Ebraheim, Hussein Bakr & Sayed Abd El Mawla, (2024)**, in a study entitled "Assessment of Gastrointestinal Outcomes among Intermittent Enterally Fed Critically Ill Patients" and showed that about one third of the studied subjects can't read and write.

**As regard to current medical diagnosis**, the present study showed that over one-third of the subjects were diagnosed with post-operative disorders, although fewer than one-third were classified as polytrauma cases. From the researcher's perspective, this outcome may be attributed to the nature of ICU admissions as emergencies, a rise in accidents, and an increased prevalence of chronic diseases among critically ill patients. This also might be because more than one half of subjects were males being more likely to engage in behaviors that increase their vulnerability to trauma (such as heavy work, fights, or even driving).

These findings were aligned with **Dukkipati et al., (2024)**, who represented that almost all the participants were post-operative. Furthermore, these findings were in harmony with **Samimian, Khaleghdoost, Ashraf & Hakimi, (2021)**, who found that less than two third of the studied subjects were diagnosed with trauma.

In contrast, these results were rejected by **AlJabri et al** who reported that almost one quarter of these individuals were diagnosed with acute respiratory distress syndrome (ARDS).

**Pertaining to comorbidities and past medical history**, the recent results found that less than half of subjects had past history for cardiovascular disorders. From the perspective of the investigator, this might as a result of most of the subjects were old aged so they were at higher risk for acquiring chronic diseases. This finding similar to **Ahmad, (2023)** who reported that two thirds of patients had past medical history for cardiovascular disorders.

**In regard to body mass index**, this current study revealed that over one-third of participants were classified as overweight. From the viewpoint of the investigator, this may be return to that the most of participants were elderly and that gaining weight is most common in adult over 50 years related to several causes including a decrease in resting metabolic rate, diminished physical activity, and age-related hormonal alterations. This finding in the same line with **Qurany Ahmed, Elsayed Mahdy, Nadr Ebraheim, Hussein Bakr & Sayed Abd El Mawla, (2024)**, in a study entitled "Assessment of Gastrointestinal Outcomes among Intermittent Enterally Fed Critically Ill Patients" and revealed that almost two fifths of the participants were overweight.

Meanwhile, this finding disagreed with **Chawada, Chavan,**

**Pokharkar, Deshmukh & Jamdade, (2024)** who represented that less than two thirds of participants had normal BMI.

**Regarding size of the catheter,** it was determined that fewer than fifty percent of studied sample were catheterized using 18 Fr or 16 Fr catheter sizes. This may arise from the availability of equipment in the ICU and client's characteristics, including age, sex, and urethral diameter. This finding aligns with **Hak et al., (2022)** who demonstrated that most of the participants in both the control and trial groups were catheterized with a 16 Fr catheter size.

**Concerning blood pressure,** there was a statistically significant difference increase regarding SBP, DBP& MAP among the studied critically ill patients when the patient was in supine versus right lateral position at the head of bed (0&15) degree on the 2<sup>nd</sup> day. From the investigator's perspective, this may be attributed to supine positions decreasing the gravity influence on the human body, hence enhancing venous return to the heart, which subsequently elevates cardiac output and increases blood pressure.

The findings of the current study were accepted with **Ismail, Mohammad & Mourad, (2021)** who reported that it was observed that all hemodynamic measures exhibited a highly statistically significant rise in the mean scores between pre-position and post-position in both the left lateral and supine positions. Furthermore, illustrated that SBP, DBP,

and MAP exhibit statistically significant reductions in the post position when in the right lateral and semi-Fowler positions. Conversely, these findings contradicted **Zhou et al., (2023)** who reported no significant variation in MAP across all angles of HOB.

**While, regarding respiratory rate,** the results indicated a statistically significant difference among the examined patients in the supine and right lateral positions at the head of the bed at 0 and 15 degrees on the first and second days. Moreover, there was a highly statistically significant difference increase in respiratory rate (RR) among the studied critically ill patients when the patient was in supine versus right lateral position at the head of bed (0&15) degree in the 1<sup>st</sup> and the 2<sup>nd</sup> day of the study. From the researcher's perspective, this finding may be associated with the benefits of deep breaths at an elevated head-of-bed position, counteracting the propensity for airway closure due to alterations in lung compliance and pressure from lower abdominal organs on the diaphragm. These findings were similar to the study conducted by **Ahmad, (2023)** who revealed that respiratory rate (RR) decreased at most different HOB angles. RR significantly decreased differences at 15°, 30°.

Furthermore, this result was agreed with **Ismail, Mohammad & Mourad, (2021)** who reported that the mean score of respiratory rates (RR) in the left lateral position and supine position increased between pre-position and post-position in a

highly statistically significant. Additionally, it was revealed that the RR in post position in right lateral and semi fowler position decreased statistically significantly.

**Concerning IAP measurements at different body positions,** the findings of the present study demonstrated a rise in the mean IAP in both the supine and right lateral positions at a 15-degree angle. Furthermore, it was shown that there were no statistically significant variations in IAP measures between the supine and right lateral positions on the first and second days of implementation. From the investigator's perspective, elevating the head of the bed resulted in heightened IAP due to a redistribution of abdominal contents and augmented resistance from the abdominal wall. When the body is in an upright position, gravity induces the descent of abdominal contents, exerting pressure on the abdominal cavity. Additionally, the abdominal muscles may contract to maintain posture, further increasing IAP.

The result of the current study matched with the study by **Ahmad, (2023)** who concluded that the patient's body position changing from supine to higher positions result in increase of intraabdominal pressure with not a statistically significant difference in the measurement values IAP supine position, HOB elevation 15° and 30°. Additionally, these findings were in agreement with **Samimian et al., (2021)** who reported that the mean of the IAP increased at 15° and 30° with not a statistically significant difference in

the measurement values IAP supine position, HOB elevation 15° and 30°. On the other hand, these results were disagreed with **Zhou et al., (2023)**, who found that there was a statistically significant increase in the IAP measurements when the HOB angle was changed from 0° to 15°. Moreover, these results were incompatible with **Mahran, Abd-Elshafy, Abd El Neem & Sayed, (2018)**, It was determined that the mean and standard deviation of IAP improved after transitioning from the reference supine position to the right lateral position, with a statistically significant difference observed.

**Regarding respiratory dynamics measurements,** these findings were found that there was a significant difference regarding lung compliance (Cl<sub>t</sub>) between the studied individuals in the supine and right lateral position at the head of the bed (0&15) degree on the 1<sup>st</sup> and the 2<sup>nd</sup> day. Also, it was found that there was a statistically significant difference increase in lung compliance (Cl<sub>t</sub>) among the studied critically ill patients in the supine versus right lateral position at the head of bed (15) degree in the 1<sup>st</sup> and the 2<sup>nd</sup> day. While there was a statistically significant difference decreased in airway resistance (Raw) among the studied subjects in the supine versus right lateral position at head of the bed (15) degree in the 1<sup>st</sup> and the 2<sup>nd</sup> day.

The results of this study were agreed with **Ahmad, (2023)** who reported that tidal volume (V<sub>t</sub>) and dynamic lung compliance were increased significantly with all of different

HOB angles 15°, 30°, and 45°. While the mean of the positive inspiratory pressure (PIP) decreased to HOB 15° than 0° with not a statistically significant difference.

Conversely, these findings incongruent with **Roldán et al., (2022)**, who revealed that respiratory system compliance reduced when changing position from the supine to Lateral position, indicating a 53 mL/cmH<sub>2</sub>O drop in chest wall compliance without changes in lung compliance. As well, these results are different from the study performed by **Elzohry, Abd El Khalik & Ismael Roushdy, (2020)** demonstrated that the supine position (lying flat) or lateral position did not influence respiratory mechanics in critically ill cases.

**Concerning correlation between clinical data and IAP**, the present study demonstrated that the highest mean IAP values were recorded in the supine and right lateral positions at a 15-degree angle at the head of the bed on the first and second days of implementation for individuals with ARDS, with no statistically significant correlation observed between medical diagnosis and IAP. From the viewpoint of the investigator, this could be because acute respiratory distress syndrome ARDS can cause increased stiffness of the chest wall (due to factors like lung edema and inflammation), which can increase the pressure within the abdomen.

The present study's findings were matched with those of **Samimian et al., (2021)**, who identified elevated IAP in non-trauma participants

relative to trauma patients. A strong association was identified between IAP and illness diagnosis.

**Regarding correlation between BMI and IAP**, the highest mean score of IAP measurements at supine and right lateral position at head of bed at (0&15) degree was seen with the Obese patients in the 1<sup>st</sup> & 2<sup>nd</sup> day of implementation. Moreover, this result showed a highly significant difference were found in the mean score of IAP& BMI in the 1<sup>st</sup> & 2<sup>nd</sup> day. From the researcher's point of view obese patients typically have abnormally high IAPs because of an increase in the volume of their abdominal or retroperitoneal contents, which is most likely the result of fatty deposits. This higher IAP is subsequently transported to the surrounding organs and cavities. Abdominal fat tissue (central obesity) appears to elevate IAP in individuals with elevated BMI through a direct impact on the abdominal cavity and pelvic floor.

The results of this study were in the same line with the study that was entitled by **Ahmad, (2023)** who showed that BMI was positively correlated with IAP. Meanwhile, these results were incongruent with **Gad, Ali & Sayed, (2025)**, who concluded that the correlation between elevated IAP and BMI was not statistically significant.

**As regard with correlation between intra-abdominal pressure and respiratory dynamics**, it was found that there is a highly statistically significant negative correlation between IAP measurements and lung compliance (CLt). Moreover, there

was a highly significant positive correlation between IAP measurements and airway resistance (Raw) throughout all the period of the study, whereby a rise in IAP causes a decrease in lung compliance while increasing airway resistance. This could be because the high IAP compresses the diaphragm and thoracic cavity therefore, intra-thoracic pressures increased, which hindering lung expansion, makes breathing harder, and reduces lung volumes and compliance.

These results in the same line with **Tayebi et al., (2025)**, who found patients with intra-abdominal hypertension had lower abdominal compliance and dynamic respiratory compliance compared to patients without IAH. Likewise, these results were aligned with **Kutluay & Akbudak, (2024)**, It was indicated that a correlation exists between IAP and respiratory parameters, wherein elevated levels of P-Peak, P-Plato, P-Drive, and PEEP are related with intra-abdominal hypertension.

**Related to correlation between hemodynamic parameters and intra-abdominal pressure**, this study demonstrated a statistically significant negative correlation between IAP measures and DBP in the supine and right lateral positions at degrees 0 and 15 on the second day of the study. A statistically significant negative correlation was discovered among the subjects in the supine position at 15 degrees for IAP measures and MAP on the second day. Simultaneously, a highly significant positive association was identified between IAP and RR in the

supine and right lateral positions at degrees (0 and 15) on the second day of the investigation. From the researcher's perspective, this may be attributed to increased IAP, which results in increased intrathoracic pressure, diminished venous return to the heart, a drop in blood pressure and MAB, and an increase in RR. These results were matched with the study conducted by **Regli, Pelosi & Malbrain, (2019)** who found that elevated IAP led to a decrease in MAP. Also, **Samimian et al., (2021)** reported that MAP and IAP also significantly correlated with each other at the three angles (0°, 15° and 30°). In addition, these results were in the same line with the study performed by **Jang et al., (2018)**, who showed that the respiratory rate (RR) raised significantly when IAP was elevated to 15, 20, and 25mmHg. On the opposite side, these findings were incongruent with **Hamoud, Abdelgani, Mekel, Kinaneh & Mahajna, (2022)**, who revealed that the MAP increased statically significantly when the IAP was raised to 15 mmHg while the patient was in the supine position.

### **Conclusion**

The findings of this study indicate that there is an elevation in the mean IAP in the supine and right lateral positions at a 15-degree angle, with no statistically significant difference in IAP values when elevating the head of the bed (HOB) angle from 0° to 15° in these positions. Also, there were no significant differences between IAP measurements in the supine position versus right lateral position.

## Recommendations

- Further studies are needed to assess the various methods of intra-abdominal pressure measurements.
- The study should be replicated on large probability sample on different setting to generalize results.

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Elevation of the Head of Bed Reduces Splanchnic Blood Flow in Patients with Intra-Abdominal Hypertension. *BMCanesthesiolo*, 23(1),133.

## Assessment of Mother's Knowledge and Practice among Primary School Child with Down Syndrome

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### Abstract

**Background:** Down syndrome is a chromosomal disorder characterized by intellectual impairment and physical abnormalities caused by an extra copy of chromosome 21. The support and nurturing provided by mothers are vital for the health and happiness of children with Down syndrome. **Aim of this study:** to assess mother's knowledge and practice among mothers of Down syndrome children in primary school . **Design:** A descriptive study design was consumed. **Setting:** The study was directed at three special needs schools, including two branches of Altarbi EL fikria and El shahid Mohamed Youssef at Fayoum governorate. **Sample:** A purposive sample was consumed; there were 70 mothers and their children. **Tools:** **Tool I:** The structured interviewing questionnaire includes 3 parts: **Part 1**, socio-demographic characteristics for mothers and their children, **Part 2**, family and medical history for mothers and their children, **Part 3**, and mothers' knowledge concerning Down syndrome. **Tool II:** Assessing mothers' practices regarding the care of their children with Down syndrome. **Tool III:** Mothers' needs for caring for their children suffering from Down syndrome. **Results:** The findings discovered that 61.4% of mothers had in acceptable total knowledge regarding Down syndrome; total, 47.1% of mothers reported consistently applying supportive caregiving practices, and 60% of mothers had a high level of total needs. **Conclusion:** Statistical analysis showed a strong positive correlation between knowledge and practice but a significant negative correlation with total needs. **Recommendation:** Apply directed educational programs to help mothers learn more about how to care for their children.

**Keywords:** Down syndrome, Primary School Child, and Special need care.

## Introduction

Down syndrome (DS), also denoted to Down's syndrome or trisomy 21, is a genetic disorder caused by an extra complete or partial copy of chromosome 21. This surplus genetic material disrupts the typical development of the body and brain, resulting in a variety of physical and cognitive difficulties that can differ significantly among individuals. It is the most prevalent chromosomal cause of intellectual disability in children. Each year, between 3,000 and 5,000 children worldwide are born with DS (**Sobiech et al., 2024**).

Down syndrome is generally not passed down genetically; instead, it arises from an error in cell division during the early stages of fetal development. The likelihood of having a child with Down syndrome increases as maternal age rises, especially after the age of 35. While children diagnosed with Down syndrome may experience various health issues, such as heart defects and hearing impairments, progress in medical treatment and early support allows many to enjoy fulfilling, healthy lives, with access to education, job opportunities, and independence (**Ahmed & Tamim, 2025**).

The stage of primary school age (roughly between 6 and 12 years old) is a crucial time for children with Down syndrome. In this period, children embark on their formal education, acquire fundamental academic skills, learn to take care of themselves, establish friendships, and gradually gain independence. It's also

a moment when early behavioral patterns, communication abilities, and cognitive development become more defined. Thus, the mother's influence during this time is particularly significant in shaping the child's health, educational progress, and social adaptation, learning, and social adjustment (**Northey et al., 2025**).

Mothers often possess limited knowledge about Down syndrome, yet this understanding is essential for effective caregiving and successful family adjustment. This knowledge encompasses awareness of the child's condition, developmental milestones, health risks, and available support services. When mothers are well-informed with accurate and thorough information, they are more inclined to pursue suitable care, make educated decisions, and foster positive interactions with their child's development (**Zhang et al., 2025**).

Mothers of children with Down syndrome face many challenges that affect their physical, emotional, and psychological well-being. The daily care of a child with developmental delays and medical needs can be demanding and requires constant attention, patience, and adaptability. These challenges often include managing frequent medical appointments, dealing with behavioral or learning difficulties, and addressing social stigma or misunderstandings from others (**Chirac et al., 2023**).

The community health nurse plays a vital role in supporting families of children with Down syndrome at the

community level. She provides health education, early screening, home visits, and continuous follow-up to ensure that mothers are equipped with the knowledge and skills needed for daily caregiving. Community nurses also help connect families to local resources, rehabilitation services, and support networks, promoting both the child's development and the mother's well-being (Mengoni et al., 2025).

### **Significance of the study**

Down syndrome is one of the greatest usual genetic disorders and is the result of chromosomal disorder. The occurrence of Down syndrome is nearly **1 in every 1000 to 1100** childbirths universally. The incidence of Down syndrome in Egypt is approximately **1 in every 800 to 1000 live** childbirths. It is considered the irresistible problem for the parents, especially mothers, who feel negative emotions like guilt, stress, or anxiety, especially when they lack access to clear information, professional guidance, or social support (Esmael et al., 2025).

### **Aim of the study:**

This study aimed to assess mother's knowledge and practice among mothers of primary school child with Down syndrome, through: -

1. Assessing health status of child with Down syndrome.
2. Assessing mothers' knowledge toward Down syndrome.
3. Assessing mothers' practice toward their Down syndrome children.

4. Assessing mothers' needs for caring their Down syndrome children.

### **Research Questions:**

1. What is health status of child with Down syndrome?
2. What is mothers' knowledge toward Down syndrome?
3. What is mothers' practice toward Down syndrome?
4. What are mothers' needs for caring their Down syndrome children?

### **Subjects and Method:**

#### **1. Technical Item:**

#### **Research design:**

A descriptive cross-section research design was employed in this study to accurately portray and analyze the mothers' knowledge and practices regarding the care of their primary school children with Down syndrome.

#### **Setting:**

The study was directed at three special needs schools, including two branches of Altarbi EL fikria and El shahid Mohamed Youssef which are affiliated with the managing of Fayoum education and the Fayoum governorate, and these three schools are the only special needs schools in the Fayoum governorate. This study was conducted at the three main schools in Fayoum Governorate that provide intellectual education services for children with special needs.

1. **The Intellectual Education School in Bandar Al-Fayoum**—a particular school devoted to the education of children with intellectual in capacities, offering

tailored curricula and services to meet their developmental needs.

**2. The Intellectual Education School in Sinnuras**—another specialized institution serving students with intellectual disabilities in the Sinnuras district, contributing to the regional support network for special education.

**3. El Shahid Mohamed Youssef School in Bandar Al-Fayoum**—an inclusive (mainstream) school that operates under the integration education model, which accommodates students with Down syndrome and other intellectual disabilities alongside typically developing, peers.

**Sample size:**

The study sample contained 70 mothers of sons with Down syndrome enrolled in the primary stage at special education and inclusive schools under the control of the Fayoum Educational Directorate.

**Type of Sample:** Purposive sample used in the study.

**Inclusive criteria for children with Down syndrome:**

1. Child identified with Down syndrome.
2. Age between 6 and 12 years (primary school stage).
3. Sex: both sexes.
4. Children living in rural areas.

**Inclusive criteria for mothers of children with Down syndrome:**

1. Mothers who are the main caregivers delivering direct daily care to the child.

2. Free from any diagnosed mental illness.

3. Inhabiting in rural areas.

**Exclusive criteria for children with Down syndrome:**

1. Children have other severe infirmities (e.g., cerebral palsy, autism spectrum disorder).
2. Children with long-lasting medical diseases that may affect daily functioning (e.g., uncontrolled epilepsy).
3. Children diagnosed mental illness (checked by a psychiatrist).

**Exclusive criteria for mothers of children with Down syndrome**

1. Mothers with a diagnosed mental disorder.

**Tools for data collection:**

**Tool I: A structured interview questionnaire:**

This tool was developed by the investigator after studying pertinent literature. It was planned to collect the essential data. It involved three parts:

**Part 1:** Socio- demographic characteristics for mothers & their children

**A.** Mothers' characteristics include 11 questions such as: Age, educational, family member, family type, the family shared a residence; the family's house consists of, number of rooms and good ventilation in the rooms of the house.

**B.** Children characteristics include 3 questions as: Age, sex, Number of siblings in the family.

**Part 2:** Family and medical history for mothers and their children

**I.** Kid family history contain 5 questions as if one of the spouses has a family history of Down syndrome, degree of this relationship, there is a family relation between the parents , degree of this relation , is there others siblings with down syndrome.

**II.** Mothers' medical history was designed to evaluate medical history. It included 13 questions as, the age of the mother during pregnancy, is there medical follow up for mother during pregnancy, is the mother suffered from any health problems during pregnancy, if yes what are these health problems, did the mother take any medications during pregnancy, If yes, were these medications taken, if yes what are these medications, did the mother exposed to radiation during pregnancy.

**III.** Child medical history include 8 questions such as, is the child entered the incubator, the time of discovering that the child has Down syndrome, the child diagnosed with Down syndrome, presence of any changes in the child's general appearance , presence of delay in growth and development.

**Part 3:** Mothers' knowledge regarding down syndrome comprise 11 MCQ as meaning, causes, types, signs & symptoms, diagnosis, complications, Down Syndrome treatable , type of treatment for down syndrome, monitoring of a child with Down Syndrome

necessary, the child regularly followed up with a physiotherapist, the child followed up with a speech therapist

#### **Scoring systems for mothers' knowledge:**

Mothers' knowledge scale using (correct =1, incorrect =0) the total score of knowledge was 11 points. Score of less than 70% (<8grades) was unsatisfactory and the score equal or more than 70% (8-11grades) was satisfactory.

#### **Tool II: Assessing Mothers' Practices Regarding the Care of Their Children with Down syndrome**

This tool was adapted and modified by the investigator after reviewing the relevant literature and consulting experts in the field (**Esmael et al., 2025**). It was designed to assess the actual care practices followed by mothers of children with Down syndrome at the primary school stage.

The questionnaire consists of **7 domains** with a total of **46 items**, including the following areas: Nutrition (13 items), Personal Hygiene (9 items), Medical Follow-up (3 items), Self-Reliance Skills (6 items), Social Skills (6 items), Cognitive Skills (7 items) & Sleep Habits (2 items):

#### **Scoring systems for mothers' practice:**

The total score of practice was 46 points. Mother's practice scale has been scored as, Always=3 Sometime =2 never =1.

The total optimal score of mother's practice scale 138. Score of less than



60% (<83) was never. The score between 60% to <75% (83- <104) was Sometime and the score equal or more than 75% (104-138) was Always.

**Tool III: Mothers' needs for caring for their children suffering from Down syndrome** guided by (Samir, et al., 2022). It was used to assess the perceived needs of mothers in caring for their children with Down syndrome at the primary school stage.

**Cognitive:** Contain 10 items as: Need more information about potential occasions to educate their children with down syndrome, to know the suitable careers that their children with down syndrome can train and work in the future, to know methods of behaviour modification to address their children's behavioral problems, simple books and scientific publications that help me deal with their children, need information about the characteristics of their children with Down syndrome, information on medical intervention methods with their DS children.

**Economical:** Comprise 9 items as: Need to deliver suitable work for the incapacitated children after their training, transportation to take their children to school or institute, children needs more state assistance to meet the expenses of my disabled child (such as food, treatment and transportation), to provide regular funds to attend specialized training courses that are provided to families to improve their dealings with their disabled child, more help to pay for

the games our disabled child needs, to allocate funds to provide additional support services to my child (verbal training).

**Psychological and social:** Embrace 9 items as: Need the school or institute to animate their children to share in educational, sports and recreational events, help to do recreational activities, people in society to understand their children's disability, to hold sessions with my children's staff at school or institute to follow up on their child's performance, to get rid of depression because of the condition of their disabled child.

**Physical needs:** Composed of four components: the necessity for a balanced and nutritious diet, external dietary supplements, adequate sleep and relaxation, and proper exercise to alleviate stress.

**Scoring systems for mothers' needs:**

Mother's needs scale involved 4 constituents (32 items): Mother's needs scale has been scored as,

I never need it =1

I need it moderately=2

I need it very much =3.

The whole optimal score of mother's needs measure 96. Score of less than 60% (<58) was never. The score between 60% to <75% (58-<72) was Moderate and the score equal or more than 75% (72-96) was much.

## **II. Operational Item:**

### **Validity:**

Adjustment of the tools was done by a panel of 5 expertise in Community Health Nursing Faculty of Nursing,

Fayoum University to measure the content validity of the tools and the necessary modifications were done accordingly.

### Reliability

The consistency was scaled as follows: <0-0.25 weak reliability, 0.25-0.75 moderate reliability, 0.75-<1 strong reliability and 1 is optimum. The reliability for this questionnaire was 0.81.

Items	Alpha Cronbach	f	P-value
Knowledge	0.785	14.067	<0.001*
Practice	0.824	21.119	<0.001*
Needs	0.809	19.318	<0.001*

### Pilot Study:

A pilot study was conducted on 10% of the total sample (7 mothers of children with Down syndrome) to check the applicability, clarity, and efficiency of the data collection tools. The pilot study was carried out in the same settings as the main study. The mothers were chosen haphazardly and were later included in the final sample, as no modifications were required based on the results of the pilot study. This ensured that the data collection tools were valid and applicable without introducing any bias.

### Field work:

- Contribution was completely voluntary, and all data was treated with accurate confidentiality. Mothers were reassured that the information

collected would be used solely for scientific research purposes.

- The majority of mothers were nearby during school hours while waiting for their children, which facilitated the data collection process. Additional opportunities to reach participants occurred during regularly scheduled parents' council meetings and during routine drop-off and pick-up times at the school.
- Data collection was carried out over a three-month period, from the beginning of March to the end of May 2025.
- The investigator was present at the study locations two days per week, directing face-to-face interviews with mothers using the organized data collection tools.
- Each interview was conducted individually in a quiet, private setting, and lasted approximately 40 to 45 minutes.
- On ordinary, three mothers were interviewed per day.
- The investigator gave the structured questionnaire by reading each item aloud, clarifying any ambiguous points, and recording the mothers' answers to ensure consistency and accuracy in data collection.

### III. Administrative item:

An approval to carry out this study was obtained from Dean of Faculty of Nursing, Fayoum University and official permission was obtained from the director of the special needs school at Fayoum

Governorate for conducting this study.

#### **Ethical considerations:**

Official permission to conduct the planned study was obtained from the Scientific Research Ethics Board, Faculty of Nursing, Fayoum University. Sharing in the study was voluntary, and participants were given complete, whole information about the study and their role before signing the informed consent. The ethical considerations include explaining the purpose and nature of the study, stating the likelihood to disavow at any time, and ensuring the confidentiality of the information, which will not be accessed by any other party without taking permission of the participants. Ethics, values, culture, and beliefs were respected.

#### **IV. Statistical analysis:**

Data gotten from the current study were statistically investigated using IBM SPSS Statistics for Windows, Version 20.0 (Armonk, NY: IBM Corp.). Quantitative data were expressed as mean and standard deviation. An unpaired Student's *t*-test was applied to compare means between two independent groups. Analysis of approval studied means across different time points within the same group. Pearson's correlation coefficient was used to assess the linear relationship between two continuous variables within the same group.

#### **Results:**

**Table (1):** illustrates that the majority of mothers were aged 40 years or more (81.4%), with a mean

age of **41.14 ± 3.24 years**. Most of them were not working (95.7%) and all belonged to nuclear families (100%). In terms of education, the largest proportion was illiterate (38.6%), followed by those with secondary education (35.7%). More than half of the families (58.6%) reported insufficient monthly income. Concerning family size, the majority had 5 to <7 members (58.6%). Over half of the families lived in houses consisting of two floors (52.9%), and almost all had 2–4 rooms (95.7%) with good ventilation (94.3%). Additionally, most families (90.0%) resided in shared housing.

**Table (2):** shows that slightly more than half of the children were males (51.4%). The majority were aged 8 to <10 years (64.3%), with a mean age of **9.36 ± 0.85 years**. Concerning family size, the largest proportion of children (60.0%) belonged to families with more than four children.

**Figure (1)** shows that, the majority of mothers (61.4%) had an unsatisfactory level of knowledge regarding Down syndrome, while only 38.6% demonstrated satisfactory knowledge.

**Figure (2)** shows that among the six domains assessed, the most consistently practiced area was social skills, with 57.1% of mothers reporting “always” engaging in supportive behaviors. Nutrition followed at 52.9%, while cognitive skills and self-reliance had lower rates of consistent practice (42.9% and 41.4%, respectively). The least

practiced domains, based on “always” responses, were self-reliance and sleep-related routines (both under 46%).

**Table (3):** shows that nearly half of the mothers (47.1%) consistently practiced supportive behaviors with their children with Down syndrome. Meanwhile, 30.0% reported engaging in such practices occasionally, and 22.9% did not apply them at all.

**Table (4):** shows that the majority of mothers (60.0%) reported a high

level of overall need in caring for their children with Down syndrome, while 32.9% indicated a moderate level of need. Only 7.1% reported having no significant needs.

**Table (5):** show that there was a strong positive correlation between mothers’ total knowledge and their total practice in caring for children with Down syndrome ( $r = 0.772$ ,  $p < 0.001$ ), indicating that higher knowledge levels are associated with better caregiving practices.

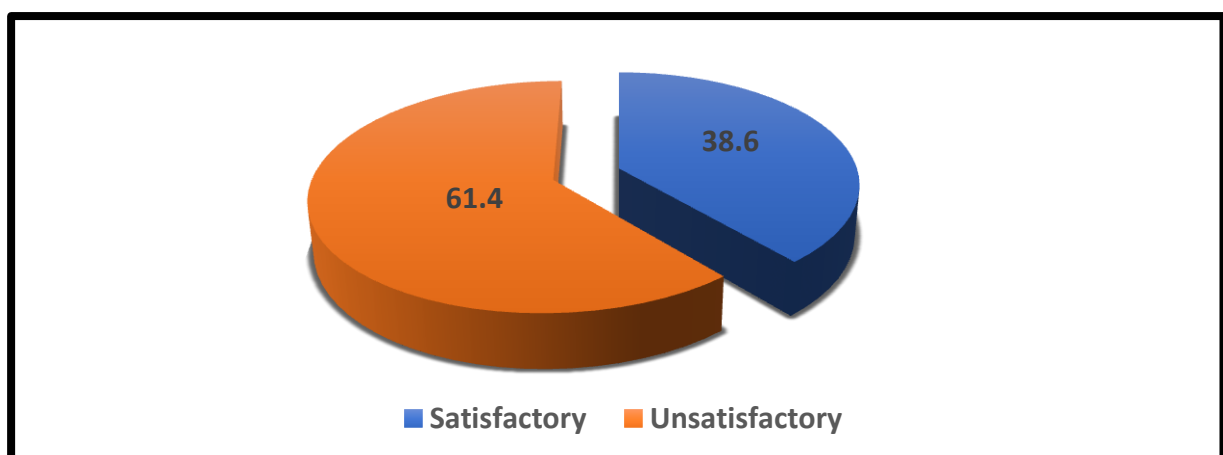
**Table (1) Frequency distribution of socio-demographic characteristics of mothers of children with Down syndrome (N=70)**

Socio-Demographic Characteristics	N=70	100%
<b>1- Age (years)</b>		
<35	4	5.7
35- <40	9	12.9
40 or more	57	81.4
Mean±SD	41.14 ± 3.24	
<b>2-Education Level</b>		
Illiterate	27	38.6
Read and write	14	20.0
Intermediate	25	35.7
University	4	5.7
<b>3-Occupation</b>		
Works	3	4.3
Not working	67	95.7
<b>5-Monthly income</b>		
Sufficient	29	41.4
Insufficient	41	58.6
<b>6-Number of family members</b>		
3- <5	19	27.1
5- <7	41	58.6
7 or more	10	14.3

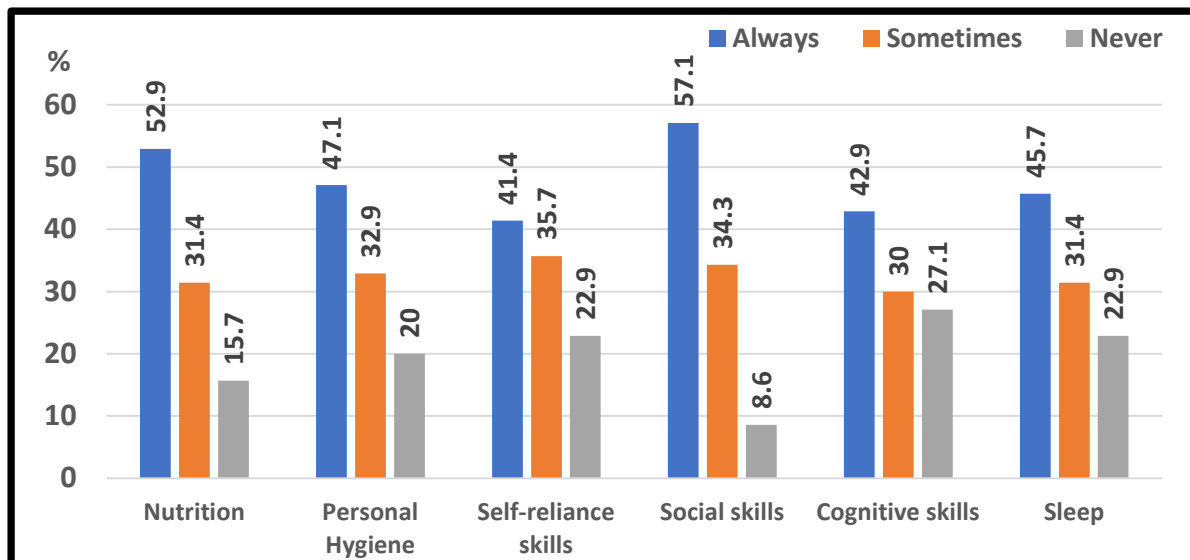
<b>7-Family type</b>		
Nuclear	70	100.0
<b>8-The family housed in a shared home</b>		
Yes	63	90.0
No	7	10.0
<b>9-The house in which the family is housed consists of</b>		
One floor	33	47.1
2 floors	37	52.9
<b>10-Number of rooms in the house</b>		
2-4 rooms	67	95.7
more than 4	3	4.3
<b>11- Good ventilation in the rooms of the house</b>		
Yes	66	94.3
No	4	5.7

**Table (2) Frequency distribution of demographic characteristics of primary school children with Down syndrome (N=70)**

<b>Child Demographic Characteristics</b>	<b>N=70</b>	<b>100%</b>
<b>1-sex</b>		
Male	36	51.4
Female	34	48.6
<b>2-Age</b>		
8- <10	45	64.3
10 or more	25	35.7
<b>Mean±SD</b>	<b>9.36 ± 0.85</b>	
<b>3-Number of children in the family</b>		
1–2 children	12	17.1
3–4 children	16	22.9
more than 4	42	60.0



**Figure (1) Frequency distribution of mothers' total knowledge level about Down syndrome (N=70).**



**Figure (2) Frequency distribution of overall mothers' practices with children with Down syndrome across key life (N=70).**

**Table 3: Frequency distribution of mothers' total practice levels toward their children with Down syndrome (N=70).**

Total practice	N	%
Always	33	47.1
Sometimes	21	30.0
Never	16	22.9

**Table 4: Frequency distribution of total needs of mothers of children with Down syndrome (N=70).**

Total needs	N	%
Much	42	60.0
Moderate	23	32.9
Never	5	7.1

**Table 5: Correlation between mothers' total knowledge, practice, and needs regarding the care of children with Down syndrome**

Variables	Total knowledge		Total practice	
	r	P-value	r	P-value
Total practice	0.772	<0.001*		
Total needs	-0.727	<0.001*	-0.496	<0.001*

## Discussion

Down syndrome is the highest general chromosomal condition. The children with Down syndrome (DS) experience delay in their cognitive and physical development which causes difficulties to perform in self-work for the Down syndrome children. The mothers of children with Down syndrome have to provide more care for their children. They face challenges to maintain their position in life (**Ahmed & Tamim, 2025**).

**Regarding demographic data**, the results of the current study showed that about nearly four fifth of the studied mother of Down syndrome child were in age above 40 years. This finding disagreed with **Bajagain, et al., (2023)**. Who studied entitle " *Knowledge regarding the prenatal testing for Down syndrome screening among the Nepalese pregnant women*" and show that nearly half of studied sample were from 20 - 30 years.

In relation to educational level among the studied mother, about nearly two fifth of the studied mothers had illiterate education. This finding not in accordance with the study carried out in Egypt by **El-Enen, et al., (2022)**. Who study entitled " *Knowledge, Attitudes and Reported Practices of Mothers with Down Syndrome Children at Kafr El-Sheikh Governorate*" and showed about one third of studied mother were had university education.

On the subject of monthly income, the result of the current study showed that nearly two third had insufficient monthly income this result in the

same line with the results conducted in Italy by **Scavarda, (2024)**. Who study entitled " *The shame-blame complex of parents with cognitively disabled children*" and show that more than half of studied sample had insufficient monthly income.

From the investigator's point of view, this finding reflects that families of children with Down syndrome often require additional medical care, therapeutic interventions, educational support, and sometimes specialized equipment.

Regarding child age, the results of the current study showed that about two third of the studied child were in age between 8-10 years old. This finding accepted with **El-Enen, et al., (2022)**. Who conducted a study at kafr El-Sheikh and showed more than two third of studied child were from 5-10 years.

From the investigator's point of view, children with Down syndrome in Fayoum often begin school at a later age due to developmental delays, challenges in readiness, or delays in accessing educational services.

Related to demographic data, the results of the current study showed that nearly half of the studied children were male. The finding attached with **Allah, et al., (2024)**. Who conducted a study in Egypt entitled " *Coping Strategies of Mothers Having Primary School Students with Down Syndrome*" and show that nearly half of the studied child was male.

From the investigator's point of view, this is by chance as the two sexes are affected roughly equally.

Concerning total mothers' knowledge level regarding Down syndrome, the present study findings showed that, majority of them had unsatisfactory level of knowledge regarding Down syndrome and minority of them had satisfactory level of knowledge regarding Down syndrome. These findings were in the same line with the study conducted by **Ahmed, et al., (2025)**, entitled *"Assessment of Mothers' Knowledge and Practice toward Care of their Children with Down Syndrome, in Egypt"*, who found that, more than two third of the studied mothers had unsatisfactory level of knowledge regarding of down syndrome, and less than fifth of them had total satisfactory level of knowledge regarding of down syndrome.

From the researcher's point of view, this might be due to health care providers don't give sufficient knowledge regarding Down syndrome to the studied mothers.

Regarding mothers' total practice levels toward their children with Down syndrome; the present study findings revealed nearly half of the studied mother consistently practiced supportive behaviors with their children with Down syndrome. This result was inconsistent with **Ahmed, et al., (2025)**, who conducted a study in Baghdad about *"Assessment of Mothers' Knowledge and Practices toward Care of their Children with Down Syndrome"* and revealed that more than two thirds of them consistently practiced supportive behaviors with their children with Down syndrome.

From the investigator's point of view, this may be due to a significant portion of mothers may be facing challenges in delivering effective daily care—whether due to lack of knowledge, psychological and social stress, or limited resources.

Concerning the overall needs of mothers of children with down syndrome, the present study showed nearly two third of mothers had very much cognitive need, one third of mothers had moderate economic needs, more than two third of mothers had very much social and psychological needs and that more than one third of the studied mothers had moderate physical needs. This finding disagreement with **Elsayed, et al., (2022)**, who carried out a study about *"Effect of educational intervention on psychological well-being and coping of mothers having children with down syndrome"* and reported that more than one-third of mothers had very much cognitive need, more than half of mothers had moderate economic needs, more than two-fifths of mothers had very much social and psychological needs and that more than half of the studied mothers had moderate physical needs.

Related to the correlation between mothers' knowledge and caregiving practice, the current study showed a strong positive correlation ( $r = 0.772$ ,  $p < 0.001$ ), indicating that higher mothers' knowledge leads to better caregiving practices for children with Down syndrome. This finding aligns with in Egypt **Elsayed et al., (2022)**. Called *"Assessment of Mothers' Knowledge and Practices toward*



*Care of their Children with Down Syndrome*" supports this link between knowledge and practice.

From the investigator's point of view, this strong association suggests that raising mothers' knowledge through implementing educational interventions such as colorful booklets and What's App support groups are supported by literature highlighting that accessible continuing education enhances caregiving quality and child's outcomes.

### Conclusion

**The current study showed that,** significant health challenges for children with Down syndrome, including delayed growth, movement difficulties, and speech delays. Most mothers had unsatisfactory knowledge about Down syndrome. Also, less than half of mothers consistently applied positive caregiving behaviors, with social and nutritional practices being more common. Practices varied according to education level and residence, with higher levels observed among educated. Unmet needs were high, particularly for medical, psychological, cognitive, and economic support.

### Recommendations:

**The finding of the present study suggested the following recommendations:**

- Organize regular educational programs for mothers to enhance their knowledge about Down syndrome and the physical, mental, and social needs of their children.
- Design practical training sessions to improve daily practices Focused on how mothers can support their children.
- Implement community awareness campaigns aimed at reducing stigma related to Down syndrome and encouraging community and school inclusion for children with Down syndrome.

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## Influence of Nepotism on Nurses' Job Performance at Workplace

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### Abstract

**Background:** Nepotism, an unprofessional practice that persists and lowers nurses job satisfaction and performance, is evident in the close relationship between families and friends and helps nurses who are family members advance in their careers by giving them preferential treatment over other nurses who possess the necessary skills and knowledge. **Aim:** To assess the influence of nepotism on nurses' job performance at workplace. **Research design:** A descriptive correlation design was utilized to conduct this study. **Setting:** The study was conducted in Tanta International Teaching Hospital. **Subjects:** The study subjects consisted of a stratified proportional randomized sampling of nurses (n=302). **Tools:** Two tools were used to collect the needed data; nurses' perception of nepotism at workplace and nurses job performance questionnaire. **Results:** The study revealed that above half (54.5 %) of nurses had a high perception of nepotism at workplace, and the high percentage (71.6%) of nurses had a high level of job performance. **Conclusion:** There was positive significant statistically correlation was found between nurses' perception of nepotism and their job performance. **Recommendations:** Hospital management applies objective and clear competency criteria in recruitment processes and ensure transparency to increase trust among nurses and ensure that decisions are based on performance. Also, teach nurses managers to establish clear policies, foster a culture of fairness and merit-based hiring in order to perform at their best rather than employing nepotism.

**Keywords:** Job Performance, Nepotism, Nurses.

## Introduction

Nepotism in healthcare organizations manifests as the hiring and selection of nurses who are friends and relatives, nurses who work for healthcare organizations that tolerate nepotism suffer greatly and lowers their job satisfaction and performance (**Owusu,2023**). Giving nurses who are a family members or friends preferential treatment when hiring or promoting them in healthcare organization is known as nepotism and it is unjust to other nurses (**Athena,2023**).

When nepotism is involved, nurses who are more suited for the position but do not socialize with the nurse's managers are put in an unethical situation, other nurses working for the healthcare organization as well as prospective nurses looking for employment are negatively impacted by this circumstance (**Williams,2022**).

Nepotism has positives and negatives sequences for nurses. It makes it easier to find nurses who are hired. Collaborating with nurses who are a family member can enhance a productive workplace and create a strong communication network inside the healthcare organization. It also encourages teamwork and collaboration in completing duties (**Aktan,2022**).

Nepotism negative effect can lead to mistrust, anger and poor nurses' performance, which prevent healthcare organizations progress and raises the turnover rate of nurses because they start to think that rewards are given based on their

proximity to management than on the nature of their work (**Bolat,2022**).

Nepotism in healthcare organization includes three dimensions; staff recruitment and selection, promotion nepotism and working procedure. First, staff recruitment and selection dimension: it is the systematic process of identifying, attracting, interviewing and selecting qualified nurses for employment within healthcare organization (**Abubakar,2024**).

Nepotism in recruitment and selection refers to the unfair practice of favoring nurses who are relatives during the hiring and selection process, regardless of their qualifications, skills and it led to hiring less competent nurses, reduced nurse's morale, and decreased organizational effectiveness (**Absar,2020**).

Secondly, promotion nepotism dimension: nepotism promotion happens when nurses are offered opportunities or promoted based more on their relationship to nurse managers than on their qualifications or experience. (**Al-Shamari,2023**). When a nurse gets promoted into a position while having fewer qualifications than other nurses, this is an example of nepotism in a healthcare organization (**Alwerthan, 2023**).

Lastly: working procedure dimension; refers to unjust work distribution might result from nepotism in workplace. Additionally, provide nurses who are family members who might not be the best

qualified for a job, an unfair advantage which lowers other nurses' morale and productivity. **(Develi,2021).**

Nepotism can have a detrimental influence on healthcare organizations output and productivity as well as indirectly affecting nurse turnover, satisfaction and loyalty and effect on nurse's job happiness and performance **(Rowshan,2023).**

Nurses job performance is the efficiency in which nurses carry out their duties, roles and responsibilities associated with providing direct patient care for others, it is successful completion of their assigned roles and responsibilities **(Al-Homayan, 2023).**

Additionally, job performance is a measure of healthcare organization output and demonstrate how well communities manage healthcare organizations, the high performance of their nurses is a key indicator of a successful healthcare organizations work **(Hidayat, 2023).** Nurses' job performance includes eight-dimension, critical and technical care, communication, leadership, patient teaching, social support, cooperation and collaboration, compliance and planning.

First, critical and technical care dimension: nurses provide care at all levels of the care continuum and work around the clock to help patients, this includes helping patients with basic needs and taking care of their bodies and bodily functions **(Uchendu, 2022).** Second, communication dimension: it refers to nurse's abilities to write and speak

clearly and confidentiality and exchange of information, thoughts and feeling when interacting with patients and other healthcare providers. Effective communication is a cornerstone of nursing practice, it ensures patient safety, building trust and promoting positive health outcomes, it's essential for nurses collaborating on teams and providing efficient medical care **(Moreira, 2022).**

Third; leadership dimension: setting organizational goals or reacting to external stimuli to help a group to achieve its goals are examples of leadership roles in the challenging field of nursing, monitoring organizational resources and group and individual progress toward objectives may fall within the purview of a nurse leader **(Campbell,2022).** Forth, patient teaching dimension: effective patient education empowers patients and their families to ask questions, facilitates communication with healthcare providers and lead to shared decision making. It also helps patients and their families become active members of their healthcare team **(Adugbire,2020).**

Fifth; social support dimension: it as providing a patient with emotional, informational and instrumental support when they are in a difficult situation. It includes demonstrating empathy, establishing trust, helping patients to solve problems, offering tangible services or assistance **(Payot, 2020).** Sixth; cooperation and collaboration dimension: are key concept in healthcare, where nurses

can increase nursing performance and reduce medical errors while also enhancing nurse collaboration to try to improve patient care quality (**Liao, 2020**).

Seventh; compliance dimension: in order to influence nurses conduct, the healthcare organization uses a variety of policies, rules, process and procedure in addition to norms in order to increase nurse's awareness of and compliance with patient safety protocols (**Mukamel, 2023**). Finally, planning dimension: the nurses are responsible for assessing the client's health status, identifying the issues, which are defined as changes in human needs, developing solutions, carrying them out and assessing how well the plan worked to promote optimal wellness and address the issues found (**Tomey, 2024**).

#### **Significance of the study:**

Nepotism, the practice of favoring nurses who are relatives or friends in workplace, has been widely reviewed for weakening workplace fairness and efficiency (**Arasli, 2021**). In the nursing profession, where teamwork, morale and job performance are critical to patient care, nepotism can have detrimental effects. This study is significant for several stakeholders, including healthcare administrators, nurses and researchers because nepotism can lead to dissatisfaction among nurses who perceive unfairness in promotions, assignments or rewards (**Khan, 2022**).

When unqualified nurses are favored over competent staff, it can reduce overall job performance, increase

errors, and lower patient care quality (**Almeida, 2022**). Nurses working in nepotistic environments often experience decreased morale, higher stress, and increased turnover intentions and effect on nurse's job performance (**Tabassum, 2021**). This study aims to assess influence of nepotism on nurses' job performance in workplace.

#### **Aim of the Study**

The aim of study is to assess the influence of nepotism on nurses' job performance at workplace.

#### **Research Questions:**

1. What are the nurse's nepotism perception levels?
2. What are the nurses' job performance levels?
3. What is the relation between nepotism and nurses job performance?

#### **Subjects and Method**

##### **Study design**

A descriptive- correlation research design was used to carry out this study.

##### **Setting:**

The current study was conducted at Tanta International Teaching Hospital, which is affiliated to the Ministry of Higher Education and Scientific Research. It included intensive care units (ICUs) as cardiology, neurology, general medical, chest, pediatric, oncology and neonate ICUs as well as inpatients departments including general surgery, cardiology, obstetrics, oncology, neurology, pediatric, orthopedic.

##### **Subjects:**

The study subjects consisted of a stratified proportional randomized sampling of nurses (n=302) that was selected from total number of nurses (N=1400), who are worked in the previously mentioned settings and available at the time of data collection.

**Tools of data collection:** The data of the study were collected by using two tools- :

**Tool (I): Nurses Perception of Nepotism at Workplace Questionnaire.** It consisted of two parts as follow:

**Part 1:** Personal characteristics of nurses: included age, gender, marital status, level of education, profession, years of experience .

**Part 2:** Nurses' Perception of Nepotism at Workplace Questionnaire. It was developed by the researcher, guided by **Asunakutlu & Avci (2020)** and related literature (**Asunakutlu, Avci & Bahadir Genis,2020**). It was used to assess nurses' perception toward the nepotism at workplace. It consisted of 18 items grouped under three dimensions as follows :

- Recruitment and selection included 6 items, Promotion nepotism included 6 items and working procedure included 6 items.

### **Scoring system**

The nurses' responses were measured by using a five- points /Likert scale ranged from (1–5) where; (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree and that for all the items of the questionnaire. The total score was

categorized according to cut-off point and summing score of all categories .

- High level of nurse's perception of nepotism > 75% from the total score.
- Moderate level of nurse's perception of nepotism from 60 % to 75% from the total score.
- Low level of nurse's perception of nepotism <60% from the total score .

**Tool (II): Nurses Job Performance Questionnaire.** It was developed by researcher, guided by **Schwerin, Greenslade & Jimmieson, (2023)** and related literature (**Maridi & Nimet Ates ,2023**). It was used to assess nurses job performance. It consisted of 40 items grouped under eight dimensions as follows:

- Critical and Technical Care included 5 items, Communication included 5 items, Leadership included 5 items, Patient Teaching included 5 items, Social Support included 5 items, Cooperation and Collaboration included 5 items, Compliance included 5 items and Planning included 5 items.

### **Scoring system:**

The nurses' responses were measured by using a five- points /Likert scale ranged from (1–5) where; (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree and that for all the items of the questionnaire. The total score was categorized according to cut-off point and summing score of all categories.

- **High level of nurse's perception of nepotism > 75% from the total score.**

- **Moderate level of nurse's perception of nepotism** from 60 % to 75% from the total score.
- **Low level of nurse's perception of nepotism** <60%. from the total score.

### Methods

- An official permission was obtained from the Dean of Nursing Faculty at Tanta University and the authoritative personnel that submitted to the previously mentioned setting to obtain their permission to conduct the study.

### Ethical considerations:

- Approval was obtained from the Nursing Scientific Research Ethics Committee (NSREC) of the faculty of Nursing, Tanta University before conducting the study with code number (413-3-2023).
- Nature of the study didn't cause harm to the entire participants during the application of the research.
- An informed consent was obtained from the nursing staff after explanation of the study aim.
- Confidentiality and anonymity had been maintained regarding data collection and the participants have right to withdrawal from the study at any time.
- The study tools (I and II) were translated to Arabic and revised with the supervisors and offered to five experts in the area of specialty to examine the content validity and clarity of the questionnaire.

- The face and content validity of study tools (I and II) were assessed to check the relevance and coverage of the questions by five jury experts of professors of Nursing Administration at Faculty of Nursing in Tanta University.
- Essential modifications were made to reach the final valid version of the tools; the face validity of the tools was calculated based on experts' opinions after calculating the content validity index was 96% for tool (I) and 99% for the tool (II).
- The study tool was tested for its reliability using Cronbach's alpha coefficient test. Reliability of the study tools (I, II) was used to test the internal consistency of the items using Cronbach Alpha with value  $\alpha = 0.882$  for the nurses' perception of nepotism questionnaire (NPNQ),  $\alpha = 0.880$  for a nurse's job performance Questionnaire.
- A pilot study was carried out on a sample of nurses (10%) of total numbers of nurses (30 nurses). This sample is excluded from the study sample during the actual collection of data. The pilot study was conducted to test the sequences of items, clarity, applicability and relevance of the questions and to identify the needed items to finish the questionnaire and to estimate the time needed to fulfill the study tools (I, II). No modifications were made and proved.



- Data Collection phase: the researcher met with nurses participated in the study in the waiting area of their departments, explain the purpose of the study, distribute the questionnaire to them individually and ask them to fill the questionnaires after obtaining oral agreement, the study tools were handled to the participated nurses when they on duty according to their working condition available to be filled. Each participant took about 20 minutes to fill in the questionnaires. The subjects recorded the answer in the presence of the researcher to ascertain all questions were answered.
- The data were collected over period of four months from August to November 2024.

### Statistical Analysis

Data was performed using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011). statistical presentation of the present study was conducted using the mean, standard deviation, unpaired student t-test was used to compare between two groups in quantitative data, Chi-square test was used to compare between groups in qualitative data, ANOVA test was used for comparison between more than two groups, Pearson correlation coefficient was used to measure the degree of association between quantitative variables.

### Results

**Table (1):** Illustrates distribution of the nurses according to their personal

characteristics including age, gender, section, marital status, qualification, current job and years of experience. As noticed in this table, the high percent (70.2%) of nurses aged 25-35 years with Mean  $\pm$  SD (31.17  $\pm$  6.70). The high percent (70.5%) of the nurses were females. More than half (57.9%) of nurses were working in critical sections .

Also, high percentage (71.5 %) of nurses were married, and more than half (51.3%) of nurses had a technical diploma degree, more than one third (35.4%) of them had bachelor of science degrees while low percent (13.2%) had postgraduate degree of nursing science. For about position title majority (80.8%) of nurses had working in their position as a staff nurses. Regarding years of experience, less than half (48.7 %) of nurses had 5 to 15 years of experience and one third (33.1%) had <5 years with Mean  $\pm$  SD (9.18 $\pm$  7.51).

**Figure (1):** Demonstrates total levels of nurses' perception of nepotism at workplace. This figure revealed that above half (54.5 %) of the nurses had high perception of nepotism at workplace. while, above quarter (26.7%) of nurses had moderate perception of nepotism at workplace and low percent (18.5%) of nurses had low perception of nepotism at workplace.

**Table (2):** This table represents levels of nurses' perceptions of nepotism in the workplace, the table showed that above half (60.7%) of nurses had high perception of

nepotism at workplace regarding to recruitment and selection, while more than half (54.5%) of nurses had high perception of nepotism at workplace regarding to promotion nepotism and above one third (40.3%) of nurses had low perception of nepotism at workplace regarding to working procedure.

**Figure (2):** Demonstrates total levels of nurses' job performance. This revealed that high percentage (71.6 %) of nurses had a high level of job performance. While, above quarter (25.7%) of nurses had a moderate level of job performance and minority (2.3%) of them had low level of job performance.

**Table (3):** this table represents levels of nurses' job performance. The result showed that majority (89.4%) of nurses had a high level of job performance regarding critical and technical care and high percentage (71.0%) of them had a high level of job performance regarding cooperation and collaboration.

Also, above two third (66.7% ,66.3%) of nurses had a high level of job performance regarding patient teaching and communication. Respectively, above half (58.1%,54.5%) of nurses had a high level of job performance regarding planning and compliance and above one third (40.3%) of nurses had a moderate level of job performance regarding social support. while above one third (35.6%) of nurses had a low level of job performance regarding leadership.

**Table (4):** Demonstrate distribution of nurses according to score regarding job performance. This table showed that the first mean score of nurse's job performance was Mean  $\pm$  SD (23.91 $\pm$ 1.98) for critical and technical care with score range (5-25) and mean average score Mean  $\pm$  SD (94.57 $\pm$ 9.92) and second mean score of nurses' job performance was Mean  $\pm$  SD (22.60  $\pm$  2.75) for cooperation and collaboration with score range (5-25) and mean average score Mean  $\pm$  SD (87.98 $\pm$ 13.74).

Then, the third mean score of nurses' job performance was Mean  $\pm$  SD (22.20  $\pm$  3.21) for patient teaching with score range (5-25) and mean average score Mean  $\pm$  SD (86.01 $\pm$ 16.05) and the fourth mean score of nurses' job performance was Mean  $\pm$  SD (22.12  $\pm$  2069) for communication with score range (5-25) and mean average score Mean  $\pm$  SD (85.58 $\pm$ 13.47).

Also, the fifth mean score of nurses' job performance was Mean  $\pm$  SD (21.50  $\pm$  2.96) for planning with score range (5-25) and mean average score Mean  $\pm$  SD (82.52 $\pm$ 14.82) and the sixth mean score  $\pm$  of nurses' job performance was Mean  $\pm$  SD (20.99  $\pm$  3.68) for compliance with score range (5-25) and mean average score Mean  $\pm$  SD (79.97 $\pm$ 18.38).

While, the seventh mean score of nurses' job performance was Mean  $\pm$  SD (18.75  $\pm$  4.21) for social support with score range (5-25) and mean average score Mean  $\pm$  SD (68.74 $\pm$ 21.07) and last mean score of nurses' job performance was for leadership Mean  $\pm$  SD (18.29  $\pm$  4.69)

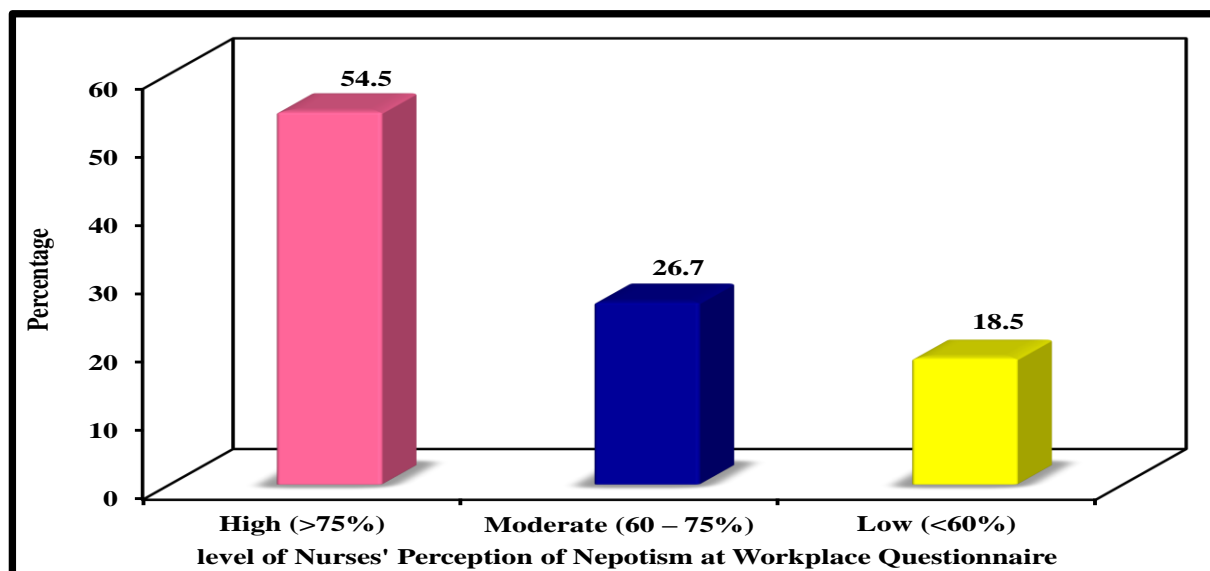
with score range (5-25) and mean average score Mean  $\pm$  SD (66.47 $\pm$ 23.46).

**Table (5):** it clarifies the correlation coefficient between total nurses' perception of nepotism at workplace

and nurses job performance; there is a significant positive correlation between nurses' perception of nepotism at workplace and nurses job performance as overall.

**Table (1): Distribution of the nurses according to their personal characteristics (n = 302)**

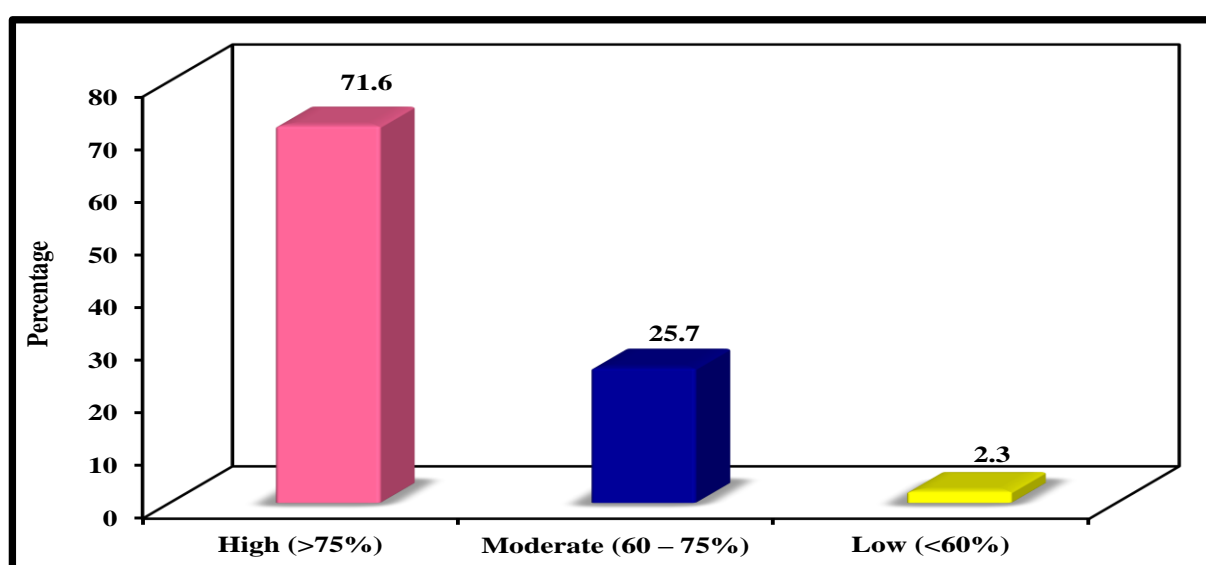
Personal Characteristics	No.	%
<b>Age</b>		
- <25	33	10.9
- 25 – 35	<b>212</b>	<b>70.2</b>
- >35	57	18.9
Min. – Max.	20.0 – 56.0	
Mean $\pm$ SD.	31.17 $\pm$ 6.70	
<b>Gender</b>		
- Male	89	29.5
- Female	<b>213</b>	<b>70.5</b>
<b>Section</b>		
- Internal sections	127	42.1
- Critical sections	<b>175</b>	<b>57.9</b>
<b>Marital status</b>		
- Married	<b>216</b>	<b>71.5</b>
- Un married	86	28.5
<b>Qualification</b>		
- Technical diploma	<b>155</b>	<b>51.3</b>
- Bachelor	107	35.4
- Postgraduate	40	13.3
<b>Current job</b>		
- Head of nursing	3	1.0
- Nursing supervisor	27	8.9
- Department supervisor	28	9.3
- Nurses	<b>244</b>	<b>80.8</b>
<b>Years of experience</b>		
- <5	100	33.1
- 5 – 15	<b>147</b>	<b>48.7</b>
- >15	55	18.2
Min. – Max.	1.0 – 37.0	
Mean $\pm$ SD.	9.18 $\pm$ 7.51	



**Figure (1): Total level of nurses' perception of nepotism at workplace (n = 302)**

**Table (2): Level of Nurses' perception of nepotism at workplace (n=302)**

Nurses' perception of nepotism at workplace	Level of nurses' perception of nepotism at workplace					
	High (>75%)		Moderate (60 – 75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Recruitment and selection	184	60.7	70	23.1	48	15.8
Promotion nepotism	165	54.5	87	28.7	50	16.5
Working procedure	62	20.5	118	38.9	122	40.3



**Figure (2): Total levels of Nurses Job Performance n = 302)**

**Table (3): Levels of Nurses Job Performance n (= 302)**

Nurses Job Performance subscales	High (>75%)		Moderate (60 – 75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Critical and Technical Care	271	89.4	27	8.9	4	1.3
Communication	201	66.3	94	31.0	7	2.3
Leadership	91	30.0	103	34.0	108	35.6
Patient Teaching	202	66.7	85	28.1	15	5.0
Social Support	100	33.0	122	40.3	80	26.4
Cooperation and Collaboration	215	71.0	79	26.1	8	2.6
Compliance	165	54.5	99	32.7	38	12.5
Planning	176	58.1	110	36.3	16	5.3

**Table (4): Distribution of nurses according to their score for nurse's job performance (n = 302)**

Nurses job performance	Score Range	Total score		% score	Rank
		Min. – Max.	Mean ± SD.	Mean ± SD.	
Critical and Technical Care	(5 – 25)	15 – 25	23.91 ± 1.98	94.57 ± 9.92	1
Communication	(5 – 25)	13 – 25	22.12 ± 2.69	85.58 ± 13.47	4
Leadership	(5 – 25)	5 – 25	18.29 ± 4.69	66.47 ± 23.46	8
Patient Teaching	(5 – 25)	5 – 25	22.20 ± 3.21	86.01 ± 16.05	3
Social Support	(5 – 25)	5 – 25	18.75 ± 4.21	68.74 ± 21.07	7
Cooperation and Collaboration	(5 – 25)	14 – 25	22.60 ± 2.75	87.98 ± 13.74	2
Compliance	(5 – 25)	10 – 25	20.99 ± 3.68	79.97 ± 18.38	6
Planning	(5 – 25)	11 – 25	21.50 ± 2.96	82.52 ± 14.82	5
Overall	(40 – 200)	117 – 200	170.37 ± 16.70	81.48 ± 10.44	

**Table (5): Correlation coefficient between total nurses' perception of nepotism at workplace and total nurses job performance (n=302)**

	Nurses' Perception of Nepotism	
	r	P
Nurses Job Performance	0.311 <sup>*</sup>	<0.001 <sup>*</sup>

### Discussion

Nepotism in nursing refers to the practice of promoting or hiring nurses who are a family member or those with close personal relationships based on connections rather than

merit. Moreover, these practices can undermine nurses' sense of justice, thereby decreasing their motivation, nurses who believe their achievements will go unrecognized may exert less effort at work and

reduce their organizational commitment. The effects of nepotism can lead to low job satisfaction, high turnover, and poor performance (**Kaya, 2021**).

Nurses' job performance refers to the extent to which nurses fulfill their assigned tasks and responsibilities and the impact they have on their work and overall organizational outcomes, relying solely on work results to measure performance can be misleading (**Bulut, 2024**).

Additionally, nurses' performance may be closely related to various factors such as job satisfaction, motivation, leadership style and organizational justice (**Tekin, 2024**).

The present study illustrated that high percent of the nurses were aged 25–35 years and were females and married. Also, above half of nurses were worked in critical sections and had a technical diploma degree; above one-third of them had Bachelor of Nursing Science, while the minority had postgraduate degrees in nursing science. Additionally, majority of nurses had been working in their position as staff nurses. Lastly, less than half of the nurses had between 5 - 15 years of experience.

Regarding nurses' perception of nepotism in workplace, the present study revealed that above than half of nurses had a high-level perception of nepotism in workplace and above than half of nurses had a high-level perception regarding recruitment and selection and promotion nepotism and more than one-third of nurses had a low-level perception regarding working procedures.

These findings may be due to lack of merit-based evaluation; when promotions and hiring nurses aren't based on clear performance criteria, favoritism becomes easier. Fear of outsiders; preference for familiar nurses may stem from a fear of introducing unknown variables into the healthcare organization. Additionally, inadequate nurses' leadership or ethics training; nurses' leaders may not understand the negative impact of nepotism on nurses' morale, productivity or diversity.

Moreover, Influence on career advancement; promotion, training opportunities and desirable unit assignments are critical for nurse's professional development when such opportunities are perceived to be based on family or personal connection rather than merit, nurses become highly sensitive to nepotistic practices.

In the same line the study done by **Jackson, (2021)** who asserted that more than half of the staff nurses had a high level of perception regarding nepotism in the workplace. Similarly, the study conducted by **Badran, (2021)** who demonstrated that half of nurse managers had high level of perception regarding nepotism, and they are disappointed in nepotism because it implies difficulties with their interfering with their plans and objectives, which directly affects workflow, staff satisfaction and patient care quality.

Also, these study findings consistent with a study of **Abbas, (2021)** who clarified that more than two-third of the nurses had a high level of

perception regarding nepotism in the workplace. Also, the present finding was supported with the study of **Arasli, (2025)** who explored that majority of nurses had high level of perception regarding nepotism at workplace and that can be extrapolated to healthcare setting and contribute to job stress and burnout among nurses.

On the other hand, the finding of the present study disagreed with the study done by **Massoudi, (2023)** who reported that about two third of nurses had low level of perception regarding nepotism in workplace. Also, the study by **Sadozai, (2024)** who noted that the high percent of nurses consider that nepotism accelerated decision making within team due to pre-existing trust among nurses who are family members. Similarly, study findings of **Schilpzand, (2025)** who described that less than half of nurses had a moderate level of perception regarding nepotism in workplace.

Also, **Stewart, (2025)** clarified that majority of nurses are believing that nepotistic hires required less training time and expenses and shorten broaden time. Additionally, the study result of **Kang & Roweley, (2025)** showed that majority of nurses who are a family hiring helped work maintain stability during economic downturns. Also, the study conducted by **Dyer, (2025)** who clarified that above half of nurses had low level of perception regarding nepotism in workplace and who implying a positive effect of nepotism on nurse's performance.

Regarding nurse's levels of job performance, the finding of the present study revealed that high percentage of nurses had a high level of job performance and majority of nurses had a high level of job performance regarding critical and technical care. Also, high percentage of nurses had a high level of job performance regarding cooperation and collaboration.

While above two third of nurses had a high level of job performance regarding patient teaching and communication. Also, above half of nurses had a high level of job performance regarding planning and compliance and above one third of nurses had a moderate level of job performance regarding social support. While above one third of nurses had a low level of job performance regarding leadership.

This finding may be due to nurses playing a central role in ensuring patient safety and providing high quality care. High-performing nurses are more likely to follow clinical guidelines, administer medications accurately and monitor patients effectively, reducing the probability of errors and complications. When nurses perform well, patients experience better health outcomes and help minimize unnecessary procedures and hospital stays, their efficiency leads to cost savings and optimal utilization of medical resources.

Additionally, it may be due to that nurses who perform at a high level contribute to effective communication and collaboration with other healthcare professionals

and use critical thinking skills to prioritize tasks, manage emergencies and deliver timely care and it reflects a strong sense of responsibility.

In the same line the study of **Laschinger, (2021)** who reported that above half of the nurses had a high level of job performance. The study of **Stolberg, (2022)** who demonstrated that more than half of the nurses believed that hospitals with higher nurse staffing and education levels had significantly lower mortality rates. Similarly, the study by **Hughes, (2023)** who reported that majority of nurses supposed that that empowering work environments positively influenced nurses' job performance and reduced burnout.

Also, the study of **Abidakun, (2023)** clarified that majority of nurses supported the critical role of nurse performance in ensuring high quality healthcare from mitigating nurses burnout. Moreover, the study results by **Cowan, (2025)** who reported that high percentage of nurses had high level of job performance and declared that performance was strongly tied to continual professional training.

On the contrary, this study contrasted with the study conducted by **Bibi, (2021)** who explored that more than one quarter of nurses had a moderate level of job performance. Also, the study of **Lasisi, (2022)** who reported that more than two-thirds of nurses had a low level of job performance. Similarly, **Wang, (2024)** described that half of nurses had low level of job performance and had difficult to quickly make accurate judgments and

responses, thus affecting the work performance.

Furthermore, this study was disagreed with the study of **Liu, (2025)** who reported that high percent of nurses unable to deal effectively with the complexity and variability of their clinical work due to differences in work experience, resulting in performance that may not yet have reached a higher level.

The present study finding revealed that there was a highly statistically significant positive correlation between total nurse's perception of nepotism at workplace and nurses job performance. This result may be due to that nurses may then feel obliged to perform at a higher level to repay perceived organizational support and when it is normalized, nurses perceiving nepotism may interpret it as stability or care from management which can enhance morale and improve performance outcome. Nepotism may grant certain nurses' preferential access to training or favorable shifts; these advantages can create conditions that indirectly improve job performance metrics compared to peers.

In same line the study of **Abbas, (2021)** who reported that there was a significant positive correlation between nepotism and nurses job performance. Similarly, the study conducts by **Rasheeda, (2025)** who clarified that there was a significant effect of nepotism in the workplace on nurses' job performance. Also, the study of **Ombanda, (2025)** who explored that nepotism had significant effect on nurse's job performance.



On the contrary, the present study disagreed with the study conducted by **Gaber, (2022)** who explored that there was a significant correlation between leadership and nurse's perceptions of subscales of nepotism. Similarly, the study result that conducted by **Seker, (2024)**, who reported that there was not a statistically significant positive correlation between nurses' perceptions of nepotism and their job performance. Also, the study result of **Sümer, (2025)** who clarified that there was not a statistically significant positive correlation between nurses' perceptions of nepotism and their job performance.

### **Conclusion**

Above half of nurses had a high perception of nepotism at workplace. Also, the high percentage of nurses had a high level of job performance. Furthermore, there was a highly statistically significant positive correlation between nurse's perception of nepotism at workplace and their job performance.

### **Recommendations**

#### **For healthcare organization:**

- Apply objective and clear competency criteria in recruitment processes and ensure transparency to increase trust among nurses and ensure that decisions are based on performance.
- Promotion and reward processes based on performance and skills, not on personal relationships

#### **For nurse's managers:**

- Encouraging senior management to adopt an impartial and inclusive leadership style

- training the nurses managers to make decisions independent of family or close relationships.

#### **For staff nurses:**

- Practice stress-management techniques (e.g., open communication, conflict resolution, or counseling) to handle feelings of injustice or demotivation that may arise from perceived nepotism.
- Develop strong, supportive relationships with work colleagues. A positive work culture helps buffer the effects of nepotism and encourages fairness.
- Focus on personal growth through training, certification and continuing education.

#### **For future nursing research:**

- Study the effect of nepotism on the quality of nursing care delivered to patients.
- Study the relationship between nurses' perception of nepotism and their professional commitment.
- Study the relation between nurse's job performance and patient safety and quality of care.

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## Effect of an Educational Program about Climate Change Based on Protection Motivation Theory on Knowledge and Daily Life Practices of Rural Women

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### Abstract

**Background:** Climate change is a critical global challenge that requires urgent and inclusive responses. Empowering rural women by recognizing their knowledge and practices is essential to strengthen resilience and promote sustainable communities. **Aim:** to evaluate effect of an educational program about climate change based on protection motivation theory on knowledge and daily life practices of rural women. **Study design:** A quasi-experimental research design was utilized. **Study setting:** This study was conducted at Kharsit Rural Health Unit, El-Gharbeya Governorate, which is affiliated with the Ministry of Health and Population. **Study subjects:** A convenience sample of 150 rural women who attended the aforementioned setting for various reasons and were willing to participate. **Study tools:** Three tools were used for data collection: **Tool (I):** Rural women's knowledge about climate change, which consisted of two parts: Socio-demographic characteristics of rural women and rural women's knowledge about climate change. **Tool (II):** Protection motivation scale. **Tool (III):** Self-reported daily life practices of rural women regarding climate change. **Results:** The majority of the studied rural women had low levels of knowledge and unsatisfactory practice scores regarding climate change before the program, and all participants also exhibited low protection motivation. Two months after the intervention, more than three-quarters of the women demonstrated high levels of knowledge and protection motivation, and about two-thirds achieved satisfactory practices. **Conclusion:** The health education program about climate change based on the Protection Motivation Theory was effective in improving rural women's knowledge and daily life practices in relation to climate change. **Recommendations:** Rural health services need to implement climate change health education initiatives for rural communities, by adopting culturally sensitive and socially relevant communication strategies.

**Keywords:** Educational program, Climate change, Protection Motivation Theory, Knowledge, Daily life practices, Rural women.

## Introduction

Climate change is an urgent global issue requiring immediate attention and action. It involves enduring shifts in temperature, humidity, and rainfall, not just short-term weather fluctuations, observed over several decades. Human activities are the primary causes of these changes (**National Aeronautics and Space Administration [NASA], 2024**). Overuse of fossil fuels (coal, oil, and gas) to generate electricity, deforestation, land-use changes, industrial operations, and agricultural practices emit massive amounts of greenhouse gases such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) into the atmosphere. The Earth's average temperature and climate variability increase as a result of these gases' absorption of solar heat (**U.S. Environmental Protection Agency [EPA], 2025**).

Increasing global temperatures, changes in precipitation patterns, melting polar ice caps, ocean acidification, and increasing sea levels have all occurred due to increased emissions in recent years. According to the National Centers for Environmental Information (2025), the average rise in global temperature was 1.27°C in 2024 and is expected to increase to 4.9°C in 2100 unless it is mitigated beforehand. This results in frequent heat waves, water scarcity, drought, and wildfires. Also, global sea level is expected to reach 2 meters by the end of this century due to ongoing global warming and melting of polar ice caps, leading to flash floods and displacement of

coastal communities (**National Oceanic and Atmospheric Administration [NOAA], 2023**).

No country or region is exempt from the catastrophic effects of climate change; however, developing countries, including Egyptian rural communities are vulnerable to its effects due to a combination of socioeconomic, environmental, geographical factors, and a decrease in their adaptive resources and their overreliance on agriculture, which is a climate-sensitive sector. One of the three hotspots for severe climate vulnerability in the world is the Nile River Delta in Egypt. (**World Bank Group [WBG], 2021**).

The agriculture sector, which is a pillar of Egypt's economy, is projected to suffer. Crop production is projected to decrease by 8 to 47% by 2060 due to increased temperatures, extreme weather events, drought, and the proliferation of plant diseases and pests. This decline in production is likely to drive up food prices, affecting Egyptian rural communities (**WBG, 2022**). Water resources are also at risk. Egypt already has an annual water shortage of over 7 billion cubic meters. Climate change exacerbates this issue by increasing water demand and reducing the availability of water resources (**National Water Research Center [NWRC], 2025**).

Responding to these potential dangers, Egypt has launched the National Climate Change Strategy 2050. The primary objective of Egypt's strategy is to enhance awareness and manage knowledge

about climate change. The country acknowledges the crucial role of educating rural communities in cultivating their collective responsibility and commitment to climate change mitigation (**Egyptian Environmental Affairs Agency [EEAA], 2022**).

Rural women, being the primary household managers, are key to transitioning toward a sustainable future for mitigating climate change impacts. Their close interaction with the environment makes them responsible for resource management and conservation (**Chitiga-Mabugu, Henseler, Maisonnave, & Mabugu, 2023**). Health education is crucial for equipping them with knowledge about climate change and its effects. This education should promote climate-friendly behaviors such as efficient water use, clean energy adoption, and waste recycling. It should also encourage the reduction of food waste, use of energy-efficient appliances, eco-friendly products, and sustainable transportation (**Boermans, Jagoda, Lemiski, Wegener, & Krzywonos, 2024**). Protection Motivation Theory (PMT) is a communication framework first introduced by Rogers in 1975. Theory sheds light on the factors that affect an individual's willingness to react to a perceived risk. It is presumed that the decision to get involved in protective behaviors is based on an assessment of two primary components: threat appraisal and coping appraisal. Threat appraisal is a cognitive process that comprises perceived severity and susceptibility, whereas coping

appraisal is an individual's ability to respond to a danger, which includes self-efficacy, response efficacy, and perceived cost. According to this theory, rural women are more likely to engage in climate-friendly behaviors when perceived severity, susceptibility, self-efficacy, and response efficacy are high and perceived costs are low (**Rogers, 1975**).

Community health nurses play a vital role in educating rural women about climate change and its environmental impact. They can increase knowledge and adoption of climate-friendly practices by creating awareness about risks and potential consequences. By engaging and empowering rural women, they can support the creation of a climate-friendly community, promoting a sustainable and resilient future (**Maiz, M. A., Rashed, M., & Shetaway, A., 2024**).

#### **Significance of the study:**

According to the Notre Dame Global Adaptation Initiative (ND-GAIN) Index, Egypt ranked 105th out of 182 nations in 2023. It was also ranked 27<sup>th</sup> globally in energy-related CO<sub>2</sub> emissions (**Abdallah & El-Shennawy, 2020**). Therefore, Egypt recognized the importance of strengthening and promoting pro-environmental behaviors, particularly among rural women as active agents in their rural communities (**Eletrebi & Zaki, 2023**). Rural women's conscious choices and proactive environmentally friendly behaviors are crucial for driving sustainability and combating climate change, highlighting the significant



environmental impact of their daily-life practices (Aldosari, 2025).

**Study aim** was to evaluate effect of an educational program about climate change based on protection motivation theory on knowledge and daily life practices of rural women.

**Study design:** A quasi-experimental research design was utilized in this study.

**Study setting:** This study was conducted at Kharsit Rural Health Unit, El-Gharbeya Governorate, which is affiliated with the Ministry of Health and Population.

**Subjects:** A convenience sample of 150 rural women who attended the aforementioned setting for various reasons and were willing to participate.

The sample size and power analysis were calculated using the Epi-Info software statistical package. The criteria used for sample size calculation were as follows: 95% confidence limit, 80% study power analysis, and attendance rate = 205 clients/ month. Based on the previously mentioned criteria, the sample size was found to be N=150 rural women.

#### **Data collection tools**

**Tool I: Rural women's knowledge about climate change.** It was developed by the researcher in the Arabic language after reviewing related literature (Salem et al., 2022; Sambath, Narayan, Kumar, Kumar, & Pradyumna, 2022). It included the following two parts:

**Part (1): Socio-demographic characteristics of rural women:** - Data on rural women's age, marital status, occupation, educational

attainment, number of rooms, number of household members, and the family's monthly income were included.

**Part (2): Rural women's knowledge about climate change:** -It involved nine questions covering definitions of climate change and global warming, causes, contributing factors, daily life practices, greenhouse gases, climate change implications, mitigating strategies, and stakeholders' responsibility.

**The scoring system:** the knowledge score was calculated as follows: the correct answer was scored "one", while incorrect/don't know answers were scored "zero." These scores were summed up. The total knowledge score was 56. The total score was converted into a percentage score and classified into:

- **Low level of knowledge:** < 50% of the total knowledge score.
- **Moderate level of knowledge:** 50% - < 65% of the total knowledge score.
- **High level of knowledge:** ≥ 65% of the total knowledge score.

**Tool II: Protection motivation scale.** The constructs of this scale were adapted by the researcher based on the constructs of protection motivation theory developed by Rogers 1975 (Rogers, 1975). This scale was used to assess protection motivation factors affecting rural women's reactions to climate change. It consisted of the following constructs:

#### **I. Threat appraisal**

**a. Rural women's perceived severity of climate change:** This comprised of eight statements that

addressed rural women's beliefs on the serious and negative consequences of climate change.

**b. Rural women's perceived vulnerability to climate change:**

This comprised eight statements assessing rural women's beliefs regarding the susceptibility of themselves, their families, and their communities to the negative impacts of climate change.

**II. Coping appraisal**

**a. Rural women's perceived response-efficacy of climate change:**

This included 35 statements that addressed rural women's beliefs in the effectiveness of recommended practices for reducing climate change impacts. It was divided into five categories. These categories were energy conservation, water conservation, transportation, waste reduction and recycle practices and community participation practices.

**b. Rural women's perceived self-efficacy of climate change:** This consisted of six statements illustrating rural women's belief in their ability and confidence to adopt climate-friendly practices.

**c. Rural women's perceived costs of climate change:** This construct comprised of five statements that describe rural women's beliefs regarding obstacles that prevent them from engaging in climate-friendly practices.

**III. Rural women's protection motivation (intention) of climate change:** This included overall statement and 35 sub-

statements that covered rural women's intention to change their lifestyle and habits that reduce greenhouse gas emissions and mitigate the effects of climate change.

**The scoring system:** For perceived severity, perceived vulnerability, and protection motivation (intention) constructs, rural women responded on a three-point Likert scale from 1-3, indicating that they agreed (3), were neutral (2), or disagreed (1). Regarding perceived costs construct items, the scale was inverted as follows disagree (3), neutral (2), agree (1). In terms of perceived response efficacy, construct items were rated on a three-point Likert scale ranging from 1-3: very effective (3), quite effective (2), and not effective at all (1). While items in the perceived self-efficacy construct were scored on a three-point Likert scale from 1-3, indicating very certain (3), quite certain (2), or not certain at all (1).). The total scores were calculated for each construct then summed up to calculate the total score of protection motivation scale. The total score ranged (98-294). The higher score indicated the higher self-protection motivation of rural women. The total score was converted into percentage, and then classified into:

- **Low protection motivation:** < 70 % of the total score.
- **High protection motivation:** ≥ 70 % of the total score.

**Tool III: Self-reported daily life practices of rural women regarding climate change.** The researcher developed this tool based on literatures review (Kircher et al.,

**2022; Talavera, Bustos, & Rebancos, 2020)** to assess rural women's self-reported climate change-related practices in daily life. It consisted of 35 statements related to energy conservation and the usage of clean energy, water conservation, smart transportation, waste reduction and recycling, and active participation in environmental protection practices.

**The scoring system:** Using a three-point Likert scale with a range of 1-3, the daily life practices of rural women were scored as follows, always (3), sometimes (2) and never (1). Statements related to self-reported practices on energy conservation and the use of smart transportation that were recorded according to their availability (if available or not), they were excluded from calculation of the total score. The excluded items comprised three specific statements. Total practice score for all other items was summed up to be (96). The higher scores signified better adoption of climate-friendly practices. The total score was divided into the following categories after being converted to a percentage: **Unsatisfactory practices:** < 70% of the total practice score. **Satisfactory practices:** ≥ 70% of the total practice score.

### **Method**

**Obtaining approval:** The Dean of the Faculty of Nursing granted the director of the Kharsit Rural Health Unit official permission to conduct this study.

**Ethical considerations:** Before initiating the study, official approval was received from Tanta University's

Faculty of Nursing Scientific Research Ethical Committee. (Code: 305/10/2023). After a detailed explanation of the study's objectives, all participating women provided informed consent. Each participant was informed that she could withdraw from the study at any time. The study procedures did not cause any injury or discomfort to participants, and strict measures were taken to preserve the confidentiality and privacy of all obtained data. Additionally, the interview sheet was designed to ensure complete anonymity.

**Validity:** The questionnaire's face validity was evaluated by experts and found to be 95%, while the content validity index of its items was 98% for the knowledge questionnaire, 96% for the Protection Motivation Scale questionnaire, and 95% for the self-reported daily life practices questionnaire. The overall questionnaire content validity index was 96%.

**Pilot study:** The researcher conducted a pilot study on 15 rural women, representing 10% of the total sample, to assess the clarity, applicability, and reliability of the study tools, as well as to estimate the time required for data collection from each. The necessary modifications were made, and these women were excluded from the main study.

**Reliability:** Cronbach's alpha coefficient was used to assess the reliability of the tools for 150 items applied to 15 women. The reliability coefficient was 0.803.

**Development of the educational program:** The program was implemented in the following phases:

**I) Assessment phase:** During the pre-intervention assessment, predesigned study tools were used to interview each woman individually in the predetermined setting to assess women's knowledge, protection motivation, and daily life practices related to climate change, as well as socio-demographic data about the study subjects.

**II) Planning phase:** The following steps were taken in order to plan the educational program in accordance with the needs of the women as identified by the assessment phase and the literature review:

**A. The general goal of the educational program:** was to improve the rural women's knowledge, protection motivation, and daily life practices regarding climate change mitigation. **The specific objectives:** were formulated for each session.

**B. Preparing educational program content (booklet):** according to the predetermined needs of women.

**C. Teaching methods and materials:** Lectures, group discussions, and brainstorming sessions were used to actively engage the participants. Women were encouraged to share their personal experiences and perspectives through storytelling. The educational content was delivered using PowerPoint presentations and illustrative

pictures and videos. Additionally, each woman received a booklet designed as a guided learning resource to support and reinforce the program's content.

**III) Implementation:** The educational program was structured into four well-organized sessions, each lasting approximately 45 to 60 minutes as follows:

**Sessoir (1):** It aimed to inform the studied women about the significance of the program, its sessions and contents.

**Session (2):** It aimed to help the studied women to identify the risk groups of climate change, its causes, and impacts particularly, in rural and on women's and family's health, livelihoods, and well-being.

**Session (3):** It aimed to enable and convince the studied women to identify and adopt climate-friendly practices.

**Session (4):** It aimed to help studied women to overcome barriers to adopt climate change mitigation practices and build confidence in their ability to take action to address climate change.

The researcher implemented the entire educational program to ensure the delivery of comprehensive, consistent, and accurate knowledge about climate change. The researcher met with participating women in the health unit's conference room, built rapport with them, described the program's purpose and relevance, and received their informed consent to participate. A pretest assessment of women's baseline knowledge, Protection Motivation Theory (PMT)

constructs, and daily life practices related to climate change were conducted to identify their learning needs. Each session included approximately five to six women, with group size determined according to the total number of participants and their circumstances. The timing of subsequent sessions was arranged individually with each participant, and educational booklets on climate change were distributed as reference materials. The post-test assessment schedule was also set with each woman and contact information (telephone number or address) was collected to facilitate follow-up after two months. The total duration of the study extended over approximately eight months, from April to November 2024.

**IV) Evaluation phase:** Evaluation was conducted twice.

- **First time (pre-test):** Prior to the beginning of the educational program for the women using tools I, II, and III.
- **Second time (Follow-up):** Two months after the implementation of the educational program, evaluation was conducted using tools I (part 2), II, and III.

### **Statistical analysis**

The Statistical Package for the Social Sciences (SPSS) software, version 25 (IBM Corp., Armonk, NY, USA), was used to code, enter, and statistically analyze the data that had been gathered. The Kruskal–Wallis's test ( $\chi^2$  value) was used to compare means between more than two groups, whereas the Mann–Whitney U test (Z value) was used to compare means between two independent

groups with non-parametric data. The relationship between the variables was evaluated using Pearson's correlation coefficient (r). For all analyses, a significance level of  $p < 0.05$  was considered statistically significant.

### **Results**

**Table (I)** demonstrates the socioeconomic characteristics of the women under study. It shows that the average age of the rural women in the study was  $31.31 \pm 5.03$  years, with a range of 23–43 years. Additionally, the table indicated that over half (52.7% and 55.3, respectively) of them were housewives and had a secondary level of education. Half (50%) of the studied women had families of four members, while 61.3% of them had two rooms in their houses. The majority (92%) of the studied women reported that their family monthly income was just enough.

**Table (II)** shows levels of total knowledge score among studied rural women throughout the study period. It shows that prior to the program's implementation, the majority of the women in the study (82.7%) had low knowledge about climate change; after the program, this percentage dropped to 0.7%. Moreover, over three-quarters (76%) of them showed a statistically significant improvement in their knowledge ( $P=0.0001$ ). Moreover, the table reveals that there was a significant increase in the total mean score of studied rural women's knowledge throughout the study period, from  $19.93 \pm 12.02$  before the program to

45.94  $\pm$  9.63 two months after the program.

**Table (III)** demonstrates a statistically significant increase in the mean scores of all protection motivation constructs for the rural women under study, two months after program implementation. Additionally, the table demonstrates a statistically significant improvement in the total means scores of protection motivation constructs ( $p = 0.0001$ ). Similarly, the total coping appraisal score showed a marked rise ( $p = 0.0001$ ). Consequently, the total protection motivation scale mean score exhibited a marked and statistically significant increase from 159.31  $\pm$  23.29 before the intervention to 265.90  $\pm$  24.37 two months after the intervention ( $p = 0.0001$ ).

**Figure (I)** demonstrates the total score levels of protection motivation scale of the studied women throughout the study period. It shows that two months after the intervention, the total levels of the protection motivation scale improved in a highly statistically significant manner ( $p = 0.0001$ ). As all studied rural women (100%) exhibited a low level of protection motivation prior to the educational program. However, two months post-intervention, this percentage markedly improved, with 79.3% of the women gaining a high level of protection motivation.

**Table (IV)** demonstrates a statistically significant improvement throughout the study period in the total mean of the rural women's self-reported daily life practices with regard to climate change ( $p=0.0001$ ).

All items under study showed notable improvements. Consequently, the total self-reported daily life practices mean score increased substantially from 51.83 $\pm$ 7.27 pre-program to 86.51 $\pm$ 8.17 post-program.

**Figure (II)** demonstrates levels of total self-reported daily life practices of studied rural women throughout the study period. It shows that, before the program implementation, all studied rural women reported unsatisfactory total practice level scores compared with only 37.3% post intervention. Meanwhile, about two-thirds (62.7%) of the studied rural women had satisfactory practices after intervention. A statistically significant difference was observed ( $p = 0.0001$ ).

**Table (V)** shows that the totals of the scores for all protection motivation constructs, total knowledge, and total self-reported practices were statistically and positively correlated ( $r=0.749$ ,  $p=0.0001$ ).

**Table (VI)** reveals a statistically significant relationship between the mean total knowledge score and sociodemographic characteristics, including occupation, number of family members, and number of rooms before program implementation. After the program implementation, there was a significant relation between the total mean knowledge score and both occupation and educational level of the studied women.

**Table (VII)** indicates that the mean total knowledge score and sociodemographic characteristics, such as occupation, number of family members, and number of rooms,

prior to the program implementation had a statistically significant relationship. Following the program's implementation, a significant relationship was found between the studied women's total mean knowledge score, occupation, and educational attainment. The table also shows that age, educational

level, and number of family members were statistically significant determinants of women's practice scores before the program implementation. Meanwhile, the family's monthly income was the only statistically significant determinant after the program's implementation ( $p < 0.05$ ).

**Table (I): Distribution of the studied rural women regarding to their socio-demographic characteristics**

Socio-demographic characteristics	The studied rural women (n=150)	
	N	%
<b>Age years: -</b>		
23-30	69	46.0
>30-43	81	54.0
<b>Range</b>	23-43	
<b>Mean±SD</b>	31.31±5.03	
<b>Occupation: -</b>		
Housewife	79	52.7
Employee	71	47.3
<b>Educational level: -</b>		
Primary education	13	8.7
Secondary	83	55.3
High education	54	36.0
<b>Number of family members: -</b>		
Three	6	4.0
Four	75	50.0
Five	69	46.0
<b>Number of rooms in the house: -</b>		
Two	92	61.3
Three	58	38.7
<b>Crowding index:-</b>		
≤ 2	150	100
<b>#Family monthly income: -</b>		
Just enough	138	92.0
Enough to be spared	12	8.0

**#According to women view**

**Table (II): Distribution of the studied rural women according to their levels of total knowledge about climate change throughout the study**

Total knowledge about climate change	The studied rural women before and two months after educational program (n=150)				$\chi^2$ test P value
	Before		Two months after		
	N	%	N	%	
Total knowledge level					<b>210.412</b> <b>0.0001*</b>
- Low level	124	82.7	1	0.7	
- Moderate level	12	8.0	35	23.3	
- High level	14	9.3	114	76.0	
Total knowledge score (0-56)					
- Range	3-53		27-55		
- Mean±SD	19.93±12.02		45.94±9.63		
- Z value	13.613				
- P value	0.0001*				

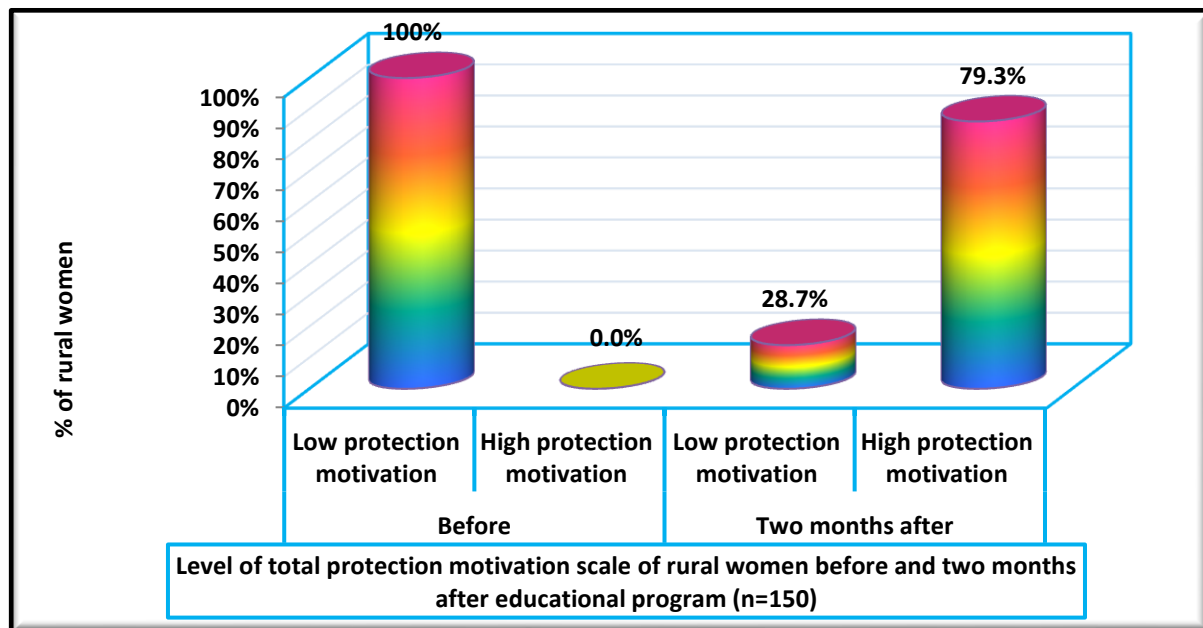
\*Statistically significant (P&lt;0.05)

**Table (III): Distribution of the studied rural women according to their total mean scores of protection motivation scale constructs throughout the study period**

Protection motivation scale (Each item was scored 1-3)	No. of statements (Score)	Mean score of the studied rural women before and two months after educational program (n=150)		Z value P value
		Before	Two months after	
		Range Mean $\pm$ SD	Range Mean $\pm$ SD	
<b>A-Threat appraisal construct scores</b>				
<b>1. Perceived severity</b>	8 (8-24)	8-24 13.22 $\pm$ 4.25	16-24 22.05 $\pm$ 2.55	13.304 0.0001*
<b>2. Perceived vulnerability</b>	8 (8-24)	8-24 16.16 $\pm$ 3.19	16-24 23.50 $\pm$ 1.03	13.488 0.0001*
<b>Total threat appraisal construct score</b>	<b>16</b> <b>(16-48)</b>	<b>16-48</b> <b>29.38<math>\pm</math>7.11</b>	<b>32-48</b> <b>45.55<math>\pm</math>3.40</b>	<b>13.323</b> <b>0.0001*</b>
<b>B-Coping appraisal construct scores</b>				
<b>1. Perceived response-efficacy</b>	35 (35-105)	43-72 53.61 $\pm$ 8.31	74-105 92.30 $\pm$ 10.98	15.021 0.0001*
<b>2. Perceived self-efficacy</b>	6 (6-18)	6-12 7.89 $\pm$ 2.25	12-18 15.03 $\pm$ 2.51	14.562 0.0001*
<b>3. Perceived response cost</b>	5 (5-15)	5-11 6.13 $\pm$ 1.56	10-15 13.53 $\pm$ 1.43	15.151 0.0001*
<b>Total coping appraisal construct score</b>	<b>46</b> <b>(46-138)</b>	<b>54-95</b> <b>67.62<math>\pm</math>10.92</b>	<b>97-138</b> <b>120.87<math>\pm</math>14.22</b>	<b>15.016</b> <b>0.0001*</b>
<b>C-Protection motivation intention</b>	<b>36</b> <b>(36-108)</b>	<b>50-79</b> <b>62.31<math>\pm</math>7.92</b>	<b>82-108</b> <b>99.48<math>\pm</math>8.48</b>	<b>15.059</b> <b>0.0001*</b>
<b>Total protection motivation scale score</b>	<b>98</b> <b>(98-294)</b>	<b>131-219</b> <b>159.31<math>\pm</math>23.29</b>	<b>222-294</b> <b>265.90<math>\pm</math>24.37</b>	<b>15.014</b> <b>0.0001*</b>

\*Statistically significant (P&lt;0.05)



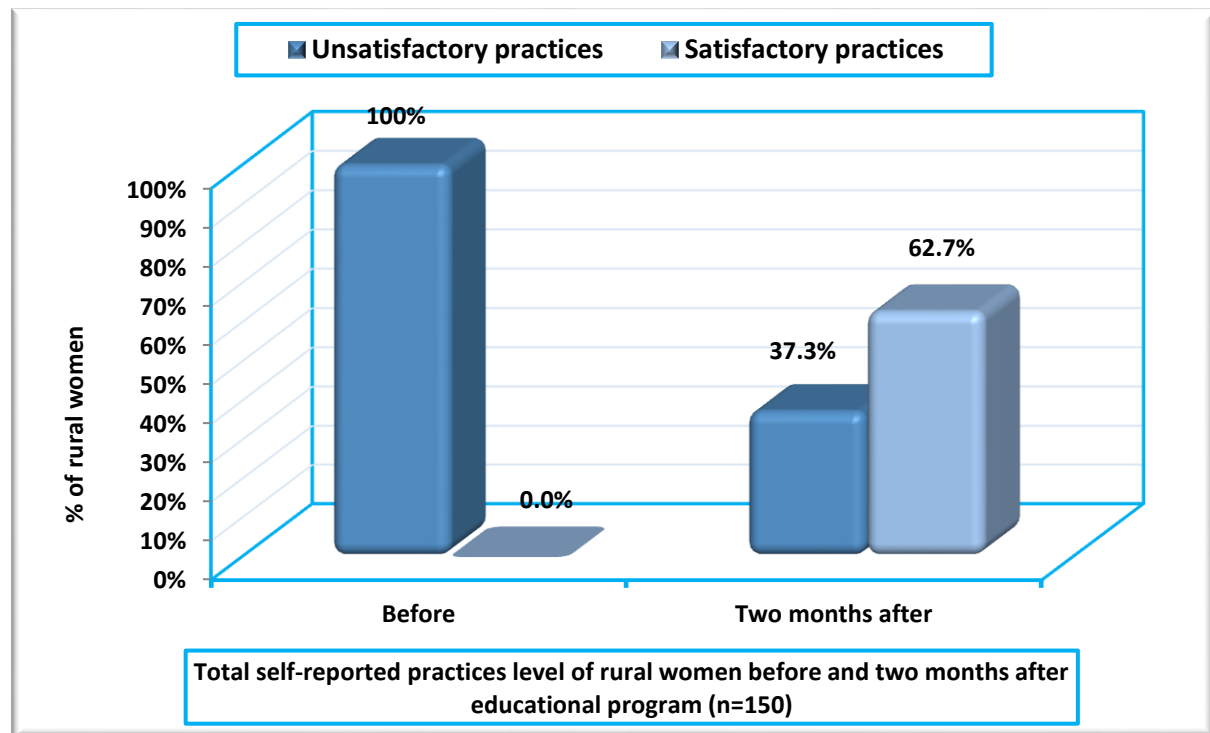


**Figure (II):** distribution of the studied rural women according to their total score levels of protection motivation scale throughout the study period

**Table (IV):** Mean and standard deviation of the total score of self-reported daily life practices of the studied rural women throughout the study period

Self-reported daily life practices subitems	No. of items (score)	Mean score of the studied rural women before and two months after educational program (n=150)		Z value P value
		Before	Two months after	
		Range Mean±SD	Range Mean±SD	
#A-Energy conservation and use of clean energy	8 (8-24)	8-18 13.31±2.51	16-24 21.65±2.27	14.795 0.0001*
B-Water conservation	5 (5-15)	5-14 8.03±1.69	10-15 13.55±1.49	14.631 0.0001*
#C- Smart transportation	2 (2-6)	2-5 2.66±1.09	5-6 5.04±0.10	12.938 0.0001*
D-Waste reduction and recycling (sustainable consumption)	13 (13-39)	18-30 22.03±2.75	29-39 36.07±2.85	15.065 0.0001*
E-Active participation in environmental protection and mitigating climate change	4 (4-12)	4-8 5.79±0.99	8-12 10.21±1.49	14.970 0.0001*
Total practice scores	32 (32-96)	43-65 51.83±7.27	73-96 86.51±8.17	15.028 0.0001*

\*Statistically significant ( $P < 0.05$ )



**Figure (III):** Distribution of the studied rural women according to their total levels of self-reported daily life practices throughout the study period

**Table (V):** Correlation between total knowledge scores and total scores of self-reported practices and protection motivation scale scores (Threat appraisal, Coping appraisal and Protection motivation intension constructs) of the studied rural women two months after implementation of the educational program

Variables	The studied rural women total scores two months after educational program (n=150)			
	Total knowledge scores		Total self-reported practices scores	
	r	P value	r	P value
Protection motivation scale scores				
A-Threat appraisal construct scores	0.695	0.0001*	0.683	0.0001*
B-Coping appraisal construct scores				
1- Perceived response efficacy	0.749	0.0001*	0.822	0.0001*
2- Perceived self- efficacy	0.758	0.0001*	0.797	0.0001*
3- Perceived response cost	0.601	0.0001*	0.688	0.0001*
Total Coping appraisal construct score	0.773	0.0001*	0.845	0.0001*
C- Protection motivation intention	0.696	0.0001*	0.862	0.0001*
Total protection motivation scale score	0.790	0.0001*	0.887	0.0001*
Total self-reported practices scores	0.669	0.0001*	-	-

*r=Correlation Coefficient*

\*Statistically significant (P<0.05)

**Table (VI): Relationship between total mean score of knowledge and socio-demographic characteristics among the studied rural women throughout the study period**

Socio-demographic characteristics	N	Total knowledge mean scores of the studied rural women before and two months after educational program (n=150)			
		Before		Two months after	
		Mean±SD	Z value or $\chi^2$ value P value	Mean±SD	Z value or $\chi^2$ value P value
<b>Age years</b>					
23-30	69	19.43±11.01	0.354	44.80±10.53	4.785
>30-43	81	20.36±12.89	0.723	46.91±8.73	0.074
<b>Occupation</b>					
Housewife	79	14.44±6.78	91.866	42.34±9.97	16.387
Employee	71	31.92±10.24	0.0001*	51.70±4.88	0.0001*
<b>Educational level</b>					
Primary education	3	9.67±5.77	0.508	41.33±12.66	13.913
Secondary	83	13.43±6.72	0.479	42.90±10.16	0.001*
High education	54	31.70±10.27		51.425±5.23	
<b>Number of family member</b>					
Three	6	19.33±7.74	7.719	44.83±12.25	3.087
Four	75	17.72±11.45	0.021*	45.04±9.99	0.213
Five	69	22.39±12.58		47.01±9.01	
<b>Number of rooms in the house</b>					
Two	92	17.28±10.38	3.353	45.03±10.18	1.616
Three	58	24.14±13.30	0.001*	47.38±8.56	0.106
<b>Family monthly income</b>					
Just enough	138	19.87±12.42	0.918	46.01±9.67	0.164
Enough to be spared	12	20.67±6.17	0.358	51.17±9.53	0.417

## Discussion

Climate change is a significant worldwide concern that impacts all communities, especially rural areas. Rural women are among the most vulnerable populations affected. Their knowledge and daily behaviors are critical in addressing the effects of climate change. Using the Protection Motivation Theory (PMT) helps to understand how these women recognize climate threats and

take action to protect themselves and their families by adopting climate-friendly behaviors (**Duru, Aro, and Oladipo, 2022**).

The current study found a statistically significant improvement in overall knowledge scores two months after program implementation compared to before the program. This is reinforced by the findings of **Afifi, Baraia, Abdel-Mordy, and Emam (2024)** in Egypt, who demonstrated

that the majority of women had insufficient total score knowledge on climate change before the program. Meanwhile, the majority of them had a high knowledge score following the educational program. The current study's improvement in knowledge score can be linked to the efficacy of the implemented educational program and supported by the fact that the majority of the studied rural women were either highly educated or secondary- educated, which may have facilitated better knowledge acquisition and retention.

However, these findings contradict those of **Devi et al. (2023)** in India, who discovered that the majority of farm women were well-informed about climate change. From the researcher's perspective, this discrepancy is attributed to the practical exposure of farm women to the environmental changes due to their daily involvement in agricultural activities. This highlights the importance of considering regional and occupational context when designing and interpreting knowledge-based studies.

Protection Motivation Theory (PMT) provides a useful framework for analyzing how individuals, particularly rural women, can be motivated to adopt pro-environmental behaviors in response to this threat (**Maddux & Rogers, 1983**). The current study found a statistically significant improvement in the Mean scores of all protection motivation constructs, including perceived vulnerability, perceived severity, response efficacy, self-efficacy, and perceived costs. Consequently, the

total protection motivation scale mean score two months after the intervention significantly improved. These results match those of **Japalagh, Aghaei, Shakeri, and Azizi (2025)**, who showed a substantial improvement in the Mean scores of perceived severity, vulnerability, response efficacy, and self-efficacy post-intervention, as well as a reduction in perceived barriers and an increase in behavioral intention. From the researcher's point of view, this improvement can be attributed to the effectiveness of the PMT-based program in enhancing awareness, strengthening coping mechanisms, and reducing perceived barriers, which collectively facilitated positive behavioral intentions.

However, the findings of the current study contradict those of **Daraz, Khan, Alsawalqa, Alrawashdeh, and Alnajdawi (2024)** in Pakistan, who reported that the majority of Pakistani women had high perceived severity towards climate change. The authors related this to the fact that Pakistani women were directly exposed to the effects of climate change, which increased their perception of severity. The results of this study demonstrated a highly statistically significant improvement in the protection motivation scale's total level score two months post-intervention, as all the studied rural women exhibited a low level of protection motivation prior to the educational program. However, two months post-intervention, this markedly improved, with most of the women reaching a high level of protection motivation. This result is

in alignment with **Sharifi et al. (2022)**, who found that after the program implementation two thirds of the women had high protection motivation compared to low protection motivation pre intervention. Both studies demonstrated that when women are empowered with knowledge and guided through a motivational framework, their protective behaviors and self-efficacy can be significantly enhanced.

The current study showed that the total Mean scores for all self-reported daily life practices had improved statistically significantly regarding climate change among the studied rural women after program implementation. The Mean scores of energy conservation, water conservation, smart transportation, waste reduction and recycling, and active participation in environmental protection all increased significantly post-program compared to pre-program, reflecting the program's effectiveness in reshaping daily practices towards more sustainable practices. These findings are consistent with those of **Ghazy and Fathy (2023)**, who reported significant post-intervention increases in the Mean scores of energy conservation and sustainable transportation practices among university student participants. The same improvements were reported in the study by **Ibrahim, Abd Elmawla, and Ali (2023)** in Egypt in water conservation practices, and **Abdallah and Farag (2022)** in environmental participation scores of the participants. From the

researcher's perspective, the consistent improvement in mean scores across all domains of the present study highlights the effectiveness of structured, culturally sensitive educational interventions in transforming climate-related practices. Such programs not only enhance awareness but also successfully translate knowledge into practical, cost-saving, and environmentally responsible actions. The present study showed a statistically significant improvement in the total practice level scores of the studied rural women two months after the program implementation compared to pre-program. Before the intervention, all the studied women reported unsatisfactory total practice levels. However, about two-thirds of the participants achieved satisfactory practice level post-program. This is in harmony with the results of **Abdallah and Farag (2022)**, who found that only a small proportion of participants demonstrated adequate practice score before intervention, while post-intervention, the majority were more likely to report satisfactory levels of environmentally conscious practices. This can be linked to the efficiency of the implemented educational program in transforming knowledge into daily practices that contribute to climate change mitigation and positioning participants as pivotal agents in advancing climate change mitigation within their daily contexts. Knowledge plays a critical role in initiating cognitive and motivational shifts that influence behavior (**Tapia-Echanove, Bloch-Atefi, Hanson-**

**Easey, Oswald, & Elliott, 2025).** This was proven by the current study, which found a statistically significant positive correlation between total knowledge, total scores of all protection motivation constructs, and total self-reported practice score. This was supported by **Elgzar, Sayed, Hussein, and Allam (2023)**, who reported that educational content structured around the PMT framework significantly enhanced women's knowledge about COVID-19 and led to improvements in self-protective behaviors. The study also found positive correlations between knowledge levels and constructs of PMT, mirroring the pattern observed in the present research.

Socio-demographic characteristics are key determinants that critically shape individuals' capacity to receive, process, and apply knowledge gained from educational interventions (**Simpson et al., 2021**). This was evidenced by the current study, which indicated that there was a statistically significant relationship between the Mean of the overall knowledge score and socioeconomic characteristics, including occupation, number of family members, and number of rooms before the program was implemented. There was a significant relationship between the total Mean score of knowledge and occupation as well as the educational level of the studied women, where employees and highly educated women gained higher Mean scores than others after program implementation. These results align with those of **Zhang et al. (2021)**,

who concluded that educational attainment and occupation were significant predictors of knowledge and behavioral intentions.

Understanding the relationship between socio-demographic characteristics and protection motivation is essential for identifying the factors that influence individuals' readiness to engage in climate-related protective behaviors (**Sarmin, Shahin, & Hasan, 2024**). In alignment with this, the present study verified a statistically significant relationship between the Mean total protection motivation scale scores and socio-demographic characteristics, where there was a statistically significant relationship between protection motivation and occupation (employed women) as well as educational level (highly educated women) two months after program implementation. The findings of **Sahari, Salo, and Sandman (2024)**, which emphasized the significance of age, education, and employment in influencing people's motivation to engage in climate action, are in line with those of the present study. They noted that younger individuals and those with higher educational attainment were more likely to perceive climate change as a severe threat and demonstrated stronger intentions to engage in both individual and collective protective behaviors. These findings underline the need to personalize climate programs to accommodate socio-demographic variations within target populations to enhance protection motivation and

ensure the sustainability of protective behaviors.

The present study demonstrated also that age, educational level, and number of family members were statistically significant determinants of women's practice scores before the program implementation, where young age, high education, and having a smaller number of family members gained higher Mean scores of self-reported practices. However, family monthly income was the only statistically significant determinant after the program implementation ( $p < 0.05$ ), as those with enough monthly income gained higher mean scores. These results are aligned with those reported by **Afifi et al. (2024)**, who found that educational level was positively associated with higher baseline knowledge and adaptive health behaviors before intervention. Meanwhile, income and employment played a key role in shaping participants' ability to adopt recommended behaviors post intervention. This is explained by the fact that the majority of the rural women in the present study were educated and between 23 and 43 years old, a stage of life often associated with greater adaptability, openness to innovation, and receptiveness to new information.

In addition, the current findings align with those of **Piao and Managi (2024)**, who confirmed that both education and income were significant predictors of environmental behavior. This suggests that while demographic factors influence baseline behavior, socioeconomic resources are crucial

for maintaining behavioral change post-intervention.

Therefore, integrating educational and economic support is essential for effective climate change mitigation among vulnerable rural populations.

Finally, the findings of this study demonstrate the tremendous positive influence of an educational program based on protection motivation theory on improving the knowledge and daily life practices of rural women concerning climate change.

### **Conclusion:**

The results of the present study concluded that the educational program on climate change, based on the Protection Motivation Theory, was effective in improving rural women's knowledge and daily life practices. The overall level of protection motivation among rural women to engage in climate-friendly practices improved significantly.

### **Recommendations:**

- Rural health services need to implement climate change health education initiatives for rural communities, by adopting culturally sensitive and socially relevant communication strategies.
- Community health nurses should implement continuous awareness campaigns aimed at raising environmental consciousness about the significance and impacts of climate change, while addressing barriers that limit education, community engagement, and the adoption of sustainable practices.

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## Relation between Healthcare Organizational Silence and its Effectiveness among Nurses

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### Abstract

**Background:** Organizational silence represents a behavioral response that can either hinder or enhance organizational performance. It may signal agreement and cooperation or, conversely, disagreement and resistance, thereby functioning as a source of pressure for both nurses and the organization. Therefore, healthcare institutions should identify the underlying causes of organizational silence among nurses, as it significantly influences their level of commitment to work and overall organizational effectiveness. **Aim:** Assess the relation between healthcare organizational silence and its effectiveness among nurses. **Design:** A descriptive correlational research design was used. **Setting:** The study was conducted at Tanta University Psychiatry, Neurology and Neurosurgery Center which affiliated to Ministry of High Education and Scientific Research. **Subjects:** All (n=336) nurses. **Tools:** It involved organizational silence and health care organizational effectiveness questionnaires. **Results:** Nearly half (48.5%) of nurses exhibited a high level of overall organizational silence and the majority (90.5%) of them had a low level of overall organizational effectiveness. **Conclusion:** There was a statistically significant negative correlation between overall silence and overall effectiveness. **Recommendations:** Hospital management provides training courses, workshops and educational programs for nurses regarding organizational silence and organizational effectiveness and establishes a system of reward and retention of nurses.

**Keywords:** Healthcare Organizational Effectiveness, Nurses, Organizational Silence.

## Introduction

Health care organizations face ongoing challenges in sustaining their operations, ensuring patient safety and protecting data security. These challenges entail considerable costs related to recruiting qualified personnel, implementing robust technologies and optimizing both clinical and administrative processes without compromising the quality of care. Additionally, they must cope with emerging competitors who attract patients by offering more convenience lower-cost services. (Schwarz, 2025). In addition, organizational silence is another challenge that cause a significant problem that an organization faces it cause disagreement hence, results in low motivation, satisfaction, and commitment from staff nurses (Sakr, Ibrahim and Ageiz ,2023).

Organizational silence can be described as a phenomenon where nurses have a conscious decision making to withhold information, feedback, or concerns within their workplace environment often due to fear of negative consequences such as retribution, ostracism, or job loss. (Shehata, Abo Gad, Shukair and Mostafa,2025).

Organizational silence has three dimensions, causes, effects, and strategies. The cause of organizational silence includes fear of punishment from superiors, fear of negative interpretation, fear of negative image “troublemaker”, fear of criticism, and abusive supervision (Tichtich and Khaiat, 2024).

The effect of organizational silence includes increasing the level of

dissatisfaction of nurses, low internal motivation, withdrawal, increasing stress, low commitment, a loss of trust in the organization and turnover. Also, failure of the organization to benefit from the ideas and constructive criticism of nurses (Cobanoglu, Sariisik, & Akovaand Coskun, 2024)

The strategies of organizational silence can be achieved by promoting accurate and open communication, practicing of fairness within the organization and involving nurses in decision-making process (Aziez, 2024).

As remaining silent means not benefiting from the intellectual contributions of nurses, problems not being identified, feedback not provided, and information not obtained directly. So, it can affect organizational effectiveness for the healthcare sector (Ighiebemhe, 2019).

Organizational effectiveness can be defined as the accuracy of the goals of a process that occurs in formal institutions that organize a cooperation with components that are coordinated with each other to achieve goals (Widiasih, 2025).

Organizational effectiveness has five dimensions including goal accomplishment, resource acquisition, internal processes, organizational involvement and competing value. The goal accomplishment dimension can be defined as the degree to which the organization effectively achieves its stated objectives (Mostafa, Mahfouz and El-Saiad, 2024). The resource acquisition dimension refers to the

organization ability to assemble and coordinate its resources, including human, financial, technical, material resources and managerial expertise (Valeri, 2024). The internal process dimension reflects the organization ability to effectively utilize and coordinate its available resources to accomplish its pre-stated goals (Saleh, Elsayed, Elsabahy and Ata, 2024). Organizational involvement dimension means the ability of the health care organization management to support nurses' participation in all aspect of their work (Esosuo and Demaki, 2024). The competing values dimension means measuring the organization's ability to cope with environmental changes and emphasis on optimization of resources, stability, and flexibility (Mostafa et al., 2024).

### **Significance of the study**

Organizational silence reflects nurses' reluctance or inability to voice their opinions and to discuss work-related problems or concerns represents a behavioral response that can either hinder or enhance organizational performance. Silence may indicate agreement and conformity or conversely, disagreement and resistance, thereby functioning as a form of social pressure affecting both nurses and organization. Therefore, healthcare institutions should identify the underlying causes of organizational silence among nurses, as it directly influences their level of commitment and consequently, the overall effectiveness of the organization (El Abdou, Hassan and Badran, 2022). The findings of

this study will contribute to raising societal awareness of the relationship between organizational silence and organizational effectiveness.

### **Aim of the study:**

**The aim of the study is to:** Assess relation between healthcare organizational silence and its effectiveness among nurses.

### **Research questions:**

- What are the levels of organizational silence among nurses?
- What are the levels of organizational effectiveness among nurses?
- What is the relation between healthcare organizational silence and its effectiveness among nurses?

### **Subjects and Method**

#### **Research design:**

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

#### **Setting:**

The study was conducted at Tanta University Psychiatry, Neurology and Neurosurgery center which affiliated to Ministry of High Education and Scientific Research.

#### **Subject:**

The subject of the study was contained all available nurses (n=336) who worked at previously mentioned setting.

#### **Tools of data collection:**

The data of the study were collected using the following two tools.

#### **Tool I: Healthcare Organizational Silence Questionnaire:**

This tool was developed by El Abdou et al., (2022) and was modified by the researcher. It was

used to assess the level of health care organizational silence among nurses. This tool divided into two parts:

**Part I: Nurses' personal characteristics and work-related data** included age, sex, marital status, years of experience, educational level, position title, department, attending training courses and participation in the hospital activities or committees.

**Part II: Health Care Organizational Silence among Nurses Questionnaire:**

This tool consists of 26 items covered three subscales as follows: Organizational silence causes (11 items), organizational silence effects (9 items) organizational silence strategies (6 items).

**Scoring system:**

Responses of nurses were measured on a five-point Likert Scale, ranging from (1-5) where; strongly disagree=1, disagree=2, little agree =3, agree=4, strongly agree=5. Total scores were categorized according to statistical cut-off point into levels of organizational silence:

- **High level** of health care organizational silence  $\geq 75\%$
- **Moderate level** of health care organizational silence  $60\% - < 75\%$
- **Low level** of health care organizational silence  $< 60\%$

**Tool II: Health Care Organizational Effectiveness among Nurses Questionnaire:**

This tool was developed by **Khalaf (2020)** and was modified by the researcher. It was used to assess the level of organizational effectiveness

among nurses. It consists of 28 items covered five subscales as follows:

**Levels of organizational effectiveness:**

Goal accomplishment (7items), resource acquisition (5 items), internal process (5 items) organizational involvement (6items) and competing value (5 items).

**Scoring system:**

Responses of staff nurses were measured on a five-point Likert Scale, ranging from (1-5) where; strongly disagree=1, disagree=2, little agree =3, agree=4, strongly agree=5. Total scores were categorized according to statistical cut-off point into levels of organizational effectiveness:

- High level of organizational effectiveness  $\geq 75\%$
- Moderate level of organizational effectiveness  $60\% - < 75\%$
- Low level of organizational effectiveness  $< 60\%$

**Method**

**1.** Official permission was obtained from the Dean of Faculty of Nursing, Tanta University to responsible authorities of Psychiatry Neurology and Neurosurgery Center to conduct the study.

**2. Ethical considerations:**

An approval from the Scientific Research and Ethical Committee at Faculty of Nursing was obtained with code number (486-6-2024).

The researcher introduced herself to the participants, a full explanation of the aim and method of the study was done to obtain acceptance and cooperation as well as their informed consent.

The right to terminate participation at any time was accepted.

The nature of the study did not cause any harm for the entire sample.

Assuring the nurses about the privacy and confidentiality of the collected data and explaining that it was used for the study purpose only was done.

3. The tools were translated into Arabic language.

4. The tools were revised by supervisors and then submitted to five experts from field of nursing administration to check content and face validity; the experts were classified into four professors and one assistant professor of Nursing Service Administration from Faculty of Nursing, Tanta University. As well as clarity of the questionnaire. The experts were requested to appraise tools' individual items in relation to its relevance and appropriateness on a 4-point Scale as follows: 1=irrelevant 2=little relevant 3=relevant 4=strongly relevant.

5. The validity of tool I was **96.73%** and tool II was **99.11%**. Necessary corrections and modifications were done based on experts' opinion.

6. Suitable statistic test was done to test reliability. Tools were tested for their reliability by Cronbach Alpha coefficient factors, to measure the internal consistency of the items. Tool I: Health care organizational silence questionnaire and their subscale were reliable was **0.887**, and tool II: Health care organizational effectiveness among nurses' scale

(Cronbach alpha coefficient) was **0.939**.

7. Pilot study was carried out on a sample (10%) of nurses (n=34) to check and ensure the clarity of the tools, identify obstacles and problems that may be encountered during data collection.

8. Data collection phase: the data was collected from different nurses during work shifts morning, afternoon, or night and distribute the questionnaires to be filled.

9. The time needed to complete the questionnaire items from nurses was between 20-30 minutes. Nurses were recorded their answers in the presence of the researcher.

10. The data were collected within three months, started from the begging of July to the end of September 2024.

## Results

**Table (1):** Illustrates distribution of the studied nurses according to personal characteristics and work-related data. As noticed in this table, the age of the nurses ranging between (21-53) years old with Mean  $\pm$  SD ( $30.20 \pm 4.99$ ). High percent (61.6%) of the nurses were females and (72.9%) of them were married. Regarding to years of experience about one third (32.1%) of them had 10-<15 year, (11.3%) had  $\geq 15$  year with mean years of experience with Mean  $\pm$  SD ( $8.35 \pm 5.17$ ) and about half (49.1%,48.2%) of them had a Technical Nursing Institute, Nursing Specialist, respectively. While only (2.7%) had post-graduates' studies. For about position title most (83.3%)



of nurses are staff nurse (49.7%) were distributed in ICU, (25.0%) in Psychiatry, (14.9%) in neurology and (10.4%) in outpatient. Most (84.2%) of nurses had not attended training courses, above half (58.3%) of them had been participated in the hospital activities or committees.

**Table (2):** Reveals mean scores of healthcare organizational silence among nurses. The table showed that strategies subscale of health care organizational silence had the highest mean percent scores ( $80.92 \pm 15.21$ ). While the causes subscale had the lowest mean percent scores ( $67.81 \pm 13.73$ ).

**Figure (1) and Table (3):** Demonstrate levels of organizational silence among nurses. It revealed that nearly half (48.5%) of nurses had a high level of overall organizational silence. While, more than one third (39.3%) of them had a moderate level and minority (12.2%) of them had a low level of overall organizational silence. It can be noticed that the majority (79.5%) of nurses had a high level of strategies subscale of health care organizational silence. More than half (53.0%) of them had high level of effect subscale. More than one third (41.4%) of them had moderate level of causes subscale.

**Table (4):** Reveals mean scores of healthcare organizational effectiveness among nurses. The table showed that the highest mean percent scores of healthcare organizational effectiveness subscales was ( $48.11 \pm 18.15$ ) for response to goal accomplishment of effectiveness. While the lowest mean

percent scores were ( $31.46 \pm 17.70$ ) for competing value subscale.

**Figure (2) and Table (5):** Demonstrate levels of organizational effectiveness among nurses according to their mean percent score about organizational effectiveness. This figure revealed that the majority (90.5%) of nurses had a low level of overall organizational effectiveness. While minority (6.3%, 3.3%) of them had a moderate and high level of overall organizational effectiveness, respectively. It can be noticed that majority (91.7%, 90.8% , 84.2% ,82.4% and 76.2%) of nurses had a low level regarding organizational involvement, competing value ,resource acquisition, internal process and goal accomplishment subscales , respectively.

**Table (6):** Reveals correlation between healthcare organizational silence subscales and health care organizational effectiveness subscales. The table shows that there was a statistically significant negative correlation between overall silence and, overall effectiveness. Also, there was statistically significant negative correlation between all healthcare organizational silence subscales and all health care organizational effectiveness subscales (at  $p < 0.001$ ).

**Table (1): Distribution of the studied nurses according to personal characteristics and work-related data (n = 336)**

Personal characteristics	No.	%
<b>Age (years)</b>		
<26	67	19.9
26 – 30	117	34.8
>30	152	45.2
Min. – Max.	21.0 – 53.0	
Mean $\pm$ SD.	30.20 $\pm$ 4.99	
<b>Sex</b>		
Male	129	38.4
Female	207	61.6
<b>Marital status</b>		
Married	245	72.9
Single	91	27.1
<b>Years of experience</b>		
<5	96	28.6
5 – <10	94	28.0
10 – <15	108	32.1
$\geq 15$	38	11.3
Min. – Max.	1.0 – 30.0	
Mean $\pm$ SD.	8.35 $\pm$ 5.17	
<b>Educational level</b>		
Associated Degree in Nursing	165	49.1
Bachelor's Degree in Nursing	162	48.2
Post studies	9	2.7
<b>Position</b>		
Head nurse	16	4.8
Charge nurse	40	11.9
Staff nurse	280	83.3
<b>Department</b>		
ICU	167	49.7
Psychiatry	84	25.0
Neurological	50	14.9
Outpatient	35	10.4
<b>Attending training courses</b>		
Yes	53	15.8
No	283	84.2
<b>Participation in the hospital activities or committees</b>		
Yes	196	58.3
No	140	41.7

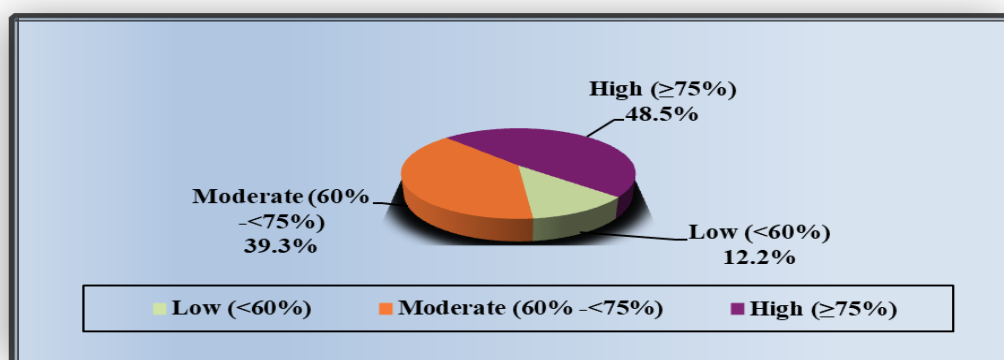
IQR: Inter quartile range

SD: Standard deviation.

**Table (2): Mean scores of health care organizational silence among nurses (n = 336)**

Healthcare Organizational silence subscales	Score Range	Total scores		Average Scores	Percent Scores	Rank
		Min. - Max.	Mean $\pm$ SD.	Mean $\pm$ SD.	Mean $\pm$ SD.	
<b>Causes</b>	<b>(11 –55)</b>	18.0 – 55.0	40.84 $\pm$ 6.04	3.71 $\pm$ 0.55	67.81 $\pm$ 13.73	3
<b>Effects</b>	<b>(9 – 45)</b>	18.0 – 45.0	35.56 $\pm$ 5.64	3.95 $\pm$ 0.63	73.78 $\pm$ 15.66	2
<b>Strategies</b>	<b>(6 – 30)</b>	8.0 – 30.0	25.42 $\pm$ 3.65	4.24 $\pm$ 0.61	80.92 $\pm$ 15.21	1
<b>Total</b>	<b>(26–130)</b>	54.0 – 130.0	101.82 $\pm$ 12.18	3.92 $\pm$ 0.47	72.90 $\pm$ 11.71	

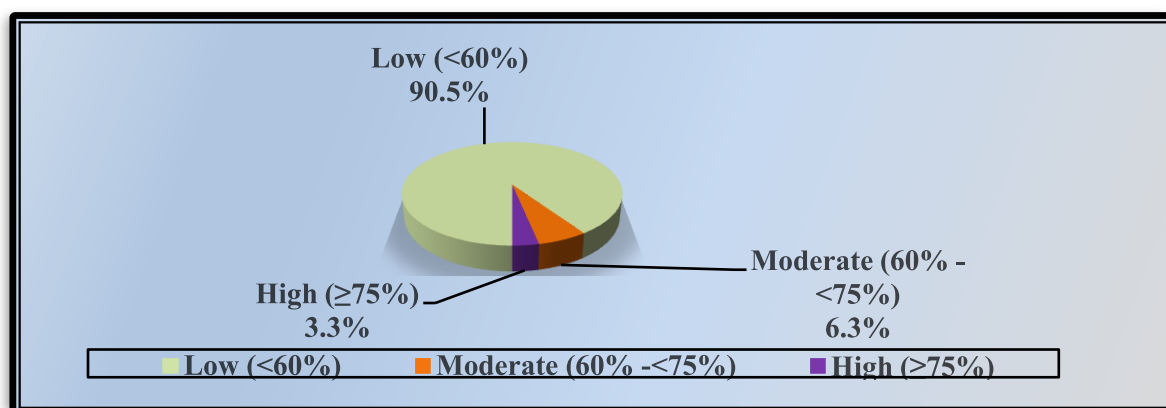
SD: Standard deviation

**Figure (1): Total Levels of organizational silence among nurses****Table (3): Levels of organizational silence among nurses (n = 336)**

Healthcare organizational silence subscales	High ( $\geq 75\%$ )		Moderate (60% < 75%)		Low (< 60%)	
	No.	%	No.	%	No.	%
<b>Causes</b>	110	32.7	139	41.4	87	25.9
<b>Effects</b>	178	53.0	101	30.1	57	17.0
<b>Strategies</b>	267	79.5	46	13.7	23	6.8
<b>Overall</b>	163	48.5	132	39.3	41	12.2

**Table (4) Mean scores of healthcare organizational effectiveness among nurses (n =336)**

Health Care Organizational Effectiveness subscales	Score Range	Total score		Average Score	Percent Score	Rank
		Min. – Max.	Mean $\pm$ SD.	Mean $\pm$ SD.	Mean $\pm$ SD.	
Goal Accomplishment	(7 – 35)	7.0 – 35.0	20.47 $\pm$ 5.08	2.92 $\pm$ 0.73	48.11 $\pm$ 18.15	1
Resource acquisition	(5 – 25)	5.0 – 25.0	12.32 $\pm$ 3.94	2.46 $\pm$ 0.79	36.58 $\pm$ 19.69	3
Internal process	(5 – 25)	5.0 – 25.0	13.32 $\pm$ 3.94	2.66 $\pm$ 0.79	41.62 $\pm$ 19.70	2
Organizational involvement	(6 – 30)	6.0 – 29.0	14.41 $\pm$ 4.41	2.40 $\pm$ 0.74	35.04 $\pm$ 18.38	4
Competing value	(5 – 25)	5.0 – 23.0	11.29 $\pm$ 3.54	2.26 $\pm$ 0.71	31.46 $\pm$ 17.70	5
Total	(28–140)	35.0 – 131.0	71.81 $\pm$ 16.68	2.56 $\pm$ 0.60	39.12 $\pm$ 14.90	

**Figure (2): Levels of organizational effectiveness among nurses****Table (5): Levels of organizational effectiveness among nurses (n = 336)**

Health Care Organizational Effectiveness subscales	High ( $\geq 75\%$ )		Moderate (60% - <75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Goal accomplishment	27	8.0	53	15.8	256	76.2
Resource acquisition	18	5.4	35	10.4	283	84.2
Internal process	25	7.4	34	10.1	277	82.4
Organizational involvement	12	3.6	16	4.8	308	91.7
Competing value	8	2.4	23	6.8	305	90.8
Overall	11	3.3	21	6.3	304	90.5

**Table (6): Correlation between healthcare organizational silence subscales and health care organizational effectiveness subscales (n = 336)**

Healthcare organizational effectiveness		Health care organizational silence			
		Causes	Effects	Strategies	Overall Silence
Goal Accomplishment	r	-0.182	-0.115	-0.303	-0.234
	P	0.001*	0.036*	<0.001*	<0.001*
Resource acquisition	r	-0.265	-0.213	-0.375	-0.342
	P	<0.001*	<0.001*	<0.001*	<0.001*
Internal process	r	-0.216	-0.181	-0.298	-0.280
	P	<0.001*	0.001*	<0.001*	<0.001*
Organizational involvement	r	-0.253	-0.267	-0.406	-0.371
	P	<0.001*	<0.001*	<0.001*	<0.001*
Competing value	r	-0.227	-0.284	-0.407	-0.366
	P	<0.001*	<0.001*	<0.001*	<0.001*
Overall Effectiveness	r	-0.284	-0.259	-0.445	-0.394
	P	<0.001*	<0.001*	<0.001*	<0.001*

R: Pearson coefficient

\*: Statistically significant at  $p \leq 0.0$ **Discussion****Concerning healthcare organizational silence**

The findings of the current study revealed that nearly half of nurses demonstrated a high level of organizational silence. This outcome is due to that above one third of nurses exhibited a moderate level of organizational silence causes subscale, while more than half of them showed a high level of organizational silence effects subscale and majority of them scored high level of organizational silence strategies subscale.

These results are in agreement with the finding of **Mohamed, Shazly and Saad (2024)** who reported that approximately two fifths of nurses

perceived organizational silence at high level.

Conversely, the present finding is inconsistent with the finding conducted by **Shehata et al., (2025)** displayed that more than two thirds of the head nurses and most of nurses experienced a low level of overall organizational silence.

Current study finding revealed that above one third of nurses had a moderate level of organizational silence causes subscale. This finding is due to that majority of the nurses were agree that organizational culture doesn't support nurses to speak up about their concerns. Also, high percent of them were agree that most nurses can't express their opinions regarding critical matters in the

hospital cause of nurses who speak up are always victimized, lack of nurse's authority which prevents them from conveying problems to their superiors, nurses thought that it's pointless to speak up about their concerns to their boss, their fear of retaliation from executives at the workplace.

This result is consistent with the results of **Soliman, Marouf and Eldeep (2024)** who found that nurses who experience incivility may develop a negative perception of the organization, leading to organizational cynicism that in its turn, may contribute to organizational silence.

In contrast, the present finding is different with the study of **Yağar and Dökme Yağar (2023)**, who found that increased silence among nurses was associated with reduced job engagement and higher intent to leave the profession.

Current study finding illustrated that more than half of nurses had a high level of organizational silence effects subscale. This finding is due to that majority of nurses were agree that if they join a hospital where nurses are afraid to speak up, they will not feel satisfied at work, they will feel unappreciated. Also, most of them were agree that if they joined a hospital where nurses are afraid to speak up, their motivation to work will decrease, they would no longer want to contribute to problem solving and making decisions or even submitting suggestions, they will feel that they are likely be exposed to internal conflicts, their turnover chance may increase and their level

of commitment to the profession will decrease.

This result is similar to the finding of **Parlar Kılıç, Öndaş Aybar and Sevinç (2021)** highlighted the negative impact of silence on job satisfaction and professional performance.

While, the present finding is inconsistent with the study of **Zou, Zhu, Fu, Zong, Tang, Chi and Jiang (2025)** illustrated that appropriate silence can avoid interpersonal conflicts and information overload, protect the privacy of personal information, and improve organizational efficiency and decision-making.

The outcome of this finding showed that the majority of nurses exhibited high level of organizational silence strategies subscale. This result is due to that majority range of nurses were agree that the hospital management does not care about the nurses' welfare, does not take nurses' opinions and ideas into consideration, lack of verbal assurance of no victimization from the hospital management would not be encouraging enough for nurses to voice anything, does not adopt an open communication policy among nurses.

This finding is in agreement with the finding of **Zou et al., (2025)** highlighted that hospitals with weak communication policies and poor staff inclusion tend to experience higher levels of silence, as nurses feel unsafe to express their opinions.

Despite that, this finding is disagreed with the study of **Labrague and De los, (2020)** reported that while

organizational silence was present, it can be reduced when appropriate strategies are actively implemented by management such as when leadership explicitly encouraged open feedback and regularly involved staff in decision-making.

### **Concerning health care organizational effectiveness:**

The present study showed that majority of nurses experienced a low level of health care organizational effectiveness. This result is due to majority of nurses experienced a low level of all dimensions of organizational effectiveness. As more than two thirds of nurses experienced a low level of goal accomplishment, majority of them had a low level of resource acquisition, majority of them experienced a low level of organizational effectiveness internal process, majority of them experienced a low level of effectiveness organizational involvement, majority of them experienced a low level of organizational effectiveness competing value approach.

The present results align with the study of **Hatta and Abdullah (2020)** which indicated that organizational effectiveness was relatively low.

On the other hand, the study of **Mostafa et al., (2024)** revealed that most of the participants exhibited high level of organizational effectiveness.

The present study illustrated that more than two thirds of nurses experienced a low level of goal accomplishment subscale. This is due to that more than two thirds of nurses were agree that they achieve

hospital's goals efficiently. Also, more than half of them were agree that the hospital management builds its goals on its strategy. Despite nurses believe that the hospital management builds its goal on its strategy and nurses achieve organizational goals efficiently, more than half of them were disagree that the hospital management provides the required resources to achieve the goals, sets measurable goals. Also, less than half of them were disagree that it sets a time constrain goals, sets specific, realistic, and achievable goals.

This outcome is agreed with the outcome of the study of **Ojogiwa and Qwabe (2023)** illustrated that the organization has a low belief in goals' achievement, organization's dominance, performance and failure to achieve set objectives and productivity.

On the other hand, this study is in consistent with the study of **Cahyono, (2024)** revealed that transformational leaders encourage staff to match their personal aspirations with those of the hospital report higher levels of job satisfaction and a greater dedication to the hospital's objectives.

The current study showed that majority of nurses experienced a low level of resource acquisition subscale. This finding is due to that more than two thirds of nurses expressed disagreement that the devices used to work at the hospital are updated whenever necessary. Additionally, above half of them were disagree that the hospital management uses its resources

effectively to achieve its goals and it is keen on making the best use of resources the hospital resources are used to adapt to environmental changes.

This outcome is consistent with the outcome of the study of **Lyng, et al., (2021)** that many nurses disagree that the hospital effectively uses resources or updates equipment highlighting a lack of proactive resource strategies. While this study is different from the study of **Abdel-Azeem, Zaki and Ghoneimy (2023)** demonstrated that the item ranked first had the highest mean score related to system resources dimension; and there is availability of needed equipment, technical skills and managerial expertise as perceived by staff nurses. The present finding illustrated that majority of nurses experienced a low level of organizational effectiveness internal process subscale. This result is due to that half of nurses were disagree that the hospital management evaluates the quality of its services in accordance with internal processes. Additionally, above one third of them were disagree it seeks to achieve a competitive advantage in its services, it constantly analyzing jobs, sets standards that link its performance with its goals, clearly defines the scope of work for each position.

This finding is consistent with the finding of the study of **Saleh et al., (2024)** revealed that internal processes had the lowest average percentage score across domains of organizational effectiveness.

conversely, this study is inconsistent with the finding of **Naveed,**

**Alhaidan, Al Halbusi, and Al-Swidi, (2022)** who proved that adjusting to changes ingrained in workplace practices and favorable perceptions (i.e., organizational culture and innovation) increases the organization's ability to maintain a competitive edge in this quickly evolving market and technological landscape.

The present study illustrated that majority of nurses experienced a low level of organizational effectiveness organizational involvement subscale. This finding is due to that high percent of nurses were disagree that the hospital management achieves the expectation of nurses who work in it, it seeks to achieve job satisfaction for nurses. Additionally, more than half of them were disagree that it seeks to provide distinguished educational services to nurses, it encourages nurses to take part in problem-solving and decision-making process. The findings corroborate the conclusion of **Atalla, Sharif, Katooa, Kandil, Mahsoon and Elseesy (2023)** revealed that the nurses in the study thought there was little shared governance and that they would not be able to take part in choices pertaining to shared governance areas, setting goals, and dispute resolution.

This study is disagreed with the study of **Akpa, Asikhia, and Nneji (2021)** revealed that an effective organizational culture can enhance overall organizational performance, improve nurses' job satisfaction and foster a greater sense of confidence in problem-solving and changing



expectations of its internal and/or external stakeholders.

The present finding showed that majority of nurses exhibited a low level of organizational effectiveness competing value subscale. This finding is due to that majority of nurses were disagree that the hospital management responds to nurses' needs in a timely manner. Also, more than two thirds of them were disagree that it is constantly working to re-engineer its internal process.

This finding is accepted with the study of **O'Neill, Vries and Comiskey (2021)** observed that the competitiveness between health care organizations was the least favored and not preferred by the participants. This study is contrary with the study of **Prowell, (2021)** illustrated that administration experience, project control, accounting, and human resources contributing to the organizational competitiveness.

#### **Correlation between healthcare organizational silence subscales and healthcare organizational effectiveness subscales:**

The finding of this study indicated that there was a statistically significant negative correlation between overall silence and, overall effectiveness. Also, there was a statistically significant negative correlation between all healthcare organizational silence subscales and all health care organizational effectiveness subscales. This result may be due to that silence within healthcare settings, may hinder the institution's overall performance. When healthcare professionals do not feel safe or motivated to speak up,

this limits opportunities for learning, improvement, and error correction. Consequently, critical organizational functions, such as communication, collaboration, and innovation, may be compromised.

The present finding is in accordance with the finding of the study of **Abd El-Mawla, Eid, Allam and Elshrief, (2025)** showed a statistically significant negative association between organizational silence and organizational learning that in its turn lead to reduced opportunities of knowledge sharing communication, change, growth, development and organizational effectiveness.

On the other hand, this study is different with the study of **Okan, (2021)** revealed that organizational silence exerted a positive influence on organizational effectiveness and added that the more the nurse choose to be silent, the more he/she will learn and the more learning of nurses, the more growth and development of the organization that contribute to organizational effectiveness.

#### **Conclusion**

The present study concluded that nearly half of nurses had a high level of overall organizational silence. While more than one third of them had a moderate level and minority of them had a low level of overall organizational silence. Majority of nurses had a low level of overall organizational effectiveness. While minority of them had a moderate and high level of overall organizational effectiveness, respectively. There was a negative correlation between healthcare organizational silence and its subscales, and health care

organizational effectiveness and its subscales.

### Recommendations

**Based on the results of the current study, the following suggestions were made:**

#### For hospital management

- Create a supportive organizational culture and environment to build good working relations within the hospital.
- Establish a system of rewards and retention of nurses to increase motivation and hospital loyalty.

#### For head nurses:

- Create a procedural justice climate in which nurses feel that their head nurse make decision that include their input.
- Listen to nurse's insights, grievances and openly express interest in nurse's opinions to reduce fear of possible negative consequences.

#### For nurses:

- Attend training courses and workshops programs to be update and to have the managerial experience to move problems to their boss.
- Use their diversity of skills and talents to achieve organizational effectiveness.

#### For future research:

- Study the relation between organizational silence and organizational loyalty.
- Study the relationship between organizational effectiveness and talent management.

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## Relation between Work Context and Proactive Behaviors among Nursing Staff

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### Abstract

**Background:** Work context for the nursing staff becomes the most powerful source for nursing staff satisfaction, commitment and proactive work behaviors. Proactive work behavior contributes to positive organizational, team and nursing staff outcomes. **Aim of the study:** To assess the relation between work context and proactive behaviors among nursing staff. **Research design:** A descriptive correlation study design was applied. **Setting:** The study was conducted in Kafr El Zayat General Hospital. **Subjects:** A stratified random sample was taken from nursing staff (n= 295) out of (N=750) **Tools:** Two tools were used to collect the data, Nursing Staff Work Context, and Proactive Work Behavior Questionnaire. **Results:** About 41% of nursing staff had a low level of overall work context and 45.1% of them had a low level of overall proactive work behavior. **Conclusion:** There was a statistically significant positive correlation between work context and proactive work behaviors among nursing staff. **Recommendations:** Hospital administrations invest in the professional development of nursing staff by conduct continuous in-service training programs that boost their knowledge and skills for proactive behaviors. Enhance physical and psychological safety by applying a zero-tolerance policy for violence or harassment against nursing staff.

**Key words:** Nursing Staff, Proactive Work Behaviors, Work Context.

## Introduction

The increasing demand for high quality healthcare services, as well as improving patient safety in the presence of scarce and limited resources, is considered as a very big challenge for healthcare organizations. In addition, continuous changes and updates of healthcare policies and standards, such as quality-of-care policies and hospital accreditation standards, force healthcare institutions to become more effective and highly productive. Requiring nursing staff to handle the increasing complexity, discarding traditional work models, accepting continuous change, respecting creativity, and acting flexibly for emerging work patterns and opportunities (**Fitzgerald, 2025**).

Creating a favorable work context for nursing staff to become a global trend to improve working conditions in the hospitals, sustain a high standard of patient care and sufficient staff members, strengthen their sense of responsibility and attitude toward their work, enhance their work engagement and maximize their retention (**Lobes, 2025**). Nursing staff work context has been associated with patient care outcomes and is described as the criteria of the work setting that either support or limit professional nursing practice. Furthermore, it is crucial for nursing staff's ability to deliver patient care in terms of quality and quantity, as well as workforce retention (**Mchugh, 2025**).

Since the quality of nursing staff work context has been linked to the quality of patient care services, it is

crucial to evaluate the work context in order to gather baseline data and allow the healthcare organization to compare and analyze its current state to established quality standards. A healthy context of work benefits patients as well as healthcare providers, including nursing staff, managers, and other caregivers (**Stroup, 2025**).

Additionally, the healthcare facilities with poor nursing staff practice contexts were more likely to have higher rates of mortality, job dissatisfaction, and turnover, whereas nursing staff in facilities with more favorable contexts of work reported lower rates of needle- stick injuries, emotional exhaustion, depersonalization, and intention to leave their current position, all of which had an impact on patient outcomes (**Aiken, 2025**).

Work context is a composite of four major categories which are management and supervision, co-worker, development opportunities and work environment. Management and supervision context include administration, standards, policies, systems, procedures, practices, values and philosophies. Co-worker context is used to describe coworkers, people that nursing staff deal with, teams and work groups, leaders, supervisors and their interactional issues (**Al-Ghwary et al., 2024**).

Development opportunities considered as a vital dimension for maintaining a high level of knowledge and practices (**Alcindor, 2024**). In addition, work environment context refers to instruments, apparatus, technology infrastructure,

and all additional technical or physical components that enable nursing staff to perform their responsibilities and nursing activities. Presence of the four categories of work context in the healthcare setting affects the ability of nursing staff to be creative, innovative and develop proactive work behavior (**Al-Ghwary et al., 2024**).

Nowadays the increased competitiveness and dynamics of healthcare organizations particularly in nursing arise the need for a qualified and proactive nursing staff to become greater than ever. Those nursing staff must possess a distinct trait that enables them to adapt to different organizational contexts in healthcare, gain the ability to actively seek out novel and inventive solutions that allows for intervention in different issues (**Gharaibeh, 2025**).

Proactive work behavior is self-initiated, anticipatory action that aims to enhance internal organization by transforming and optimizing the situation of oneself or one's environment. It refers to future-focused and transformative measures that change the existing individual or environmental conditions (**Zabady, El Bialy, Awad, & Al Anwar, 2024**). Proactive work behavior of nursing staff is affected by their own curiosity and eagerness to learn, which improves the organization's standing. Lower nursing achievement and effectiveness are more likely to occur to leaders who do not encourage proactive work behavior (**Su et al., 2022**).

Proactive work behavior has four

important dimensions including individual innovation, problem prevention, taking charge and voice. As it highlights a series of activities that are not included in the daily basic duties allocated to nursing staff, through which they actively and impulsively take initiation to improve their working conditions. Furthermore, it enables them to anticipate and solve problems for organization's benefit (**Jia & Yue, 2025**).

Nursing staff innovation refers to actions through which nurses become aware of new and emerging opportunities, generate new ideas, and seek to put those ideas into action (**Li et al., 2023**). Problem prevention refers to actions by which nursing staff make efforts to explore the essence of problems and optimize procedures to prevent their future recurrence (**Rodríguez-García et al., 2023**). Taking charge refers to actions which nursing staff attempt to improve some approach work that was conducted, including work structures, practice and procedures. Finally, voice refers to actions by which nursing staff express constructive challenges to improve the standard procedures of their work surroundings (**Fay et al., 2023**).

A proactive nursing staff at healthcare settings are those who are awareing enough to catch improvement opportunities, considering it as important chances for improvement, generate new useful ideas that decreases reoccurring problems, and enhance the effectiveness of work procedures. These enable healthcare



organizations to quickly adapt to changes and challenges, and to focus on improving the context of work (**Zabady et al., 2024**).

Furthermore, healthcare organizations are being urged to improve their management practices and to reinforce proactivity among nursing staff in order to improve organizational outcomes (**Abu-Qutaish, Alost, Abu-Shosha, Oweidat, & Nashwan, 2025**). Work context predicts proactive action based on individual variations that facilitate transformation. Because proactive work behavior pushes organizations to improve its outcomes, it is essential for nursing staff to practice proactive work behavior as an active work habit within which the nursing staff plans and seeks to enhance the internal organizational environment while focusing on improving themselves or the environment (**Htet, Abhicharttibutra, & Wichaikum, 2024**).

According to rapid changes in the work environments of organizations, nursing staff must plan and prepare in advance for potential threats or dangers by being proactive in achieving long-term goals. Especially in healthcare settings, nursing staff, as health care professionals, have the responsibility to make an effort to optimize care processes and manage problems to provide high quality care by taking proactive behavior at work. Therefore, proactive work behavior is important for nursing staff (**Elshehtawy, Abdalla, & Abdelmonem, 2024**).

### **Significance of the study**

Nursing staff performance and quality of care provided to patients influenced primarily by the work context in the health organization. Work context for the nursing staff becomes the most powerful source for nursing staff satisfaction and commitment. It included physical, social and administrative organizational environment. Proactive work behavior contributes to positive organizational, team and nursing staff outcomes. In healthcare contexts, nursing staff with high levels of proactive work behavior are likely to implement safe, effective, timely, efficient, equitable and patient-centered nursing care (**Peng et al., 2023**). That is why there is a curiosity and interest to conduct such type of study to determine what the relation between the work context and nursing staff proactive work behaviors.

### **Aim of the Study**

Assess the relation between work context and proactive behaviors among nursing staff.

### **Research questions**

1. What are the levels of work context and proactive behaviors as perceived by nursing staff?
2. What is the relation between work context and proactive behaviors among nursing staff?

### **Research design**

In this study, a descriptive correlation study design was utilized.

### **Setting**

The present study was conducted in all in-patient departments at Kafr El-Zayat General Hospital, which affiliated to Ministry of Health and Population. Kafr El-Zayat General

Hospital was established in 1982 in the center of Kafr El-Zayat city, El-Gharbia Governorate. The hospital consists of 4 buildings: the main building (4 floors), the emergency building (3 floors), the outpatient clinics building (3 floors) and a separate building for burn intensive care. Kafr El-Zayat General Hospital provides a wide range of healthcare services with a capacity of 270 beds including: Medical (60), Surgical (60), Orthopedic (30) and Pediatric (30 bed), as well as all Intensive and Intermediate Care Units including Medical (21), Surgical (10), Pediatric (14, Cardiac (8), Burn (10) and Neonatal care (27 bed).

#### **Subjects: -**

A stratified random sample was taken from nursing staff (n= 295) out of (N=750) who are working in the previously mentioned settings, available at time of data collection and were willing to participate in this study.

#### **Tools of data collection**

Two tools were utilized for the collection of data:

**Tool I: Nursing Staff Work Context Questionnaire:** This tool was developed by the researcher and guided by (Brooks, 2001 & Lateef et al., 2021) and related literatures (Lee., & Jang, 2023 & Souza et al., 2020). It is composed of two parts as follow:

**Part I: Nursing Staff Personal Characteristics and Work-Related Data:** It included age, sex, marital status, position, level of education, years of experience, department, residence, working hours and previous participation in workshops

related to work context and proactive behaviors.

**Part II: Nursing Staff Work Context Questionnaire:** This part is used to assess work context as perceived by nursing staff. It is composed of 40 items that are divided into four dimensions as follows: **Management and supervision:** included 14 items- **Co-workers:** included 7 items - **Development opportunities:** included 5 items- **Work environment:** included 14 items.

#### **Scoring system:**

The responses of nursing staff were measured on a five-point Likert Scale ranging from (1-5) where; (1) strongly disagree, (2) Disagree, (3) Neutral, (4) Agree & (5) Strongly agree. They were concluded into 3 points where strongly agree and agree = agree and strongly disagree and disagree = disagree. **The Total scores categorized according to statistical cut-off point (60%) into:**

- High level of work context >75%.
- Moderate level of work context 60%-75%.
- Low level of work context < 60% score.

**Tool (II): Proactive Work Behavior Scale (PWBS):** It was developed by the researcher guided by (Parker & Collins, 2010; Ali et al., 2018; Smithikrai, 2022). It is used to assess proactive work behavior as perceived by nursing staff. It is composed of 37 items divided into four dimensions as follows:- **Problem prevention:** included 12 items- **Individual innovation:** included 7 items- **Voice:** included 8 items- **Taking charge:** included 10

items.

### **Scoring System:**

The responses of nursing staff were measured on a three-point Likert Scale. Ranging from (1-3) where; (1) for very infrequent, (2) for somewhat frequently, (3) for very frequently.

### **Total scores classified according to statistical cut-off point (60%) into:**

- High level of proactive work behaviors >75%.
- Moderate level of proactive work behaviors 60%-75 %.
- Low level of proactive work behaviors < 60%.

### **Method**

1. An official approval to conduct the study was acquired from Dean of Faculty of Nursing and submitted to the responsible authorities of Kafr El-Zayat General Hospital for permission to carry out the study.
2. **Ethical considerations:**
  - An approval from Scientific Research Ethical Nursing Committee was obtained with code No. (343-12-2023).
  - The nature of the study did not cause any harm to the entire subjects
  - Following an explanation of the study's goal, the participants provided written informed consent to participate.
  - The right to terminate participation at any time was accepted.
  - A code number was used instead of names.
3. The tools of the study were developed by the researcher after reviewing of related literatures. Since Arabic is the participant's mother tongue, Tools II and I

were translated into it.

4. The face validity value of Nursing Staff Work Context Questionnaire was **99.6%** and Proactive Work Behavior questionnaire was **99.5%**.
5. A **pilot study** was conducted on 10% of the nurses (30 nursing staff) to test clarity, sequence of items, applicability, the questions' pertinence and to calculate the amount of time required to finish the survey
6. **Reliability of tools** examined using Cronbach's Alpha coefficient factor, its value for the tool I was (**0.924**) and for tool II was (**0.860**)
7. **Data collection phase:** the data were collected by the researcher, through meeting nursing staff in small groups in their departments after explaining the aim of the study, during morning and noon shifts, according to their workload. Tool 1 and tool II distributed. The questionnaires were completed in the presence of the researcher to ascertain all questions were answered.
8. The data was gathered throughout a three-month period, beginning on July 1, 2024, and ending on September 30, 2024.
9. The estimated time needed to complete the questionnaire items from subjects for both tools was 20 up to 30 minutes.

### **Statistical analysis:**

Data was fed to the computer and analyzed using IBM SPSS software package version (20.0). (Armonk, NY: IBM Corp) Qualitative data were described using number and

percentage. The **Kolmogorov-Smirnov** test was used to verify the normality of distribution. Quantitative data were described using range (minimum and maximum), mean and standard deviation. Significance of the obtained results was judged at the 5% level.

## Results

**Table (1):** Shows nursing staff personal characteristics and work-related data of study subject. It was observed that more than one third (39%) of nursing staff had 30 – <40 years old with mean age score  $37.54 \pm 8.51$ . Most of them (95.3%) were females. Majorities (87.5%) of nursing staff were married and high percentage (86.4%) of them were staff nurses. Concerning the level of nursing education, less than half (48.8% and 45.4%) of nursing staff had Associate Degree and Bachelor Degree in Nursing respectively while, minority (5.8%) of them had Postgraduate Studies in Nursing. Additionally, about one third (32.5%) of them had more than 15 years of work experience. As regard to working department 44.1%, 19.3%, 10.5%, 10.2%, 9.5% and 6.4% of nursing staff were working at intensive care units, intermediate care units, orthopedic, surgical, pediatrics and medical departments, respectively. More than half (54.9%) of them were from urban areas. Majority (86.4%) of nursing staff were working full time. None of them previously participated in any workshop related to work context & proactive behavior.

**Figure (1) and Table (2):** Illustrate levels of work context as perceived

by nursing staff. As noticed, less than half (41%) of nursing staff had a low level and 38.3% of them had a moderate level of overall work context. While 20.7% of them had a high level of overall work context. About 56.3% and 33.6% of nursing staff had a high level of work context related to co-worker and management and supervision dimensions, respectively. On the other side, 68.8% and 48.8% of them had a low level of work context related to work environment and development opportunities dimensions, respectively.

**Table (3):** Demonstrates mean scores and standard deviation of work context dimensions as perceived by nursing staff. As noticed, co-worker dimension was ranked as the highest mean scores with mean percent of  $78.50 \pm 18.82$ , followed by management and supervision dimension with mean percent  $67.38 \pm 19.86$ . While the lowest mean scores were related to work environment dimension with mean percent  $51.69 \pm 15.20$ .

**Figure (2) and Table (4):** Reveal levels of proactive work behavior as perceived by nursing staff. As noticed about 45.1% of nursing staff had a low level, 40.7% of nursing staff had a moderate level and 14.2% of them had a high level of overall proactive work behavior. Also, it was noticed that 55.3% and 40% of nursing staff had a high level of proactive work behavior related to voice and individual innovation dimensions, respectively. While 64.7% and 53.6% of them had a low level related to problem prevention

and taking charge dimensions, respectively.

**Table (5):** Demonstrates mean scores and standard deviation of proactive work behavior dimensions as perceived by nursing staff. It noticed that the highest mean scores were related to voice dimension with mean percent  $74.62 \pm 22.23$  followed by individual innovation dimension with mean percent  $65.28 \pm 23.66$ . While,

the lowest mean scores were related to problem prevention dimension with mean percent  $51.33 \pm 24.47$ .

**Table (6):** Demonstrates correlation between nursing staff work context and proactive behavior. It was noticed that a positive statistically significant correlation was found between overall work context and proactive work behavior and all dimensions.

**Table (1): Nursing staff personal characteristics and work-related data (n=295)**

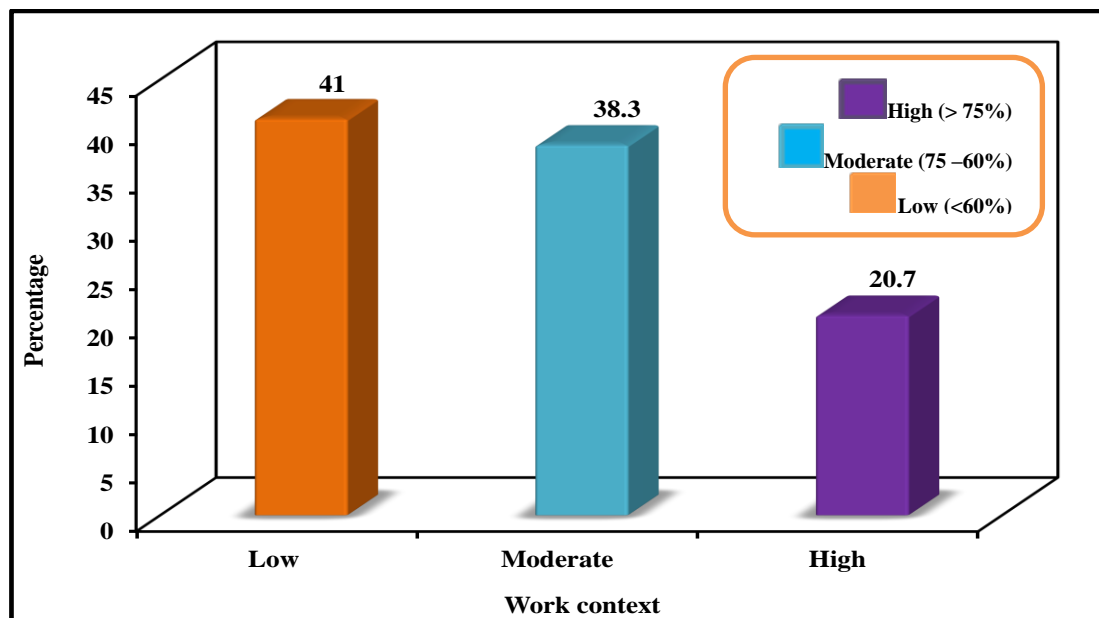
Personal characteristics & work-related data	No.	%
<b>Age (years)</b>		
<30	60	20.3
30 – <40	115	39.0
40 – <50	86	29.2
$\geq 50$	34	11.5
Min. – Max.	20.0 – 58.0	
Mean $\pm$ SD.	$37.54 \pm 8.51$	
<b>Sex</b>		
Male	14	4.7
Female	281	95.3
<b>Marital status</b>		
Married	258	87.5
Un-married	37	12.5
<b>Position</b>		
Nursing director	1	0.3
Assistant director	2	0.7
Supervisor	2	0.7
Head nurse	35	11.9
Staff nurse	255	86.4
<b>Level of nursing education</b>		
Associate Degree in Nursing	144	48.8
Bachelor Degree of Nursing	134	45.4
Post Graduate Studies in Nursing	17	5.8
<b>Years of experience</b>		
<1 year	21	7.1
1year – < 5 years	37	12.5
5years – < 10 years	64	21.7
10 years – < 15 years	77	26.1
>15 years	96	32.5
<b>Department</b>		
Medical	19	6.4
Surgical	30	10.2
Orthopedic	31	10.5
Pediatrics	28	9.5

Intensive care	130	44.1
Intermediate care	57	19.3
<b>Residence</b>		
Rural	133	45.1
Urban	162	54.9
<b>Working hours</b>		
Full time	255	86.4
Part time	40	13.6
<b>Previously participated in workshop related to work context &amp; proactive behaviors</b>		
Yes	0	0.0
No	295	100.0

SD:Standard deviation

Table (2): Levels of work context as perceived by nursing staff (n=295)

Work context Dimensions	High (> 75%)		Moderate (75 –60%)		Low (<60%)	
	No.	%	No.	%	No.	%
Management and supervision	99	33.6	96	32.5	100	33.9
Co-workers	166	56.3	80	27.1	49	16.6
Development opportunities	73	24.7	78	26.4	144	48.8
Work environment	14	4.7	78	26.4	203	68.8
<b>Overall</b>	<b>61</b>	<b>20.7</b>	<b>113</b>	<b>38.3</b>	<b>121</b>	<b>41.0</b>



Figures (1): Levels of work context as perceived by nursing staff

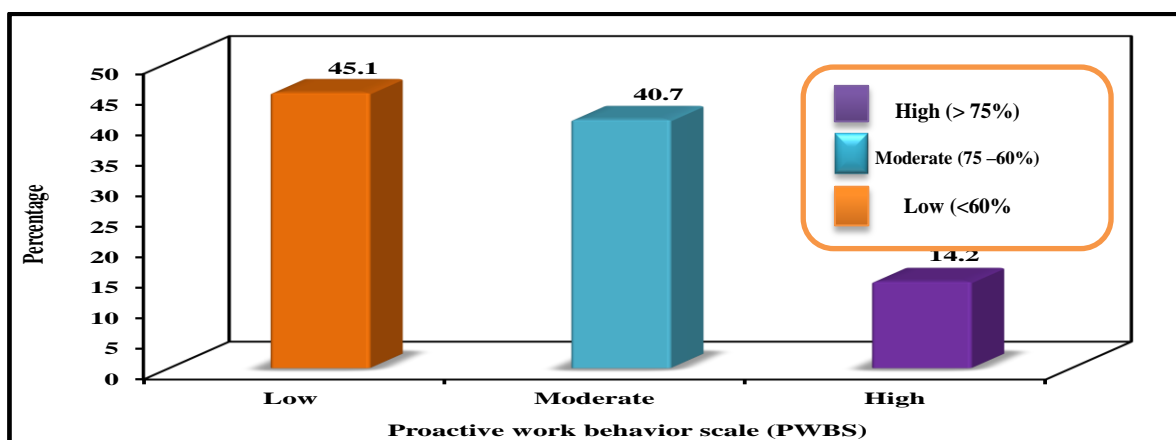
**Table (3): Mean scores and standard deviation of work context dimensions as perceived by nursing staff (n=295)**

Work context Dimensions	Score Range	Total scores		Average Score (1 – 5)	% Score	Rank
		Min. – Max.	Mean $\pm$ SD.	Mean $\pm$ SD.	Mean $\pm$ SD.	
Management and supervision	(14 – 70)	28.0 – 70.0	51.74 $\pm$ 11.12	3.70 $\pm$ 0.79	67.38 $\pm$ 19.86	2
Co-workers	(7 – 35)	13.0 – 35.0	28.98 $\pm$ 28.98	4.14 $\pm$ 0.75	78.50 $\pm$ 18.82	1
Development opportunities	(5 – 25)	9.0 – 25.0	17.13 $\pm$ 4.44	3.43 $\pm$ 0.89	60.63 $\pm$ 22.22	3
Work environment	(14 – 70)	24.0 – 62.0	42.95 $\pm$ 8.51	3.07 $\pm$ 0.61	51.69 $\pm$ 15.20	4
Overall	(40 – 200)	85.0 – 192.0	140.8 $\pm$ 24.58	3.52 $\pm$ 0.61	62.99 $\pm$ 15.37	

SD: Standard deviation

**Table (4): Levels of proactive work behavior as perceived by nursing staff(n=295)**

Proactive work behavior dimensions	High (> 75%)		Moderate (75-60%)		Low (<60%)	
	No.	%	No.	%	No.	%
Problem prevention	39	13.2	65	22.0	191	64.7
Individual innovation	118	40.0	61	20.7	116	39.3
Voice	163	55.3	57	19.3	75	25.4
Taking charge	55	18.6	82	27.8	158	53.6
Overall	42	14.2	120	40.7	133	45.1

**Figures (2): Levels of proactive work behavior as perceived by nursing staff**

**Table (5): Mean scores and standard deviation of proactive work behavior dimensions as perceived by nursing staff (n=295)**

Proactive work behavior dimensions	Score Range	Total scores		Average Score (1 – 5)	% Score	Rank
		Min. – Max.	Mean $\pm$ SD.	Mean $\pm$ SD.	Mean $\pm$ SD.	
Problem prevention	(12 – 36)	12.0 – 36.0	24.32 $\pm$ 5.87	2.03 $\pm$ 0.49	51.33 $\pm$ 24.47	4
Individual innovation	(7 – 21)	9.0 – 21.0	16.14 $\pm$ 3.31	2.31 $\pm$ 0.47	65.28 $\pm$ 23.66	2
Voice	(8 – 24)	8.0 – 24.0	19.94 $\pm$ 3.56	2.49 $\pm$ 0.44	74.62 $\pm$ 22.23	1
Taking charge	(10 – 30)	10.0 – 29.0	21.17 $\pm$ 4.62	2.12 $\pm$ 0.46	55.85 $\pm$ 23.09	3
Overall	(37 – 111)	39.0 – 110.0	81.57 $\pm$ 13.37	2.20 $\pm$ 0.36	60.22 $\pm$ 18.06	

SD: Standard deviation

**Table (6): Correlation between nursing staff work context and proactive behavior (n=295)**

Work context Dimensions	Proactive Work Behavior dimensions									
	Problem prevention		Individual innovation		Voice		Taking charge		Overall	
	r	P	r	P	r	P	r	P	R	P
Management and supervision	0.695*	<0.001*	0.380*	<0.001*	0.475*	<0.001*	0.616*	<0.001*	0.695*	<0.001*
Co-workers	0.538*	<0.001*	0.402*	<0.001*	0.477*	<0.001*	0.505*	<0.001*	0.591*	<0.001*
Development opportunities	0.258*	<0.001*	0.439*	<0.001*	0.321*	<0.001*	0.217*	<0.001*	0.344*	<0.001*
Work environment	0.540*	<0.001*	0.396*	<0.001*	0.421*	<0.001*	0.483*	<0.001*	0.572*	<0.001*
Overall	0.693*	<0.001*	0.520*	<0.001*	0.558*	<0.001*	0.620*	<0.001*	0.741*	<0.001*

R: Pearson coefficient

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

## Discussion

A positive work context substantially impacts proactive behavior among nursing staff., who view their work context as supportive, offering possibilities for growth, autonomy, and recognition, are more inclined to exhibit proactive behaviors, including pursuing new knowledge, proposing enhancements, and taking initiative to improve patient care (Li et al., 2025). Conversely, a challenging or unsupportive work context can stifle proactive behavior, potentially

leading to decreased job satisfaction, increased stress, and even intention to leave. Therefore, fostering a positive and engaging work context is crucial for promoting proactive behavior and ultimately improving patient outcomes and staff well-being (Mohi Ud Din & Zhang, 2025).

### Level of overall work context of nursing staff:

The current study results revealed that less than half of nursing staff had a low level of overall work context. This finding is owing to that



high percent of nursing staff had a low level of work environment, development opportunities and management and supervision. In addition, this finding is due to that the majority of the investigated nursing staff were staff nurses and the low educational level of these nursing staff that about half of them had only nursing associate degree. Moreover, none of them previously participated in any workshop related to work context. From the perspective of the researcher, these results may be due to work context is a subjective perception and each nurse has different perceptions and responses to work context or environment. Moreover, this may be due to that nursing staff of Kafr El Zayat General Hospital still suffering from high workload, lack of resources, lack of managers' appreciation, acknowledge and support, poor communication, poor training and lack of improvement opportunities and programs which may decrease their willingness to put in an effort at work and may diminish their level of work context. This result supported with the study conducted by **White et al., (2020)** who showed that more than half of study subject had low level of work context. Also, **Ulrich et al., (2022)** who revealed that the overall work context, nursing staff had lowest level. And **Heidari et al., (2022)** who revealed that more than three quarters of the study subject had a low level of work context on the other hand, these results disagreed with the study by **Poku et al. (2022)**

who displayed that about two thirds of study subject had high perception of work context. Also, **Alenazy et al., (2023)** who declared that the majority of the study subject had a high level of work context and **Szilvassy & Šírok, (2022)** who revealed that more than two thirds of the study subject had high level work context.

#### **Level of overall proactive work behavior:**

The current study results illustrated that less than half of nursing staff had a low level of overall proactive work behavior. This result is due to that less than half of the studied nursing staff had less than 10 years of experience and the majority of the studied nursing staff were staff nurses. In addition, the low educational level of studied nursing staff that about half of them had nursing associate degree, also none of them previously participated in any workshop related to proactive behavior. From the researcher's point of view, this result may be due to a lack of the nursing staff's endeavor to think, plan, and act in advance, taking initiative for improvement in current situations. Also, limit their abilities to create new techniques, search for causes of problems, optimize work procedures, and express ideas. As well as decreased their capacity to come up with novel and innovative solutions to avoid recurring issues.

Additionally, they could not take charge in some work areas, such as quality assurance, nursing standards, guidelines, or hospital missions.

Moreover, these results may be due to resistance to change, low self-efficacy as nursing staff may doubt their ability to influence systems or lead improvements. High workload and stress as staff have no time for going beyond assigned responsibilities.

The study result is in the same line with **Sabra et al., (2021)** who reported that nearly half of the study subject had low level of proactive work behavior. In addition to, this result matched with a study carried out by **Shokry et al., (2023)** who mentioned that all studied nurses had a low level of proactive behavior. In addition, **Htet et al., (2024)** who stated that more than half of nurses had low level of overall level of proactive work behavior. Also, **Maung et al., (2025)** who showed that more than half of the studied nurses had low level of proactive work behavior.

On the other hand, this result is incongruent with the study results conducted by **Elbus et al., (2024)** who reported that nearly than half of the studied nurses had high level regarding proactive work behavior. Also, **Ali et al., (2018)** who reported that more than half of nurses had moderate level regarding proactive work behavior.

### **Correlation between study variables:**

Concerning correlation between nursing staff work context and proactive behavior, the present study clarified that a positive statistically significant correlation was found between work context and proactive

work behavior, and this correlation indicates that enhancements in the work environment are likely to lead to increased proactive actions by nursing staff.

This correlation suggests that a supportive work context, which includes physical, social, and psychological elements, fosters behaviors where nursing staff actively seek to improve their surroundings and performance. Understanding this correlation is crucial, as proactive work behavior not only benefits nursing staff individually but also contributes to overall organizational performance by enhancing productivity and innovation. The statistical significance of this correlation reinforces the reliability of the findings, suggesting that the observed effects are not due to chance. Therefore, organizations aiming to boost proactive behaviors should focus on optimizing their work contexts to achieve better outcomes.

Nurses would be more proactive in their work if their context of work was marked by less problematic interactions with patients, peers, supervisors, and physicians; adequate workload and preparation; more certainty about treatment; greater autonomy; feedback; more variety and significance of tasks; safe nurse staffing levels; good communication; collaboration and teamwork with physicians; competent nurse managers; support from hospital management to enable nurses to provide effective and efficient patient

care; a safe, empowering, and satisfying workplace; a culture that fosters communication and collaboration; a climate where nursing staff feel physically and emotionally safe and well-being; meaningful recognition and authentic leadership, and vice versa.

This study result is agreed with **Hu et al., (2021)** who revealed that a positive statistically significant correlation between work context and proactive behavior. The study of **Permata and Mangundjaya, (2021)** whose argued that the variables that exhibit significant correlation between proactive work behavior and work context. Also, **Hegazy et al., (2022)** who showed that there was highly significant statistical positive correlation between nurses' perception level of work environment factors and their level of proactive behaviors. In addition, the current study result is in the same line with **Tsai, (2023)** who indicated that significant correlation with working context daily activity and daily proactive behavior. This finding is congruent with **Xie et al., (2024)** who illustrated that the work context positively moderated the association between proactive personality and personal growth initiative.

The study finding is disagreed with **Cui & Li, (2021)** who stated that negative correlation between proactive behavior and work context. Also, **Su et al., (2022)** who showed a negative statistical correlation between workplace relationships and proactive behavior. Moreover, this

result is inconsistent with the study conducted by **Yuspahrudin et al., (2024)** who revealed a negative statistical correlation between level of workplace setting and their level of proactive work behavior.

### **Conclusion:**

According to the findings of the present study it was concluded that less than half of nursing staff had a low level of overall work context. While more than two thirds of them had a low level of work context related to work environment. Less than half of nursing staff had a low level of overall proactive work behavior. While less than two thirds of them had a low level related to problem prevention. There was a statistically significant positive correlation between work context and proactive work behavior among nursing staff at Kafr El-Zayat General Hospital.

### **Recommendations:**

**The following recommendations were suggested:**

#### **For hospital administration:**

- Invest in the professional development of nursing staff by conduct continuous in-service training programs and offer skill-based training (e.g., communication, conflict resolution, leadership skills, and problem solving) that boost the knowledge and skills of nursing staff for proactive behaviors.
- Regularly update the staffing plan to improve the staffing ratios that will reduce workload on nursing staff.

- Ensure a clean and comfortable facility for nursing staff as well-maintained lounges, rest areas, and nursing stations.
- Create a career advancement pathway, clear promotion tracks and support advanced certifications.
- Create a mentorship program through pair junior nurses with experienced mentors to foster growth and knowledge sharing.
- Apply open-door leadership policy and encourage open communication between nurses and management.
- Build a positive work environment and enhance physical and psychological safety by applying a zero-tolerance policy for violence or harassment against nursing staff.
- Regularly solicit nurse input through surveys or suggestion boxes and act on their recommendations.
- Follow participatory decision-making through involving nursing staff in policy changes and quality improvement initiatives.

**For head nurses:**

- Demonstrate initiative, flexibility, and solution-oriented thinking in daily routines.
- Give timely, constructive feedback and invite it from staff as well.
- Empower nurses, delegate meaningful tasks and allow staff to make appropriate decisions within their scope.
- Acknowledge contributions and praise nurses, who suggest improvements, volunteer for tasks, or go the extra mile.

- Share learning opportunities and post info about conferences, online courses, and training programs.
- Be flexible with schedules where possible, especially for staff facing life challenges.
- Encourage rest breaks and ensure they are actually taken.

**For nurses:**

- Gain the abilities of prioritization, initiative, problem solving, idea generation, idea realization, and proactive actions through actively participating in-group problem-solving and brainstorming sessions.
- Attend educational programs about proactive work behaviors and attend self-study courses to gain experience and best practices.
- Seek to guidance and assistance from other nursing staff.

**For further research:**

- Investigate the impact of work environment on proactive nursing behavior in hospital.
- Study the relation between self-efficacy and proactive work behaviors among nurses.
- Study barriers and facilitators for proactive behaviors in nursing practice.
- Investigate the relation between psychological safety and proactive work behaviors among nursing staff.

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## The Mediating Role of Felt Obligation in the Relation between Open Book Management and Climate Change Mitigation among Nurses

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### Abstract

**Background:** Open book management emphasizes open information sharing without bureaucratic or dominant constraints. It supports nurses' behaviors, encourages autonomous thinking, fosters creativity and builds a positive work atmosphere where nurses feel obligated and committed to their organization for mitigating climate change. **Aim:** Assess the mediating role of felt obligation in the relation between open book management and climate change mitigation among nurses. **Design:** A descriptive correlational study design was employed. **Setting:** El Mehalla El Kobra General Hospital, which is affiliated with the Ministry of Health and Population. **Subjects:** a stratified random sample (280) of nurses were selected. **Tools:** Three tools were used: Open Book Management, Felt Obligation, and Climate Change Mitigation Questionnaires. **Results:** Most (88.2%) nurses had a moderate perception level about open book management and nearly two-thirds (63.9%) of them reported a high level of felt obligation. Over half (50.4%) of nurses had a high level of total perception of climate change mitigation and more than thirty (32.9%) had a moderate level. **Conclusion:** Felt obligation partially mediates the relation between open book management and climate change mitigation. **Recommendation:** Continuously engaging nurses in training programs about open book management and climate change mitigation. Providing a supportive work environment that values recognition, fair workload distribution, and professional development opportunities to foster nurses' sense of obligation

**Key words:** Climate Change Mitigation, Felt Obligation, Nurses, Open Book Management

## Introduction

Healthcare organizations have experienced several approaches, techniques, and strategies in an attempt to manage better organizational performance in the currently challenging healthcare environment, where the risks are high and the demands are persistently fluctuating (**Faozen, & Sandy 2024**). One of these approaches that gain eminence is open book management, an innovative attitude that is based on accountability, obligation, transparency, and collaboration all at the same time to encourage staff members to take responsibility and feel innovative in the organization (**Maisarah, Hassan & Elsetouhi 2023**).

Open book management, some calls it “management by common vision”, as its core is the discovering common vision among nurses, and permits everyone to have the autonomy to trial and learn the new, and release nurses’ distress from fault or failure (**Abugabel, 2023**). The standard of open book management is that the knowledge gained by nurses must benefit them to carry out their responsibilities and feel obligated, as well as wholly recognize the inclusive performance of the organization (**Mohamed, Ramzy & Abdelhafez, 2024**).

Open book management including dimensions of sharing information, nurses’ training, empowerment, and rewarding (**Al-Taii, Ismael & Khudhur, 2020**). In shared information, nurses receive financial information that helps them to

practice their own jobs and support their organization. Training enhances or even transforms nurses’ attitudes and behaviors, as well as develops their job-related knowledge, skills, and competencies. Empowerment enables nurses to participate in decisions based on the shared information. Finally, rewarding nurses occurs when the organization uses incentives based on their performance to increase productivity and efficiency (**Albaqawi et al., 2020; El-Sedeek et al 2024**).

Felt obligation refers to nurses’ belief and responsiveness in their commitment to organization’s progress, care for the safety of the organization, and the achievement of organizational goals (**Chen et al, 2024**). It is driven by factors like supportive leadership, feeling trusted, decent work, and supportive reward system (**Elgazar and Zoromba, 2024**). Nurses with high sense of “felt obligation” demonstrate initiative by taking appointments that benefit the organization, even extending beyond their elected duties and liabilities (**Lu et al, 2022**). Nurses felt obligation to response to health challenges that may be produced by growing life-threatening weather occasions (**Radwan et al, 2025**).

Nurses also play an important role in addressing climate change. They have a key responsibility in protecting human health, which is closely linked to their duty to provide safe and high-quality care (**International Council of Nursing, 2018**). In addition to promoting

health and well-being, nurses' perceived climate change mitigation includes educating patients and clients about the health impacts of climate change and raising awareness. Nurses also advocate for and help implement sustainable policies and practices, as well as collaborate with others to urge immediate action on climate change and prioritize green healthcare policies (**Mahmoud & Mahmoud, 2023**).

### **Significance of the study**

Nurses play an influential role in climate change mitigation and help individuals and groups to adjust to its effect. However, fostering nurses' active engagement in environmental sustainability requires organizational strategies that enhance their sense of responsibility and ownership toward such goals (**Mousa, Elshair & Elsayy, 2024**). Open book management can be one of the most dynamic attitudes for running changing healthcare organization that focuses on sharing data, training nurses to embrace leadership roles and empowering them to make informed decisions. Moreover, create mutual trust and understanding; along with fostering innovation, collaboration and make them feel obligated to protecting health and wellbeing and to maintain social justice as a way to mitigate and fight climate change (**Mohamed, Ramzy & Abdelhafez 2024**).

Open book management is limited debated in the healthcare sector as well as researches on nurses' perceptions, responsiveness, and actions related to climate change

mitigation. It is necessary to conduct this study to discover the relation between open book management and climate change mitigation among nurses and how nurses' felt obligation mediated this relation.

### **Theoretical Framework**

The relation between open book management, felt obligation and climate change mitigation is analyzed utilizing the theories of Social Exchange Theory (SET) (**Blau, 1964**) and Stakeholder Theory (**Freeman & McVea 2001**).

Open Book Management (OBM) refers to the transparent sharing of organizational information with employees, involving them in decision-making and encouraging a sense of ownership. According to Stakeholder Theory, employees are critical stakeholders whose behaviors and values influence organizational outcomes, including environmental sustainability. When nurses have access to organizational information and are engaged in decision-making, they are more likely to internalize organizational goals related to environmental responsibility and participate actively in climate change mitigation initiatives (e.g., reducing energy use, waste management, sustainable practices in hospitals).

Climate change mitigation in the healthcare sector involves reducing the environmental footprint through energy conservation, waste reduction, sustainable procurement, and promoting green practices. According to Pro-Environmental Behavior models, organizational context and psychological states play crucial roles in driving sustainable actions. Thus,

when open book management fosters a sense of responsibility, nurses are more inclined to engage in environmental stewardship behaviors. Based on Social Exchange Theory, when employees perceive transparency, trust, and inclusion through OBM, they develop a sense of felt obligation—a psychological state where individuals feel a moral duty to reciprocate the organization's trust and support with positive behaviors. Felt obligation encourages proactive and discretionary actions, including those that support sustainability and climate change mitigation. Nurses who feel valued and responsible are more likely to take initiative in eco-friendly practices within healthcare settings.

### 3. Climate Change Mitigation Behaviors among Nurses

Climate change mitigation in the healthcare sector involves reducing the environmental footprint through energy conservation, waste reduction, sustainable procurement, and promoting green practices. According to Pro-Environmental Behavior models, organizational context and psychological states play crucial roles in driving sustainable actions. Thus, when open book management fosters a sense of responsibility, nurses are more inclined to engage in environmental stewardship behaviors.

#### Aim of the study

Assess the mediating role of felt obligation in the relation between open book management and climate change mitigation among nurses.

#### Research questions

Following the literature review findings, the researcher proposed the following questions (Figure 1):

- What are the levels of open book management, felt obligation and climate change mitigation as perceived by nurses?
- Is nurses' felt obligation has a mediating role in the relation between open book management and climate change mitigation among nurses?

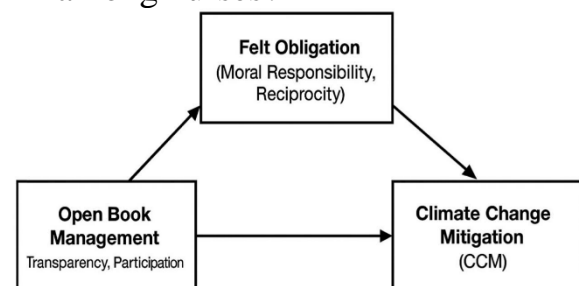


Figure 1. Theoretical framework

## Subjects and Method

**Research design:** A descriptive correlational study design was used to achieve the study's aim.

**Setting:** the study was conducted at El Mehalla El Kobra General Hospital which allied to Ministry of health and population.

**Subjects:** A stratified random sample (280) of nurses was selected from total number of nurses (1000) based on EPI. Info Microsoft with a 95% confidence level, 5% error margin, and 50% response distribution. The calculation yielded a sample size of 278, and increased to 280 participants to facilitate proportional allocation across strata.

#### Tools:

To achieve the current study's aim two tools were used:

**Tool I: Open Book Management Questionnaire**

This tool developed by researchers based on **Nikzad and Maryam, (2012) and Alkhamis, (2018)** to measure nurses' perception regarding open book management. It consisted of 20 items allotted into four dimensions; information sharing, nurses' training, nurses' empowerment, and nurses' rewarding with five items for each dimension. Furthermore, eight items related to nurses' data were used.

### **Scoring system**

The constructs employed in this study was measured by five – point Likert scale with choices ranging from “1= strongly disagree” to “5=strongly agree”. The scores of each dimension summit up and then transformed into percent score. The levels of open book management perception were scored statistically based on **Mohamed et al., (2024)** where  $\geq 81\%$  considered % high level of perception; 80 %-41% moderate level; and  $<40\%$  low perception.

### **Tool II: Felt Obligation Questionnaire**

This tool was measured with the seven positively worded items developed by **Eisenberger (2001)** and used to measure nurses' felt obligation levels.

### **Scoring system**

Nurses' responses considered against 3-point Likert scales ranging between 1 and 3; where 3 = always, 2= sometimes and 1= never. Nurses' felt obligation levels scored based on statistically cut-off values:  $>75\%$  high level of felt obligation; 75%-60% moderate level; and  $<60\%$  low obligation felt.

### **Tool III: Climate Change Mitigation Questionnaire**

This tool was constructed by researchers based on **Winquest et al., (2022), Castener, (2024) and Radwan et al., (2025)**. It involved 15 statements for measuring nurses' role in climate change mitigation that dividing into three dimensions involving: raise awareness (5items), developing and implementing sustainable practice (7items), and partnership and collaboration (3 items).

### **Scoring system:**

The rating scale for this tool ranged from 1-5 where 1 = strongly disagree to 5=strongly agree. The total score was obtained by adding up the scores from all categories. Then, the scores were ordered based on a statistical cut-off point into three levels: high climate change mitigation role ( $>75\%$ ), moderate (60% to $<75\%$ ) and low ( $<60\%$ ).

**Validity and reliability:** The questionnaire was introduced to a jury of five experts from nursing administration specialty to check face and content validity. According to this evaluation, required modifications were done, and a pilot study was conducted on 10% of nurses (n=28). Reliability of the tools was tested using Cronbach's alpha coefficient test which equal to 0.921, 0.894, 0.896 for tool I , II &III respectively.

**Ethical considerations:** Approval of Faculty of Nursing, Tanta University Scientific Research Ethics' Committee was obtained (code number 640-4-2025). A consent regarding acceptance to participate

was obtained from nurses after providing them with information regarding the study's aim and nature. Their obscurity was considered, and nurses were confident that all data was used for research aim only and they had the right to withdraw from study at any time.

### Procedures

After explaining the purpose of the study, the researchers contacted the nurses in their work setting and requested for involvement in the study. The estimated time needed to fill all questionnaire was 20-30 minutes. The data collection period started at the beginning of May and ends in July 2025.

### Statistical analysis of the data

The statistical analysis of the data was achieved 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 designated using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Implication of the obtained results was judged at the 5% level. The used tests were Chi-square test for categorical variables, to compare between different groups, moreover, F-test (ANOVA) For normally distributed quantitative variables, to compare between more than two groups, Pearson coefficient test to correlate between two normally distributed quantitative variables and Bootstrapped mediation analysis test to assess whether the

effect of an independent variable on a dependent variable is transmitted through a mediator variable.

### Results

**Table (1)** shows distribution of nurses according to their personal and work-related data. More than half (50.7%) of nurses were aged 30-40 with a mean age of  $31.80 \pm 6.31$ . Majority (92.5%, 91.4%) of them are female and married. Over half (57.9%, 55.7%) had bachelor degree and less than ten years of experience with mean years of  $9.10 \pm 5.84$ . The highest percent (14.3%, 12.1%) worked in medical and ICU unit. Nearly seventy percent (69.6%) didn't attain training program about open book management while for climate change more than three quadrant didn't attain any training.

**Figure (2):** Shows levels of nurses' perception about total open book management. Most nurses (88.2%) had moderate perception level about open book management.

**Table (2)** shows open book management and felt obligation mean scores. The table showed that the total mean percent score for open book management was  $68.93 \pm 9.96$ . The highest mean percent score ( $77.55 \pm 13.61$ ) was for information sharing followed by ( $77.55 \pm 13.61$ ) for nurses training and nurses' empowerment ( $74.39 \pm 13.90$ ). While, the lowest one ( $47.57 \pm 18.020$ ) for nurse rewarding. Regarding felt obligation, the total mean was ( $28.29 \pm 5.07$ ) and total mean percent score was  $76.05 \pm 18.10$ .

**Figure (3)** shows levels of nurses overall felt obligation. The figure



revealed that nearly two-thirds (63.9%) of nurse had high level in felt obligation. While little percent (19.6%, 16.4%) had moderate and low level in felt obligation.

Table (3) shows mean scores of climate change mitigation among nurses. The table showed that the overall mean percent score was  $71.83 \pm 13.23$ . The nurse's role in raising awareness achieved the highest mean percent score ( $73.48 \pm 17.94$ ) followed by sustainable practice ( $71.82 \pm 15.85$ ) and partnership ( $69.08 \pm 20.70$ ).

**Figure (4)** illustrates overall levels of nurses' perception about climate change mitigation. The figure showed that over half (50.4%) of nurses reported a high level of total perception to climate change mitigation, and more than thirty (32.9%) had moderate level.

**Table (4)** and figure (5) show mediation analysis test of felt obligation. It was observed that felt

obligation partially mediate relation between open book and climate change mitigation where open book has a positive direct effect on felt obligation ( $B = 0.194$ ) as well as open book has a direct effect on climate change ( $B = 0.303$ ). Also felt obligation has direct effect on climate change ( $B = 0.251$ ).

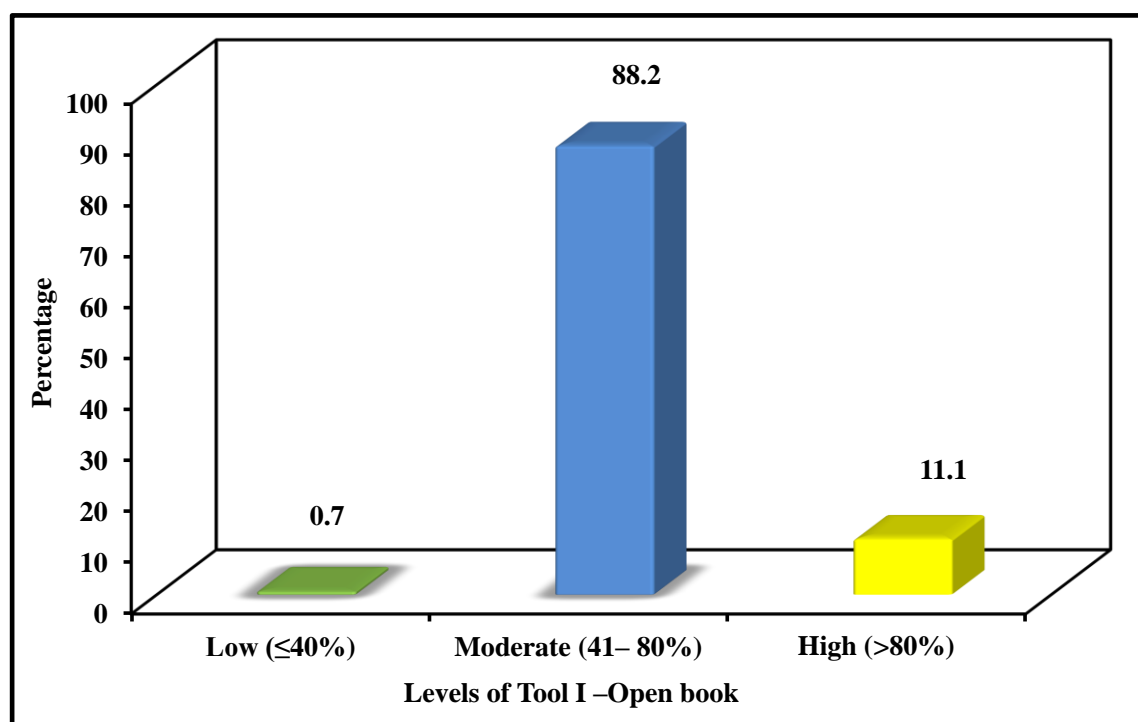
**Table (5)** shows the relation between the percentage scores of the studied variables and the participants' personal and work-related characteristics. There was a significant relation between open book management and age, department, work experience, and attendance of training programs. The results also revealed a significant relation between felt obligation and age, department, and marital status. In addition, the table showed a significant relation between climate change mitigation and age, department, and training.

**Table (1): Distribution of nurses according to their personal and work-related data (n = 280)**

Personal data	No.	%
<b>Age (Years)</b>		
<30	111	39.6
30 – 40	142	50.7
>40	27	9.7
Min. – Max.	20.0 – 50.0	
Mean $\pm$ SD.	$31.80 \pm 6.31$	
<b>Sex</b>		
Male	21	7.5
Female	259	92.5
<b>Marital status</b>		
Married	256	91.4
Single	24	8.6
<b>Education</b>		
Nursing Diploma	42	15.0
Technical institute	52	18.6
Bachelor of Nursing	162	57.8
Postgraduate studies	24	8.6

<b>Department</b>		
Burn		
Dialysis	27	9.6
Emergency	28	10.0
Gyna	25	8.9
ICU	28	10.0
Medical	34	12.1
Pediatric	40	14.4
Out patient	25	8.9
Surgical	31	11.1
	42	15.0
<b>Years' Experience</b>		
<10	156	55.8
10 – 15	90	32.1
>15	34	12.1
Min. – Max.	1.0 – 26.0	
Mean $\pm$ SD.	9.10 $\pm$ 5.84	
<b>Previous training on open book</b>		
No	195	69.6
Yes	85	30.4
<b>Previous training on climate change</b>		
No	212	75.7
Yes	68	24.3

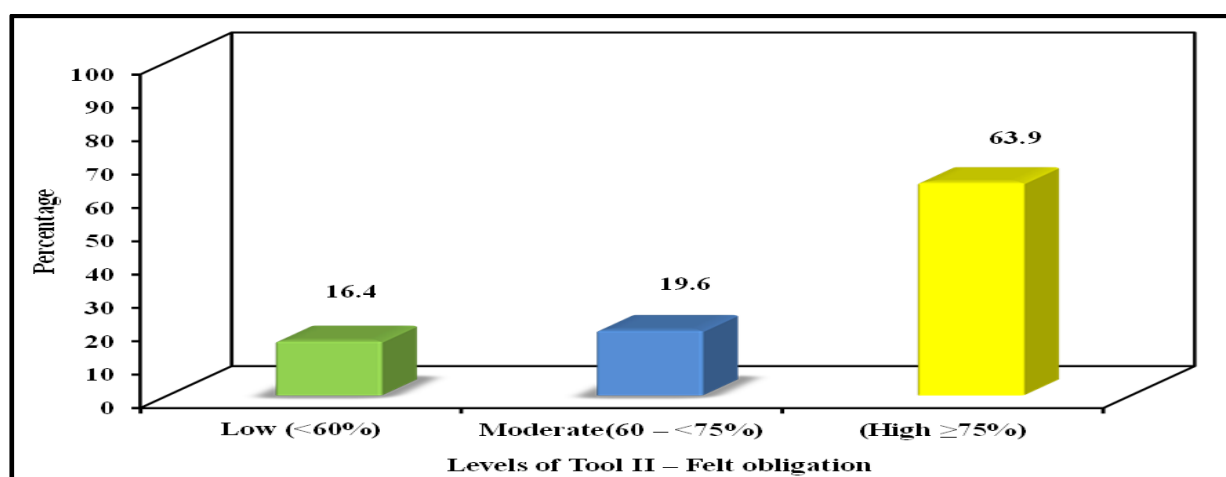
SD: Standard deviation



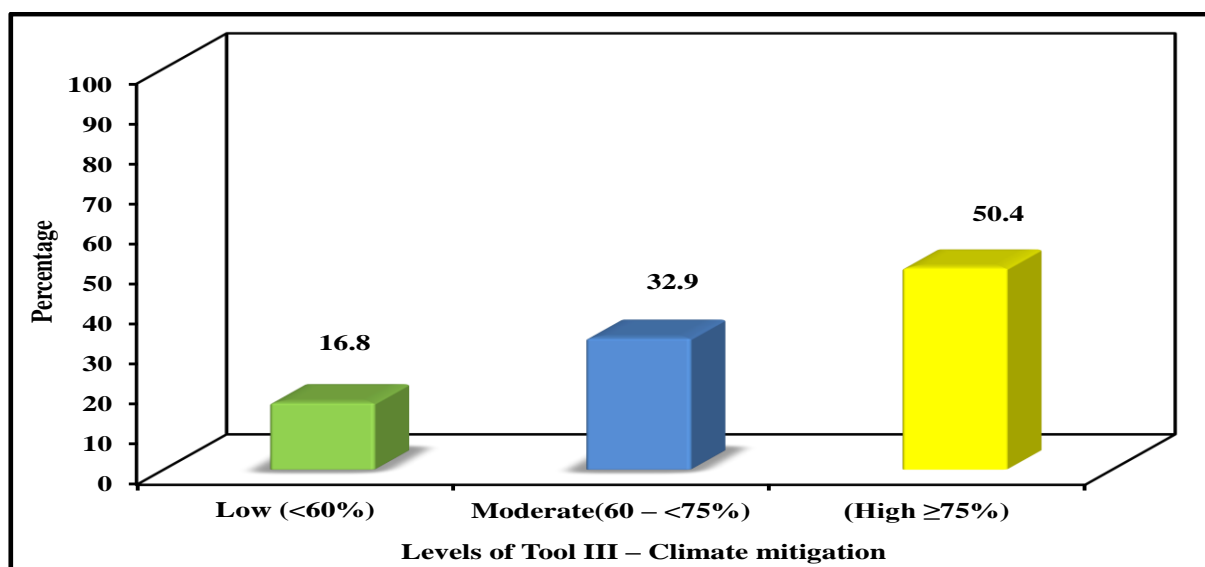
**Figure (1): Levels of nurses' perception about total open book management (n = 280)**

**Table (2): Open book management and felt obligation mean scores (n = 280)**

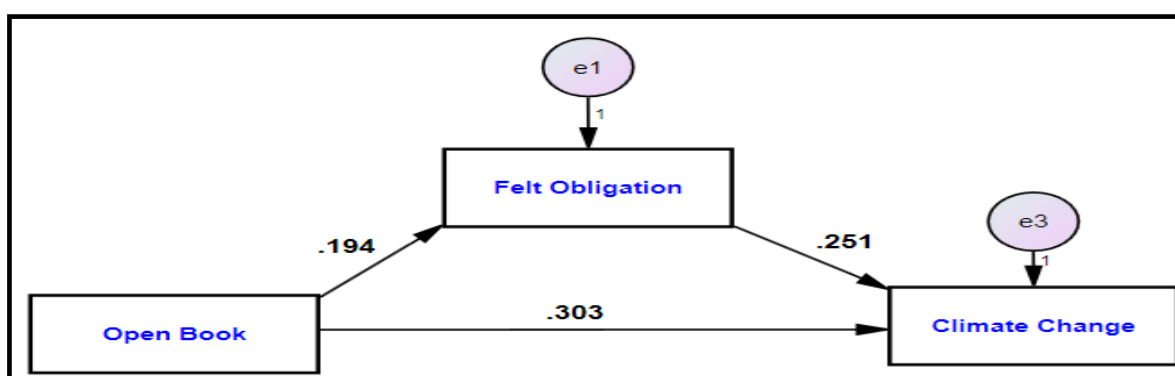
	Score Range	Total Score		Average Score (1 – 5)	Percent Score	Rank
		(Min. – Max)	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Information sharing	(5 – 25)	13.0 – 25.0	20.51 $\pm$ 2.72	4.10 $\pm$ 0.54	77.55 $\pm$ 13.61	1
Nurses training	(5 – 25)	10.0 – 25.0	20.24 $\pm$ 3.17	4.05 $\pm$ 0.63	76.20 $\pm$ 15.84	2
Nurse empowerment	(5 – 25)	13.0 – 25.0	19.88 $\pm$ 2.78	3.98 $\pm$ 0.56	74.39 $\pm$ 13.90	3
Nurse rewarding	(5 – 25)	8.0 – 24.0	14.51 $\pm$ 3.60	2.90 $\pm$ 0.72	47.57 $\pm$ 18.02	4
Overall open book	(20 – 100)	52.0 – 90.0	75.14 $\pm$ 7.97	3.76 $\pm$ 0.40	68.93 $\pm$ 9.96	
Felt obligation	(7 – 35)	9.0 – 35.0	28.29 $\pm$ 5.07	4.04 $\pm$ 0.72	76.05 $\pm$ 18.10	

**Figure (2): Levels of nurses overall felt obligation (n = 280)****Table (3): Mean scores of climate change mitigation among nurses (n = 280)**

	Score Range	Total Score		Average Score (1 – 5)	Percent Score	Rank
		Min. – Max.	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Raise awareness	(5 – 25)	7.0 – 25.0	19.70 $\pm$ 3.59	3.94 $\pm$ 0.72	73.48 $\pm$ 17.94	1
Sustainable practice	(7 – 35)	15.0 – 35.0	27.11 $\pm$ 4.44	3.87 $\pm$ 0.63	71.82 $\pm$ 15.85	2
Partnerships or collaborations	(3 – 15)	3.0 – 15.0	11.29 $\pm$ 2.48	3.76 $\pm$ 0.83	69.08 $\pm$ 20.70	3
Overall	(15 – 75)	37.0 – 75.0	58.10 $\pm$ 7.94	3.87 $\pm$ 0.53	71.83 $\pm$ 13.23	



**Figure (3): Overall levels of nurses' perception about climate change mitigation (n = 280)**



**Figure (4) & Table (4): Mediation analysis test for felt obligation**

	B	P	95% CI (LL – UL)
<b>Paths</b>			
a1	0.194	<0.001*	0.122 – 0.265
b1	0.251	0.006*	0.071 – 0.430
<b>Direct Effect (c')</b>	0.303	<0.001*	0.189 – 0.417
<b>Indirect Effect (a1*b1)</b>			
Open Book → Felt Obligation → Climate Change	0.049	0.015*	0.005 – 0.104
<b>Total Effect (c' + a1*b1)</b>	0.351	<0.001*	0.241 – 0.462

**Bootstrapped mediation analysis test**

a1: Open Book → Felt Obligation      b1: Felt Obligation → Climate Change  
 c': Open Book → Climate Change      Bootstrapped mediation analysis test

**Table (5): Relation between percent score of studied variables with personal and work- related data (n = 280)**

Personal data	N	Tool I: Open book	Tool II: Felt obligation	Tool III: Climate change mitigation
		Mean $\pm$ SD.	Mean $\pm$ SD.	Mean $\pm$ SD.
<b>Age (Years)</b>				
<30	111	75.55 $\pm$ 6.94	77.16 $\pm$ 17.15	72.90 $\pm$ 13.64
30 – 40	142	76.46 $\pm$ 7.71	77.54 $\pm$ 13.93	72.31 $\pm$ 12.0
>40	27	66.52 $\pm$ 8.20	63.62 $\pm$ 32.25	64.88 $\pm$ 15.97
<b>F(p)</b>		<b>20.421* (&lt;0.001*)</b>	<b>7.375* (&lt;0.001*)</b>	<b>4.282* (0.015*)</b>
<b>Marital status</b>				
Married	256	68.70 $\pm$ 10.19	75.33 $\pm$ 18.48	72.0 $\pm$ 13.43
Single	24	71.35 $\pm$ 6.72	83.63 $\pm$ 11.04	70.0 $\pm$ 11.03
<b>t(p)</b>		<b>1.755 (0.088)</b>	<b>3.276* (0.002*)</b>	<b>0.707 (0.480)</b>
<b>Department</b>				
Burn	27	62.96 $\pm$ 11.07	70.24 $\pm$ 20.71	65.68 $\pm$ 14.66
Dialysis	28	70.18 $\pm$ 11.12	82.65 $\pm$ 11.93	69.05 $\pm$ 11.16
Emergency	25	69.20 $\pm$ 11.85	82.43 $\pm$ 11.80	73.07 $\pm$ 13.09
Gyna	28	69.64 $\pm$ 6.96	81.12 $\pm$ 14.11	78.45 $\pm$ 12.63
ICU	34	69.23 $\pm$ 9.70	64.71 $\pm$ 24.14	66.81 $\pm$ 14.32
Medical	40	67.63 $\pm$ 8.62	77.14 $\pm$ 12.91	74.79 $\pm$ 10.37
Pediatric	25	68.45 $\pm$ 5.44	79.57 $\pm$ 12.86	78.20 $\pm$ 13.19
Outpatient	31	75.12 $\pm$ 9.11	82.03 $\pm$ 8.53	75.0 $\pm$ 10.06
Surgical	42	68.01 $\pm$ 10.97	69.81 $\pm$ 24.42	67.58 $\pm$ 13.54
<b>F(p)</b>		<b>3.104* (0.002*)</b>	<b>4.802* (&lt;0.001*)</b>	<b>4.560* (&lt;0.001*)</b>
<b>Years' Experience</b>				
<10	156	69.44 $\pm$ 9.50	76.33 $\pm$ 16.65	71.53 $\pm$ 12.58
10 – 15	90	69.93 $\pm$ 10.54	77.14 $\pm$ 14.77	73.41 $\pm$ 13.62
>15	34	63.93 $\pm$ 9.20	71.85 $\pm$ 29.26	69.02 $\pm$ 14.87
<b>F(p)</b>		<b>5.083* (0.007*)</b>	<b>1.099 (0.335)</b>	<b>1.452 (0.236)</b>
<b>Previous training on open book</b>				
No	195	67.65 $\pm$ 10.16	78.37 $\pm$ 16.19	72.03 $\pm$ 13.65
Yes	85	71.85 $\pm$ 8.85	70.71 $\pm$ 21.0	71.37 $\pm$ 12.29
<b>t(p)</b>		<b>3.302* (0.001*)</b>	<b>2.995* (0.003*)</b>	<b>0.379 (0.705)</b>
<b>Previous training on climate change</b>				
No	212	70.09 $\pm$ 8.08	76.25 $\pm$ 18.24	73.56 $\pm$ 12.20
Yes	68	65.31 $\pm$ 13.78	75.42 $\pm$ 17.77	66.42 $\pm$ 14.88
<b>t(p)</b>		<b>2.712* (0.008*)</b>	<b>0.327 (0.744)</b>	<b>3.588* (0.001*)</b>

SD: Standard deviation

t: Student t-test

F:F for One way ANOVA test

p: p value for Relation between **Percent score** of Open book, Felt obligation and Climate change mitigation with Personal data\*: Statistically significant at  $p \leq 0.05$ 

## Discussion

Open-book management means transparency for nurses in sharing information about hospital performance, including financial performance. This method encourages nurses to become more

efficient in their decisions. Nurses believe in their obligation to the organization's development and the attainment of organizational objectives. As climate change is the major challenges facing nurses in the 21st century. Nurses' mitigation

strategies are very important to combat climate change-related health risks. (Macagba, 2019; Chen et al., 2024; Tiitta et al., 2025). Therefore, this study aimed to assess whether felt obligation mediates between open book management and climate change mitigation among nurses.

#### **Felt obligation mediating role**

The present study finds that felt obligation partially mediates the relation between open book management and climate change mitigation among nurses. open book has a positive direct effect on felt obligation as well as open book has a direct effect on climate change. Also felt obligation has direct effect on climate change. This indicates that open book management strategy supports nurses through access to organizational information, training, reward and empowerment, they develop a stronger sense of personal responsibility and commitment toward their organization's goals. Thus, a sense of felt obligation, in turn, translates into greater motivation to participate in climate change mitigation within the healthcare setting.

This result aligns with Khalil (2020), who revealed that information sharing, training, and empowerment have a significant and negative effect on organizational anomie. Similarly, Tan et al., (2023) found that felt obligation mediated the link between perceived organizational support and balance of work- life in the homogeneous sample. While Eisenberger et al., (2025) found that perceived organizational support was positively connected to felt

obligation, but felt obligation was not allied with job satisfaction, affective commitment, or extra-role performance.

**Regarding open book management,** result of the study discovered that the majority of nurses reported a moderate level of perception about open book management. This is in fact pertaining to only about one-third had training on open book management. Open book management provides nurses with sufficient knowledge and tools that are crucial for their success. This is congruent with El-Sedeek et al., (2024) found that there is a need for more continuous training on open-book to develop staff abilities in understanding the issues occurring at their units and increase their motivations. Mohamed et al., (2024) supported the result and found study subjects at three studied hospitals had a moderate perception of open book management.

Regarding open book dimensions: Information sharing had the highest mean percent score followed by nurses' training and empowerment. While, rewarding of nurses was the lowest score. This lowest level of rewarding may be due to nurses feel their contribution are not properly recognized. Empowering nurses and sharing information makes them feel important and valued, but this needs to match a reward system to motivates them. This agreed with result of Amuche et al., (2019) who found that the main obstacle to open book management is an unfair reward system. Eltouky (2022) found that over two-third of nurses are not

satisfied with their reward. **Zhang et al., (2024)** found nurse effort-reward imbalance is high. **Rickerson, (2025)** recommended about importance of implementing effective reward systems in health care organizations to retain nurses and increase job satisfaction.

### **Felt obligation**

The study result revealed that more than sixty of nurses had high level of felt obligation. This result may be attributed to the presence of supported leader that trusted, valued, and encourage nurses during their work. **Lu et al., (2022)** recommended about importance of using trust strategies by managers to enhance subordinates' psychological safety and felt obligation. Our result aligns with **Chen et al., (2024)** who found high level of felt obligation among nurses and nurses' felt obligation partially mediate inclusive leadership and nurses' caring behavior.

### **Regarding climate change mitigation among nurses**

Results of the study revealed that over half of studied nurses reported a high perception level toward their role in climate change mitigation, and nearly one-third had a moderate level. Although training opportunities for nurses about their role to mitigate climate change are still limited, the growing global and local attention to climate change through media, governmental policies, and hospital sustainability initiatives may raise perception levels among nurses. **Kirche et al., (2022)** found that the most common barrier pertained to a lack of knowledge regarding how to approach climate change. While

**Mekawy (2023)** disagreed with our result and found slightly more than fifty of staff nurses had a low perception of climate change. **Maiz , Rashed , and Shetaway (2024)** showed that the majority of nurses possessed minimal background about climate change, and social media considered as the primary source of information. Also, **Yeboah et al., (2024)** review recommended the importance of raising awareness for nurses about climate change and sustainable practices.

Regarding to dimension of climate change mitigation. Nurses' role in raising awareness had the highest mean percent score in climate change mitigation followed by sustainable practice and partnership in the last. This may be due to nurses are in frontline position who frequently interact with patient, communities put them in position to educate and raise awareness about climate change problems and importance of adherence to sustainable practice. While partnership came last because it may depend on some hospital factors beyond their control. This agreed with **Gaudreau et al., (2024)** review about integrating climate change mitigation strategies, concluded that there is a mismatch between the roles nurses could play in addressing climate change and the readiness of organizations to provide the required support.

### **Relation between personal data and study variables**

Our study shows a significance relation between open book management and age, department, work experience and attendance of

training program. This may be due to younger and low experienced nurses are more open to modern management approaches that emphasize transparency, participation, and shared information. They tend to be more adaptable to change and technology-driven systems that motivate them to attain training programs.

This supported with **Mohamed et al., (2024)** who explored that nurses' age, experience years and job title were predictors of OBM. While **Šteffko, Trubač, & Papula (2024)** found no significant association between previous working experience and the positive approach to open book management. The results also show a significant relation between felt obligation and age, department, and marital status.

Younger and middle-aged nurses had a high score of felt obligation than older nurses. Similarly, nurses working in dialysis, emergency, gynecology, and reception units had significantly higher levels of felt obligation than those in intensive care and surgical units. Also, single nurses had a higher felt obligation score than married nurses. This result indicates the importance of considering personal characteristics as a factor affecting nurses' felt obligation. **Gassas & Salem (2023)** supported our result, emphasizing on influence of nurses' personal characteristics on their levels of commitment. While **Alwidyan et al., (2022)** don't support the result and found no significant relationship between perceived work obligation and marital status.

Result of the study showed a noteworthy relationship among climate change mitigation and factors like age, department and training. Younger nurses had a higher score for their role in climate change mitigation than older nurses. This is may be due to younger nurses tend to be more adaptable and open to innovation and they willing to participate in new initiatives **Skeiryte , Krikštolaitis , and Liobikienė (2022)** support this result and observed that younger people tend to perceptive climate change issues more often than older individuals. In relation to department nurses working in the gynecological and pediatric departments reporting the highest mean scores. This may be due to their close connection to vulnerable populations such as women and children, who are more affected by climate change health problems.

This finding aligns with **Costa et al (2025)** who emphasized that the key nursing role in monitoring vulnerable populations as they are more subject to the effects from adverse climate events. Also, there was a significant relation between training and nurses' mitigation of climate change. **Maiz , Rashed , and Shetaway (2024)** who recommended the importance of implementing instructional guidelines to improve nurses' perceptions regarding climate change and environmental sustainability practices because nurses are unsure of their role in mitigating climate change.

### **Conclusion**

Felt obligation partially mediates the relation between open book



management and climate change mitigation. Most nurses had a moderate perception level about open book management, whereas nearly two-thirds of nurses reported a high level of felt obligation. Over half of nurses perceived their role in mitigating climate change at a high level and nearly one third had a moderate level.

### **Recommendations**

#### **For hospital administrators**

- Take proactive steps to prevent and decrease the effort-reward inequity for nurses as ensure fair compensation and maintain transparent and supportive management practice.
- Provide continuous training programs about open book management and climate change.
- Prioritize partnership and collaboration with governmental, community, and academic stakeholders, as these alliances are essential for strengthening hospital resilience and achieving effective climate change mitigation.
- Consider nurses' personal characteristics when developing strategies to enhance felt obligation

#### **For head nurses**

- Increase awareness of nurses about their role to mitigate climate change by continuous training programs and participation in workshops
- Provide supportive work environment that values recognition, fair workload distribution, and professional development opportunities, as

such conditions foster nurses' sense of obligation and encourage greater commitment to organizational and environmental goals.

#### **For nurses**

- Seek to understand hospital goals, resources, and performance indicators to feel more involved and responsible for achieving sustainability and quality outcomes.
- Actively join environmental committees.
- Attain work shops on climate change and open book management.

#### **For education**

- Integrate open book management strategies and climate change mitigation in nursing curricula

#### **Further research**

- Study effect of Integrating open book management strategies and role of nurses to mitigate climate change in different hospitals setting and on large sample.

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## Relation between Nursing Managers' Care Coordination and Nurses' Perception of Patients' Safety Measures

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### Abstract

**Background:** Patient safety is essential within the healthcare environment, reliant on effective care coordination led by nursing managers. The nursing manager plays a significant role in facilitating healthcare delivery and influencing nurses' perception of safety measures. **Aim:** To identify the relation between nursing managers' care coordination and nurses' perception of patients' safety measures. **Design:** A descriptive correlational design was used. **Setting:** The present study was carried out at Tanta University Main Hospital and Emergency Hospital. **Subjects:** The study included all (N=67) nurse managers and all(n=322) of staff nurses. **Tools:** Two tools were used to collect data; care coordination and nurses' perception of patients' safety measures structured questionnaires. **Results:** more than half (58.2%, 51.5%) of nurse managers and nurses had moderate care coordination perception levels. While the majority (87.6%) of staff nurses had a moderate level of patient safety perception. **Conclusion:** There was a statistically significant positive correlation between staff nurses' care coordination and their perception of patients' safety measures. **Recommendations:** Designing and implementing ongoing education and training programs for promoting and enhancing nurses' knowledge about care coordination and training on patient safety measures, developing strategies that enhance the culture of teamwork and effective communication.

**Keywords:** Care coordination, Nurse managers, Patient safety, Staff nurses.

## Introduction

The nurse managers are in charge of the care coordination and controlling its daily operations. The nurse managers oversee the integration of utilization management and discharge/transition planning functions in order to offer optimal patient-centered care based on outcomes **(Luther, Barra, & Martial, 2019)**.

Also, they assist the director of care management in developing tools, procedures, and systems to optimize the department's and the organization's strategic goals. Nurse managers are well positioned in hospitals to ensure efficient care coordination at the operational level **(Nurmeksla, Kvist, & Suhonen, 2021)**.

The Agency for Healthcare Research and Quality (2020) defines care coordination as the planned coordination of patient care activities between two or more individuals (including the patient) participating in a patient's care in order to support the appropriate delivery of health care services. Care coordination activities are the actions that help nurse managers to promote holistic and patient-centered care to ensure that a patient's needs and goals are understood and shared among care providers, patients, and families as a patient moves from one healthcare setting to another **(AHRQ, 2020; AHRQ, 2023)**.

Care coordination entails the following eight activities: First, establishing accountability or negotiating responsibility is a bilateral agreement between nurse

managers and nurses who specifically specify their obligations in interdependent role behaviors and agree to report on the fulfillment of responsibilities on a regular basis **(Mohammad, Ellethey, & Elzohairy, 2022)**

Second, support self-management goals through goal setting and action planning that are widely employed because they are supposed to help patients change their behavior. It also refers to the assistance provided to those with chronic conditions for managing their health on a daily basis **(Allegante, Wells, & Peterson, 2019)**. Third, create a proactive plan of care, including proactively asking patients about the type of care they prefer if they become critically ill to alleviate their uncertainty as well as their family members **(AHRQ, 2021)**.

Fourth, communication is the act of moving information from one place, person, or group to another and can be one-on-one or between groups of people. It can be face-to-face or through communication technologies **(Möckli et al., (2023)**. Fifth, facilitate transitions mean that transitioning patients from department to a safe community environment that requires protocols and procedures **(AHRQ, 2023)**. Sixth, monitor, follow up and respond to change as monitoring is a continuous or recurring procedure that allows for regular feedback on information that has been consistently collected. Follow up is a systematic and objective feedback of a finished or continuing action aimed at establishing its performance.

Successful change management necessitates the implementation of various phases to enable a smooth transition (**AHRQ, 2023; Al-Amin et al., 2022**). Seventh, link to community resources involves giving information on the availability of necessary integrate services with other community resources that may help support patients' health as needed (**Hughes et al., 2022**). Finally, align resources with patients, which focus on analyzing patients' requirements and allocating health care resources based on these needs in order to operate with fewer resources and achieve better outcomes (**Valentijn et al., 2022; WHO, 2023**).

Nurse managers enhance care coordination activities by fostering an interactive management environment and the development of collegial connections among nursing staff and others. Otherwise, inadequate coordination of care leads to medical issues, unnecessary hospitalization, lower functional status, patient noncompliance with care plans, and increased dependency, as well as having an impact on patients' safety (**Anderson et al., 2021; Ma et al., 2023**).

Patient safety is a healthcare discipline that arose as a result of the increasing complexity of healthcare systems and the rise in patient harm in healthcare institutions. Its goal is to prevent and decrease risks, errors, and harm to patients while providing health care (**WHO, 2021**). Patients' safety has twelve dimensions, which are as follows: First, communication openness, which is defined as

encouraging a culture of openness. It entails explaining what happened to patients who were harmed as a result of their medical care (**AHRQ, 2022**). Second, feedback and communication about error mean ineffective or sufficient communication among team members is a primary contributing cause to unfavorable outcomes, according to error prevention. Communication breakdowns in the acute care setting result in increased patient harm, length of stay, and resource utilization, as well as increased career dissatisfaction and turnover (**Vermeir et al., 2023**). Third, frequency of events reported involves reporting patient safety events that are a beneficial method for improving patient safety (**Lim et al., 2022**). fourth, handoffs and transitions refer to the structured exchange of essential patient information during transitions between healthcare providers or settings (**Segall et al., 2023**).

Fifth, management support for patient safety through prioritizing safety, allocating resources, and cultivating a work climate that encourages safe practices and reporting (**Huang et al., 2024; Murray et al., 2024**). Sixth, a non-punitive response to error assures staff nurses that mistakes won't be punished but instead treated as opportunities for learning and improvement (**Bashir et al., 2024**). Seventh, organizational learning and continuous improvement involve systematically reviewing errors, near misses, and failures to drive



corrective actions (**Mistri et al., 2023**).

Eighth, staffing refers to ensuring that nurse numbers, skill mix, and workloads are appropriate to deliver safe, high-quality care (**Alabdullah et al., 2024**). Ninth, manager expectations and actions promoting patient safety describe leaders seeking input from staff on safety improvements, acknowledging contributions, and acting on suggestions (**Bashir et al., 2024**). Tenth, teamwork across units involves different hospital units coordinating and collaborating effectively to ensure seamless patient care and reduce fragmentation (**Alsobou et al., 2025; Mistri et al., 2023**).

Eleventh, teamwork within units means that nurses within the same unit actively support each other, share workload, and trust one another in the shared goal of safe patient care (**Mistri et al., 2023; Alabdullah et al., 2024**). Finally, overall perceptions of patient safety capture how staff evaluate the effectiveness of systems, procedures, and leadership in preventing harm (**Murray et al., 2024; Huang et al., 2024**).

### **Significance of Study**

Successful care coordination can reduce clinical error and guarantee safer patient care through teamwork and communication among healthcare practitioners. A lack of nurse managers' care coordination caused by a lack of education, training, communication, contact, and trust among nurses may result in an increase in hospital stay length, as

well as, patients' unhappiness, poor patient treatment, and poor patient safety, in addition to rising hospital expenditures, according to studies (**AHRQ, 2023; Song et al., 2022; Shrank et al., 2023**). In the US, one estimated cost of waste resulting from poorly coordinated care is between 25 and 45 billion dollars. Analysis of nine million Medicaid and dual Medicaid/Medicare claims concluded that the cost of patients with poorly coordinated care was 75 percent higher than patients with properly coordinated care (**Bates et al., 2023**). So, this study was addressed to assess the relation between nursing managers' care coordination and nurses' perception about patients' safety.

### **Aim of the study:**

Identify the relation between nursing managers' care coordination and nurses' perception about patients' safety measures.

### **Research Questions**

- What are the levels of nurse managers' care coordination as perceived themselves and their nurses?
- What are the levels of nurses' perception of patient safety measures?
- What is the relation between nurse managers' care coordination as perceived by nurses and their perception about patients' safety measures?

### **Operational definition:**

Nurse managers are operationalized as supervisors, head nurses and nurses who are in charge of organizing the nursing care instead of head nurse at the unit level on

afternoon and night shifts.

## **Subject and Methods**

### **Research Design**

A descriptive correlational research design was used to identify the relation between nursing managers' care coordination and nurses' perception of patients' safety measures. This design is appropriate for the kind of the subject being studied and used questionnaires to determine variables and relations between them when sufficient data was available (**Edmondson & McManus, 2020**).

### **Setting**

This study was conducted in two hospitals at Tanta University Main Hospital and Emergency Hospital. The first hospital called Tanta University Main Hospital affiliated to Ministry of High education and research with bed capacity 285 beds, and 7 departments. It includes: (Gynecology and Obstetrics, Cardiac, Neurology, Tropical, Blood bank, Central laboratory and Oncology departments).

The second hospital is called Emergency Hospital with bed capacity 222 beds and 8 department including; (General surgery department, Recovery unit, Neurosurgery department, vascular surgery department, Orthopedic department, Toxicology department, Radiology department and Burn department).

### **Subjects**

The subjects of this study included two groups

- All (N=67) nurse managers at the previously mentioned setting of

Emergency Hospital (n=32) and Tanta University Main Hospitals (n=35).

- A convenience sampling (n=322) of staff nurses who are involved in patients' care with at least one year of experience was included from the total number of nurses (N=1948).
- The sample size and power analysis was calculated using Epi-info software statistical package to ensure that a suitable and representative size is obtained. The criteria used for sample size calculation were as follows; Z=confidence level at 95% (1.96) & d=Error proportion (0.05).

### **Tools of data collection**

To fulfill the aim of this study, two tools were used.

**Tool I: Care Coordination Structured Questionnaire** It consisted of two parts as follow;

**Part (1):** subjects' personal and work-related data including age, department, years of experience, training course, position, and educational level.

**Part (2): care coordination structured questionnaire.** This part was developed by the researcher based on **McDonald *et al.*, (2014)**, and **Johnson & Johnston (2017)**. It was used to collect data about care coordination from nurse managers' and nurses' viewpoints. It was divided into eight scales, which consisted of 61 items as follow;

- Establish accountability or negotiate responsibility
- Support self-management goals
- Create proactive plans of care
- Communication

- Facilitate transition
- Monitor, follow up and respond to change
- Link to community resources
- Align resources with patients' needs

### Scoring system

Subjects' responses were measured on three points Likert Scale ranging from 3-1 where (3) perfectly coordinated, (2) coordinated care, (1) uncertainly coordinated.

The total scores were calculated by summing scores of all categories. The total scores represented in varying levels according to statistical cutoff point as follow;

- **High coordination level** ( $\geq 80\%$  from the total score).
- **Moderate coordination level** ( $60\% < 80\%$  from the total score)
- **Low coordination level** ( $< 60\%$  from the total score).

### Tool II: Nurses' perception of patients' safety structured questionnaire

This tool was developed by the researcher based on **Sorra *et al.*, (2016)**, and **Radwan (2019)**. It was used to assess nurses' perception about patients' safety and included

**Part (1): Patients' safety structured questionnaire.** It was divided into twelve dimensions with 43 items as follow;

- Communication openness
- Feedback and communication about error
- Frequency of events reported

Nurses' responses for these dimensions were measured on five points Likert Scale ranging from (1-5) where (1) never, (2) rarely, (3)

sometimes, (4) most of the times and (5) always.

- Handoffs and transitions
- Management support for patient safety
- Non-punitive response to error
- Organizational learning and continuous improvement
- Staffing
- Manager expectation and actions promoting safety
- Teamwork across units
- Teamwork within units
- Overall perceptions of patients' safety

### Scoring system

Nurses' responses for these dimensions were measured on five points Likert Scale ranging from (1-5) where (1) strongly agree, (2) agree, (3) uncertainly agree, (4) disagree and (5) strongly disagree.

The total scores were summed up and classified into levels according to statistical cut off points as follow;

- **High level of patients' safety perception** ( $\geq 80\%$  from the total score).
- **Moderate level of patients' safety perception** ( $60\% - < 80\%$  from the total score)
- **Low level of patients' safety perception** ( $< 60\%$  from the total score).

### Method

**1.** An official permission was obtained from the Dean of Faculty of nursing, Tanta Main University Hospitals and Emergency Hospital to responsible authorities of hospital to conduct the study.

### **2. Ethical considerations:**

- Nature of the study was not causing any harm to the entire sample.
  - Nurses consent assuring the nurses about the privacy and confidentiality of the collected data and explain that it was used for the study purpose only.
  - Confidentiality and privacy were taken into consideration regarding data collection. code number was used instead of names.
3. The research tools were translated to Arabic language and amended by a panel of five experts of nursing administration specialists who reviewed the content of the tools for clarity, relevance, comprehensiveness, comprehension, application, and simplicity of use. Experts' opinions and suggestions were taken into consideration and modifications of tools were done accordingly.
- The five experts were three professors of nursing administrator and two assistant professors of nursing administrator from Faculty of Nursing Tanta University (Appendix IV).
  - The experts were asked for some modifications related to grammatical language and rephrasing of some sentences related to their answers and the necessary modification were done based on their opinions
  - The experts' responses were represented in four points rating scale ranged from (1 – 4) where 1= not relevant, 2= little relevant, 3=relevant, 4= strongly relevant.

The face validity value of tool I: Care coordination structured Questionnaire were 98.6% and tool II: Patients' safety structured questionnaire was 98% (Appendix IV).

4. A pilot study was conducted on 10% of the selected subjects (7 nurse managers and 32 nurses) who were convenient at the time of data collection and excluded from sample size in order to ensure the clarity of questions, applicability of the tools, the time needed to complete the sheet. Also, to identify obstacles and problems that might be encountered during data collection.
5. Reliability of the tools tested using Cronbach's Coefficient Alpha Test where  $r=0.929$  of nurses,  $r=0.992$  of nurse managers for tool I, and  $r=0.803$  of nurses for tool II (Appendix IV).
6. **Data collection phase:** The data was collected from nurse managers and nurses. The researcher met the respondents in small group consisting of one to four subjects' study during their work shifts morning, or afternoon, to distribute the questionnaires. The subjects recorded the answer in the presence of the researcher to clarify any questions needed.
7. The appropriate time for data collection varied according to the type of work and workload for each department; sometimes it was done in the middle of shift and in the other times before the end of the shift. The time needed to complete the questionnaires

items from the subjects was between 20-30 minutes for two tools.

8. The data was collected over a period of six months from the beginning of May2022 to the end October 2022

### **Statistical analysis of the data**

Data was fed to the computer and analyzed using IBM SPSS Software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were described using number and percentage. The **Kolmogorov-Smirnov** test was used to verify the normality of distribution Quantitative data were described using range (Minimum and maximum), mean, standard deviation and median Significance of the obtained results was judged at the 5% level. **The used tests were Chi-square test** used for categorical variables, to compare between different groups, **Monte Carlo correction** for Correction for chi-square when more than 20% of the cells have expected count less than 5, **Mann Whitney test:** for abnormally distributed quantitative variables, to compare between two studied groups , **Spearman coefficient** To correlate between two distributed abnormally quantitative variables and **Cronbach's Alpha** as reliability Statistics was assessed using Cronbach's Alpha test

### **Results**

**Table (1):** represents distribution of nursing staff (nurse managers and nurses) according to personal and work-related characteristics. There was a statistically significant difference between nurse managers

and nurses in all items of personal characteristics except department, and training. This table showed that about two-thirds (64.2%) of nurse managers aged 30-40years while 35.8% of nurse manager aged 40-50 years. On the other hand, total nurses (36.3%) aged was 40-50 years while 5.3% of nurses aged<30years. Regarding years of experience, more than half (56.7%) of nurse manager had 10-20 years of experience and 4.5% of them had 20-30 years of experience with mean experience  $10.91 \pm 4.63$ , while more than one third (36.4%) of nurses had 20-30 years of experience and 5% of them had <10 years of experience with mean experience  $23.20 \pm 8.60$ . 79.2% of nurses, and 80.6% of nurse managers attended training course. Regarding educational level, the majority (92.5%) was bachelor of nursing, while total (100%) of nurses was from nursing institute

**Figure (1):** this figure shows that more than half (58.2%, 51.5%) of nurse manager and nurses had moderate care coordination perception levels. While more than one third (34.3%) of nurse manager, and about half (48.4%) of nurses had a high coordination perception level.

**Figure (2):** this figure indicates that the majority (87.6%) of nurses had a moderate level of patient safety perception, while the only (1.8%) of staff nurses had a high level of overall patient safety perception.

**Figure (3):** this figure shows there was statistically significant, positive correlation between nurses' care coordination and their perception of

patients' safety measures ( $p=0.004$ ,  $r=0.161$ )).

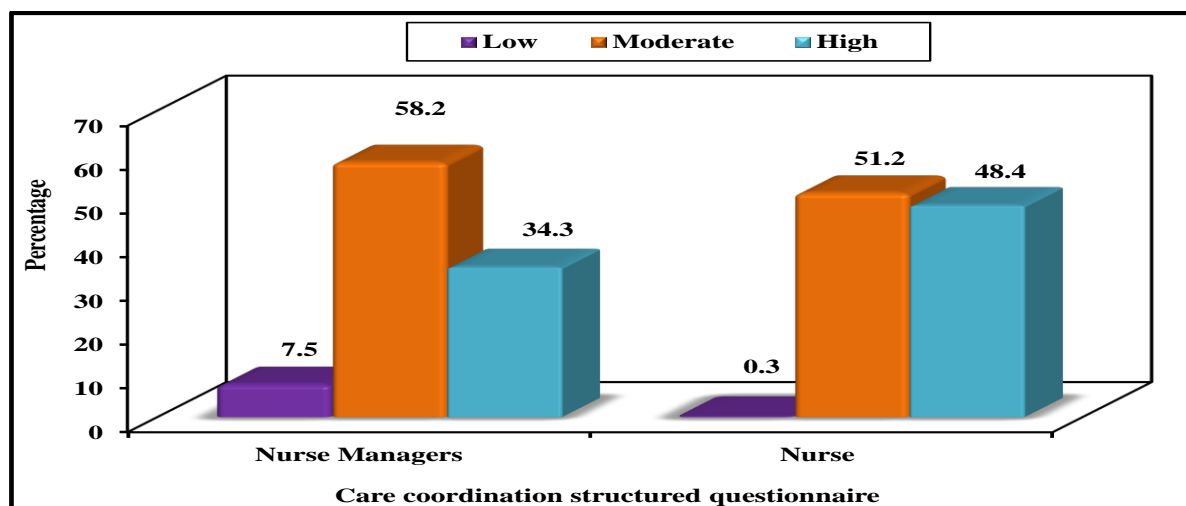
**Table (2):** illustrates that there was no statistically significant relation between overall perception levels of care coordination among nurse managers and their personal data except their years of experience, and as regard nurses, no statistically significant relation between nurses'

overall perception levels of care coordination and their personal data except age.

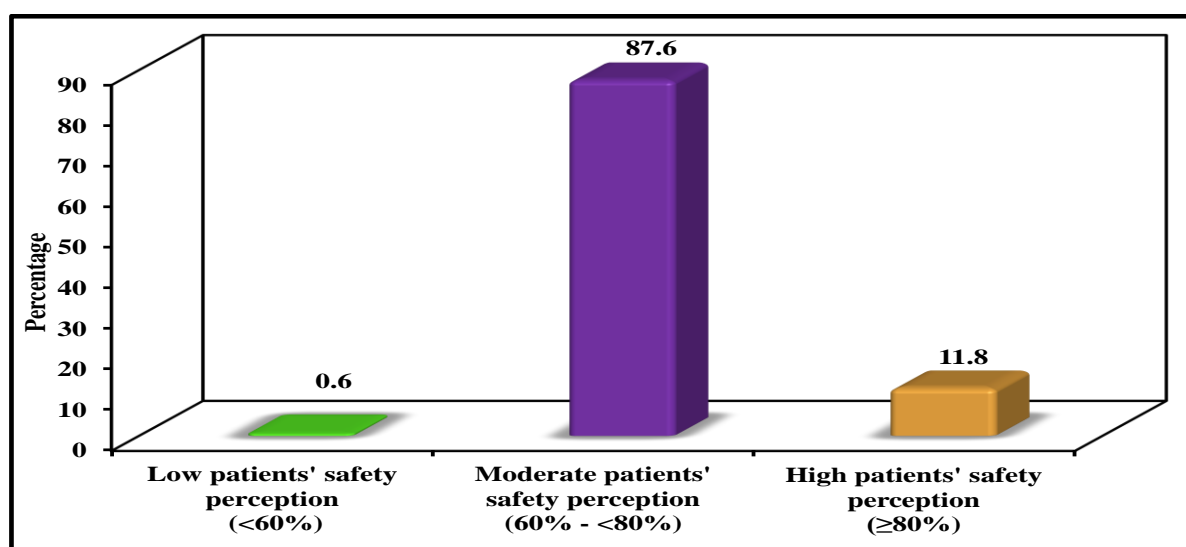
**Table (3):** illustrates that there was statistically significant relation between nurses' perception of patients' safety measures and all personal data except their attending training course (at  $p=$  (0.870)

**Table (1) Distribution and frequency of nurses according to their personal and work-related characteristic**

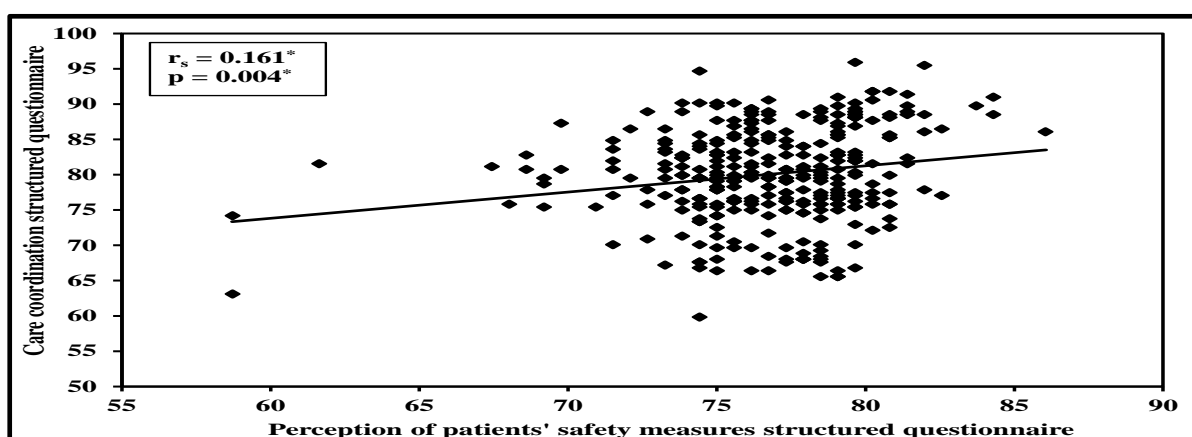
Part (1): Personal characteristic data	Nurse Managers (n = 67)		Nurse (n = 322)		P
	No.	%	No.	%	
Age					
<30	0	0.0	17	5.3	<0.001*
30-40	43	64.2	104	32.3	
40-50	24	35.8	117	36.3	
≥50	0	0.0	84	26.1	
Min. – Max.	49.0–30.0		59.0–25.0		<0.001*
Mean ± SD.	4.84±37.90		8.45±43.11		
Median	37.0		43.0		
Years of experience					
<10	26	38.8	16	5.0	<0.001*
10-20	38	56.7	99	30.7	
20-30	3	4.5	117	36.4	
≥30	0	0.0	90	28.0	
Min. – Max.	24.0–2.0		42.0–5.0		<0.001*
Mean ± SD.	4.63±10.91		23.20 ± 8.60		
Median	10.0		23.0		
Are you attending any training course?					
No	13	19.4	67	20.8	0.796
Yes	54	80.6	255	79.2	
Number of training course	(n = 54)		(n = 255)		
1	7	13.0	28	11.0	<0.001*
2	10	18.5	190	74.5	
3	21	38.9	27	10.6	
4+	16	29.6	10	3.9	
Educational Level					
BSc in nursing	62	92.5	0	0.0	
Post graduate diploma	5	7.5	0	0.0	
Nursing Institute	0	0.0	322	100.0	
Position					
Charge nurse	0	0.0	0	0.0	—
Nurse supervisor	67	100.0	0	0.0	
Bed Side Nurse	0	0.0	322	100.0	



**Figure (1): Nurse managers' and nurses' perception levels of care coordination**



**Figure (2): Levels of nurses' perception regarding overall patients' safety (n = 322)**



**Figure (3): Correlation between nurses' care coordination and their perception of patients' safety measures (n = 322)**

**Table (2): Relation between (nurses' and nurse managers') overall care coordination and their personal characteristic data**

Variable	%Score overall Care coordination	
	Nurse Managers (n = 67)	Nurse (n = 322)
	Mean $\pm$ SD.	Mean $\pm$ SD.
<b>Age</b>		
<30	–	80.62 $\pm$ 7.16
30-40	78.17 $\pm$ 8.74	80.97 $\pm$ 6.62
40-50	77.75 $\pm$ 9.19	78.79 $\pm$ 6.83
$\geq$ 50	–	80.50 $\pm$ 6.08
<b>Test of sig. (p)</b>	<b>U=471.0 (0.556)</b>	<b>H=7.732 (0.052) *</b>
<b>Years of experience</b>		
<10	5.32 $\pm$ 78.86	6.83 $\pm$ 81.28
10-20	9.58 $\pm$ 76.45	6.53 $\pm$ 80.68
20-30	15.03 $\pm$ 90.71	6.99 $\pm$ 78.93
$\geq$ 30	–	6.16 $\pm$ 80.54
<b>H(p)</b>	<b>7.197* (0.027*)</b>	<b>6.446 (0.092)</b>
<b>Are you attending any training course?</b>		
No	10.60 $\pm$ 81.40	6.01 $\pm$ 79.91
Yes	8.27 $\pm$ 77.21	6.80 $\pm$ 80.08
<b>U(p)</b>	<b>340.0 (0.861)</b>	<b>8217.0 (0.631)</b>
<b>Number of training course</b>		
1	2.46 $\pm$ 76.76	8.77 $\pm$ 81.22
2	8.44 $\pm$ 80.0	6.16 $\pm$ 79.66
3	9.03 $\pm$ 78.22	8.25 $\pm$ 80.36
4+	8.48 $\pm$ 74.33	7.27 $\pm$ 84.06
<b>H(p)</b>	<b>3.663 (0.300)</b>	<b>6.546 (0.088)</b>

**Table (3): Relation between staff nurses ' overall perception of patients' safety measures and their personal characteristic (n = 322)**

Variable	%Score overall Perception of patients' safety measures
	Mean $\pm$ SD.
<b>Age</b>	
<30	7.12 $\pm$ 75.68
30-40	2.76 $\pm$ 77.43
40-50	3.16 $\pm$ 76.65
$\geq$ 50	3.03 $\pm$ 76.21
<b>H (p)</b>	<b>7.617 (0.055) *</b>
<b>Years of experience</b>	
<10	7.52 $\pm$ 75.94
10-20	2.59 $\pm$ 77.46
20-30	3.21 $\pm$ 76.58
$\geq$ 30	3.04 $\pm$ 76.28
<b>H (p)</b>	<b>9.251* (0.026*)</b>
<b>Are you attending any training course?</b>	
No	3.79 $\pm$ 76.71
Yes	3.24 $\pm$ 76.75
<b>U(p)</b>	<b>8431.50 (0.870)</b>
<b>Number of training course</b>	
1	3.03 $\pm$ 77.39
2	3.08 $\pm$ 76.54
3	4.56 $\pm$ 77.15
4+	2.0 $\pm$ 77.85
<b>H (p)</b>	<b>8.575* (0.036*)</b>



## Discussion

Nurse managers play a critical role in coordinating care and promoting teamwork across different units. (World Health Organization (WHO). 2021). Care coordination is recognized as a cornerstone of safe and effective healthcare delivery. It refers to the deliberate organization of patient care activities and the exchange of information among healthcare professionals to ensure quality, continuity, and safety.

Nurse managers are central to this process as they oversee communication, allocate resources, and encourage collaboration across disciplines. Their ability to coordinate care effectively not only improves patient outcomes but also influences how nurses perceive and apply patient safety measures. Understanding this relationship is essential for strengthening the culture of safety and enhancing the overall quality of care. (Manojlovich, & Ketfian. (2022). Accordingly, the present study was conducted aiming to identify the relation between nurse managers' care coordination and nurses' perception of patients' safety measures.

### Nursing staff care coordination

Concerning the nursing staff care coordination, the findings of this study demonstrated that the overall care coordination scores were significantly higher among nurses compared with nurse managers. Also, more than half of both nurse managers and nurses reported a moderate level of care coordination. This result suggested that nurses, who are directly involved in bedside

care, may perceive themselves as more engaged in coordination tasks, reflecting their continuous interaction with patients and multidisciplinary teams. As well as while the nursing staff in the hospitals studied were generally aware of and engaged in care coordination activities, there remain challenges in achieving consistently high levels of coordination across teams reflecting the complexity of healthcare delivery.

There were statistically significant differences observed between the two groups in specific dimensions such as establishing accountability or negotiating responsibility, supporting self-management goals, linking to community resources, and aligning resources with patients' needs. These findings suggested that nurses generally perceived higher effectiveness in several care coordination domains compared to nurse managers. Higher scores among nurses may be explained by their direct and continuous contact with patients. In contrast, nurse managers' responsibilities are more administrative and supervisory, which may reduce their engagement in hands-on coordination activities. The results of current study align with the work of **Toles et al. (2022)**, who reported that frontline nurses were more likely to recognize the practical aspects of care coordination, particularly in areas related to patient transitions and resource allocation, while nurse leaders focused more on strategic planning. Similarly, **McDonald et al. (2021)**, emphasized that accountability, resource

alignment, and patient-centered goal setting are crucial but often variably perceived by different professional groups within healthcare systems. Conversely, studies conducted by **Van Houdt et al. (2020)** in highly integrated systems, reported higher performance in community linkage and resource alignment due to stronger interprofessional networks and community-based models of care.

### **Staff nurses' perception of patients' safety measures**

As regard to the nurses' perception of patients' safety measures. The finding of the current study revealed that the majority of nurses reported a moderate perception of overall patient safety. These findings indicated that although awareness of patient safety is present, it remains at a moderate level for most and reflected the nurses' recognition of the importance of continuous system improvement and collaborative communication in promoting safety. In contrast, the lowest scores were observed in staffing, followed by communication openness that may be due to workload pressure and limited open dialogue remain barriers to safety culture.

These findings align with **El-Jardali et al. (2020)** and **Aiken et al. (2021)** who found that higher scores for organizational learning and continuous improvement, On the other hand, **Halligan & Zecevic (2021)** found higher scores for communication openness. This result in difference with the results of a study conducted in Cairo in 2021 which revealed that the domain with

the highest positive responses was teamwork within units while the lowest positive response was the domain non-punitive response to error (**Abdel-Elkader, and Abdel-megeed, 2021**).

### **Correlation between staff nurses' care coordination and their perception of patient safety measures**

The present study demonstrated a statistically significant positive correlation between staff nurses' care coordination and their perception of patient safety measures. This finding may be explained by nurses engage in more effective care coordination that reflected in awareness about their perception of patient safety improves.

This result is consistent with the findings by **Manojlovich and DeCicco (2022)**, who emphasized that positive perceptions of patient safety and supportive work environments were associated with better nurse-physician collaboration. Likewise, **Singer et al. (2020)** found that hospitals with stronger safety cultures achieved higher efficiency in coordination across units. However, **Mardon et al. (2020)** is not along with this result and demonstrated that the link between patient safety culture and care coordination is not always strong, particularly in organizations facing staffing shortages and high workloads.

### **Relation between nurses' overall care coordination and their personal characteristic data**

As regard to the overall care coordination and personal characteristic data of staff nurses and

nurse managers shows that there was no statistically significant relation between care coordination scores and most personal characteristics among staff nurses, except for age. Among nurse managers, years of experience showed a statistically significant effect. This implies that more experienced nurse managers are likely to perceive and facilitate better care coordination, possibly due to enhanced leadership and system navigation skills. This result is in line with **Thomas & Peterson (2020)**, who suggested that years of clinical and managerial experience positively influence leaders' ability to coordinate care. For staff nurses, the lack of significant association between training courses and care coordination is consistent with **Wagner et al. (2021)**, who reported that attending isolated training programs did not necessarily translate into improved coordination unless embedded within long-term organizational strategies. In contrast, studies by **Reeves et al. (2020)** demonstrated that targeted interprofessional education programs significantly enhanced care coordination and teamwork, highlighting possible gaps in local training curricula.

#### **Relation between staff nurses' overall perception of patients' safety measures and their personal characteristic**

Concerning the overall perception of patients' safety measures and staff nurses' personal characteristic, there was significantly associated with years of experience, age, and number

of training courses attended. These findings suggested that accumulated experience and repeated exposure to training enhance awareness and perception of safety culture. This is supported by **El-Jardali et al. (2020)**, who found that healthcare workers with longer tenure and multiple safety-related training reported more positive safety perceptions, **Farokhzadian et al. (2020)** noted that continuous education and professional maturity contribute to stronger patient safety attitudes.

Conversely, the lack of significant relation with "attending training courses indicated that the quality and continuity of training may matter more than mere participation. This was similarly reported by **Sammer et al. (2021)**, who emphasized that sporadic training does not substantially impact patient safety culture unless integrated into daily practice. The goal of studying the relations between nurse managers' care coordination and nurses' perception of patient safety measures is to improve both patient outcomes and the overall safety culture in healthcare organizations. Exploring this relation can provide insights into how leadership behaviors and coordination strategies may strengthen or hinder nurses' adherence to safety practices. (**Boamah, Read & Spence Laschinger, 2020**).

#### **Conclusion**

The present study was conducted to identify the relation between nurse managers' care coordination and nurses' perception of patients' safety

measures. There was statistically significant positive correlation between staff nurses' care coordination and their perception of patients' safety measures. The finding of the present concluded that more than half of nurse managers and staff nurses had moderate overall care coordination perception levels. Specifically, the highest dimension of nurse managers was related to creating proactive plans of care, while the lowest dimension of nurse managers was for link to community resources. The highest dimension of staff nurses was related to facilitating patients' transition. While the lowest dimension was linked to community resources. Majority of staff nurses had moderate level of overall patient safety perception. Specifically, more than two -thirds of staff nurses had high perception of patient safety measures regarding management support for patient safety.

### **Recommendations**

**Considering the findings of this study, the following recommendations were proposed:**

#### **For administration**

- Designing and implementing ongoing education and training programs for promoting and enhancing their knowledge about care coordination and training on patient safety measures.
- Developing strategies that enhance the culture of teamwork and effective communication.
- Updating patients' safety measures.
- Fostering a culture of accountability and responsibility

that enhances the quality of care provided to patients.

- Holding regular meeting with nurse managers and allowing them to discuss their needs and interests.

#### **For nurse managers**

- Promoting nurses' active participation in hospital affairs for developing the quality and efficiency of nursing care services and the outcomes of healthcare institutions.
- Guiding and counseling staff nurses to meet their professional needs.
- Using appreciation to encourage better performance and ask how staff nurses prefer to receive recognition for good behaviors.
- Recognizing the importance of sharing power and involving all team members in decision-making processes.

#### **For nurses**

- Attending seminars and workshops to be updated that improve their perception about teamwork, enable them to work in teams and improve their performance.
- Building good relationship with their colleagues depend on respect and trust.

#### **For educational level**

- Patient care coordination needs to be studied in the curriculum of Faculty of Nursing.

#### **For further research**

- Explore longitudinal effects of care coordination initiatives and training, aiming to address identified gaps and strengthen interprofessional collaboration,

ultimately enhancing patient-centered outcomes.

- Additional studies about factors affecting care coordination and patient safety between staff nurses.

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## Salary Satisfaction as a Predictor of Emotional Exhaustion and Work Incivility among Nurses at Tanta City Hospitals

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### Abstract

**Background:** Nurses' happiness and performance on the job are significantly influenced by their salary. **Aim** The purpose of this study was to assess salary satisfaction as a predictor of emotional exhaustion and work incivility among nurses at Tanta City Hospitals. **Methodology** Data were gathered from 500 nurses working at public and government hospitals in Tanta City, Egypt, using a cross-sectional descriptive study approach. The factors were measured using the Workplace Incivility Scale, Emotional Exhaustion Scale, and Salary Satisfaction Questionnaire. **Results;** The results reveal strong, highly significant positive correlations between all three variables at the  $p < .01$  level. Salary satisfaction was strongly correlated with emotional exhaustion ( $r = .88^{**}$ ) and with workplace incivility ( $r = .91^{**}$ ). Additionally, a robust positive correlation was observed between emotional exhaustion and workplace incivility ( $r = .85^{**}$ ). **Conclusion** there were strong, highly significant positive correlations between all three variables. Salary satisfaction was strongly correlated with emotional exhaustion and with workplace incivility. Additionally, a robust positive correlation was observed between emotional exhaustion and workplace incivility. **Recommendations;** In order to increase nurse happiness and wellbeing, the study emphasised the necessity for healthcare organisations to provide fair and competitive wage structures top priority. Reducing emotional tiredness and workplace rudeness can also be achieved by fostering a supportive workplace environment.

**Keywords:** Emotional Exhaustion, Nurses, Salary Satisfaction, Work Incivility.

## Introduction

Salary satisfaction refers to an individual's level of contentment or happiness with the amount of money they receive for their work. It is a subjective evaluation of how well the compensation matches the effort and value that an individual puts into their job. Salary satisfaction is influenced by a range of factors, including an individual's personal financial needs and goals, the level of compensation offered by their employer, their perception of the fairness of the pay system, and the availability of alternative employment opportunities. (Mammen & Hills, 2023; Akgunduz & Eser, 2022).

When individual feel they are not being compensated fairly for their work, it can lead to job dissatisfaction and disengagement, which can increase the likelihood of experiencing work incivility. Work incivility can then contribute to emotional exhaustion, which can further reduce job satisfaction and overall well-being (Khan, Elahi & Abid, 2021).

Work incivility and emotional exhaustion are particularly common among nurses, who often work in high-stress environments and face high levels of workload and job demands. Research has shown that work incivility can significantly contribute to emotional exhaustion among nurses, which can have serious consequences for their health and well-being. (Faheem et al., 2022 and Doğantekin et al., (2023).

Nurses who experience work incivility, such as verbal abuse, bullying, or undermining behavior from colleagues or supervisors, are

more likely to experience emotional exhaustion, burnout, and turnover intentions. This can lead to decreased job satisfaction and increased absenteeism, as well as increased risk of physical and mental health problems such as depression, anxiety, and cardiovascular disease. (Butt & Yazdani, 2021 and Gui, et al., 2022).

To address work incivility and reduce emotional exhaustion among nurses, healthcare organizations can implement policies and training programs that promote respectful and supportive workplace cultures. This includes providing education and resources for managers and employees to recognize and address incivility, as well as establishing systems for reporting and investigating incidents of incivility. While providing a better source of income and good package of salary is another significant way to tackle and handles such situation (Mammen, Lam & Hills, 2023 and Gustiawan et al., 2023).

To address these issues, individual can take several steps. Providing competitive and fair compensation packages, with transparent and equitable pay structures, can help to promote salary or pay satisfaction among employees. Additionally, promoting a culture of respect, civility, and inclusion can reduce incidents of work incivility and foster a positive workplace environment. (Butt & Yazdani, 2021 and Loh & Saleh 2022).

Furthermore, providing resources and support for managing stress and promoting well-being, such as individual assistance programs or

mindfulness training, can help individual to better cope with the demands of their jobs and reduce the likelihood of experiencing emotional exhaustion. By taking a holistic approach that addresses all three factors, employers can create a positive workplace culture that supports employee well-being and promotes job satisfaction and retention. (Faheem et al., 2022 and Sahputri & Ahyakudin 2023).

### **Significance of the study**

The nursing profession is known to be demanding, both physically and emotionally, which can lead to high levels of stress and burnout among nurses. The nursing profession in Tanta City-Egypt is facing challenges related to high levels of stress, burnout, and turnover, which can be influenced by various factors such as salary or pay satisfaction and work incivility. There is a need to explore the relationship between these factors and emotional exhaustion among nurses to better understand the root causes of job dissatisfaction and attrition in the profession. (Albougami et al., 2022)

This topic is important due to the significant role nurses play in the healthcare system. Nursing is a high-stress profession that requires long hours, critical thinking, and complex decision-making. Nurses, who experience high levels of work stress, including work incivility and emotional exhaustion, are at risk of negative health outcomes, including burnout and turnover intentions (Salama et al., 2022). This can lead to a shortage of nurses and negatively affect the quality of care provided to patients. Therefore, understanding the factors that contribute to work

stress among nurses, including salary satisfaction, work incivility, and emotional exhaustion, is essential for developing effective interventions to improve nurses' well-being and job satisfaction.

Despite some previous research on the topic, there is still a lack of comprehensive studies that have investigated the relationship between salary satisfaction, work incivility, and emotional exhaustion among Egyptian nurses. Therefore, this study aims to address this gap by examining the prevalence of these factors and exploring their interrelationships to determine their impact on the emotional exhaustion experienced by nurses.

### **Purpose of the Research**

The primary purpose was to assess salary satisfaction as a predictor of emotional exhaustion and work incivility among nurses at Tanta City Hospitals, Egypt. Further, this research explored sub objectives such as:

### **Research Questions**

1. What is the level of salary satisfaction among nurses?
2. What is the level of work incivility experienced by nurses?
3. What is the level of emotional exhaustion experienced by nurses?
4. Is there a relationship between salary satisfaction and work incivility among nurses?
5. Is there a relationship between salary satisfaction and emotional exhaustion among nurses?
6. Is there a relationship between work incivility and emotional exhaustion among nurses?

## Methodology

**Research Design:** A descriptive correlational cross-sectional research design was used.

**Study Setting:** different nursing departments of public and government hospitals located in Tanta City, Egypt.

**Targeted Population:** Nursing staff working in the targeted hospitals was considered as targeted population of this research.

**Sample and Sample Technique:** Sample size was comprised from 500 nurses from different hospitals. For this convenient sampling technique was used. While sample was calculated by using, Google based online sampling formula.

## Study Tools

### Tool 1 Demographic Data

This Tool was included the basic information of nurses such as age, marital status, qualification, role of job, duty hours, role, experience and number of dependent family members etc.

### Tool 2 Salary Satisfaction Questionnaire

A 4-items based short questionnaire was developed by **Asekun (2015)**. This has 5-point response option with one for not satisfied, two for slightly satisfied, three for moderately satisfied, four for satisfied, and five for extremely satisfied. This scale holds a good validity and reliability as it was reported in Nigerian study as 0.94. (**Asekun, 2015**)

### Tool 3 Emotional Exhaustion Scale

McCall (2002) developed a nine item based questionnaire with 5-point response option as zero= Not at all and four= extremely. This scale holds a good validity and reliability as it

was reported in Nigerian study as 0.81 (McCall, 2002).

### Tool 4 Workplace Incivility Scale

**Cortina et al. (2021)** developed this scale to measure workplace incivility from co-workers as well as supervisors. This scale has 5-point response option as one for strongly disagree to five for strongly agree with 14 total items. The reliability of the tool is reported to be .85 (**Cortina et al., 2021**).

### Plan and implementation process

Before start of study, a written permission was acquired from the regional ethical review board as well as Nursing department by providing a brief research proposal. After that, with the IRB approval from Faculty of nursing, Tanta university, data collection permission was be obtained. While from the participants, a written inform consent was taken by mentioning a brief and goal of the study. With signing the inform consent form participant who able to take part in the study. While researcher itself was collect the data, was assign coding, and was stored all data in the password-protected drive. Further data analysis was applied according to the research requirements.

### Analysis of Data

For the current research, to analysis the data according to the objectives of the study, version 28 of the Statistical Package for Social Sciences was used. To see the demographics, descriptive statistics was used. To check the Alpha reliability of the scales, reliability statics was used. To check the relationship among variables, Pearson Correlation method was used. To check the level of education

Anova was used. To see the casual effects there was used linear regression and group comparison's mean differences, Post-Hoc comparison was used.

### **Ethical Considerations**

For the ongoing study, before starting the research process, the researcher followed all ethical approvals including inform consent, human rights, participant's safety etc. Before conduction of reseach, inform consent was obtained from the participants. Data was kept confidential and will be used only for the research purposes. It was explained well to the participants that, they are allow to participate willingly in the study, and at any stage of this process, they may leave with their concerns.

### **Results**

The data analytic technique was used to conduct inferential and descriptive statistical analysis in the findings chapter. To assess the level of *salary satisfaction*, *work incivility* and emotional exhaustion mean and standered deviatin measuremed. Pearson Product Moment The association between salary or pay satisfaction, work incivility and emotional exhaustion using correlation analysis.

**Table 1** reveales that 59.8% of participants were male nurses, which is an interesting finding given that nursing is typically a female-dominated profession both globally and in Egypt. The sample had an equal distribution of single and married nurses, offering balanced perspectives on work-related outcomes. In terms of age, a relatively even distribution was observed, with the largest group

(30%) aged between 21–30 years, while a considerable proportion (26%) were aged 51 years and above, indicating a mature and experienced nursing workforce. Most participants were employed at Tanta University Hospital (62%), reflecting the institution's large nursing staff and central role in healthcare delivery in Tanta City. Nurses were well-distributed across various departments, ensuring representation from high-stress units like ICU and OT, as well as pediatric, medical, and emergency departments. Regarding job roles, nursing supervisors made up the largest category (40.2%), which could influence overall perceptions of salary satisfaction and workplace incivility due to differences in authority and workload compared to staff nurses and nursing assistants.

The bar chart (**Figure1**) illustrates the mean (M) and standard deviation (S.D.) levels of salary satisfaction, emotional exhaustion, and workplace incivility experienced by nurses in the study. It is evident that the highest mean score was recorded for emotional exhaustion, followed closely by workplace incivility, indicating that nurses frequently experience high levels of both emotional strain and uncivil behaviors in their work environment. In contrast, salary satisfaction demonstrated a considerably lower mean, reflecting widespread dissatisfaction with pay among the participants. The relatively low standard deviations across all three variables suggest limited variability in responses, implying that these experiences were commonly shared among the nursing staff. Overall, the

findings highlight significant workplace challenges for nurses in Tanta City hospitals, with notable implications for staff well-being and organizational management.

**Table 2** presents the psychometric properties of the scales used in the study, confirming strong internal consistency for all measures, with Cronbach's alpha values ranging from .88 to .97. The Salary Satisfaction Questionnaire (SSQ) demonstrated excellent reliability ( $\alpha = .97$ ) with a mean score of 18.17 ( $SD = 2.15$ ), suggesting generally low satisfaction given the potential maximum of 20. The Emotional Exhaustion Scale (EE) also showed high reliability ( $\alpha = .95$ ) and a notably high mean of 55.18 ( $SD = 4.75$ ) relative to its potential range, indicating substantial emotional strain among participants. Similarly, the Workplace Incivility Scale (WI) reported good reliability ( $\alpha = .88$ ) and a high mean score of 51.31 ( $SD = 5.01$ ), highlighting frequent experiences of incivility. Skewness and kurtosis values indicate slight negative skewness for all scales, particularly for WI (-1.75), suggesting that most respondents scored toward the higher end of the scale, with acceptable levels of kurtosis indicating near-normal distribution. These results affirm the reliability and suitability of the instruments for assessing the study's variables in this sample.

**Table 3** displays the correlation coefficients between salary satisfaction, emotional exhaustion, and workplace incivility among the study sample ( $N = 500$ ). The results reveal strong, highly significant positive correlations between all

three variables at the  $p < .01$  level. Salary satisfaction was strongly correlated with emotional exhaustion ( $r = .88^{**}$ ) and with workplace incivility ( $r = .91^{**}$ ), indicating that lower satisfaction with salary is associated with higher levels of both emotional exhaustion and workplace incivility. Additionally, a robust positive correlation was observed between emotional exhaustion and workplace incivility ( $r = .85^{**}$ ), suggesting that nurses who experience more uncivil behavior at work also report greater emotional fatigue. These findings underscore the interconnected nature of financial, emotional, and interpersonal stressors in the hospital work environment and emphasize the importance of addressing salary dissatisfaction and workplace civility to mitigate emotional exhaustion among nursing staff.

**Table 4** presents the correlation coefficients between salary satisfaction and various demographic variables among the study sample ( $N = 500$ ). The findings indicate that salary satisfaction (SSQ) was highly and significantly correlated with all demographic factors at the  $p < .01$  level. The strongest correlation was observed between salary satisfaction and job role ( $r = .861^{**}$ ), suggesting that nurses' positions within the hospital hierarchy significantly influence their perceptions of salary fairness and adequacy. Notably, substantial positive correlations were also found between salary satisfaction and gender ( $r = .761^{**}$ ), marital status ( $r = .791^{**}$ ), and age ( $r = .534^{**}$ ), implying that personal characteristics may shape how nurses perceive and evaluate their

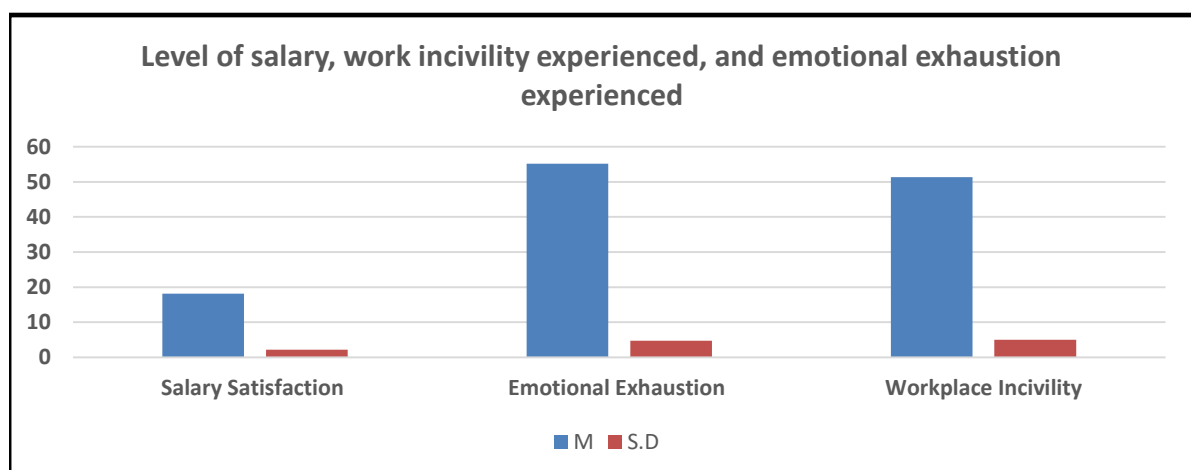
compensation. Additionally, hospital-related variables such as hospital name ( $r = .689^{**}$ ) and department ( $r = .822^{**}$ ) demonstrated strong associations with salary satisfaction, indicating that institutional and departmental contexts contribute

meaningfully to pay perceptions. Collectively, these results highlight the multifactorial nature of salary satisfaction, shaped by both personal demographics and workplace characteristics within the nursing profession in Tanta City.

**Table 1: Demographical Information of the study participants. (N=500)**

Variable	Categories	N	%
Sex	Female	201	40.2
	Male	299	59.8
Marital Status	Single	250	50.0
	Married	250	50.0
Age	21 – 30	150	30
	31 – 40	120	24
	41 – 50	100	20
	51 +	130	26
Hospital Name	Tanta university hospital	310	62
	Tanta cancer center	130	26
	El Menshawy hospital	62	12
Hospital department	OT	80	16
	ICU	80	16
	Surgery	50	10
	OPD	50	10
	Pediatric	75	15
	Emergency	55	11
	Medical	62	12.4
	Other	50	10
Job role	Staff Nurse ( BSc nurses)	151	30.2
	Nursing Assistant ( diploma nurses)	148	29.6
	Nursing Supervisor	201	40.2

Note: *f* =frequency, % = personage



**Figure 1: Level of salary, work incivility, and emotional exhaustion experienced**

**Table 2: Psychometric Properties of Scales Used in the study (N=500)**

	k	A	M	(SD)	Range		Skewness		Kurtosis	
					Actual	Potential	Stati	Std. E	Stati	Std. E
SSQ	500	.97	18.17	2.15	5 – 20	4 – 20	-1.21	.12	1.71	.24
EE	500	.95	55.18	4.75	11 – 36	9 – 36	-.49	.12	.40	.24
WI	500	.88	51.31	5.01	16 – 68	14 – 70	-1.75	.12	.47	.21

Note: SSQ = Salary Satisfaction Questionnaire, EE = Emotional Exhaustion Scale, WI = Workplace Incivility. k = number of items, M = Mean, SD = standard deviation,  $\alpha$  = Cronbach's alpha, Range Min= Minimum Score, Range Max= Maximum Score,

**Table 3: Correlation between salary or pay satisfaction, work incivility and emotional exhaustion (K = 500).**

Variables	SSQ	EE	WI
SSQ	-	.88**	.91**
EE	--	-	.85**
WI	-	-	-

Note: SSQ = Salary Satisfaction Questionnaire, EE = Emotional Exhaustion Scale, WI = Workplace Incivility.

\*\* = highly significant at .01

\* = Significant at .05

**Table 4: Correlation between salary or pay satisfaction, with demographic values (K = 500).**

Variable	1	2	3	4	5	6	7	8
SSQ		.761**	.791**	.534**	.689**	.822**	.927**	.861**
Gender		-	.753**	.776**	.852**	.809**	.806**	.822**
Marital Status		-	-	.529**	.601**	.692**	.527**	.809**
Age		-	-	-	.638**	.529**	.664**	.792**
Hospital Name		-	-	-	-	.574**	.625**	.829**
Hospital department		-	-	-	-	-	.709**	.874**
Job role								.861**

## Discussion

The present study investigates salary satisfaction as a predictor of emotional exhaustion and work incivility among nurses at Tanta City Hospitals, along with the influence of demographic and job-related factors on salary satisfaction. The findings provide valuable insights into the interconnected nature of financial, interpersonal, and emotional stressors within the healthcare environment.

The results revealed generally low levels of salary satisfaction among nurses, accompanied by high levels of emotional exhaustion and frequent experiences of workplace incivility. These findings are consistent with prior research conducted in similar healthcare contexts. For instance, **El-Gazar et al. (2020)** found that inadequate financial rewards were a key predictor of burnout and job dissatisfaction among Egyptian



nurses, particularly in public hospitals where resource limitations are more pronounced. The high emotional exhaustion scores observed in this study mirror international evidence indicating that nurses frequently experience significant emotional strain due to demanding workloads, staffing shortages, and limited organizational support (**Kelly et al., 2021**).

Correlation analysis confirmed strong, statistically significant positive relationships between salary dissatisfaction, emotional exhaustion, and workplace incivility. This suggests that lower salary satisfaction is associated with both higher emotional fatigue and increased exposure to uncivil behaviors at work. Similar patterns were reported by **Alquwez (2020)**, who emphasized that insufficient compensation often contributes to poor morale, interpersonal conflict, and burnout in nursing environments. These findings reinforce the importance of addressing financial and organizational factors simultaneously when seeking to improve the work climate for nursing professionals.

Moreover, the study identified significant correlations between salary satisfaction and demographic variables such as gender, marital status, age, hospital name, department, and job role. Notably, the strongest association was between salary satisfaction and job role, indicating that nurses in higher supervisory positions reported greater satisfaction with their pay compared to staff nurses and nursing assistants. This is aligned with findings from **Hussein et al. (2022)**, who highlighted that leadership roles

within Egyptian hospitals typically receive better remuneration and benefits, which may buffer against work-related stressors. Additionally, variations in salary satisfaction based on department and hospital name suggest that institutional policies and departmental workloads influence financial perceptions, as documented in studies by **Ismail et al. (2019)**, which showed that specialty units like ICU and emergency departments often report higher occupational stress and dissatisfaction.

Interestingly, the significant positive correlations between salary satisfaction and both gender and marital status indicate possible sociocultural influences on how financial compensation is perceived among Egyptian nurses. This observation aligns with the work of **El Dahshan and Keshk (2014)**, who noted that cultural expectations surrounding gender roles and family responsibilities in Egypt can shape job satisfaction determinants, with male and married nurses often seeking higher income stability.

In conclusion, this study underscores the critical need for hospital administrators and policymakers in Egypt to adopt comprehensive strategies that address both financial incentives and workplace civility to improve nurses' well-being and job satisfaction. Future interventions should consider demographic disparities and departmental differences to ensure equitable and supportive work environments for all nursing staff.

One of the primary limitations of this study is its cross-sectional design, which restricts the ability to draw

causal inferences between salary satisfaction, emotional exhaustion, and workplace incivility. While significant associations were identified among these variables, the nature of their relationships over time remains unclear. Longitudinal or experimental studies would be necessary to establish causality and to determine whether changes in salary satisfaction directly lead to alterations in emotional exhaustion levels or workplace behavior.

Another limitation lies in the reliance on self-reported questionnaires for data collection. Participants' responses may have been influenced by social desirability bias, as nurses might underreport negative experiences such as workplace incivility or emotional exhaustion due to fear of professional repercussions or stigma. Additionally, recall bias could affect the accuracy of the responses, as participants might not fully remember or objectively assess their past experiences and feelings.

### Conclusion

In conclusion, this study showed that nurses' income satisfaction is essential in minimising emotional weariness and rudeness at work. The results showed a substantial correlation between lower levels of emotional tiredness and rudeness at work and wage satisfaction. These findings have significant ramifications for nurses, legislators, and healthcare organisations.

This study emphasises the significance of income satisfaction for nurses and illustrates how it affects emotional tiredness and workplace rudeness. Enhancing nurse wellbeing and providing high-quality

healthcare services depend on addressing pay concerns and fostering a healthy work environment.

### Recommendation

The following suggestions for further investigation can be made in light of the study's limitations:

- In order to increase nurse happiness and wellbeing, the study emphasised the necessity for healthcare organisations to provide fair and competitive wage structures top priority.
- Reducing emotional tiredness and workplace rudeness can also be achieved by fostering a supportive workplace environment.
- To recruit and keep skilled professionals, policymakers should take into account setting wage norms that match nurses' credentials and duties.

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## Effect of Intradialytic Exercises on Muscle Cramps and Fatigue among Children Undergoing Hemodialysis

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### Abstract

**Background:** Children undergoing hemodialysis often suffer from negative effects such as muscle cramps, arrhythmias, nausea, vomiting, low blood pressure, and fatigue. **Aim:** The current study aimed to evaluate the effect of intradialytic exercises on muscle cramps and fatigue among children undergoing hemodialysis. **Research design:** This research was conducted using one group (pre-posttest) quasi-experimental research design. **Setting:** This research was conducted in the pediatric hemodialysis units at Minia University Hospital for obstetric and pediatrics (MUHOP). **Sample:** A Convenience sample included all the available children (55) with end-stage renal disease undergoing hemodialysis. **Research tools:** There were two tools used. **Tool I:** A Structured interview questionnaire. **Part I:** Bio-demographic data of children. **Part II:** Multidimensional Fatigue Scale for the Pediatric Quality of Life Inventory. **Tool II:** Muscle cramps questionnaire. **Results:** The study findings indicated that nearly three quarters of the studied children experienced severe fatigue before intradialytic exercises, whereas most of them reported mild fatigue after these exercises, showing highly statistically significant differences. Conversely, more than half of children experienced severe muscle cramp pre-intradialytic exercises compared to None of them in post-intradialytic exercises. **Conclusion:** Intradialytic exercises had a positive effect on reducing fatigue level and muscle cramp severity among hemodialysis children with statistically significant differences between pre and post intradialytic exercises. **Recommendations:** Intradialytic exercises can be adapted as a standard practice for children receiving hemodialysis.

**Key words:** Children, Fatigue, Hemodialysis, Intradialytic exercises, Muscle cramp

## Introduction

A serious global health concern, Chronic Kidney Disease (CKD) has a high fatality rate, particularly in children. A reduced glomerular filtration rate (below 60 mL/min/1.73 m<sup>2</sup>) that lasts for at least three months or kidney damage, regardless of filtration rate (even if it surpasses 60 mL/min/1.73 m<sup>2</sup>), are the two hallmarks of chronic kidney disease (Vaidya & Aeddula,2024).

The causes of CKD in children differ by age; from birth to early teens, they typically involve hereditary or congenital conditions, while for ages 15-19, glomerulonephritis is the most frequent reason for CKD. Chronic kidney disease results in various health issues, including anemia, heart complications, bone deterioration, and mortality (Ghatas et al., 2020).

Hemodialysis (HD), a laborious process that occurs two or three times a week for roughly three to five hours each day, is the most popular and extensively utilized renal replacement therapy for children with End-Stage Renal Disease (ESRD). Hemodialysis replaces the functions of the failing kidneys with an artificial kidney machine (Kamal Eldin et al.,2024). Despite its benefits, children undergoing hemodialysis often suffer negative effects on dialysis days, such as muscle cramps, arrhythmia, nausea, vomiting, post-dialysis hypotension, and fatigue. With the lengthening of dialysis sessions, patients encounter different levels of physical, cognitive, and psychological impairments, greatly affecting their quality of life (Fang, et al.,2025).

Muscle cramps are a frequent complication encountered by HD children and are characterized by abrupt, painful and involuntarily contraction of a muscle, especially in the lower extremities (Anbu& Rathiga,2021). They occur suddenly during and in between HD sessions and may last from few seconds to several minutes, cramps commonly affect the calf, feet, toes and thigh muscles. Between 25% to 80% of adolescents receiving hemodialysis experience muscle cramps, which are a typical cause for interrupting a hemodialysis session early (Takahashi,2021). The causes of these cramps including hypotension caused by removing excess fluid during HD. Likewise, electrolyte imbalance, hypo-perfusion, tissue hypoxia, hyponatremia, hypomagnesaemia and, alterations in plasma osmolality are the common causes (El-Said et al.,2023).

Fatigue is a significant symptom faced by hemodialysis patients, often largely ignored by healthcare professionals. Fatigue is a term describing a complex, multifaceted symptom, marked by an intense feeling of exhaustion, low energy, and reduced ability for physical and mental tasks that rest does not alleviate, moreover, fatigue affects life quality, emotional health, and daily self-care activities (Mohamed et al.,2024).

Recently, numerous researches have indicated the importance of intradialytic exercises to relieve muscles wasting and fatigue among hemodialysis children. Intradialytic exercise is one of the most common

non-pharmacological treatments used to control muscular cramps (**Shalaan et al., 2024**). According to the current literatures, stretching a muscle can decrease and alleviate muscle cramps, as it reduces muscle protein loss and maintains muscle functions. Also, it reduces the circulation stasis, which promotes solute elimination, blood flow, and the strength of the muscle, as well as improving oxygen diffusion, which promotes aerobic capacity (**Wayan, 2021**).

Similarly previous study by **Hatef et al, (2021)** who illustrated that exercise training can enhance peripheral perfusion, blood pressure, muscle blood circulation, while reducing fatigue, uremic nephropathy, myopathy, and cramping in the muscles.

Pediatric dialysis nurse serves as a caregiver and advisor during HD sessions, playing a crucial part in addressing both immediate and ongoing challenges faced by children with ESRF and their families. Consequently, nursing actions focus on both preventing and addressing HD complications like muscle cramps and fatigue, as well as educating children on non-pharmacological care. Non-pharmacological approaches effectively reduce muscle cramps and fatigue; therefore, nurses play a crucial role in helping children on HD recognize options that can alleviate and address these issues, as medication can be expensive and linked to side effects or other medication-related complications (**Sabry et al., 2023**).

### Significance of the study

It is presently estimated that there are 18.5 to 100 instances of chronic renal failure in every million children worldwide, a number that has gradually climbed over the past 20 years. Adolescent mortality rates range from 30% to 100% greater than the general populations. The necessity for specialist care is highlighted by the brief lifespan of an adolescent under the age of 14 who is reliant on dialysis. According to statistics, there are 264 cases of children getting dialysis overall, 225 cases of CRF per million children in Egypt, and an estimated 74 occurrences of ESRD per year (**El-Said et al., 2024**).

Numerous studies examine the great advantages of physical exercises for children receiving dialysis, similarly, a prior study in Egypt by **Salama et al., 2022**, evaluated the effects of intradialytic exercise on the biochemical results, fatigue, and psychological distress of 50 hemodialysis children at the pediatric hemodialysis unit at Menoufia University Hospital in Shubin El-Koom City. The study found that intradialytic exercise had a positive effect on the biochemical findings, psychological distress, and fatigue of hemodialysis children.

In Egypt, while all hemodialysis children report experiencing fatigue, depression, and muscle cramps, there has been limited research conducted to alleviate their complaints. Intradialytic exercises have been recognized as essential in enhancing muscular tissue flexibility and overall health and well-being in

children receiving hemodialysis, by facilitating physiological processes such as the restoration of skeletal muscle. Therefore, this study was done to evaluate the effect of intradialytic exercises on muscle cramps and fatigue among children undergoing hemodialysis. The researchers sincerely hope that the findings from the current study will offer evidence-based guidelines that can effectively enhance both nursing practice and research within the field of nephrology nursing.

### **Aim of the study**

The aim of the present research was to evaluate the effect of intradialytic exercises on muscle cramps and fatigue among children undergoing hemodialysis

### **Research hypotheses: -**

H0: Intradialytic exercises have no effect on muscle cramps and fatigue among children undergoing hemodialysis.

H1: Children undergoing hemodialysis who will practice intradialytic exercises will have lower muscle cramps level than before application.

H2: Children undergoing hemodialysis who will practice intradialytic exercises will have lower fatigue level than before application.

### **Research design: -**

This study was carried out using a quasi-experimental research approach with one group (pre-posttest). Although it includes manipulating the independent variable without randomly assigning participants to conditions or the order of conditions, this kind of

experimental design is quite similar to a real experimental design (**Grove & Gray, 2018**)

### **Settings:**

This study was conducted at Minia University Hospital for Obstetrics and Pediatrics (MUHOP) in the pediatric hemodialysis units. The hemodialysis facility included four rooms accommodating 16 beds.

### **Sample:**

A Convenience sample including all the available children (55) having known as end-stage renal disease undergoing hemodialysis over a period of three months.

### **Data collection tools**

To collect the necessary data, two tools were used: -

**Tool I: A Structured interview questionnaire, which included the following Parts:**

**Part I: Bio-demographic data related to children:-**It encompassed the child's age, gender, residence, frequency and duration of hemodialysis sessions, the times when cramps occur, the muscles involved, and the limitations of movement and activity brought on by cramps.

### **Part II: Multidimensional Fatigue Scale:**

Multidimensional Fatigue Scale for the Pediatric Quality of Life Inventory was taken from **Varni et al. (1998)**. This scale evaluates fatigue in pediatric patients and comprises 18 items categorized into three primary domains: general fatigue, sleep and rest fatigue, and cognitive fatigue, with six items in each category. A 3-point Likert scale will be employed, where 0 signifies



that a problem is never present; 1 indicates that a problem occurs sometimes, and 2 denotes that a problem is almost always present.

**Scoring system:**

- Mild fatigue= 0–12 score
- Moderate fatigue = 3–24 score
- Severe fatigue = 25–36 score

**Tool II: Muscle cramps questionnaire:**

It was adopted from **Basemath (2014)** to measure the severity of muscle cramps during hemodialysis. It rates the degree of cramping from 0 to 13 and takes into account various factors of muscular cramps, including frequency, duration, temperature, discomfort, and pain intensity.

**Muscle cramp scoring system:**

a score of zero means there are no cramps, a score between one and four points suggests mild cramps, a score between five and eight points shows moderate cramps, and a score between nine and thirteen points indicates severe cramps.

**Ethical considerations**

The research proposal had been given approval by Minia University's Faculty of Nursing's ethical committee with code number (REC202553). Prior to the pilot study and the actual research, formal approval and consent were secured from the Dean of the Faculty of Nursing and the director of the aforementioned hospital. Written permission was secured from the parents of children who agreed to take part in the study, following an explanation of the study's intent and nature; participants had the right to decline participation and/or withdraw

from the study at any moment without reason, and no health risks were involved. Participants were guaranteed that all their information is strictly confidential, and anonymity was ensured by assigning numbers to each child instead of using names to safeguard their privacy.

**Validity**

The tools were provided to five specialists in the Pediatric field to evaluate the content validity, including 3 experts from the Faculty of Nursing at Minia University and 2 experts from the Faculty of Medicine at Minia University. Tools were reviewed for topic coverage, items sequencing, clearness, relevance, applicability, format and length. Minor changes had been done such as rephrasing of certain sentences based on the suggestions of experts.

**Reliability**

The reliability of the study instruments was assessed through Cronbach's alpha coefficient test, showing tool I and tool II were dependable with  $r=0.776$  and  $r=0.81$ , respectively.

**Pilot Study:** Once ethical approval was obtained and access to the hospital was granted, a pilot study was performed involving 10% (5) of the participants to assess the study procedure and evaluate the effectiveness of the tools used in the research. The required adjustment was made, and the pilot was added to the study sample.

**Data collection procedure**

The researchers provided the parents and their children with a straightforward explanation of the study's

aim and the contents of the sheet, assuring them of the procedure's safety and encouraging them to take part. All pertinent ethical factors evaluated to guarantee the privacy and confidentiality of the gathered data by obtaining written consent from the parents of children involved in the study, explaining that they have the right to refuse to continue participation and the interview took place in the dialysis units. The data was gathered over a period of three months from early June 2025 to late August.

**Before application of intradialytic exercises):**

The researchers collected demographic data, medical data, muscle cramps level and fatigue level from children.

**During Intradialytic exercises application: -**

Where intradialytic exercises applied for them. The researchers interviewed each child and his/ her parent and explained how to do the intradialytic exercises by performing it while the child and his/ her parent watched them, the child was asked to re-demonstrate it and to perform the intradialytic exercises in the same way at home every day, the researchers used demonstration and re-demonstration for teaching and also, video recorded about intradialytic exercises, brochures and posters were used as the teaching method. The researcher visited the hemodialysis units three days a week.

**The researchers instructed the child to do intradialytic exercises in the following steps:**

The exercise session began within the first two hours of starting the dialysis once the child was connected to the machine and all alarms were turned off. **Intradialytic exercises** consisted of flexibility exercises; range-of-motion, resistance and relaxation were performed three times per week for 20-minutes over one month. Participants were instructed to take a deep inhale through their noses, hold it for a little while, and then softly exhale after five deep breathing exercises at the start of each exercise session. The child then started the flexibility exercises, which involved smoothly extending their muscles for ten seconds until a slight tension was felt.

Following five repetitions of this exercise, the child completed the range-of-motion exercise on their own. This activity involved raising and lowering the arm's shoulder without a shunt, moving it side to side, and then bending and straightening the elbow and wrist from up to down and side to side while rotating in both clockwise and counterclockwise directions. Next, rotate clockwise and counterclockwise while bending and straightening the knee joints and moving the ankle joints up and down from side to side. The researchers then assisted the child in performing the resistance exercise by using the child's wrist and ankle to pull and push the researcher's hand. At the end of each session, relaxation techniques were used. The children were told to stay quiet, close their eyes, and take five deep breaths. The

body portions connected to the dialysis machine were not exercised in order to prevent the needle from disconnecting; instead, the remainder of the body was physically active. The posttest was taken from each child one month after starting to practice the intradialytic exercises in the form of measuring muscle cramps severity and fatigue level for children undergoing hemodialysis using tool I & II

### Statistical Analysis

Version 28 of the statistical program SPSS (Statistical Package for Social Sciences) was used to enter and analyze data. Excel was used to produce graphics. The Wilcoxon test was used to compare two Means before and after intradialytic workouts, and the Friedman test was used to compare more than two means. The quantitative data were given as mean and standard deviation ( $\bar{X} \pm SD$ ). Frequency distribution tables were used to display the qualitative data, together with counts and percentages (No. & %). The chi-squared ( $\chi^2$ ) test was used to analyze it. For all tests considered significant, the significance level was set at a P value of less than 0.05. Furthermore, the association between the total tiredness scores and the total muscle cramp scores prior to and following the intradialytic exercise technique tests was evaluated using a Spearman correlation test.

### Results:

**Table (1):** Proves that, regarding to the child's age 60% of them their age ranged between 10- <14 yrs., concerning education the study results proves that 58.2% of the

studied children were in primary school, on the other hand; regarding residence 69.1% of the studied children came from rural area and 81.8% of the them receiving hemodialysis for more than 3 yrs. Concerning number of sessions per week 87.3% of the studied children received three hemodialysis sessions per week.

Regarding the time and the site of the child's experiencing muscle cramp 87.3%, 78%, respectively of the studied children experience muscle cramp in the last hour of dialysis and in both legs. On the other hand, the calf muscle cramp was experienced in 76.4% of the studied children and the muscle cramp restrict activity in 90.9% of them.

**Figure (1):** Reveals that; regarding child's gender the study results proved that; 67.6% of the studied children were male and 32.4% were female.

**Table (2):** Clears that the statistically significant differences were found between pre and post intradialytic exercises intervention among hemodialysis children in every item on the muscular cramp scale, including the frequency, duration of muscle cramp, leg temperature, discomfort and pain, p. value at .001.

**Figure (2):** Proves that 54.5% of the studied children experienced severe muscle cramp pre-intradialytic exercises compared to no one in post intradialytic exercises. Moreover; 14.5% of children had mild cramp pre- intradialytic exercises compared to 69.1% post- intradialytic exercises.

**Table (3):** Clarifies that; there were a reduction in the total mean score of general fatigue, cognitive and sleep/rest fatigue and total mean score of multidimensional fatigue scale in which the mean scores were  $4.54 \pm 1.74$ ,  $3.12 \pm 1.82$ ,  $2.25 \pm 1.35$  and  $9.94 \pm 3.79$  respectively post-intervention compared to  $9.03 \pm 3.40$ ,  $8.16 \pm 2.78$ ,  $9.47 \pm 3.24$  and  $26.67 \pm 8.31$  respectively pre-intervention with statistically significant differences p. value at 0.001

**Figure (3):** Proves that; 74.5% of the studied children had severe fatigue pre- intradialytic exercise compared to 81.8% of them had mild fatigue after intradialytic exercise with highly statistically significant differences P. value at 0.001.

**Table (4):** Shows that, there were no statistically significant difference between the child's demographic data and muscle cramp except for gender before application of intradialytic exercises, the statistically significant differences were found at P. value at 0.01. But for medical data of children

the statistically significant differences were found between the time experiencing muscle cramp in pre and post intradialytic exercise P. value 0.01 and 0.04 respectively and also, the statistically significant differences were found between location of muscle cramp at pre-intradialytic exercises P. value 0.001, and the affected muscles of cramp with muscle cramp score P. value at 0.008 and 0.01 respectively at pre and post-intradialytic exercises.

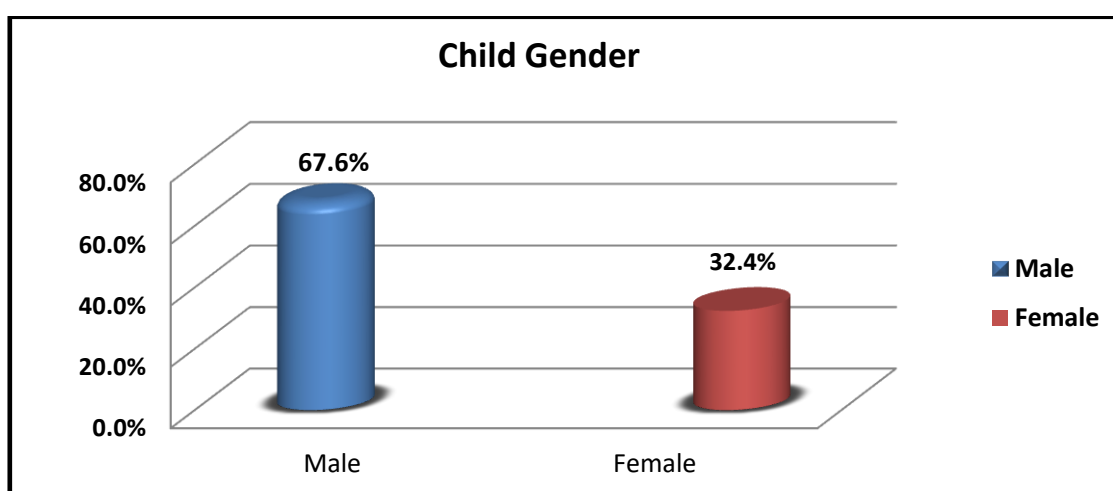
**Table (5):** Proves that; the statistically significant relations were found between total fatigue level and child's age, educational level, duration of hemodialysis, frequency of hemodialysis per week and time of experiencing muscle cramp post-intradialytic exercise application P. value at 0.0001.

**Table (6):** There were statistically significant fair positive correlation between total fatigue level and muscle cramp scale score  $r=0.625$  P. (0.001\*\*) post intradialytic exercise intervention.

**Table (1):-Percentage distribution of the studied children according to their bio-demographic characteristics (n =55)**

Bio-demographic characteristics of the studied children	No.=55	
	No	%
<b>Child age in years:</b>		
6- <10	5	9.1
10- <14	33	60.0
>14	17	30.9
<b>Mean + SD</b>	<b>12 ± 2.24 Years</b>	
<b>Child education</b>		
Primary school	32	58.2
Preparatory school	16	29.1
Secondary school	7	12.7

<b>Residence:</b>		
Rural	38	69.1
Urban	17	30.9
<b>Duration of hemodialysis:</b>		
<1yrs	2	3.6
1 -< 3 yrs	8	14.5
More than 3 yrs	45	81.9
<b>Frequency of hemodialysis per week:</b>		
Once	3	5.5
Twice	4	7.3
Three times	48	87.2
<b>Duration of hemodialysis per session:</b>		
4 Hours	55	100.0
<b>Time experiencing muscle cramp:</b>		
Middle hour	7	12.7
Last hour	48	87.3
<b>Location of muscle cramp:</b>		
Right leg	8	14.5
Left leg	4	7.3
Both legs	43	78.2
<b>Affected muscles:</b>		
Calf	42	76.4
Hamstring	6	10.9
Soleus	7	12.7
<b>Cramp could restrict activity:</b>		
No	5	9.1
Yes	50	90.9

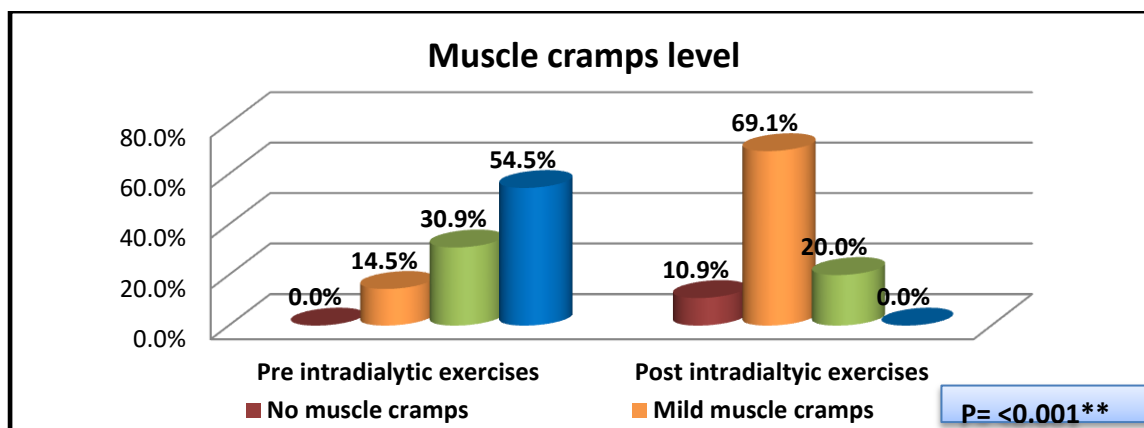


**Figure (1): Percentage distribution of the studied children according to their gender (n = 55)**

**Table (2): Percentage Distribution of Muscle Cramps Scale items pre and post intradialytic exercises application among Children Undergoing hemodialysis (n = 55)**

Muscle cramps scale items	Pre-intradialytic exercises application		Post-intradialytic exercises application		X <sup>2</sup>	P-Value
	No	%	No	%		
Frequency of muscle cramps						
Not occur	7	12.7	40	72.7	52.64	0.001**
Less than 3 times/hour	19	34.5	15	27.3		
More than 3 times/hour	29	52.8	0	0.0		
Muscle cramps duration						
Not occur	6	10.9	29	52.7	43.53	0.001**
Less than 5 min	20	36.3	26	47.3		
More than 5 min	29	52.8	0	0.0		
Pain level						
No pain	3	5.5	38	69.1	67	0.001**
Mild	15	27.3	17	30.9		
Moderate	31	56.4	0	0.0		
Severe	6	10.8	0	0.0		
Leg temperature						
Warm	5	9.1	43	78.2	55.6	0.001**
Cold	38	69.1	12	21.8		
Calmmy	12	21.8	0	0.0		
Discomfort						
No	0	0.0	9	16.4	54.32	0.001**
Perceptible	7	12.7	30	54.5		
Sensitive	17	30.9	16	29.1		
Painful	20	36.4	0	0.0		
Unbearable	11	20	0	0.0		

\*\* =A highly statistically significant

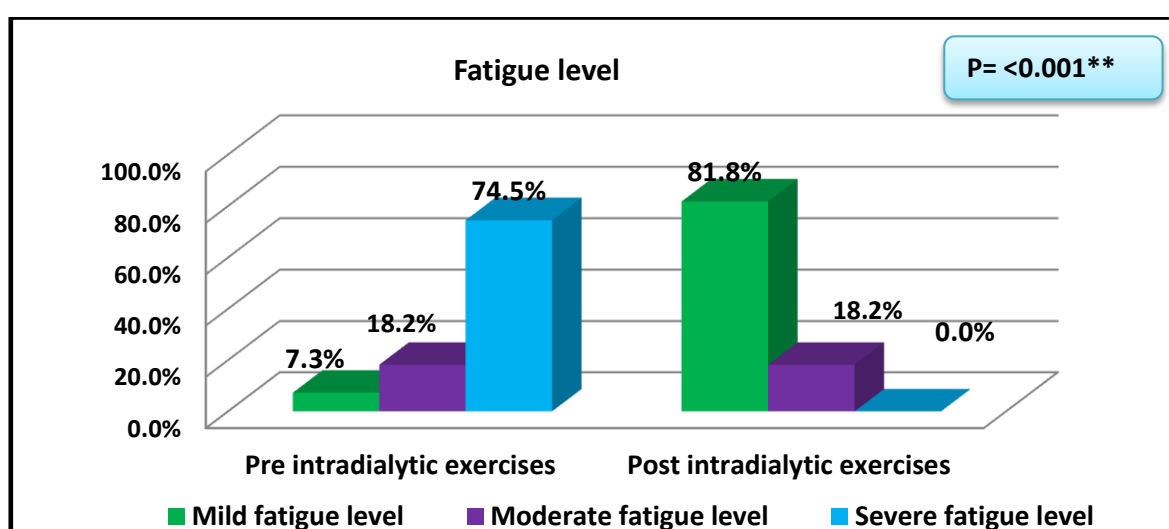


**Figure (2): Total muscle cramps level pre and post intradialytic exercises application among children undergoing hemodialysis (n = 55)**

**Table (3): Total Mean score of Fatigue Scale domains pre and post intradialytic exercises application among children undergoing hemodialysis (n = 55)**

Multidimensional Fatigue Scale domains	Pre intradialytic exercises	Post intradialytic exercises	P – value (Wilcoxon)
	Mean ± SD	Mean ± SD	
General Fatigue	9.03± 3.40	4.54 ± 1.74	<0.001** (8.71)
Sleep / Rest Fatigue	8.16± 2.78	3.12 ± 1.82	<0.001** (11.20)
Cognitive Fatigue	9.47± 3.24	2.25± 1.35	<0.001** (15.24)
Total score	26.67± 8.31	9.94± 3.79	<0.001** (13.57)

\*\* =A highly statistically significant



**Figure (3) :Total fatigue level pre and post intradialytic exercises application among children undergoing hemodialysis (n = 55)**

**Table (4): Relation between the Bio-demographic characteristics of the studied children and Muscle Cramps Scale (n=55)**

Bio-demographic characteristics	Pre-intradialytic exercises		Post -intradialytic exercises	
	Mean ±SD	Significance test	Mean ±SD	Significance test
Age (Years)				
6<10	7.6 ±1.9	Fri=0.16 P=0.84(NS)	1.0±0.0	Fri=0.20 P=0.64(NS)
10<14	8.3 ±2.8		2.12 ±1.6	
>14	8.1 ±2.4		3.5±1.8	
Gender				
Male	8.8 ±2.3	Mann-Whitney =2.41, <b>P=0.01*</b>	2.4 ±1.9	Mann-Whitney =1.75, P=0.86(NS)
Female	6.9 ±2.6		2. 2 ±1.5	
Residence				
Rural	8.1 ±2.5	Mann-Whitney =0.27, P=0.78(NS)	2.1 ±1.8	Mann-Whitney =1.65, P=0.098(NS)
Urban	8.3 ±2.9		2. 9 ±1.5	
Educational level				
Primary school	8.5 ±2.9	Fri=1.34 P=0.32(NS)	2.1 ±1.7	Fri=1.08 P=0.29(NS)
Preparatory school	8.2 ±2.4		2. 8 ±1.8	
Secondary school	6.8 ±3.0		2. 4 ±1.8	
Duration of hemodialysis:				
<1	10.0±0.0	Fri =0.83 P=0.44) (NS)	1.0 ±0.0	Fri=3.1 P=0.07(NS)
1 -< 3	8.8 ±1.3		3. 2 ±2.18	
≥3	8.0 ±2.8		2. 3 ±1.7	
Frequency of hemodialysis per week:				
Once	8.6 ±2.5	Fri =0.39, P=0.67) (NS)	1.3±0.55	Fri=1.31 P=0.23(NS)
Twice	9.2 ±2.2		2.5±2.08	
Three times	8.1 ±2.6		2.4 ±1.8	
Time experiencing muscle cramp:				
Middle hour	6.0 ±3.1	Fri =6.30, <b>P=0.01*</b>	1.0 ±0.0	<b>Fri=4.08 P=0.04*</b>
Last hour	8.5 ±2.4		2. 6 ±1.8	
Location of muscle cramp:				
Right leg	5.1 ±1.7	Fri =8.5, <b>P=0.001**</b>	1.0 ±0.0	Fri=0.23 P=0.63(NS)
Left leg	8.0 ±2.8		3.0 ±1.4	
Both legs	8.8 ±2.3		2. 6 ±1.8	
Affected muscles:				
Calf	8.6 ±2.4	Fri=5.30 <b>P=0.008**</b>	2.7 ±1.7	<b>Fri=5.81 P=0.01*</b>
Hamstring	5.1 ±2.6		1.6 ±1.6	
Soleus	8.8 ±2.3		1.0 ±1.4	
Cramp could restrict activity:				
No	6.8 ±1.6	Mann-Whitney =1.60, P=0.12(NS)	1.0 ±0.0	Mann-Whitney=1.80 P=0.08(NS)
Yes	8.3 ±2.6		2.5±1.80	

Fri- Friedman test , Mann-Whitney test

NS= Non statistically significant \* =Statistically significant difference \*\* =A highly statistically significant



**Table (5): Relation between the bio-demographic characteristics of the studied children and the total mean score of fatigue (n=55)**

Socio-demographic characteristics	Pre-intradialytic exercises		Post-intradialytic exercises	
	Mean ±SD	Significance test	Mean ±SD	Significance test
Age (Years)				
6<10	28.0 ±4.18	Fri=0.16 P=0.85(NS)	8.6 ±3.04	Fri=55 P=0.0001**
10<14	26.9 ±8.9		9.4 ±3.02	
>14	25.8 ±8.1		11.3±4.9	
Gender				
Male	26.9 ±7.1	Mann-Whitney=0.74 P=0.455(NS)	10.5±4.2	Mann-Whitney =1.77, P=0.07(NS)
Female	26.1 ±10.5		8.6 ±2.2	
Residence				
Rural	25.2 ±9.2	Mann-Whitney =2.16, P=0.03	10.5±4.0	Mann-Whitney =1.77, P=0.07(NS)
Urban	29.8 ±4.5		8.5 ±2.9	
Educational level				
Primary school	26.3 ±9.1	Fri=0.23 P=0.78(NS)	9.5 ±3.7	Fri=51.04 P=0.0001**
Preparatory school	26.5 ±8.2		10.18±2.7	
Secondary school	28.7 ±3.4		11.1±5.8	
Duration of hemodialysis:				
<1	31.0 ±0.0	Fri =0.56, P=0.58(NS)	12.5±0.7	Fri=54 P=0.0001**
1 -< 3	24.3 ±10.9		13.1±3.7	
≥3	26.8±7.9		9.2 ±3.5	
Frequency of hemodialysis per week:				
Once	29.0 ±3.0	Fri =1.83, P=0.31(NS)	8.3 ±2.5	Fri=52 P=0.0001**
Twice	20.7 ±9.4		13.7±6.9	
Three times	27.0 ±3.0		9.7 ±3.4	
Time experiencing muscle cramp:				
Middle hour	27.1 ±5.2	Fri =0.025, P=0.87(NS)	8.8 ±4.2	Fri=55 P=0.0001**
Last hour	26.6±8.7		10.1±3.7	
Location of muscle cramp:				
Right leg	28.8 ±4.5	Fri =1.41, P=0.25(NS)	8.3 ±4.4	Fri=1.77 P=0.18(NS)
Left leg	20.5 ±14.4		7.7 ±2.0	
Both legs	26.8±8.1		10.4±3.7	
Affected muscles:				
Calf	26.1±9.0	Fri=0.75 P=0.47(NS)	9.6 ±3.1	Fri=0.46 P=0.63(NS)
Hamstring	25.8 ±6.3		10.3±7.8	
Soleus	30.2 ±2.3		11.1±3.0	
Cramp could restrict activity:				
No	31.8 ±1.4	Mann-Whitney =1.95,P=0.05*	10.2±3.0	Mann-Whitney=0.44 P=0.65(NS)
Yes	26.1±8.5		9.9 ±3.7	

Fri- Friedman test , Mann-Whitney test

NS= Non statistically significant \* =Statistically significant difference \*\* =A highly statistically significant

**Table (6): Correlation between total fatigue level and Muscle cramps Scale scores (n=55)**

Fatigue Scale	Muscle cramps Scale	
	Pre – intervention	Post – intervention
Pre – intervention	0.056 (0.685)	
Post – intervention		0.625 (<0.001**)

\*\* . Correlation is significant at the 0.01 level

## Discussion

Regarding bio-demographic characteristics of children the present study findings clear that, concerning the child's age more than half of them, their age ranged between 10- <14 yrs., and were in primary school. On the other hand, more than two thirds of the studied children came from rural area, the majority of them received hemodialysis for more than 3 yrs. and received three hemodialysis sessions per week.

**Regarding age**, the study result was agreed with the study done by **Ali & Mohamed (2023)** who studied the effect of intradialytic physical exercise on stress levels for children receiving hemodialysis they declared that half of the studied children their ages were 14-18 years. But the present study was contradicted with **Osman et al. (2023)** who assessed self-care program and its effect on the quality of life for children receiving hemodialysis, they documented that; two fifths of the studied children their ages were 12 years.

Current study results were congruent with a descriptive research design done by **Ali et al. (2024)** entitled assessment of stress and anxiety levels in hemodialysis children at

Beni-Suef University Hospital's nephrology unit; they showed that; two third of the studied children their ages were 11-<15 years.

**Regarding to the child's education**, present study results were supported with the study by **Elfeshawy et al. (2024)**, they declared that two third of them attended primary schooling.

**Regarding duration of hemodialysis**, the present study results were congruent with the study done by **El-Said et al. (2023)** about intradialytic exercises program for nurses and its effect on cramping in the periphery of muscles and perfusion in children receiving hemodialysis, completed at the pediatric renal dialysis unit at Benha University Hospital stated that; more than half of the children were on hemodialysis for 3 years or longer, but the current study results were contradicted with the study done by **Mahmoud et al.(2022)** who studied non-pharmacological methods used to reduce discomfort and anxiety in children receiving dialysis carried out in the pediatric dialysis unit at Sohag University Hospital. They reported that half of the studied children received hemodialysis <2 yrs.

**Regarding Frequency of hemodialysis per week**, the study

results came in line with the study done by **Sayed et al. (2025)** about implementing an acupuncture strategy to alleviate the effects of hemodialysis in children suffering from chronic kidney failure, conducted at the hemodialysis unit of Assiut University Children's Hospital, they reported that; three quarters of the children under study received hemodialysis three times per week. **Additionally**, the current study results were similar to the study done by **Abdelsamie et al. (2022)** they stated that; the majority of children received three dialysis sessions per week

**Concerning gender** of the studied children receiving hemodialysis, the current study findings revealed that; just more than two thirds of children under study were male. The study result was consistent with a randomized control trial conducted by **Mohamed et al. (2024)**, who evaluate the effect of foot reflexology on sleep quality and fatigue for children in school-age undergoing hemodialysis, they reported that two-thirds of the children involved in the study were male. Also, the study results were consistent with a randomized control trial conducted by **Khalf-Allah et al. (2024)**, who assessed the stretching muscle and isometric exercises and their impact of on the quality of life for children undergoing continuous hemodialysis, they proved that; the majority of the children were male.

**Regarding the time and the site, the child's experiencing muscle cramps** the present study results proved that the majority and more

than three quarters respectively of the studied children experienced muscle cramp in the last hour of dialysis and in both legs. On the other hand, regarding the affected muscle, the study results concluded that; more than three quarter of the studied children experienced calf muscle cramp and the muscle cramp restricted activity in most of them.

Regarding the time and the site, the child experiencing muscle cramp, current study results were congruent with the study by **Albadr et al. (2020)** their study investigated intradialytic hemodialysis exercises and their impact on leg cramps and fatigue, the researchers concluded that; a significant number of participants experienced muscle cramps during the final hour of hemodialysis, with more than half of patients reporting cramps in both legs.

Concerning the affected muscle and activity restriction by the muscle cramp, present study results were congruent with the Egyptian study by **El-Said et al. (2023)** proved that; muscle spasms were experienced in both legs in the majority of children, which included the calf muscles. Furthermore, the movement and activity were restricted in all children.

Regarding the **muscle cramps scale items**, the study results prove that statistically significant differences were found between pre and post intradialytic exercises application among hemodialysis children in all items of muscle cramp scale such as frequency and duration of muscle

cramp, pain level, temperature of the leg, and discomfort p. value at .001. The present study findings were supported with the study by **El-Said, et al. (2023)** proved that there was a highly statistically significant difference between muscle cramps frequency and duration, level of pain, leg temperature and discomfort in the children under study before and after intradialytic exercises program implementation. Also, the study by **Al badr et al., (2020)** found that there was statistically significance difference as regard cramp questionnaire chart (frequency and duration of muscle cramps, leg temperature, level of pain and discomfort) pre and post intradialytic exercises application.

**Regarding the total level of muscle cramps**, the study results proved that more than half of children under the study experienced severe cramp pre-intradialytic exercises compared to no one in post intradialytic exercises. Moreover, minority of children had mild cramp pre intradialytic exercise compared to more than two thirds post-intradialytic exercises. The study results were consistent with **Jancy & Parimalas (2020)** concluded that ongoing intradialytic physical exercises can help prevent and diminish the muscle cramps occurrence during hemodialysis.

From the researchers' point of view intradialytic exercises can enhance muscle blood circulation that helps in reducing muscles cramps. Also, the study results ensure the role of the researchers' instructions which make children adhered to the

exercises at home as the presence of the researchers in the unit and encouraging the children to re-demonstrate the exercises using videos and posters. ***The current study results accepted the first hypothesis***

Also; the study results were congruent with the study by **Abouelala& Khalil (2021)** who studied passive and active physical stretching exercises and their impact on managing cramped leg in patients receiving hemodialysis indicated that; over three-quarters and more than two-thirds of the patients examined who experienced severe muscle cramps prior to engaging in intradialytic exercises for the two examined groups, respectively. However, following the implementation of stretching exercises, more than half of the study group reported the absence of muscle cramps, in contrast to a minority of the control group with statistically significant differences p. value at ( $p=0.001$ ) between the study and control groups.

The study result also was in accordance with **Chandralekha & Mercy (2020)** who studied the effect of intradialytic stretching exercises on muscle cramps and fatigue indicated that there is a notable enhancement in the intensity of muscle cramps scores within the intervention group after intradialytic stretching exercises application.

**Regarding the total mean score of fatigue**, the study results proved that there was a reduction in the total mean score of cognitive fatigue, general fatigue, and sleep/rest fatigue

and total mean score of multidimensional fatigue scale in post-intradialytic exercises intervention group with statistically significant differences p. value at 0.001.

The present study findings were supported with the Egyptian study by **Salama, et al.(2022)** whose study entitled the impact of intradialytic exercise on psychological distress, fatigue and biochemical results in children undergoing hemodialysis, Egyptian journal of health care, concluded that; the study group scored less mean scores of general fatigue, cognitive fatigue, and sleep/rest fatigue compared to control group after 4 weeks of intervention with highly statistically significant differences p. value 0.001.

**Regarding the total level of fatigue among children, current study findings prove that; near three quarters of children under the study had severe fatigue pre- intradialytic exercises compared to the majority of them had mild fatigue after intradialytic exercises and the highly statistically significant differences were found at P. value at 0.001. The current study results accepted the second hypothesis**

The current study findings were congruent with **Hamed and Abdel Aziz (2020)** who studied a randomized quasi-experimental study about the deep breathing exercise training and its impact on fatigue' level among patients undergoing hemodialysis, proved that; there were statistically significant differences in fatigue scores before and after the deep breathing exercise among

regular hemodialysis patients in the study group.

From the researchers' perspectives, the children's eagerness and drive to combat fatigue, along with the guidance provided during follow-up calls to initially engage in light exercise for brief intervals and progressively extend the duration based on the children's tolerance, are likely contributing factors for the ongoing enhancements.

**Regarding the relation between the children's bio-demographic data and total mean score of muscle cramp, the study findings cleared that, there were no statistically significant difference between the demographic data of child and muscle cramp except for gender before application of intradialytic exercise P. value at 0.01. But for medical data of children the statistically significant differences were found between the time experiencing muscle cramp in pre and post intradialytic exercise P. value at 0.01 and 0.04 respectively and also, the statistically significant differences were found between location muscle affected muscle with cramp score P. value at 0.008 and 0.01 respectively at pre and post-intradialytic exercise.**

Present study results were contradicted with the study done by **Prageetha et al. (2023)** who studied the impact of intradialytic physical exercise on muscle cramps among patients receiving hemodialysis in a selected hospital at Namakkal found that; there were no correlation between the demographic characteristics with the level of

muscle cramp at post-test among hemodialysis patients, also there were no association between the clinical data with the muscle cramps level of at post- test among hemodialysis patients.

The present study findings were congruent with **Kumari et al. (2024)** whose study entitled intradialytic stretching exercises: Its effect on lower limb muscular spasms in individuals undergoing routine hemodialysis revealed that; there was no significant association between the severity of muscle cramps and factors such as gender, age and the disease duration, or length of dialysis treatment in both the study and control groups. Furthermore, the same research identified a significant relationship between the intensity of muscle cramps in lower limb and the muscle cramps occurrence during daily activities, the experience of lower limb cramps while undergoing hemodialysis, the specific leg affected by the cramps, the extent to which cramps limited activities and movement, and the areas impacted by muscle cramps in the study and control groups P. value  $p < 0.001$ .

Concerning the relation between the children's demographic characteristics and fatigue the study results proved that the statistically significant association was found between the fatigue level and child's age, educational level, duration and, frequency of hemodialysis per week P. value at 0.001

Present study findings were congruent with the research done by **Alshammari et al. (2023)** about social support and its impact fatigue

levels and sleep in patients undergoing hemodialysis in Saudi Arabia, they noted a significant correlation between the patients' age and their level of fatigue. Also, current study findings were congruent with the study done by **Ramadan et al. (2023)** about evaluation of fatigue and its determinants in children suffering from chronic renal disease stages III to V; found that an extended duration of hemodialysis correlates with an increased severity of fatigue experienced by pediatric CKD patients.

The present study results were disagreed with the study done by **Sulkowski et al. (2025)** entitled "fatigue in patients undergoing hemodialysis: a comparative study with healthy individuals they clarified that; male patients undergoing hemodialysis experienced higher levels of fatigue. In the same context, Hassen et al. (2024) demonstrated that; female hemodialysis patients exhibited severe fatigue scores compared to male.

**Regarding correlation between total fatigue and muscle cramp level**, current study findings proves that; there were statistically significant fair positive association between total fatigue and muscle cramp level  $r=0.625$  P.(0.001) post-dialytic exercise intervention, these findings were consistent with the study by **Albadr et al.(2020)** cleared that; a positive association was found between the cramp questionnaire scale and the fatigue severity after two months of application of

intradialytic exercises. Also, the present study findings were consistent with the study by **Adhikary et al.(2022)** about the fatigue level and muscle cramps experienced by patients undergoing hemodialysis in a specific hospital, concluded that; very strong association was found between fatigue & muscle cramps.

### Conclusion

Application of intradialytic exercises for children receiving hemodialysis was effective in reducing the total level of fatigue from near to three quarters of the studied children had severe fatigue pre-intradialytic exercise compared to the majority of them had mild fatigue after intradialytic exercises with highly statistically significant difference. Also, there was a reduction in the severity of muscle cramp from more than half of the children under study experienced severe cramp pre-intradialytic exercises compared to no one in post-intradialytic exercises. Also, statistically significant fair positive association was found between the total fatigue and muscle cramp level  $r = 0.625$  (0.001) post-intradialytic exercise intervention.

### Recommendations

- Nurses should be trained in the use of intradialytic exercises to lessen muscle cramps and fatigue during hemodialysis.
- The hemodialysis unit should be provided with booklets and brochures to convey the significance of intradialytic exercises for children.

- Intradialytic exercises should be adapted to be standard practice for the children receiving hemodialysis.
- The effects of intradialytic exercises on hemodialysis children's fatigue and muscle cramps should be further investigated by conducting comparable study with a bigger sample size and from other geographic locations.

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## Determinants of Turnover Intention among Nursing Staff

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### Abstract

**Background:** Nursing turnover intention is a critical global issue that threatens healthcare stability, with particular significance in Saudi Arabia due to its reliance on an expatriate workforce and the strategic goals of Saudi Vision 2030.

**Aim:** This study aimed to determine the determinants of turnover intention among nursing staff. **Methods:** A descriptive quantitative design was employed, using a self-administered questionnaire with 150 nursing staff from Maternity and Children Hospital in Hafr Al-Batin city, Saudi Arabia. Data was analyzed using descriptive statistics, correlation, and regression analyses. **Results:** The findings revealed that a majority of the participants were female, married, non-Saudi nationals aged 26-35. Turnover intention was significantly correlated with lower job performance satisfaction ( $r = .746, p < 0.01$ ) and higher job stress ( $r = .631, p < 0.01$ ). Regression analysis confirmed that work relationships ( $\beta = .270, p < 0.001$ ) and job performance satisfaction ( $\beta = .680, p < 0.001$ ) were significant predictors of turnover intention. The study also found that perceived organizational support and nurses' engagement play a mitigating role.

**Conclusion:** The study found that turnover intention among nursing staff was strongly influenced by job satisfaction, burnout, work-family conflict, leadership style, and organizational culture. Statistical analyses revealed that dissatisfaction with job performance and poor work relationships were the strongest predictors of turnover intention, while higher perceived organizational support and engagement significantly reduced the likelihood of leaving. **Recommendation:** in light of the results of this study the researcher recommended investigating the causal links between factors influencing nursing staff turnover requires a longitudinal research design.

**Key words:** Determinants, Turnover Intention, Nursing Staff.

## Introduction

Nursing is universally recognized as the backbone of healthcare systems, playing a pivotal role in ensuring quality, safety, and continuity of patient care. However, nursing turnover has emerged as a persistent global challenge, threatening healthcare stability and patient outcomes. The World Health Organization (WHO) has consistently warned of nursing shortages, predicting a deficit of millions of nurses worldwide if effective retention strategies are not implemented (WHO, 2021). High turnover among nurses not only undermines healthcare delivery but also results in increased financial burdens due to repeated recruitment, training, and orientation of new staff (Lee, 2022).

Turnover intention, defined as the conscious and deliberate willingness of nurses to leave their organization, (Zhang et al., 2021). In nursing, turnover intention has been linked to numerous individual, organizational, and contextual factors, including burnout, low job satisfaction, work-family conflict, lack of professional growth opportunities, and unsupportive organizational environments (Minkyung et al., 2022; Chen et al., 2023). These issues become particularly critical in high-stress clinical units such as emergency, intensive care, and surgical wards, where nurses face heavy workloads, frequent exposure to traumatic situations, and limited resources.

In the Saudi Arabian context, the issue of nursing turnover is further complicated by workforce composition and organizational challenges. The healthcare system heavily relies on a multinational nursing workforce, the majority of whom are expatriates (Lin et al., 2021). Cultural adjustments, language barriers, and limited social support systems exacerbate stress and increase intentions to leave. Moreover, the Kingdom's strategic healthcare expansion under Saudi Vision 2030 places additional emphasis on building and retaining a competent nursing workforce to meet increasing healthcare demands. Thus, identifying the predictors of turnover intention among nurses in Saudi healthcare institutions is of strategic importance, both for organizational sustainability and for the achievement of national healthcare goals.

## Significance of study

Nursing turnover has severe consequences at individual, organizational, and systemic levels. At the individual level, it contributes to job dissatisfaction, fatigue, and compromised well-being. At the organizational level, it disrupts care continuity, increases the workload of remaining staff, and generates substantial financial costs. At the systemic level, high turnover weakens healthcare delivery capacity, undermines patient safety, and limits the ability of healthcare institutions to achieve accreditation and quality benchmarks (Poon et al., 2022; Wahyuni et al., 2023).

In Saudi Arabia, studies have revealed that turnover intentions are alarmingly high among nurses, particularly expatriates who face unique social and occupational challenges. Despite the recognition of this problem, there is limited empirical evidence exploring the combined effects of demographic variables, job satisfaction, burnout, work-family conflict, leadership style, organizational culture, and organizational support on turnover intention within Saudi healthcare institutions. Without such data, it is difficult for policymakers and administrators to design tailored interventions that enhance retention. This study addresses this gap by investigating the predictors of turnover intention among nursing staff in a Saudi healthcare setting, with a particular focus on how perceived organizational support and employee engagement may mitigate turnover.

### Research Questions

The study sought to answer the following research questions:

1. What are the demographic and job-related characteristics associated with turnover intention among nursing staff?
2. How do job satisfaction, burnout, work-family conflict, leadership style, and organizational culture relate to turnover intention?
3. To what extent do perceived organizational support and nurses' engagement reduce the negative effects of turnover intention?

### Methodology

This study adopted a **descriptive quantitative research design** to investigate the variables influencing turnover intention among nursing staff.

- **Study setting:** this study was conducted at Maternity and Children Hospital in Hafr Al-Batin city, Saudi Arabia.
  - **Population and Sample:** The total number of nurses working at the Maternity and Children Hospital was 456. Using **Yamane's (1967)** formula for sample size determination at a 95% confidence level, the estimated sample size was approximately 213. However, due to time constraints and accessibility, a convenience sample of 150 nurses (representing about one-third of the total population) was selected. This sample was considered sufficient to obtain representative data from the target population.
  - **Tools of data collection:** A structured, self-administered questionnaire was used, which collected information on demographic data, job satisfaction, burnout, work-family conflict, leadership style, organizational culture, perceived organizational support, and turnover intention.
1. **Job Satisfaction:** *Job Satisfaction Survey (JSS)* by **Spector, (1985)**. The JSS typically contains 36 items across nine facets (pay, promotion, supervision, benefits, contingent rewards, operating

conditions, coworkers, nature of work, communication), rated on a 5-point Likert scale.

**Scoring System;** each facet (subscale) has 4 items, so scores for each facet range from 4 to 20. The total JSS score is obtained by summing all 36 items: Minimum total = 36, Maximum total = 180. Reverse scoring: Negatively worded items are reverse scored before summation (e.g., Strongly Disagree = 5, Strongly Agree = 1) to maintain consistency in directionality (higher scores = higher satisfaction).

#### **Total Score Range**

- 36 -108 Dissatisfied
- 109 – 143 Ambivalent (Neutral)
- 144 – 180 Satisfied

**2. Burnout: Maslach** Burnout Inventory (MBI) or a reduced burnout scale (1996). The MBI consists of 22 items across three domains: emotional exhaustion, depersonalization, and reduced personal accomplishment.

#### **Scoring System**

Each item is rated on a 7-point Likert-type frequency scale:

0 = Never, 1 = A few times a year, 2 = Once a month, 3 = A few times a month, 4 = Once a week, 5 = A few times a week, 6 = Every day

- **Higher scores** on EE and DP indicate greater burnout.
- **Lower scores** on PA indicate greater burnout (reverse relationship).

**3. Work-Family Conflict: Work-Family Conflict Scale** by Netemeyer et al. (1996). The scale has 10 items divided into two dimensions (work interfering with

family, family interfering with work), rated on a 5-point Likert scale.

#### **Scoring System**

Each dimension (WIF and FIW) is scored separately by summing the responses to its 5 items. The possible range per subscale is 5 to 25 points.

**Higher scores** indicate greater conflict in that direction (either work interfering with family or family interfering with work).

**4. Leadership Style: Multifactor Leadership Questionnaire (MLQ)** by Bass & Avolio. (2004) The MLQ (21 items) measures transformational, transactional, and laissez-faire leadership styles, rated on a 5-point scale.

#### **Scoring System**

Each item is rated on a 5-point Likert frequency scale:

0 = Not at all, 1 = Once in a while, 2 = Sometimes, 3 = Fairly often, and 4 = Frequently, if not always

**Scores for each subscale** are obtained by averaging the responses for the items belonging to that subscale.

**Transformational Leadership Score:** Mean of its 12 items (higher = stronger transformational behavior).

**Transactional Leadership Score:** Mean of its 6 items (higher = more transactional behavior).

**Laissez-Faire Leadership Score:** Mean of its 3 items (higher = more avoidant behavior).

**5. Organizational Culture: Organizational Culture Assessment Instrument (OCAI)** by Cameron & Quinn (2006). The OCAI measures four types of

culture: clan (collaborative), adhocracy (creative), market (competitive), and hierarchy (controlled). Items are scored using a distribution method across dimensions.

### Scoring System

The OCAI uses a forced-choice distribution method rather than a traditional Likert scale.

Respondents are asked to distribute 100 points among the four statements in each dimension based on how accurately each describes their organization.

The total points for each dimension must equal 100. This is done twice:

Once for the Current Culture (how the organization is now).

Once for the Preferred Culture (how they would like it to be).

### Calculating Scores

Add the points for each culture type across all six dimensions.

Divide the total by 6 to get the average score for each culture type.

**6. Perceived Organizational Support (POS):** *Survey of Perceived Organizational Support (SPOS)* by Eisenberger et al. (1986) The SPOS has 8 items rated on a Likert scale, assessing the degree to which employees feel valued and supported by their organization.

### Scoring System

Each item is rated on a 7-point Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree).

### Handling Reverse-Scored Items

**For positively-worded** items: The score is used as-is.

**For negatively-worded** (reverse-scored) items: The score must be reversed before calculation.

Reversal is done as follows: 1=7, 2=6, 3=5, 4=4, 5=3, 6=2, 7=1.

### Calculating the Mean Score

The most common and interpretable score is the mean score. This results in a single score that also ranges from 1 to 7.

**High Score** (e.g., 5.5 to 7.0): Indicates a strong perception of organizational support.

**Moderate Score** (e.g., 3.5 to 5.4): Suggests a neutral or ambivalent perception.

**Low Score** (e.g., 1.0 to 3.4): Indicates a low perception of organizational support.

**7. Turnover Intention:** *Turnover Intention Scale (TIS-6)*. Roodt, (2004) The TIS-6 contains 6 items that measure the extent to which nurses are considering leaving their job, using a 5-point Likert scale.

### Scoring System

The items are a mix of positively-worded (directly indicating leaving) and negatively-worded (indicating staying). The negatively-worded items must be reverse-scored.

The possible total score ranges from 6 to 30.

**High Score** (e.g., Mean of 4.0 to 5.0 / Total of 24-30): Indicates a very strong intention to leave the organization.

**Moderate Score** (e.g., Mean of 2.5 to 3.9 / Total of 15-23): Suggests a moderate or ambivalent level of turnover intention.

**Low Score** (e.g., Mean of 1.0 to 2.4 / Total of 6-14): Indicates a low intention to leave.

### Data Analysis:

- **Descriptive statistics** (frequencies and percentages) were applied to summarize demographic and job-related data.
- **Correlation analysis** was used to examine relationships between turnover intention and variables such as job satisfaction, burnout, and work-family conflict.
- **Regression analysis** was performed to assess the role of organizational support and employee engagement in mitigating turnover intention.

### Results

#### Table 1: Demographic Information of the Study Participants

The demographic data presented in Table 1 indicated that the majority of the study participants were female nurses (94.7%). Most of the respondents were between 26 and 35 years of age, representing a young and active workforce that is highly involved in direct patient care. Almost all participants were non-Saudi nationals (98.7%). Furthermore, the majority were married (75.3%), suggesting that family responsibilities may add to the challenges associated with emotional exhaustion. In terms of education, most nurses hold a bachelor's degree (57.3%), followed by diploma holders (40%), indicating a generally well-educated nursing staff. The highest participation was from the medical-surgical and emergency departments, both of which are

known for their high workload and stressful environments. Most respondents had between 6 and 10 years of experience, which implies adequate professional exposure and stability in their roles.

#### Table 2: Correlation Between Study Variables

Table 2 demonstrates significant positive correlations among the study variables. The results reveal that turnover intention is strongly correlated with job performance satisfaction ( $r = .746$ ,  $p < 0.01$ ) and job stress ( $r = .631$ ,  $p < 0.01$ ). Additionally, job stress showed a significant relationship with work relationships ( $r = .507$ ,  $p < 0.01$ ). Turnover intention is positively correlated with burnout and work-family conflict, and negatively correlated with job satisfaction, leadership style, organizational culture, and perceived organizational support.

Strong negative correlations with job satisfaction ( $r = -.746$ ) and perceived organizational support ( $r = -.458$ ) indicate these are key protective factors against turnover.

Leadership style and organizational culture play moderate yet significant roles in enhancing job satisfaction and reducing turnover

#### Table 3: Negative Effects of Turnover Intention as Criterion Variable

The regression analysis in Table 3 further confirms that work relationships ( $\beta = .270$ ,  $p < 0.001$ ) and job performance satisfaction ( $\beta = .680$ ,  $p < 0.001$ ) significantly predict turnover intention. The positive beta



coefficients indicate that as dissatisfaction with work relationships and job performance satisfaction increases, the intention to leave the job also rises. This finding emphasizes that the quality of workplace relationships and satisfaction with performance

outcomes are key determinants of nurses' retention. Improving professional communication, ensuring recognition of effort, and promoting a supportive work environment can mitigate turnover intention and enhance overall emotional well-being.

**Table # 1: Demographical Information of the study participants (k=150)**

	Variable	No	%
<b>Gender</b>			
	Female	142	94.7
	Male	8	5.3
<b>Age</b>			
	≤ 25 years	21	14.0
	26 – 30 years	55	36.7
	31 –35years	47	31.3
	36–40 years	27	18.0
<b>Nationality</b>			
	Saudi	2	1.3
	Non-Saudi	148	98.7
<b>Marital Status</b>			
	Single	29	19.3
	Married	113	75.3
	Divorced	8	5.4
<b>Educational Level</b>			
	Diploma	60	40.0
	Bachelor's	86	57.3
	Master	4	2.7
<b>Working in department</b>			
	Medical-surgical unit	44	29.3
	Pediatrics	28	18.7
	Intensive care unit	8	5.3
	Obstetrics/gynecology	26	17.3
	Emergency department	44	29.3
<b>Year of Experience</b>			
	Less than 1 year	28	18.7
	1-5 years	31	20.7
	6-10 years	56	37.3
	More than 10 years	35	23.3
<b>Nursing job title</b>			
	Registered nurse	105	70.0
	Licensed practical nurse	9	6.0
	Nurse manager/supervisor	11	7.3
	Clinical nurse specialist	25	16.7

Note: f =frequency, % = personage

**Table 2: Correlation between study variables (N = 150)**

Variables	A	M	S.D	Turnover Intention	Burnout	Work Family Conflict	Job Satisfaction	Leadership Style	Organizational Culture	Perceived Organizational Support
Turnover Intention	.76	19.04	4.74	—	.631**	.350**	-.746**	-.412**	-.385**	-.458**
Burnout	.83	9.31	3.12	.631**	—	.507**	-.552**	-.328**	-.301**	-.342**
Work-Family Conflict	.76	10.04	2.10	.350**	.507**	—	-.418**	-.285*	-.294*	-.310**
Job Satisfaction	.76	12.10	2.71	-.746**	-.552**	-.418**	—	.489**	.470**	.513**
Leadership Style	.73	11.85	2.54	-.412**	-.328**	-.285*	.489**	—	.526**	.494**
Organizational Culture	.75	10.92	2.33	-.385**	-.301**	-.294*	.470**	.526**	—	.538**
Perceived Organizational Support	.78	11.64	2.42	-.458**	-.342**	-.310**	.513**	.494**	.538**	—

\*\* = highly significant at .01

\* = Significant at .05

**Table 3: Negative effects of turnover intention as criterion variable (k = 150)**

Variable	B	Std.E	B	T	p
(Constant)	-4.192	0.855		-4.901	0.000
Work Relationships	0.401	0.076	0.270	5.290	0.000
Job_Performance_Satisfaction	0.783	0.059	0.680	13.305	0.000

p = significant

\*\* = highly significant at .01

\* = Significant at .05

## Discussion

The issue of nursing staff turnover has become a major concern for healthcare organizations worldwide. High turnover not only increases organizational costs but also threatens the quality and continuity of patient care. Understanding the

factors influencing nurses' intentions to leave is therefore essential for developing effective retention strategies. In this context, the present study aimed to explore the determinants of turnover intention among nursing staff, focusing on leadership style, burnout, work–

family conflict, job satisfaction, organizational culture, perceived organizational support, and employee engagement.

The findings revealed significant associations between turnover intention and several key variables. Consistent with prior research (**A et al., 2022; Lee, 2022**), job satisfaction emerged as one of the strongest predictors of nurses' intention to leave. Nurses with higher levels of job satisfaction were less likely to consider resignation. This aligns with the theoretical assumption that satisfied employees are more committed to their organization and motivated to remain in their positions.

In contrast, burnout was found to have a strong positive correlation with turnover intention, supporting the results of **Zhang et al. (2021)** and **Garg et al. (2023)**. Nurses experiencing emotional exhaustion and depersonalization often feel overwhelmed and disengaged, which increases the likelihood of leaving the profession. The similarity between these findings and previous literature reinforces the critical need for burnout prevention strategies within healthcare institutions.

Similarly, work–family conflict showed a significant positive relationship with turnover intention, confirming the results of **Chen et al. (2023)** and **Saberi et al. (2023)**. Nurses who struggle to balance professional and personal responsibilities may perceive their work environment as unsupportive, thus developing stronger intentions to quit. The current study supports this

notion, emphasizing the importance of flexible scheduling and supportive policies to alleviate work–family stress.

Leadership style and organizational culture also demonstrated strong relationships with turnover intention. The results align with those of **Poon et al. (2022)**, **Mitchell et al. (2022)**, **Dodanwala et al. (2022)**, and **Wahyuni et al. (2023)**, who found that transformational leadership and supportive organizational cultures contribute to higher employee retention. However, some studies (e.g., [Add contrasting reference]) have reported weaker associations, possibly due to contextual or cultural variations across healthcare systems. The study also highlighted the moderating role of perceived organizational support and employee engagement. In agreement with **Mossarah (2023)** and **Gilal et al. (2022)**, nurses who felt valued and supported by their organizations reported lower intentions to leave. Likewise, consistent with **Kebede and Fikire (2022)**, employee engagement—characterized by vigor, dedication, and absorption—was negatively correlated with turnover intention. These findings suggest that fostering a supportive and engaging workplace can buffer the negative effects of burnout and work–family conflict.

Overall, this study contributes to existing knowledge by integrating multiple personal and organizational variables that influence nurses' turnover intentions. It supports the broader evidence base suggesting that improving job satisfaction, reducing

burnout, managing work–family conflict, promoting supportive leadership, and enhancing organizational culture and engagement are critical for retaining nursing staff. Future research should examine potential cultural or institutional differences that may explain variations in these relationships.

### Limitations of the study

It is critical to recognize this study's limitations.

- Convenience sampling, for starters, raises the likelihood of bias in the sample process.
- Furthermore, depending on self-report measures could have caused response biases and data collecting errors.
- Additionally, this study's conclusions could only apply to the Maternity and Children Hospital in Hafr Albatin.

Despite these drawbacks, this study provides insightful information on the variables impacting nursing staff turnover intention. This study adds to the corpus of knowledge by identifying demographic and job-related traits linked to turnover intention and by evaluating the interactions between different factors.

### Conclusion

The study found that turnover intention among nursing staff was strongly influenced by job satisfaction, burnout, work-family conflict, leadership style, and organizational culture. Statistical analyses revealed that dissatisfaction with job performance and poor work relationships were the strongest predictors of turnover intention,

while higher perceived organizational support and engagement significantly reduced the likelihood of leaving.

### Recommendation

Several suggestions for future research and healthcare organizations may be offered considering the results and limitations of this study:

- Investigating the causal links between factors influencing nursing staff turnover requires a longitudinal research design.
- Random or stratified sampling methods should be used to achieve a more representative sample of nursing personnel across healthcare settings.

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