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University Students' Awareness and Perception of Artificial Intelligence Application in Nursing Education

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Perception of Students of Technical Health and Technical Nursing Institutes regarding Premarital Counseling

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Abstract:

Background: Premarital counseling is a form of health promotion activities provided for couples to help them prepare for marriage and establishment of a healthy family by building a strong foundation, addressing potential issues, and improving communication skills. It involves discussing topics like finances, children, and values before marriage. **Aim:** To determine perception of students of Technical Health and Technical Nursing Institutes regarding premarital counseling. **Subjects and method: Design:** A descriptive research design was used. **Setting:** Technical Health and Technical Nursing Institutes, Egypt. **Subjects:** A purposive sample of 300 students from first and second academic years of Technical Health and Technical Nursing Institutes. **Tools:** Two tools were used: Tool I: Students' knowledge regarding premarital counseling included two parts. Part one: Socio-demographic characteristics. Part two: Students' knowledge regarding premarital counseling. Tool II: Students' attitudes regarding premarital counseling. **Results:** The current study revealed that 44.3% of the studied nursing students had low level of knowledge with 87.0% of them had positive attitudes regarding premarital counseling with a highly statistically significant relation between knowledge and attitudes regarding premarital counseling. **Conclusion and Recommendations:** The studied nursing students had poor level of knowledge and positive attitudes regarding premarital counseling. So, health educational programs targeting students at all places and communities should be implemented to enhance their knowledge and attitudes regarding premarital counseling.

Keywords: Knowledge, Attitude, and Premarital Counseling.

Introduction

Premarital counseling (PMC) is a crucial primary routine worldwide ongoing health care preventive and promotional activities based on special protocols and guidelines to help young couples get ready for starting a strong healthy family (**Osman, H., Baraia, & Abdelati, 2021**).

The PMC is provided for young couples within the maternal and child health centers' services by physicians, trained paramedics, or other health care providers such as nurses (**Ezzat & Gomaa, 2022**).

Premarital counseling aims to have a healthy marriage, prevent genetic disorders, congenital anomalies and several medical, psychosocial and marital problems among young couples, as well as educate and guide those who plan to conceive to optimize their health as well as well-being, to identify and manage any potential medical or genetic problems that could impact pregnancy (**Muthiadin, 2023; Leahy, 2023**).

The components of PMC involve history, physical examination, and laboratory investigations or premarital screening (PMS) (**Osman et al., 2021**). The PMS includes a panel of tests for

genetic, infectious and blood transmitted diseases to detect any hereditary and transmissible diseases, to prevent the risk of transmitting any disease to the children (**Rahman, Naznin, Giti, Islam, & Khatun, 2022**). The PMS can help couples to decide whether to conceive in presence of risk for abnormality (**Rahmat, Fajrian, & Ma'rufah, 2022**).

Genetic disorders occur in about 2%-5% of all live births, account for up to 30% of pediatric hospital admissions and cause about 50% of childhood deaths in industrialized countries. In Egypt, consanguinity rates throughout the last 40 years ranged between 29% and 39%. The issue of PMC is of immense significance in Arab countries to prevent congenital malformation because of the high occurrence of consanguineous marriages (**El-Attar et al., 2022**), (**Ezzat & Gomaa, 2022**).

Genetic and congenital problems such as hearing impairment, mental retardation, autosomal recessive osteoporosis, as well as blood disorders such as thalassemia are diseases that may result from marriage among relatives and can be identified and prevented via premarital counseling. In

addition, PMC regarding premarital vaccination can simply be preventing the exposures to some infectious diseases such as; hepatitis B virus, and rubella with their consequent physical or mental disorders in the newborn **(Hanoon, & Khalaf, 2021)**.

The PMC components also involve education related to healthy lifestyle choices, nutrition and potential risks to pregnancy, awareness of family planning options, and addressing any concerns related to pregnancy as well as childbirth so as to empower young couples with the knowledge and resources to make informed decisions and take proactive steps to enhance their readiness for pregnancy and parenthood. The PMC can also help partners in setting realistic goals and expectations, improve their communication, and learn conflict resolution when problems arise **(Chamgurdani et al., 2020)**.

Nurses have a crucial role to play in PMC, care and examination. They can communicate with clients verbally and nonverbally about biological, psychological, social, cultural, spiritual, and environmental domains. The nurses' role is very complex as it includes; their role as advocates,

leaders, educators, communicators, coordinators of care, consultants, members of the health profession, care givers, empowering agents, researchers, health promoters, and role models **(Osman et al., 2021)**.

Students of Technical Health and Technical Nursing Institutes are the future nurses who will be responsible for providing PMC as a principle component of their nursing role. Additionally, they are the future couples who need PMC for themselves as well **(Kabbash, Attalla, Atla, 2019)**.

The benefits of PMC for students include improved knowledge of the importance of premarital counseling and its role in preventing health and psychosocial problems and leading to enhance positive attitude toward premarital counseling, especially regarding issues like consanguineous marriage. It also helps students learn and practice communication styles and conflict resolution techniques that are essential for long-term marital success and helps them discuss and align their expectations regarding various aspects of married life, including career goals, finances, and family dynamics **(Gomaa, Eladawi, & Nabil, 2025)**.

(Ebid, Soliman, Abo Shabana, 2021), (Ashry, Abo Shabana, Abdel Ati, 2024).

The importance of PMC for students includes early identification and mitigation of potential future marital problems before they become major issues. It signifies an intentional and proactive approach to building a durable foundation for marriage, demonstrating a willingness to invest in the relationship's future success. Furthermore, it equips students with the knowledge to make informed decisions about marriage, particularly in contexts where genetic diseases or consanguineous marriage are concerns **(Gomaa, et al, 2025). (Emam, Fahmy, Salah, 2024). (Almualm, A. 2022).**

However, PMC can be influenced by the individual's perception of the students. Perception is accepting, choosing, sorting out, interpreting, checking and responding to improvements **(Mohammed, Emam, & Abd Elrahim, 2022).**

Perception is an essential tool that can help students of Technical Health and Technical Nursing Institutes navigate the complexities of intimate relationships, communication and

conflict resolution during marriage **(Hollifield, 2021).**

Significance of the study:

Knowledge, attitudes, and other factors are important issues of the individual's perception of students of Technical Health and Technical Nursing Institutes regarding PMC. Discussions of pre-marital relationships, as well as societal norms, religious barriers, stigmatization, or cultural taboos are very important factors. **(Sarvari, Aali, Sharbaf, Aali, & Dindoost, 2023).**

Additionally, personal factors as daily life problems and other health related conditions can also influence the perception of nursing students regarding PMC **(Mohammed et al., 2022).**

Nursing students' perception regarding PMC is especially important, because they have double responsibility toward themselves and their future clients. Scarce research studies exist in this regard. Therefore, it is critical to evaluate perception of nursing students regarding PMC.

Aim of this study

The aim of this study was to determine perception of students of Technical Health and Technical Nursing

Institutes regarding premarital counseling (PMC).

Research Questions

- What is the knowledge of students of Technical Health and Technical Nursing Institutes regarding PMC?
- What is the attitude of students of Technical Health and Technical Nursing Institutes regarding PMC?

Subjects and Method

Subjects:

Design:

A descriptive research design was used to conduct this study.

Setting:

This study was conducted in Egypt at the clinical objective structured examination laboratories of Technical Nursing Institute, Tanta University, and Technical Institute of Tanta, Kafr Al-sheikh Branch and Central Runways. The Technical Nursing Institute, Tanta University is located on the third floor of the comprehensive outpatient clinics of the main hospitals of Tanta University affiliated to High Education and Scientific Research, while the Health Technical Institute of Tanta, Kafr Al-sheikh Branch, General Nursing Division is located in the fourth floor above KFS nursing school for boys, and KFS nursing school for

girls, which is affiliated to the Ministry of Health and Population.

Subjects:

A purposive sample of three hundred nursing students at Technical Nursing Institute, Tanta University, Technical Institute of Tanta and Kafr Al-sheikh Nursing Branch, were selected from the previously mentioned study settings according to the following inclusion criteria: Male and female, age ranged from 18-20 years old, first and second level students, and unmarried.

Tools of data collection:

To achieve the aim of this study, two tools were used:

Tool (I): Students' knowledge regarding premarital counseling.

It was developed by the researcher after reviewing related literatures (Kabbash, Attalla, & Atla, 2019; Al-Qahtani et al., 2019; Al-Shafai, Al-Romaihi, Al-Hajri, Islam, & Adawi, 2022). It comprised two main parts as follows:

Part (1): Socio-demographic characteristics of the studied' students. It included age, residence, grade level, family income, parents' consanguinity, and family history of hereditary diseases.

Part (2): Students' knowledge regarding premarital counseling which entitled open and close ended questions related to; definition, importance, benefits, barriers and components of premarital counseling, its impact on marital relationship, laboratory investigations, and immunizations focused in PMC, places offering PMC, preparation needed before conducting PMC as well as common diseases that are focused and/or targeted by PMC, nursing role in PMC, and sources of knowledge regarding PMC. The scoring system of nursing students' knowledge was categorized as follows: Correct and complete answers were scored as (2), correct and incomplete answers were scored as (1) and incorrect answers or don't know were scored as zero (0), total score ranged from (0- 2).

The total score of knowledge' was calculated as follows: high level of knowledge; ≥ 80 , moderate level of knowledge; $60 - < 80\%$, and low level of knowledge; $< 60\%$.

Tool (II): Students' attitudes regarding premarital counseling.

This tool was adapted by the researcher from related literatures (J, R, M, & F, 2019; Al-Kindi et al., 2019; Ezzat &

Gomaa, 2022). It included seventeen statements to investigate students' attitudes regarding PMC such as Appropriate time for conducting PMC is just before marriage. The PMC ensures fitness for marriage. Customs and traditions do not prevent them from utilizing PMC. The PMC do not break personal privacy. The PMC must be obligatory. Advise future couples to conduct /or agreed to do for PMC. The scoring system: each statement was rated using a 3 points Likert Scale as follows: Agree answers were scored as (2). Uncertain answers were scored as (1). Disagree answers were scored as zero (0), total score ranged from (0- 2). The total score of nursing students' attitude was categorized as follows: Positive attitudes $\geq 60\%$. Negative attitudes $< 60\%$.

Method:

The current study was implemented according to the following steps:

1. Administrative approval:

The researcher obtained an official letter clarifying the purpose of the study from the Faculty of Nursing and submitted it to the responsible authorities of the selected settings for permission to conduct the study.

2. Ethical considerations:

Approval of the Scientific Research Ethical Committee of Faculty of Nursing Tanta University was obtained, Code Number 378-2-2024. The researcher introduced herself to the participants, and a full explanation of the aim and method of the study was done to obtain their acceptance and cooperation, as well as their informed consent. Their right to abstain or terminate participation in the study at any time was respected. The nature of the study did not cause any harm or pain for the entire sample. The studied students were assured about privacy and confidentiality of the collected data and that the data will only be used for the purpose of this study.

3. Tools development:

Tool (I) was developed by the researcher after reviewing recent related literature.

Tool (II) was adapted from related literature.

4. Validity of the study tools:

The study tools were tested for face and content validity by jury test of five experts in the field of Maternal and Neonatal Health Nursing to evaluate the individual items, as well as the entire instrument as being relevant and

appropriate to test what it wanted to measure. The face validity of the questionnaire was calculated based on experts' opinion and it was 94% and the content validity index of its items 95% for students' knowledge regarding premarital counseling questionnaire and 96% for students' attitudes regarding premarital counseling questionnaire. Total validity Index of the questionnaires was 96.7%.

5. Pilot study:

After development of the study tools, a pilot study was accomplished before the actual data collection on 10% (30 students) to ascertain the clarity, feasibility and applicability of the tools. Consequently, the necessary modifications and rephrasing were done in line with pilot study results. At that time, the tools were made ready for use. The data obtained from the pilot study was involved in the current study, because no major modifications were made.

6. Reliability of the study tools:

It was tested by Cronbach's alpha from data collected in the pilot study. The alpha value was found to be 0.802 for Tool I, and 0.791 for Tool II. Total reliability Cronbach's Alpha of the questionnaires was 0.797, which

indicated high reliability of the research tools.

7. Data collection (field work):

The data were collected by the researcher from students at the previously mentioned study settings in the morning from 9:00 a.m. to 1.00 p.m. over a period of six months, ranging from the beginning of October 2024 to the end of March 2025 until the predetermined sample size was collected. The researcher attended 3 days/week (Saturday, Monday, and Thursday), due to a high attendance rate of students at both settings in these days.

The researcher presented herself and then delivered a full explanation of the study aim to all students who were approached and enrolled in the study. After that, the researcher asked all students who meet the predetermined inclusion criteria at each study setting to give their informed consent orally and written to participate in the study. Firstly, the researcher started data collection from the first-year students of Technical Nursing Institute, Tanta University. They were sixty-five students selected randomly from the four routine clinical training groups at a clinical classroom and central runway

of the Technical Nursing Institute. Secondly, the researcher collected the data from the first-year students at Health Technical Institute of Tanta, Kafr Al-sheikh Branch, General Nursing Division. The researcher selected 110 students randomly from the ten routine clinical training groups at their clinical classes.

Then, the researcher continued data collection with 50 students from the second year of Technical Nursing Institute, Tanta University. Those students were selected randomly from a total number of (530) students at a time interval between lectures and sometimes after their clinical training session. Finally, the researcher ended collection of the data with students from second year Health Technical Institute of Tanta, Kafr Al-sheikh Branch, General Nursing Division. The researcher selected 75 students randomly from the three routine clinical training groups at central runway clinical classes. The study's researcher took into consideration time of their routine clinical training session, lecturers or any other tasks required by the students. Therefore, the researcher interviewed the students after the end of their tasks.

The researcher applied the study tools individually for each nursing student. The researcher used tool (I); part (1) to collect the socio-demographic characteristics, and part (2) to assess knowledge of nursing students regarding premarital counseling. It was elucidating to the students, so they were capable to fill it by a self-report on an individual basis in the presence of the researcher. The students recorded the answer in tool I in about thirty minutes and returned it to the researcher.

Then, the researcher used tool (II) for the assessment of the students' attitudes regarding premarital counseling. This tool was also explained to the students and filled by a self-report on an individual basis. It was conducted for about 12 minutes.

8. Statistical analysis

The collected data were coded, entered, tabulated and analyzed using SPSS software (**Statistical Package for Social Science**) version 25 (IBM Corporation, Armonk, NY, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data, by frequency, percentage or proportion of each

category, comparison between two groups and more was done using Chi-square test (χ^2).

For comparison between means of two groups of non-parametric data of independent samples, Z value of Mann-Whitney test was used. For comparison between means of more than two means of non-parametric data, Kruskal-Wallis (χ^2) value was calculated. Correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at $p < 0.05$ for interpretation of results of the tests (**Dawson & Trapp, 2004**).

Results

Table (1): It clarifies that less than two thirds (60.6%) of the studied' students aged 20 years, with a mean age of 24.25 ± 4.74 years. It was also noticed that slightly more than three quarters (76.3%) of the studied students were female and slightly more than two thirds (67. 0%) were living in rural areas. Moreover, two thirds (66.0%) of the studied students were in their second academic year, and their family income was reported as "enough" by more than two thirds (70.0%) of them.

Table (2): It demonstrates that parents' consanguinity present in slightly more

than one quarter (25.3%) of the students' parents. Regarding the family history of hereditary diseases, it was evident that slightly more than one fifth (21.0%) reported different hereditary diseases. The most reported disease was diabetes mellitus (11.0%), followed by hypertension (8.3%).

Figure (1): It illustrates that lack of awareness represents the highest (49.0%) main barriers of conducting PMC.

Figure (2): It reveals that slightly more than one quarter (26.3%) of the studied students hear about PMC from media.

Table (3): It reports that (44.3%) of the studied students had high level of knowledge regarding PMC items. It was also noticed that the mean score of the studied' students' knowledge was 15.01 ± 6.36 .

Figure (3): It demonstrates that slightly less than two thirds (65.3%) agree with premarital counseling items.

Table (4): It indicates the studied students' total attitudes' level regarding PMC. It revealed that 87.0% of the studied' students exhibited positive attitudes, the table also illustrates that

the range was 8 - 34, with a mean score ($25.56 \pm SD = 5.14$).

Table (5) and Figure (4): It shows the relationship between total level of knowledge and total level of attitudes of the studied' students regarding PMC. They demonstrate that among the students who Had high level of knowledge ($n = 57$), most of them (98.2%) had positive attitudes. Additionally, there was a significant relationship between the studied students' total level of knowledge and their total level of attitudes regarding PMC ($\chi^2 = 31.979$, $P = 0.0001$).

Table (1): Socio demographic characteristics of the studied' students (n= 300)

Students' socio demographic characteristics	N	%
Age (years)		
18-<19	33	11.1
19-<20	85	28.3
20 years	102	60.6
Range	18-30	
Mean±SD	24.25±4.74	
Sex		
Male	71	23.7
Female	229	76.3
Residence		
Rural	201	67.0
Urban	99	33.0
Grade level/ current Academic year		
1 st	102	34.0
2 nd	198	66.0
Family income		
Not enough	90	30.0
Enough	210	70.0

Table (2): Consanguinity and family history of hereditary diseases of the studied students' parents (n= 300)

Students 'parents' consanguinity and family history of hereditary diseases	N	%
Parents' consanguinity		
-No	224	74.7
-Yes	76	25.3
Family history of hereditary disease		
-No	237	79.0
-Yes	63	21.0
Name of the hereditary disease		
Cancer-DM-	1	0.3
Cardiac diseases	1	0.3
Diabetes mellitus	33	11.1
FMF	1	0.3
Hypertension	25	8.3
Thalassemia	2	0.7

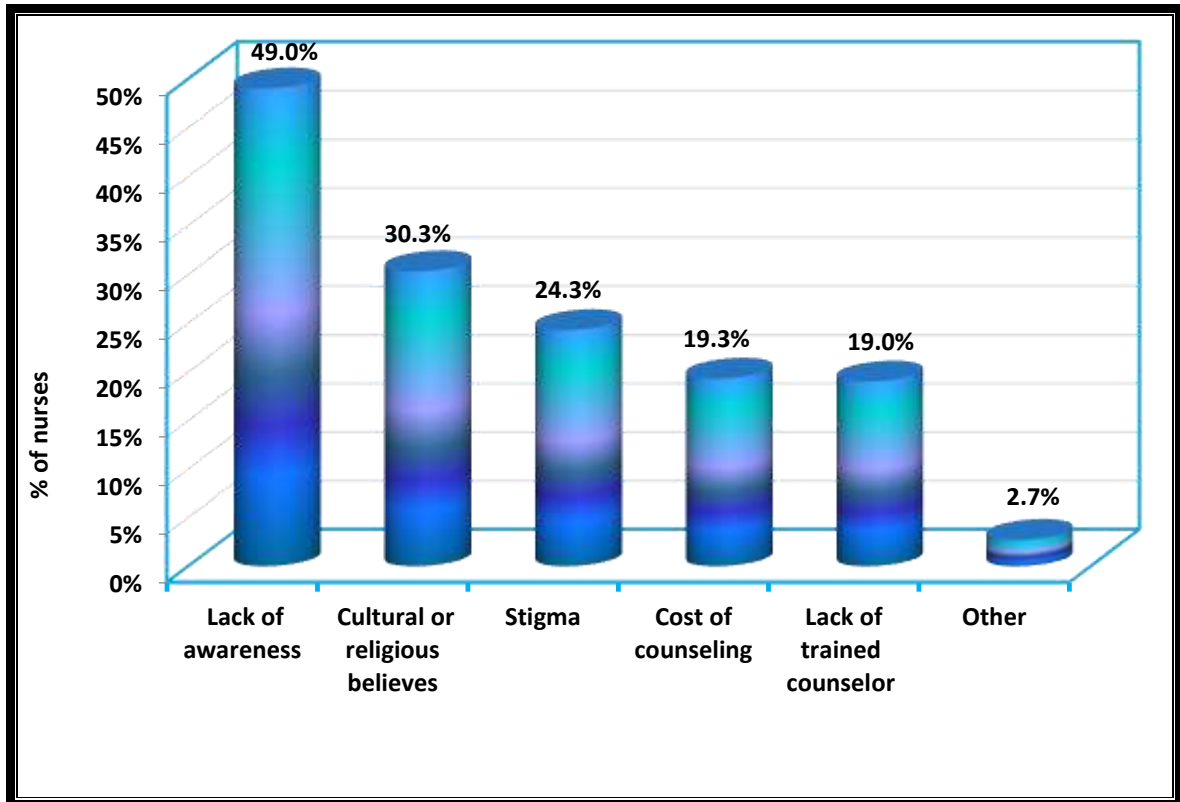


Figure (1): The studied students' main barriers of conducting PMC (more than one answer)

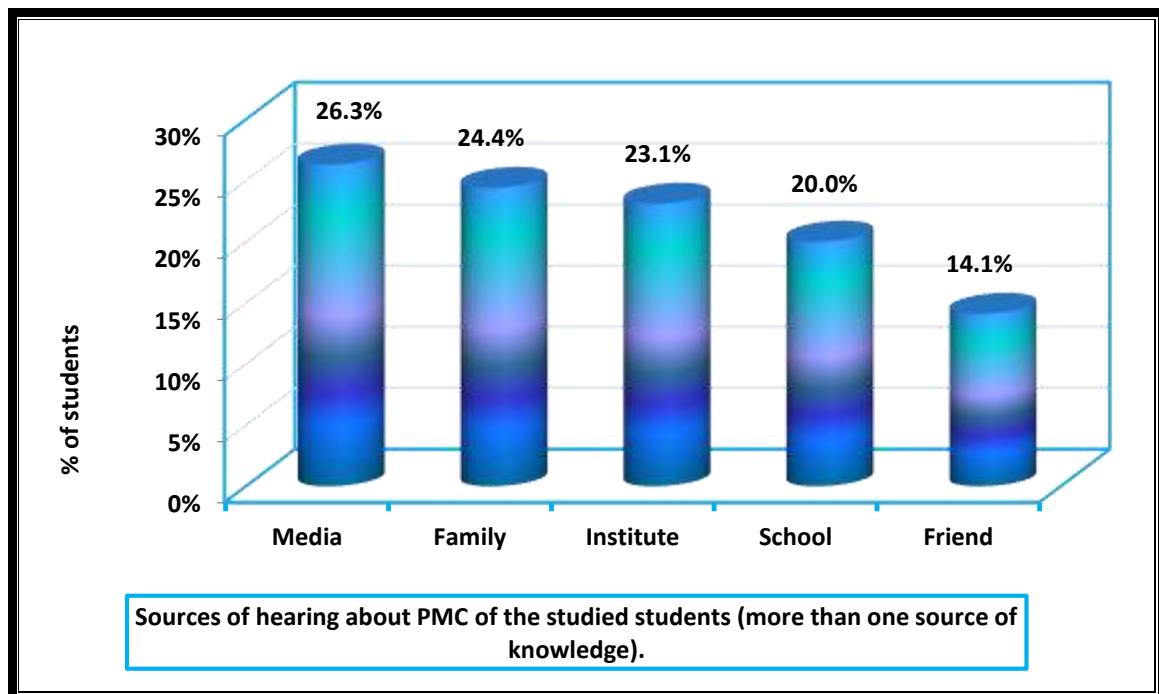
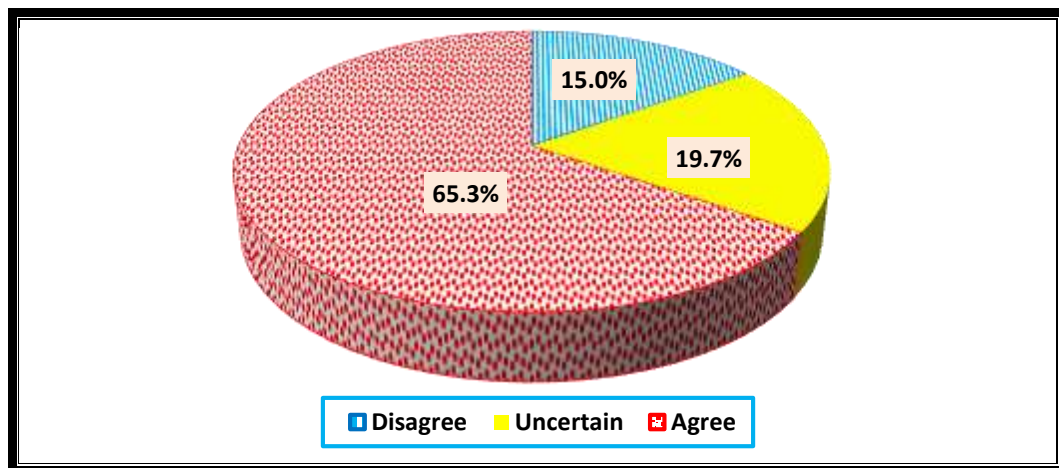


Figure (2): The studied students' source of knowledge regarding PMC (more than one answer)

Table (3): The studied students' total knowledge level regarding PMC (n= 300)

Total knowledge' level (Each item was scored 0-2)	N	%
Low level (0-15)	133	44.3
Moderate level (16-20)	110	36.7
High level (21-24)	57	19.0
Range	0-24	
Mean $\pm$ SD	15.01 $\pm$ 6.36	

**Figure (3): The studied students' total attitudes' score regarding PMC (n=300)****Table (4): The studied students' total attitudes' level regarding PMC (n= 300)**

Total attitudes' level (Each item was scored 0-2)	N	%
Negative attitudes (0-18)	39	13.0
Positive attitudes (19-34)	261	87.0
Range	0-34	
Mean $\pm$ SD	25.56 $\pm$ 5.14	

Table (5): Relationship between total level of knowledge and total level of attitudes of the studied' students regarding PMC (300)

Total level of attitudes (n=300)	Total level of knowledge (n=300)						χ^2 test
	Low (n=133)		Moderate (n=110)		High (n=57)		P value
	N	%	N	%	N	%	
Negative attitudes	33	24.8	4	3.6	1	1.8	31.979
Positive attitudes	100	75.2	106	96.4	56	98.2	0.0001*

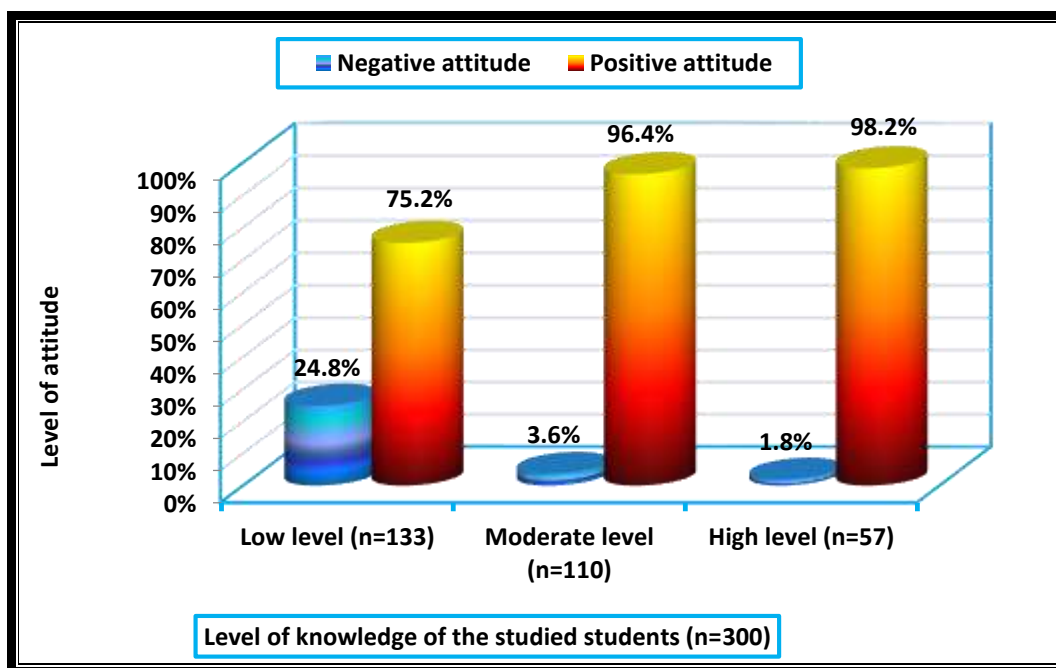


Figure (4): Relationship between total level of knowledge and total level of attitudes of the studied' students regarding PMC (n=300)

Discussion:

Premarital counseling is an important strategy for helping individuals including nursing students, to learn skills about better understanding of marriage, improving social relationships, resolving marital conflicts, reducing the high divorce rates and then applying what is learned in everyday lives (Alhetar et al., 2024).

Nursing students are future nurses who will be accountable for prevention of diseases and promotion of health for themselves and those who will take care of them. Their perception of premarital counseling is essential, as they represent a pivotal cohort in the future delivery of health education and counseling services (Samy, Mohammed & Saleh, 2024).

The results of the present study show that regarding socio demographic

characteristics of the studied nursing students, that less than two thirds of student's age ranged from 20 to less than 21 years with a mean age of 24.25 ± 4.74 years. As well, more than three quarters of them were female. This may be due to the predominance of females in nursing profession, which is consistent with global trends that has historically been female dominated due to societal perceptions and gender norms associated with caregiving roles. This finding agrees with the study performed by (Gomaa et al., 2025) who noticed that the mean age of the students was 22.1 years old, and most of them were females. The present study finding is partially consistent with the study performed by (Abdo & Sayed, 2024) who found that more than one half of the studied students were 20

years old and above with mean $\pm$ SD 21.06 ± 7.16 and more than one half of them were females. In addition, the present study reflected that more than two thirds of the studied' students live in rural areas, and two thirds of them were in their second academic year (table 1). This finding is congruent with the study conducted by **(Al-Shafai, Al-Romaihi, Al-Hajri, Islam, & Adawi, 2022)**, in Qatar. They found that the highest percentage of the studied' students were in their second academic year. This current finding is also supported by **(Mohammed et al., 2022)** who carried out a study in Egypt, and noticed that more than one half of the studied students were rural residents. Regarding family income, it was reported as enough by slightly more than two thirds of the students (table 1). This may be related to the fact that many families adjust their lifestyle and expenses according to their financial resources, especially when there is reliance on stable sources of income such as governmental jobs. This finding is in harmony with the study performed by **(Mahmoud, El-Ganzory, & Abd El Fattah, 2021)**, and **(Samy et al. 2024)**. They reported that most of the students perceived their family income as sufficient.

Furthermore, the current study indicated that parents' consanguinity was reported in slightly more than one quarter of the families. As well, slightly

more than one fifth reported a family history of hereditary diseases. The most reported diseases included diabetes mellitus and hypertension (table 2). This may be due to the high prevalence of consanguineous marriages in rural areas where cultural traditions and family ties play a major role in marital choices. The predominance of these chronic diseases can also be attributed to their widespread occurrence in the general Egyptian population, as well as shared genetic and lifestyle factors within families. This finding is supported by **(Ebid et al 2021)**, who observed that parental consanguineous marriage was reported by more than one fifth of students. **(Ahmed & Elkhateeb, 2024)** also support the present study. They observed that less than two thirds of the students had family history of chronic diseases; most of them had hypertension, and less than two thirds of them had diabetes mellitus.

As regard main barriers of conducting PMC (figure 1), the current study indicated that lack of awareness represents the highest main barrier as reported by almost half of the studied students, followed by cultural/religious believes reported by less than one third of them, stigma reported by about one quarter of them, cost of counseling and lack of trained counselor reported by almost one fifth of them, respectively. Then, minority of students reported "not necessary, not available online and fear

of unknown” as other barriers of PMC, respectively. This may stem from the fact that lack of awareness remains a fundamental obstacle in many communities, particularly in rural or underserved areas, where health education programs may be limited or poorly implemented. This result is compatible with **Alkalbani et al. (2022)**, who illustrated that the highest percentage of the studied participants reported willingness was more influenced by awareness and cultural barriers. This finding diverged from **(Ebid et al 2021)** who found that a significant proportion of the studied’ students reported lack of family and institutional counseling support as strongly effective barriers of PMC. **(Gomaa et al., 2025)** also noticed that the highest percentage of the students reported "Not to interfere with God's Will," as the main cause of refusing premarital examination, while minority of the reported financial reasons.

Pertaining source of knowledge about PMC, the present study portrayed that more than one quarter of the studied students heard about PMC from media, slightly more than one fifth of them acquired their knowledge from their family, slightly more than one fifth of them from their institute, one fifth of them acquired their knowledge from other sources as their school respectively, as well more than one tenth of them heard from their friends

(figure 2). Parallel with this finding, a study performed by **Omer, Mohamed, & Abukaraig, (2023)**, who found that the commonest source of information among the largest portion of the studied’ students was social media. Consistently, a study conducted by **(Dewi, Susanti, Rinawan, Gondodiputro, & Martini, 2022)**, reported that the primary source of information about PMC was obtained from online media. From the researcher’s point of view, this may be attributed to the fact that media is one of the most accessible and influential sources of information for young people.

Concerning the studied student’s total knowledge level regarding PMC, the present study portrayed that slightly more than two fifths of them exhibited low level of knowledge, nearly one fifth exhibited high level of knowledge, and the main score of the studied students’ knowledge was 15.01 ± 6.36 (table 3). This may be attributed to limited exposure to formal education or awareness programs on the topic, as PMC is not universally emphasized in academic curricula. Cultural norms, accessibility of resources, and personal interest in relationship preparedness can also influence knowledge levels. Students who have high level of knowledge can be interpreted as a considerable portion of students had access to reliable sources of

information, possibly through nursing education, personal interest, or community-based awareness initiatives. The current study results are in line with **(Abd Eltawab, Eldesokey, Mostafa, & Morad, 2025)**. They reported that approximately two-thirds of their participants had unsatisfactory level of knowledge about premarital screening and genetic counseling. On contrary, **(Osman et al., 2021)** who found that most students had satisfactory knowledge about premarital examination and counseling items. This finding agrees with **(Ahmed & Elkhateeb, 2024)** who affirmed that nearly one half of the students had poor knowledge, while more than one fifth of them had good knowledge about PMC. This result is also consistent with the study carried out by **(Samy et al., 2024)** who reported that about two thirds of studied group had unsatisfactory level of knowledge about PMC. Additionally, **(Sabbah, Abdel-mohsen, & Saad, 2023)**, reported that, more than two-thirds studied group had an unsatisfactory level of knowledge about PMC. Moreover, a study in Egypt carried out by **(Kamal, Abdel-Aziem, Kamal, & Ragab, 2024)**, noticed that total student's knowledge at the pre-educational program was unsatisfactory among more than three fifths of them. Conversely, a study conducted by **(Amran, Fasya, & Salamah, 2025)**, in Indonesia, found that more than half of

participants demonstrated high levels of knowledge regarding premarital screening. On the other hand, this study result is contradicted by **(Almualm, 2022)** who observed that majority of the participants had a high knowledge level, while less than one fifth of them had a low knowledge level about PMC. Difference between results may be due to cultural factors, or lack of educational programs.

Regarding the studied students' total attitudes' score regarding PMC, the current study represented that almost two third of the studied students expressed agreement regarding all PMC items, while less than one fifth of them expressed disagreement and were uncertain regarding all PMC items, respectively (figure 3). This may be due to the generally positive perception of PMC among nursing students who are more likely to recognize its importance in promoting family health, preventing hereditary diseases, and supporting informed marital decisions. This finding was supported by a study carried out in Egypt by **(Hamed, Eshra, Ali, & Khalil, 2022)**, They found that more than one half of the studied participants agreed on all items of attitudes toward premarital screening and genetic counseling. On contrary, **(Omi-Ujuanbi & Osumah, 2024)** found that majority of the students disagreed on all the items except item 2.

Pertaining to the total attitudes' level of the studied students regarding PMC (table, 4), the current study reflected that most students demonstrated positive attitudes regarding PMC. While only less than one fifth of them displayed negative attitudes. This may be because nursing students are generally more aware of the health benefits and preventive value of PMC, which aligns with their academic training and professional orientation toward promoting public health. The majority's positive attitudes may also reflect a growing societal shift toward accepting PMC as a necessary step for ensuring healthy family life and preventing hereditary or communicable diseases. Parallel with this result, the study carried out by **(Alhetar et al., 2024)** who reported that majority of the students displayed positive attitudes towards PMC. Similarly, the study conducted by **(Abdo & Sayed, 2024)** declared that more than three fifths of the studied' students had positive attitudes regarding PMC. In the same line, a study conducted by **(Abd Eltawab et al., 2025)** noticed that more than one half of the participants had positive attitudes regarding premarital screening and genetic counseling. In the same context, **(Dewi et al., 2022)** declared that majority of the respondents had positive attitudes toward premarital counseling. While, this result is incongruent with a study

carried out by **(Mahmood et al., 2024)** who observed that majority of students exhibited poor attitudes toward PMC. **(Omi-Ujuanbi & Osumah, 2024)** also on contrary of the present study. They found that the attitudes towards PMC among undergraduates were negatively skewed.

Considering the relationship between total level of knowledge and total level of attitudes regarding PMC (table 5 and figure 3), the current study represented that among students with a low level of knowledge, about one quarter of them exhibited negative attitudes, whereas almost three quarters of them demonstrated positive attitudes. In contrast, among those with a moderate level of knowledge, only minority of them had a negative attitude, with most of them displaying positive attitudes. Notably, among students with high knowledge level, negative attitudes were minimal, and vast majority of them had positive attitudes. As well, this can be interpreted as higher levels of knowledge are positively associated with more favorable attitudes. As knowledge increases, the prevalence of negative attitudes decrease markedly, indicating the potential influence of knowledge acquisition on attitudes formation and improvement. This may be attributed to the strong link between knowledge and attitudes, where increased understanding of PMC leads to greater appreciation of its benefits

and importance in preventing genetic and communicable diseases, promoting informed marital decisions, and supporting family health. In the same respect, the study carried out by **(Ezzat & Gomaa, 2022)**. They noticed a statistically significant correlation between total knowledge and total attitudes toward PMC, indicating that higher knowledge aligns with more positive attitudes. This result is also in accordance with the study performed by **(Al-Shafai et al., 2022)** who found that positive attitudes toward a PMC were associated with good knowledge level. Additionally, a study conducted by **(Shebani et al., 2024)** argued that most students had positive attitudes toward PMC despite knowledge gaps. Finally, students of Technical Health and Technical Nursing Institutes are the future couples and the prospective health care providers who are supposed to provide health care services and convince the surrounding communities regarding the importance of premarital counseling, and utilization of the available health services, which are essential components of the primary health care services **(Kabbash et al., 2019)**.

Conclusion:

Based on the findings of the present study, it can be concluded that students of Technical Health and Technical Nursing Institutes had low level of knowledge and positive attitudes

regarding premarital counseling, with a statistically significant relationship between their knowledge and attitudes.

Recommendations:

Based on the findings of the present study, the researcher recommends integrating comprehensive and structured PMC content into the core curriculum of nursing education at all levels. It is also recommended to conduct studies to measure the effect of PMC education on future clinical practice, marital life, and sustained attitudes of nursing graduates.

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Effect of Implementing Nursing Care Bundle on The Clinical Outcomes of Patients with Chest Injuries

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Abstract

Background: Chest injury represents 20–25% of all traumas worldwide and considered third cause of death for polytrauma patients, following head trauma and abdominal injuries. **Aim:** Evaluate the effect of implementing nursing care bundle on the clinical outcomes of patients with chest injuries. **Design:** Quasi- experimental study design. **Settings:** Traumatology and Emergency Medicine Intensive Care Unit at Tanta university and Cardio thoracic critical care unit at kafr- Elshikh general hospital were site of this research. **Subjects:** Eighty purposive chest injured patients who were admitted to previously mentioned settings. **Tools:** Data were collected using **Tool 1**, Chest Injury Patient's Assessment Questionnaire. **Tool II**, Patient's Clinical Outcome Assessment. **Results:** The findings revealed that majority (95.0%& 97.5%) of control and study groups had severe pain on admission while (52.5%) of study group had mild pain compared to (25.00%) of control group at 4th day of study. Additionally, it was noticed that about two thirds of both groups (62.5% & 60.00%) had moderate dyspnea on admission while two thirds (62.5%) of study group and less than one fifth (12.5%) of control groups had no dyspnea on the 4th day of study. Concerning chest injury complication, it was noticed that hypoxia and hypercapnia among study group (37.5%) compared to (87.5%) among control group. Regarding dyspnea assessment, statistically significance differences were observed between control and study groups with P=0. 000. **Conclusion:** Nursing care bundle had positive effect on decreasing severity of pain associated with chest injury, reducing dyspnea degree, improving physiological parameters and decreasing rate of chest injury related complications. **Recommendations:** Chest injury care bundle is suggested to be conducted as scheduled care for all patients with chest trauma.

Key words: Chest injury, Nursing care bundle, Clinical outcomes.

Introduction

Trauma considered a main cause of death worldwide, accounting for around 10% of all death (**Adal et al., 2024**). Despite, injuries of trauma may happen in different body parts, one out of four trauma patients die from chest injury or due to its complication (**Dogrul, Kiliccalan, Asci, & Peke, 2020**). Blunt and penetrating are considered types of chest trauma. Motor vehicle crashes (MVC) are most frequent blunt chest trauma cause which represent up to 80% of casualties. Falls, vehicles striking pedestrians, violent crimes, and blast injuries are further reasons. Gunshots and stabbings, which together account for 20% of all serious trauma in the US, are the primary cause of penetrating trauma (**Amonkar, 2022**).

Additionally, **Kim & Moore (2020)** had examined the risk associated with improper management of chest trauma like pneumonia, respiratory failure, pulmonary damage, delayed recovery, and increased resource use. So, it was necessary to treat chest trauma as soon as possible using proper care protocol. However, their application is inconsistent, and assessment of

combined therapies for blunt chest injuries is necessary. Therefore, it was essential to develop a care bundle for chest injuries (**Curtis et al., 2021**).

A Care bundle is a group of three to five evidence-based interventions which, when performed together, have a better outcome than if performed individually (**Ali, Abd El Mawla, & Ahmed, 2020**). Three essential pillars of care were outlined in the Chest Injury Care Bundle (ChIP) involving support of respiration, using analgesic and prevention of complications (**Curtis et al., 2021**).

A study performed by **Elsayed, Hafez, Maarouf, & AbdElAziz, (2025)**, showed that high flow nasal cannula significantly decreased both rate of intubation and duration of stay in the intensive care unit for patients with moderate to severe blunt chest trauma. Regarding, management of pain for patients with blunt chest injury can start with incorporating simple and oral opioid analgesia, then probably using of IV opioids, ketamine, regional and epidural analgesia. Mild to severe pain can be relieved through using

simple analgesic (**Zhaksylyk, Abdildin, Sultangazin, humakanov a, & Viderman, 2024**).

Subsequently, early mobilization, chest physical therapy (deep breathing exercises, coughing), and the use of an incentive spirometer are all part of preventing complications for patients with chest injuries (**Franklin & Anjum, 2023**).

Significance of the study:

Trauma of chest considered one of the predisposing causes of death worldwide, especially affecting younger people. According to **Llompert-Pou, & Chico-Fernández, (2021)**, About 25% of trauma-associated deaths are directly due to trauma. It is still the third most common injury worldwide, only surpassed by head and severe traumas. The second highest fatality rate from thoracic injuries after head injuries highlights the vital importance of early treatment in these.

Kibu et al., (2025), stated that individuals with chest (thoracic) trauma have a higher overall mortality rate (15–25%) than those with cardiac or tracheobronchial–esophageal injuries. This highlights

how serious chest trauma is in relation to other traumatic injuries.

The total number of patients with injuries of chest admitted to critical care units at Tanta University Hospital and kafr- Elshikh were 100 cases regarding to hospital record statistics in the previous year., 2022.

It raises the mortality rates of traumatized patients who are admitted to the intensive care unit. So, chest injury care bundle had to be created in order to evaluate the integrated interventions for chest injuries (**Kourouche et al., 2021**).

The aim of this study was to: Evaluate the effect of implementing nursing care bundle on the clinical outcomes of patients with chest injuries.

Research hypothesis:

H1: Clinical outcomes of patient's who would receive nursing care bundle are expected to be improved compared to patients who will not receiving nursing care bundle.

Subjects and Method

Design: Quasi-experimental research design.

Settings: The study conducted at - Traumatology and Emergency Medicine Intensive Care Unit at

Tanta university Emergency Hospital and Cardio thoracic intensive care unit at kafr- Elshikh general hospital.

Subjects: 80 adult patients with chest injuries were selected as a purposive sample from previous settings who fulfilled the inclusion criteria.

Inclusion criteria:

Adult conscious newly admitted patients of both gender aged 21-60 years.

Data collection tools: Two tools were employed as follows.

Tool (I): Chest Injury Patient's Assessment Questionnaire: After reviewing related literature the researcher created tool (Curtis et al.,2021; Eimer, Freier, Weiler, Frerichs, & Becher, (2021). It was divided into two distinct parts

Part (A): patient's socio Demographic Data: It involve patient's age, sex, occupation and education level

Part (B): Patient' Clinical Data: It include past medical history, smoking history, types of chest injuries and signs and symptoms of chest injury.

Tool II: Patient's Clinical Outcome Assessment: It was divided into five parts

Part (A) Subjective Expressed Pain:

This part was created by researcher after reviewing the literature of review (Curtis et al.,2021; Eimer et al.,2021) to assess complete history of pain regarding duration, aggravating and alleviating factors of pain.

Part (B) Numerical pain Rating Scale: McCaffery, & Ferrell, (1994) created scale and adopted by Gorall, Curtis, Little& Panko, (2016) to measure severity of pain. The pain which patient feels ranges from none to extreme level of pain. This scale is horizontal line 10cm in length, in which patient marks around point that they feel.

Scoring system

- Score (0) representing no pain,
- Score from (1–3) mild pain,
- Score from (4–6) moderate pain,
- Score from (7–9) demonstrating severe pain
- (10) representing intolerable pain
- (0) representing no pain.

Part (C): Physiological Parameters Assessment: Created by researcher after reviewing related litterateurs (Theodoratou et

al.,2023&Marasco et al.,2023) it included vital signs (mean arterial blood pressure, pulse rate and saturation of oxygen) respiratory assessment (respiratory rate, rhythm, using of accessory muscles, symmetry of chest and chest sound) and Arterial blood gases (PH, PaO₂, PaCO₂).

Part (D) Dyspnea Scale: Fletcher, (2015) developed scale. It used five grades, ranging from 0 to 4, to assess the degree of dyspnea. G0 indicated that the patient had minimal dyspnea, G1 mild dyspnea, G2 patients have moderate dyspnea, G3 patients stop for breath following walking just under 100 meters G4 patients are too dyspneic.

Scoring system

0= no dyspnea, 1=slight dyspnea,2-3=moderate dyspnea and4=severe dyspnea

Part (E) Chest Injury Related Complications Assessment:

Created by researcher after reviewing related literature (Helsloot, Fitzgerald, Lefering, Verelst, & Missant, 2023; Polmear, Kakalecik, Croft, & Hagen, 2022). It included complications of respiration such as

atelectasis, pneumonia, hypercapnia, hypoxia and death.

Scoring system

- Present complication was scored (1)
- No complication was scored (0)

Methods

The following procedures were used to complete the study

1.Administrative process:

1. The Tanta University Faculty of Nursing sent an official letter to the director of the Traumatology and Emergency Medicine Intensive Care Unit at Tanta Emergency Hospital and Kafr-Elshikh General Hospital. Permission to conduct the study was granted by the directors of the selected locations.

2. Ethical considerations

Permission was obtained by the Faculty of Nursing's Scientific Research Ethics Committee. (Code No. 306-10-2023).

- Each patient gave informed consent after being aware of the nature, purpose and advantages of the trial, as well as their ability to discontinue participation at any time without cause.

- Patients' privacy was taken into consideration when collecting data, and instead of revealing their names, code numbers were used to maintain anonymity and confidentiality.
- Withdrawal from the study at any time without rational.

3-Tools development: Tool I and tool II was created through researcher after review of the relevant litterateurs. Tool II part (B) was developed by **McCaffery & Ferrell, (1994)** and adopted by **Gorall et al., (2016)**. Tool II part (D) was developed by **Fletcher (2015)**.

4-Tools validity:

Five experts in medical biostatistics, critical care, and emergency nursing evaluated each tool's content validity for clarity and applicability, and any necessary changes were made.

5. A pilot study:

A team of five specialists in emergency nursing, critical care, and medicine evaluated each instrument to guarantee their content authenticity and clarity

6. Reliability of the tool

All tools examined for reliability using Cronbach's alpha test. It was 0.761 for tool I, interrater reliability

for numerical pain rating scale (II) was 0.951 and for dyspnea scale was 0.825.

7- Data collection

Data were collected over period of 12 months. The current study was carried out in four stages: assessment, planning, implementation, and evaluation.

Phase 1: Assessment phase:

Using tool, I to evaluate demographic and clinical data of patients. Tool II was also utilized to measure pain severity, changes in physiological parameters and dyspnea level, and respiratory complications.

Phase 2: Planning phase: -

The chest injury care bundle was designed according to needs of subjects and review of literature (**Curtis et al., 2021**) regarding improving patient outcomes.

- chest injury care bundle was designed based on determined needs, relevant literature and researches.

- In order to be implemented, the researcher got the necessary supplies ready. such as analgesic, high flow nasal cannula and spirometer and folded towel or pillow.

Expected Outcomes of the study:

- Decrease severity of pain associated with chest injury,
- Decrease dyspnea degree
- Improve physiological parameters involving (vital signs, oxygen saturation, respiratory parameters and Arterial Blood Gases)
- Decrease rate of chest injury related complications.

Phase 3: Implementation phase: -

(control group): received standard nursing management.

provided in critical care unit that includes: Giving analgesic medication as ordered, measuring vital signs and care of chest tube.

(study group): was received chest injury care bundle was completed by the researcher for the study participants throughout the course of the next four days, starting at the time of admission. Consequently, the bundle item's content was applied.

A- Initial Assessment

- Assess presence of pain
- Assess ability of patients to take deep breathing and cough
- Assess oxygen saturation and prepare patient for Chest X-ray

- If patient has a pain provides analgesic as physician order.
- Re-assessment (after 30 min post initial analgesia) any inability to deep breath/cough or Ongoing pain or poor effort on incentive spirometer/vital capacity start the following

B-Provide respiratory support through:

- Oxygen therapy.
- Consider nasal oxygen supply
- -Ensure the humidifier is properly filled with sterile water, turned on before use.
- place the prongs into the patient's nostrils, pass the tubing over their ears, and secure it with a sliding collar or headgear.
- Finally, monitor the system for blockages or kinks and adjust the settings as needed.

C- Regular analgesic regime:

- Oral analgesic
- Consider combination with patient-controlled analgesic

D- Complication Prevention:**1- Early Mobilization:**

The patient was seated and the head of the bed was raised. as patient tolerated manually or by using

buttons of elevation in electronic beds.

2-Chest physiotherapy

Deep breathing exercise through instruct the patient regarding the following step:

- Ask the patient to draw elbows back to permit expansion of chest
- Instruct patients inhale deeply through his nose.
- Hold his breath for five counts.
- Breathe out slowly through his nose.

3- Coughing exercise:

- It was carried out both before and after the patient was discharged from the hospital.
- Request that the patient inhale deeply through their nose, close their throat, contract their abdominal muscles, open their throat, cough violently, and expectorate their secretions into tissue.
- Patient's chest and abdomen should be splinted by the researchers while they cough.
- By supporting the patient's chest with a folded towel or pillow as they cough, discomfort is lessened.

- Prior to coughing, the patient should be requested to huff three to five times.

4- Incentive spirometer:

- Request that the patient sit on the edge of the bed or as high up as he can.
- Put the mouthpiece firmly in his mouth close his lips around it after holding the incentive spirometer upright.
- Inhale as deeply and slowly as possible.
- Take note of the yellow piston as it rises toward the column's top.
- The blue-outlined area should be reached by the yellow indicator.
- Hold his breath for as long as he can.
- After that, gently release the breath and let the piston drop to the column's bottom.
- Repeat steps one through five at least ten times every hour after taking a brief break.
- Make sure the patient's lungs are clear by coughing up after each set of ten deep breaths.
- When coughing, place pillow firmly against the patient's incision to support it.

- Lastly, teach patients how to cough and breathe deeply, take analgesics when necessary, and use support or splint pillows.

E-Discharge Planning:

Analgesia and Wean Flow Nasal Prongs (depending on patient state) Once respiratory function is enhanced and discomfort is under control, discharge home Patient and family education should include a three-day follow-up with a regular physician and a return to the emergency room if breathing or pain worsens.

4- Evaluation phase: -

Evaluation will be done for each patient with chest injury for both control and study group through using Tool (I) part (B) and tool (II) for four consecutive days from admission after implementing of nursing care bundle.

Results

Table (1) Shows ddistribution of the studied patients according to their socio–demographic characteristics

Concerning age, about half (47.5%-50.00%) in both groups were aged from 40-50 years old, with Mean $\pm$ SD 44.70 $\pm$ 8.513, 45.88 $\pm$ 6.529

respectively. Additionally, most (85.00%) and three quarter (77.50%) of both groups were male.

Also, more than half of them (55.00%&57.5%) were able to read and write in both control and study groups respectively. Regarding occupation, less than half (47.5%) of control group were technical worker while more than half (57.5%) in study group.

Table (2) Shows distribution of the studied patients according to their clinical data.

Concerning smoking history, about two third (65.00%,60.00%) of both groups were smoker, with Mean $\pm$ SD 23.27 $\pm$ 7.341, 24.58 $\pm$ 8.712 respectively. Additionally, about nearly half of them (42.5%&40.00%) had asthma in both control and study group and about half of them (50.00%&45.00%) had hemothorax respectively. Moreover, all of both groups (100.00%) had dyspnea and decreased breath sound. Concerning tachypnea majority (97.5%&92.5%) of control and study groups suffered from.

Table (3): Distribution of the studied patients according to pain severity: This table illustrates that

the mean of pain severity was (8.40 ± 0.74) and (8.05 ± 0.75) on admission among control and study groups respectively and decreased to (5.00 ± 1.63) and (3.93 ± 1.98) at the 4th day among control and study groups respectively. In addition, it was observed that majority (95.0% & 97.5%) of study groups had severe pain on admission. Moreover, at 4th day it was observed that more than half (57.5%) of control group had moderate pain comparing with about one third (35.00%) of study group. While at 4th day less than one fifth of control group had mild pain compared to more than half (52.5%) of study group. Additionally, statistically differences were observed among control and study group at 1st, 2nd, 3rd and 4th day with $P=0.039$, 0.004 , 0.000 & 0.010 respectively.

Table (4): Distribution of studied patient according to dyspnea assessment. This table illustrates that mean of dyspnea was (2.68 ± 1.05) and (2.33 ± 1.07) on admission among control and study groups respectively and it decreased to (1.58 ± 1.22) and (0.60 ± 0.96) at 4th day of admission among control and

study groups respectively. In addition, it was observed that about two thirds of them (62.5% & 60.00%) had moderate dyspnea among control and study groups on admission respectively. However, less than one fifth (12.5%) of control group had no dyspnea compared to about two third (62.5%) of study group with $P= (0.001 \& 0.000)$ respectively at 4th day of observation. Moreover, statistically significant variations between both groups only at 3rd and 4th day of $P=0.000$.

Table (5): Distribution of studied patients according to chest injury complications.

Regarding complications of chest injuries, it was observed that the majority (97.5%, 90.00% & 92.5%) of control and study group respectively had hypercapnia and hypoxia on admission. On other hand, this percentage decreased to (87.5%) and (37.5%) among both groups at 4th day respectively.

Table (6) Relation between socio-demographic characteristics of the studied patients and their pain severity: That table illustrated statistical significant difference

between gender, occupation and pain severity in study group on admission and at 4th day of observations ($P > 0.05$).

Table (7) Relation between clinical data of the studied patients and their pain severity Concerning control group there was significant relation between pain severity and major chest injury at 4th day of observation with ($P = 0.025$). Regarding study group, there was significant relation between pain severity and minor chest injury at 4th day with ($P = 0.004$). Also, there were significant relations between pain severity and major chest injury with ($P = 0.001$ & 0.011) on admission and 4th day.

Table (8) Relation between clinical data of the studied patients and their dyspnea level. Regarding control group, there was statistically significant relation between dyspnea level and minor chest injury on admission and at 4th day with ($P = 0.010$ & 0.015) respectively. Also there was statistically significant relation between dyspnea and major chest injury on admission with ($P = 0.007$).

Additionally, statistically significant relation between dyspnea level and minor chest injury on admission among study group with ($P = 0.010$) and with their major chest injury on admission and 4th day with ($P = 0.014$ & 0.000) respectively.

Table (9) Correlation between physiological parameters of the studied patients and their dyspnea level. This table shows negative correlation between dyspnea level, mean arterial pressure (MAP), Arterial oxyhemoglobin saturation (Sao₂) and Arterial oxygen tension (Pao₂) among control and study groups on admissions and fourth day of observation.

While there was positive correlation between dyspnea level, heart rate respiratory rate and Partial pressure of carbon dioxide (Paco₂) among control group on admission and fourth day. Also, were positive correlation between dyspnea level, respiratory rate and Partial pressure of carbon dioxide (Paco₂) among study group on admission and fourth day.

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

Characteristics	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Age (in years)					
▪ (20-<30)	3	7.5	0	0.0	
▪ (30-<40)	8	20.0	9	22.5	4.29
▪ (40-<50)	19	47.5	20	50.0	0.232
▪ (50-60)	10	25.0	11	27.5	
Range	(22-59)		(32-57)		t=0.69
Mean ± SD	44.70±8.513		45.88±6.529		P=0.491
Gender					
▪ Male	34	85.0	31	77.5	FE
▪ Female	6	15.0	9	22.5	0.404
Educational level					
▪ Illiterate	14	35.0	10	25.0	1.52
▪ Read and write	22	55.0	23	57.5	0.468
▪ University	4	10.0	7	17.5	
Occupation					
▪ Manual work	15	37.5	7	17.5	
▪ Technical work	19	47.5	23	57.5	5.38
▪ House wife	5	12.5	6	15.0	0.146
▪ Employee	1	2.5	4	10.0	

Table (2): Distribution of the studied patients according to their clinical data

Clinical data	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Smoking history					
▪ Smoker	26	65.0	24	60.0	FE
▪ Non-smoker	14	35.0	16	40.0	0.818
Number of cigarettes					
Range	(15-45)		(15-45)		t=0.58
Mean ± SD	23.27±7.341		24.58±8.712		P=0.566
Past medical history					
▪ Chronic bronchitis	3	7.5	4	10.0	FE
▪ Asthma	17	42.5	16	40.0	0.692
Types of chest injuries					

A-Minor chest injuries					
▪ Haemothorax	20	50.0	18	45.0	0.21 0.654
▪ Rib fractures less than three ribs	6	15.0	6	15.0	
▪ Pneumothoracies	14	35.0	14	35.0	
Major chest injuries					
▪ Tension pneumothorax	3	7.5	3	7.5	0.14
▪ Open pneumothorax	3	7.5	5	12.5	0.709
Signs and symptoms of chest injury					
▪ Dyspnea	40	100.0	40	100.0	5.60 0.018*
▪ Decreased breathing sound	40	100.0	40	100.0	
▪ Absent breathing sounds	1	2.5	1	2.5	
▪ Breathe with nasal flaring and using accessory muscles	1	2.5	9	22.5	
▪ Paradoxical movement of chest wall	2	5.0	3	7.5	
▪ Cyanosis of fingers lips or face	1	2.5	2	5.0	
▪ Tachypnea	39	97.5	37	92.5	
▪ Tracheal deviation	1	2.5	4	10.0	
▪ Distension jugular veins	6	15.0	6	15.0	

FE: Fisher' Exact test

Table (3): Distribution of the studied patients according to pain severity

Pain severity	The studied patients (n=80)																	
	Control group (n=40)								χ^2 P	Study group (n=40)								χ^2 P
	On admission		2 nd day		3 rd day		4 th day			On Admission		2 nd day		3 rd day		4 th day		
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%	
▪ Mild	0	0.0	0	0.0	1	2.5	10	25.0		0	0.0	0	0.0	11	27.5	21	52.5	
▪ Moderate	0	0.0	6	15.0	22	55.0	23	57.5	101.07	0	0.0	18	45.0	22	55.0	14	35.0	124.27
▪ Sever	38	95.0	34	85.0	17	42.5	7	17.5	0.000*	39	97.5	22	55.0	7	17.5	5	12.5	0.000*
▪ Worst/Intolerable pain	2	5.0	0	0.0	0	0.0	0	0.0		1	2.5	0	0.0	0	0.0	0	0.0	
Range	(7-10)		(4-9)		(3-9)		(2-8)		F=55.38	(7-10)		(4-9)		(2-9)		(1-7)		F=53.90
Mean ± SD	8.40±0.74		7.45±1.04		6.25±1.41		5.00±1.63		P=0.000*	8.05±0.75		6.60±1.52		4.83±1.81		3.93±1.98		P=0.000*
Control Vs Study																		
t	2.11		2.93		3.93		2.65											
P	0.039*		0.004*		0.000*		0.010*											

* Significant at level P<0.05. Mild (1-3) Moderate (4-6) Sever (7-9) Worst or Intolerable pain (10)

Table (4): Distribution of studied patient according to dyspnea assessment

Dyspnea Level	The studied patients (n=80)																	
	Control group (n=40)								χ^2 P	Study group (n=40)								χ^2 P
	On admission		2 nd day		3 rd day		4 th day			On admission		2 nd day		3 rd day		4 th day		
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%	
▪ No dyspnea	1	2.5	4	10.0	5	12.5	5	12.5		1	2.5	9	22.5	18	45.0	25	62.5	
▪ Slight dyspnea	3	7.5	16	40.0	18	45.0	20	50.0	28.23	9	22.5	11	27.5	17	42.5	10	25.0	73.84
▪ Moderate	25	62.5	13	32.5	11	27.5	9	22.5	0.001*	24	60.0	20	50.0	5	12.5	5	12.5	0.000*
▪ Severe dyspnea	11	27.5	7	17.5	6	15.0	6	15.0		6	15.0	0	0.0	0	0.0	0	0.0	
Range	(0-4)		(0-4)		(0-4)		(0-4)		F=6.82	(0-4)		(0-3)		(0-3)		(0-3)		F=24.42
Mean ± SD	2.68±1.05		1.90±1.30		1.68±1.25		1.58±1.22		P=0.000*	2.33±1.07		1.48±1.06		0.78±0.92		0.60±0.96		P=0.000*

Control Vs Study										
t	1.48	1.64	3.67	3.99						
P	0.144	0.113	0.000*	0.000*						

* Significant at level $P < 0.05$. No dyspnea (0) Slight dyspnea (1) Moderate (2-3) Severe dyspnea (4)

Table (5): Distribution of studied patients according to chest injury complications

Chest injury related complications	The studied patients (n=80)																	
	Control group (n=40)								χ^2 P	Study group (n=40)								χ^2 P
	On admission		2 nd day		3 rd day		4 th day			On admission		2 nd day		3 rd day		4 th day		
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%	
1-Atelectasis	0	0.0	0	0.0	0	0.0	0	0.0	11.404 0.010*	0	0.0	1	2.5	1	2.5	0	0.0	10.03 0.213
2-Pneumonia	0	0.0	0	0.0	0	0.0	4	10.0		0	0.0	1	2.5	1	2.5	3	7.5	
3-Acute respiratory distress syndrome	0	0.0	0	0.0	0	0.0	0	0.0		1	2.5	0	0.0	0	0.0	0	0.0	
4-Pulmonary embolism	0	0.0	0	0.0	0	0.0	0	0.0		0	0.0	0	0.0	0	0.0	0	0.0	
5-Hypercapnia	39	97.5	39	97.5	36	90.0	35	87.5		36	90.0	33	82.5	17	42.5	15	37.5	
6-Hypoxia	39	97.5	39	97.5	36	90.0	35	87.5		37	92.5	33	82.5	16	40.0	15	37.5	

* Significant at level $P < 0.05$.

Table (6): Relation between socio-demographic characteristics of the studied patients and their pain severity

Characteristics	The studied patients (n=80)			
	Pain severity			
	Control group (n=40)		Study group (n=40)	
	On admission	4 th day	On admission	4 th day
Age (in years)				
▪ (20-<30)	8.33±0.577	2.67±0.577	-	-
▪ (30-<40)	8.38±0.518	4.38±1.408	7.89±0.333	2.78±1.481
▪ (40-<50)	8.53±0.697	5.53±1.467	8.10±0.718	4.30±1.809
▪ (50-60)	8.20±1.033	5.20±1.687	8.09±1.044	4.18±2.401
F , P	0.415 , 0.743	3.822 , 0.018	0.259 , 0.773	2.071 , 0.140
Gender				
▪ Male	8.38±0.779	4.97±1.642	8.10±0.790	4.26±1.983
▪ Female	8.50±0.548	5.17±1.722	7.89±0.601	2.78±1.563
t , P	0.125 , 0.726	0.072 , 0.790	0.530 , 0.471	4.224 , 0.047*
Educational level				
▪ Illiterate	8.64±0.842	5.43±1.828	8.40±0.843	4.10±2.514
▪ Read and write	8.32±0.716	5.05±1.463	8.04±0.706	4.13±1.961
▪ University	8.00±0.00	3.25±0.500	7.57±0.535	3.00±0.816
F , P	1.493 , 0.238	3.086 , 0.058	2.745 , 0.077	0.924 , 0.406
Occupation				
▪ Manual work	8.40±0.910	4.93±1.792	8.71±0.756	5.86±1.345
▪ Technical work	8.47±0.697	5.42±1.502	8.04±0.706	3.91±2.021
▪ House wife	8.20±0.447	4.00±1.225	7.67±0.516	2.50±1.049
▪ Employee				
	8.00±0.00	3.00±0.00	7.50±0.577	2.75±0.957
F , P	0.263 , 0.852	1.630 , 0.200	3.719 , 0.020*	4.830 , 0.006*

* Significant at level P<0.05.

Table (7): Relation between clinical data of the studied patients and their pain severity

Clinical data	The studied patients (n=80)			
	Pain severity			
	Control group (n=40)		Study group (n=40)	
	On admission	4 th day	On Admission	4 th day
Smoking history				
▪ Smoker	8.46±0.811	5.08±1.695	8.21±0.779	4.33±2.078
▪ Non-smoker	8.29±0.611	4.86±1.562	7.81±0.655	3.31±1.702
t , P	0.501 , 0.483	0.161 , 0.690	2.802 , 0.102	2.663 , 0.111
Types of chest injuries				
A-Minor chest injuries				
▪ Haemothorax	8.25±0.786	4.75±1.585	7.94±0.539	3.61±1.914
▪ Rib fractures < three ribs	9.17±0.408	6.00±1.549	8.33±0.516	6.00±0.00
▪ Pneumothoracies	8.29±0.611	4.57±1.505	7.57±0.514	2.79±0.893
F , P	9.035 , 0.005	2.767 , 0.104	1.009 , 0.321	9.437 , 0.004*

Major chest injuries				
▪ Tension pneumothorax	9.33±0.577	7.00±1.00	9.33±0.577	6.67±0.577
▪ Open pneumothorax	9.00±0.00	6.67±0.577	9.00±0.00	6.60±0.548
t , P	3.062 , 0.088	5.416 , 0.025*	12.258 , 0.001*	7.215 , 0.011*

* Significant at level $P < 0.05$.

Table (8): Relation between clinical data of the studied patients and their dyspnea level

Clinical data	The studied patients (n=80) Dyspnea level			
	Control group (n=40)		Study group (n=40)	
	On admission	4 th day	On Admission	4 th day
Smoking history				
▪ Smoker	2.73±0.962	1.65±1.198	2.42±1.100	0.67±0.917
▪ Non-smoker	2.57±1.222	1.43±1.284	2.19±1.047	0.50±1.033
t , P	0.206 , 0.652	0.306 , 0.583	0.433 , 0.515	0.287 , 0.595
Types of chest injuries				
A-Minor chest injuries				
▪ Haemothorax	2.80±0.951	1.60±1.046	2.28±1.127	0.33±0.485
▪ Rib fractures < three ribs	3.67±0.816	2.67±1.211	3.33±0.516	1.00±0.00
▪ Pneumothoracies	2.00±0.877	0.79±0.579	2.00±0.784	0.14±0.363
F , P	7.361 , 0.010*	6.476 , 0.015*	7.254 , 0.010*	1.245 , 0.272
Major chest injuries				
▪ Tension pneumothorax	3.67±0.577	3.31±0.185	2.33±1.528	1.33±1.528
▪ Open pneumothorax	4.00±0.00	3.33±1.155	3.40±0.894	2.40±0.894
t , P	7.980 , 0.007*	0.501 , 0.483	6.574 , 0.014*	41.177 , 0.000*

* Significant at level $P < 0.05$.

Table (9): Correlation between physiological parameters of the studied patients and their dyspnea level

Physiological parameters	The studied patients (n=80) Dyspnea level							
	Control group (n=40)				Study group (n=40)			
	On admission		4 th day		On admission		4 th day	
	r	P	r	P	r	P	r	P
Heart rate	0.363	0.021*	0.582	0.000**	-0.060	0.713	0.080	0.625
Mean arterial pressure (MAP)	-0.347	0.028*	-0.465	0.002**	-0.540	0.000**	-0.195	0.227
Respiratory assessment								
Respiratory rate	0.454	0.003**	0.580	0.000**	0.005	0.977	0.538	0.000**
Arterial oxyhemoglobin saturation (SaO₂)	-0.650	0.000**	-0.495	0.001**	-0.469	0.002**	-0.744	0.000**

Arterial oxygen tension (PaO ₂)	-	0.000**	-	0.000**	-	0.036*	-	0.000**
	0.542		0.580		0.333		0.795	
Partial pressure of carbondioxide (PaCO ₂)	0.827	0.000**	0.674	0.000**	0.376	0.017*	0.754	0.000**

* Significant at level $P < 0.05$.

Discussion

Chest injuries after head trauma, considered the second most common cause of death and is considered as a major contributor to morbidity and mortality globally. Furthermore, it is a substantial contributor to Hospitalization and long-term disability account for 10% of hospital admissions and 25% of trauma-related deaths. (Yimam, Mustofa, & Aytolign, 2021).

Concerning age, about half of both groups were aged from 40-50 years old. This may be due to engagement in daily life work. This result agreed with Zhang et al., 2023 who demonstrated that most of the studied patient age ranged from 31 to 60 years. However, this result was disagreed with the study performed by Masuma, Boniface, & Lugazia, 2021 and revealed that two thirds of the patients under study were between the ages of 20 and 39.

In relation to gender the most of control group and three quarter of study group were male this may return to their active participation in dangerous everyday activities, such as speeding, riding motorbikes, driving, violence, and falling from high locations because of their jobs.

This result was similar with AlSulaiman et al., 2023, who concluded that majority of the studied sample were males. Additionally, these results agree with Hajjar et al., 2021 and showed that the majority of patients were male. Additionally, these result agreed with Eshetu, 2021 and stated that three quarter of chest trauma patients were males.

Regarding level of education more than half of both groups, had ability to read and write this may be due to perception of the value of education and their poor income levels, which prevent them from finishing their education and looking for manual work.

These results were supported by Abafita et al., 2020 and demonstrated that one third of sample had ability to read and write. However, these result incongruent with the study performed by Kahloul et al., 2020, they noticed that nearly half of sample had secondary level of education.

Concerning occupation Over half of the study group and almost half of the control group participated in technical work this may be due to compatible of educational level.

These results agree with **Khursheed, Ashraf, Rather, & Bari, 2019** and showed that two third of sample had manual work.

In relation to distribution of the studied patients according to their clinical data concerning smoking history two third of both groups were smoker, nearly half had asthma and haemothorax in both groups. Moreover, both of groups suffered from dyspnea and decreased breath sound this could be due to chest trauma which result in dyspnea, reduced breath sounds moreover, asthma and smoking history between studied groups.

These results agreed with **Tuan et al., 2023** and revealed that most patients with haemothorax in blunt chest trauma had dyspnea and chest pain and about two third had decreased breath sounds. Additionally, these result agreed with **Curtis et al., 2021** they revealed that almost half had asthma and were smoker.

Moreover, these results were in harmony with **Singh et al., 2024** stated that the majority of patients had hemothorax followed by pneumothorax and pneumohemothorax.

Moreover, the majority of both groups had severe pain, at the time of admission and the patients' pain were reduced to more than half among

study group at 4th day. Additionally, statistically significance difference was observed among control and study groups through days of observations this could be due to the management of pain associated chest injury couldn't have started on admission and through application of chest injury care bundle the severity of pain reduced.

These results were supported by **Ghaffarzar et al., 2023** who founded that severity of pain reduced overtime. Also, a study performed by **Kahloul et al., 2020** concluded that more than half of studied sample had mild pain on discharge.

Moreover, these results were concurrent with **Elgariah, & Omran, 2023** who demonstrated that pain severity reduced among patient with rib fracture.

Regarding dyspnea assessment, it was observed that about two third of both groups had moderate dyspnea on admission. In the 4th day of admission, it was noticed that about two third of study group had mild dyspnea. Moreover, statistically significant difference was observed between control and study only at 3rd and 4th day of observations this may be due to impact of chest physiotherapy and using of incentive spirometer they improve ventilation of lung, lessen anesthesia effects or shallow breathing, aid in the removal

of respiratory secretions, promote respiratory gas exchange, and reinflate alveoli that have deflated to reduce the severity of dyspnea **El-Koa Eid, Abd Elrahman, & El Kalashy, (2023).**

These results were supported with **Mohamed, et al., 2018** who revealed that diaphragmatic breathing and relaxation therapy are crucial methods for minimizing pain severity, dyspnea level and maximizing peak oxygen consumption.

Additionally, these results were in harmony with **Sharma, & Kaur, 2020** demonstrated that an incentive spirometer can effectively improve respiratory parameters and lessen dyspnea severity.

In relation to complication related chest injuries it was observed that the majority of both groups had hypercapnia and hypoxia on admission. On other hand, the percentage decreased to most of control and to one third among study group at 4th day this is could be compatible with improvement of severity of dyspnea. These results similar with **Moslam, Badawy, & Asida, 2015** showed that there was an enhancement of pulmonary function test parameters and blood gas parameters.

Moreover, these results were supported with **Carlino et al., 2020**

who stated that patient with lung injury had decreased in arterial partial pressure of oxygen and oxygen saturation. However, these result disagreed with **Branea et al.,** who noticed that the majority of the parameters had normal values.

Also these results were disagreed with **Potey, Kale, & Kanake, 2020** they studied revealed that pneumonia and atelectasis were the most frequent side effects of chest trauma.

Concerning relation between pain severity and socio-demographic characteristics it was observed that there was significant statistical relation between pain severity, gender and occupation among study group this may be due to sex related variation in pain sensitivity, hormonal modulation of nociception, difference in injury pattern and sociocultural differences in reporting of pain (**Athnaiel, Cantillo, Paredes, & Knezevic, 2023**). These results were supported with **Rabiou, et al., 2018** and demonstrated that two factors of post-traumatic persistent chest injury are age ≥ 55 years and male gender. However, this result disapproved with **Kahloul et al., 2020** who studied revealed that there were There is no correlation between gender and the intensity of pain. **Regarding relation between clinical data and severity of pain,** the recent study revealed that there was

significant relation between severity of pain and minor chest injury at 4th day. Also, there were significant relation between pain severity and major chest injury on admission and 4th day. This could be due to serious chest injuries might result in discomfort from internal organs like the heart, lungs, or major blood arteries, smaller chest injuries can cause pain from soft tissue injury like bruises or strains.

These findings were supported with **Carrie et al., 2019** and finalized that there was significant relation between chronic pain and blunt chest trauma.

As regard relation between dyspnea and clinical data of the studied patients with chest injuries.

Regarding, control group there was statistically significant relation between dyspnea level and minor chest injury on admission and 4th day. Concerning study group, the current study showed that there was statistically significant relation between degree of dyspnea and minor chest injury on admission and with their major chest injury on admission and 4th day. This may be due to asymmetry of chest due to chest injury that result in impaired lung expansion, ventilation and impaired gas exchange and result in dyspnea.

These results were in the same line with **Wu, et al., 2021** who clarified that rib fracture cause pulmonary

ventilation function declining to some extent. These results were in the same line with **Getz, Mommsen, Clausen, & Winkelmann, 2019**, who revealed that Chest wall instability alone is less detrimental to respiratory insufficiency than lung contusions.

Concerning relation between physiological parameters of the studied patients with chest injuries and their dyspnea level.

The recent study noticed that there were negative correlation between level of dyspnea, arterial oxyhemoglobin saturation (SaO₂) and arterial oxygen tension (PaO₂) on admission and 4th day and negative correlation between dyspnea level and mean arterial pressure (MAP) on admission .Also, there were positive correlation between dyspnea level and partial pressure of carbon dioxide (PaCO₂) on admission and 4th day where and between dyspnea level and respiratory rate on 4th day .This may be due to the body's ability to maintain proper oxygenation (PaO₂), carbon dioxide elimination (PaCO₂), and acid-base balance is frequently compromised by underlying physiological conditions (chest injury) that result in dyspnea (**Lagina & Valley, 2024**).

These results agreed with **El Bishbeshy, 2025** and showed that that there was a statistically

significant association between Partial pressure of carbon dioxide (PaCO_2), HCO_3 and severity of dyspnea. Additionally, these findings were consistent with **Santus et al., 2023** who stated that elevation of arterial carbon dioxide pressure (PaCO_2) result in shortness of breath. Additionally, severe increase in PaCO_2 , possibly contributing to dyspnea.

Additionally, **Neto et al., 2025** demonstrated that in acid accumulation or loss, can result in reduction of blood pH and bicarbonate levels, potentially causing increased respiratory drive and dyspnea

Conclusion

Based on the results of recent study, it is possible to conclude that chest injury care bundle had positive effect on reducing severity of pain associated with chest injury, reducing dyspnea degree, improving physiological parameters (vital signs, oxygen saturation, respiratory parameters and arterial blood gases) and decreasing rate of chest injury related complications

Recommendations

Based on the findings of the present study, the following recommendations were suggested:

- In order to improve the quality of nursing care provided to patients with chest injuries and lower the

associated complications, an in-service training program and workshop should be developed on a regular basis for nursing staff working in the Cardiothoracic Surgery Unit and the Traumatology and Emergency Medicine Intensive Care Unit.

Replication of the study in a large probability sample

- Further studies are needed to focus on the long-term effects of chest injury bundles on patient recovery, pulmonary function, and quality of life after discharge.

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Influence of Workplace Oppression on Nurses' Moral Courage
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Abstract

Background: Workplace oppression is an emerging occupational problem affects nurses; it is a long-standing, global phenomenon with severe negative impacts on individual nurses' moral courage, professional well-being, patient care quality, and the healthcare system as a whole. **Aim:** This study aimed to assess the relation between workplace oppression and nurses' moral courage. **Design:** A descriptive-correlational research design was utilized to conduct this study. **Setting:** This study was conducted at Tanta Main University, including intensive care units (ICUs) and all departments. **Subjects:** The study's subjects consisted of a stratified random sample of nurses (n=269). **Tools:** Two tools were used to collect the data: The Nurses' Workplace Oppression and Nurses' Moral Courage Questionnaire. **Results:** The study's findings showed that 65.4% of nurses had a low level of workplace oppression; however, 90.0% of them had a high level of moral courage. **Conclusion:** There was a negative statistically significant correlation between workplace oppression and nurses' moral courage. **Recommendations:** Develop policies and practices to avoid ambiguity regarding what nursing professionals should do while oppressed and promote a culture that focuses on teamwork, communication, and a collaborative work environment to encourage nurses to speak courageously about safety concerns and unethical practices without fear of unfair blame.

Keywords: Moral courage, Nurses, Workplace oppression.

Introduction

A healthy nursing practice environment fosters a sense of personal and professional accountability among nurses not only for their profession but also for their patients. Such an environment empowers nurses to confront and **defeat** challenges that arise when workplace conditions no longer support meaningful interpersonal nursing practice **(Noor, Jamil, & Ahmed, 2022)**. Within hospital settings, nurses deliver complex and high-level care while navigating numerous challenges, including intense work pressures, exposure to violence, uncertainty, and the rapid pace of change inherent in healthcare **(Chakraborty, Mandal, & Sharma, 2021)**.

Nurses in their profession face violence, bullying, exploitation, discrimination, and disrespect from patients and their families, as well as their own colleagues and physicians, instead of receiving respect, recognition, and reward. There is indeed a long-standing culture of oppression in the nursing profession, and nurses are the first oppressed group in the hospital **(Young, Majchrzak, & Kane, 2021)**.

Workplace oppression is a pervasive global concern that exerts detrimental effects not only on nurses themselves but also on the functioning of healthcare organizations and the quality of care experienced by patients. Workplace

oppression occurs due to unjust behaviors and unfairly treating nurses that cause unequal relationships in the organization. It decreases nurses' job satisfaction, low self-esteem, powerlessness, and reducing their subordination. Oppression is a concept reflecting negative actions taken against nurses **(Means & Moll, 2023)**.

In the nursing profession, oppression is characterized by **inequity**, ignoring others' rights, overlooking nurses' opinions and disrespecting dignity **(Luiz & Terziev, 2024)**. The presence and persistence of such behaviors have detrimental and irreversible effects on nurses, the nursing profession, work productivity, and most importantly, patients' quality of care. Nursing oppression has three dimensions, including assimilation, marginalization, and lateral violence **(Dillard & Walker, 2022)**.

Assimilation is the complex phenomenon where nurses internalize the demeaning views and power dynamics imposed upon the profession by a dominant group (historically, physicians and the patriarchal healthcare system) **Basri, Wanggai & Kara (2023)**. Marginalization in the nursing profession undermines its recognition and contribution to patient recovery, often allowing physicians to receive sole credit for positive clinical outcomes. This dynamic perpetuates an inequitable social

structure in healthcare, fostering power imbalances that restrict equitable access to professional opportunities and recognition **(Saba, Nestor, Hernandez, & Stennis, 2023)**.

Lateral violence is a pattern of behavior in which nurses in an oppressed group direct their dissatisfaction, anger, and aggression toward each other or those less powerful within their peer group **(Nguyen-Garay, 2025)**. Addressing workplace oppression requires nurses to demonstrate substantial moral courage. Moral courage empowers nurses to uphold patient safety and quality care, to engage in ethical collaboration with other healthcare professionals, and to advocate for equitable and compassionate healthcare practices across all settings **(Pajakoski, Rannikko, Leino-Kilpi, & Numminen, 2021)**.

In nursing, moral courage represents the embodiment of personal and professional values in situations of conflict, opposition, or power imbalance. It enables nurses to stand firm in defense of ethical principles and the greater good. As an ethical mandate, professional nurses are expected to exercise moral courage to promote human dignity—the core value underpinning nursing practice. It comprises four key dimensions: compassion and authentic presence, moral responsibility, moral integrity, and commitment to quality care

(Buckingham et al., 2021).

Compassion and authentic presence involve forming trusting relationships with patients, alleviating their suffering, and engaging in empathetic, nonjudgmental listening. Compassionate nursing recognizes the intrinsic worth of every individual and responds to patient needs with empathy, respect, and thoughtful consideration **(Yollu, Yumuşak, & Korkmaz, 2024)**. Moral responsibility entails the nurses' duties to recognize and respond appropriately to patients' symptoms, administer medications safely, implement comfort measures, and collaborate with multidisciplinary teams to enhance patient and family adaptation **(Mosley, et al., 2021)**.

Moral integrity **contemplates** honesty, fairness, and steadfast adherence to ethical values, manifested in maintaining confidentiality, demonstrating transparency, and cultivating trust in practice **(Ng & Wai, 2021)**. Commitment to quality care involves not only dedication to meeting patients' needs and ensuring continuity of care but also a broader commitment to the nursing role and professional standards **(Mohammadi, Masoumi, Oshvandi, Khazaei & Bijani, 2022)**.

Significance of the Study

Despite the prevalence of oppressive behaviors in nursing practice, these issues

are often normalized rather than challenged, being perceived as inherent to the profession. Such normalization has far-reaching implications, undermining professional performance, compromising patient safety, diminishing the quality of care, and weakening organizational effectiveness (Rodrigues, 2021; Ferguson & Anderson., 2021).

Ultimately, moral courage is a foundational virtue in nursing that enhances both personal and professional growth. Conversely, workplace oppression fosters a sense of **inability to act** and disempowerment, eroding nurses' confidence and professional engagement. Hence, it is imperative to examine the influence of workplace oppression on nurses' moral courage, thereby contributing to a deeper understanding ethical resilience and professional integrity within nursing practice.

Aim of the study

To assess the influence of workplace oppression on nurses' moral courage.

Research questions:

- What are the levels of workplace oppression and moral courage as perceived by nurses?
- What is the relation between workplace oppression and nurses' moral courage?

Subjects and method

Study design: Descriptive- correlational research design will be utilized to conduct this study.

Setting: The study was conducted at Tanta Main University Hospital, which is affiliated to the Ministry of Higher Education and Scientific Research.

Subjects: The study's subjects consisted of a stratified random sample of nurses (n=269) that will be selected from the total number of nurses (890). The technique for selecting the sample from the previous mentioned settings was proportional according to the number in each department strata.

Tools of data collection: The data was collected through the following two tools:

Tool (I): Workplace Oppression Structured Questionnaire: This tool consisted of two parts:

Part I: Nurses' personal-work related data: It included nurses' personal data: age, gender, marital status, number of children, educational level, department name, job title, years of experience, type of contract, and number of working hours per week.

Part II: Nurses' Workplace Oppression Questionnaire: This tool was adapted by the researcher based on related literature (Rodrigues, 2021; Ferguson & Anderson., 2021). It was used to assess workplace oppression as perceived by nurses. It consisted of 3 dimensions: assimilation (17 items), marginalization (13 items), lateral Violence (14 items).

Scoring system: Nurses' responses were measured on a three points Likert Scale ranging from 1 to 3; never =1 to always = 3. The total scores were summing up and classified according to cut-off points as follows:).

- High level of workplace oppression $\geq 75\%$ (score ≥ 99).
- Moderate level of workplace oppression 60- $<75\%$ (score 79- <99).
- Low level of workplace oppression $<60\%$ (score <79).

Tool II: Moral Courage Questionnaire:

This tool was adapted by the researcher based on related literature reviews (Numminen et al., 2021; Pajakoski et al., 2021). It was used to assess nurses' moral courage. It consisted of seventeen items dividing into four dimensions: **compassion and true presence** (4 items), moral

responsibility (3 items), **moral integrity** (4 items), and **commitment to good care** (6 items).

Scoring system:

Nurses' responses were measured on five points Likert Scale ranging from 1 to 5; when strongly disagree =1 to strongly agree =5. The total scores were summing up and classified according to cut-off points as follows:

- High moral courage level $\geq 75\%$ (Score ≥ 64).
- Moderate moral courage level 60- $<75\%$ (Score 51- <64).

- Low moral courage level $<60\%$ (Score <51).

Method

1. Official permission to conduct the study was obtained from the dean of Faculty of Nursing and authoritative personnel of main Tanta hospital.

2. Ethical considerations:

- a) An approval from the Scientific Research Ethics committee at the Faculty of Nursing was obtained with a code number 254/5/2023.
 - b) The researcher was introducing herself to the participant, a full explanation of the aim and methods of the study will be done to obtain their acceptance, cooperation and informed consent.
 - c) The right to obtain participation at any time was respected.
 - d) The nature of the study will not cause any harm or pain for entire subjects.
 - e) Assuring nurses about the privacy and confidentiality of collected data that was used only for the study purpose.
3. Validation: Tool I and II were translated into Arabic and presented to a jury of five experts in the area of specialty to check the content validity and clarity of each tool. The experts were three professors and two assistant professors of nursing administration department from the Faculty of Nursing at Tanta University.
 4. The experts' responses were represented on a four-point rating scale ranging from 4= strongly relevant, to 1= not relevant.

Necessary modifications were made including; clarification, omission of certain items, addition of others and simplifying work-related words.

5. The face validity value of tool (1) part 2 was 91.6% and tool II was 91.5%.
6. A pilot study was carried out on a sample of 10% of nurses (n=26) who excluded from the main study sample during the actual collection of data. It was carried out after the experts' opinions before starting the actual collection to test the clarity, sequence of items, an applicability, and relevance of the questions and determine the needed time to complete the questionnaire. According to feedback from pilot study, the estimated time needed to complete the questionnaire items from nurses was around 15-20 minutes.
7. The reliability of tools was tested using the Cronbach's Alpha Coefficient test. The reliability value of tool I was 90.5% and tool II was 93%.

Data collection phase: The data were collected from nurses by the researcher in various areas 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 a period of five months, starting from the beginning of November 2022 until the end of March 2023.

Statistical analysis: Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp.). The questionnaire was analyzed for internal consistency using Cronbach's alpha coefficient test. Qualitative data were described using numbers and percents. Quantitative data were described using range, mean, standard deviation and median. The A regression test was used to detect the most independent variable. The correlation was calculated using Pearson's correlation coefficient at $p < 0.05$ for the significance level.

Results

Table 1: Shows the frequency and distribution of nurses' personal and work-related data. It was observed that 87.0% of nurses were female and 42.0% of them were aged between 30 and 45 years old with a mean score of 37.46 ± 12.07 . Moreover, 88.5% of nurses were married and 62.2% of them had between 1 and 2 children, with a mean score of 2.25 ± 1.16 . Regarding the educational level, 80.7% of nurses had a secondary nursing diploma. More than half (59.5%) of them had 5 to 15 years of experience with a mean score of 9.47 ± 5.48 . The majority (88.8%) of the studied participants were staff nurses, and 64.7% of them worked in departments of pediatrics, cosmetology, obstetrics, cardiology, oncology, and neurology. All the nurses surveyed in this study were

employed full-time, working 36 hours per week.

Figure 1: Represents the overall levels of nurses' perceptions of workplace oppression. The figure shows that 47.9% of nurses had a moderate perception level, while 42.4% of them had a low perception level and only 9.7% of them had a high perception level of workplace oppression.

Figure 2: Portrays the overall level of nurses' moral courage. The vast majority (90.0%) of nurses had a high perception level of moral courage and only 10% of them had a moderate level.

Figure 3: Denotes the correlation matrix between overall nurses' perception of workplace oppression and their moral courage. The figure shows negative statistically significant correlations between overall nurses' perception of workplace oppression dimensions and moral courage dimensions.

Table 2: Signifies the linear regression between nurses' perceptions of workplace oppression and their moral courage. The table indicates a negative statistical contribution to the prediction of the explained variance between overall nurses' perceptions of workplace oppression and their moral courage with an adjusted regression coefficient (R^2) value of 0.068, F test=19.521 at a highly significant level of $p<0.01$.

Table (1): Frequency and distribution of the studied nurses' according to their personal data (269 nurses)

Personal data	No.	%
Gender		
Male	35	13.0
Female	234	87.0
Age (years)		
<30	89	33.1
30 – 45	113	42.0
>45	67	24.9
Min. – Max.	20.0 – 60.0	
Mean $\pm$ SD.	37.46 $\pm$ 12.07	
Marital status		
Married	238	88.5
Unmarried	31	11.5
Number of children (n=238)		
1–2	148	62.2
3 –4	80	33.6
5–6	10	4.2
Min. – Max.	1.0 – 6.0	
Mean $\pm$ SD.	2.25 $\pm$ 1.16	
Education level		
Secondary Nursing Diploma	217	80.7
Technical Nursing Diploma	19	7.1
Bachelor of Science in Nursing	19	7.1
Postgraduate studies	14	5.2
Years of experience		
<5	61	22.7
5 – 15	160	59.5
>15	48	17.8
Min. – Max.	1.0 – 20.0	
Mean $\pm$ SD.	9.47 $\pm$ 5.48	
Job title		
Nursing supervisor	17	6.3
Head nurse	13	4.8
Staff nurse	239	88.8
Working unit		
Neurology Intensive Care Unit	40	14.9
Cardiac Intensive Care Unit	23	8.6
Oncology Intensive Care Unit	32	11.9
Cardiology department	29	10.8
Obstetric department	28	10.4
Oncology department	26	9.7
Neurology department	24	8.9
Pediatric department	35	13.0
Cosmetology department	32	11.9
Type of contract		
Full time	269	100.0
Part time	0	0.0
Number of working hours per week (36)	269	100.0

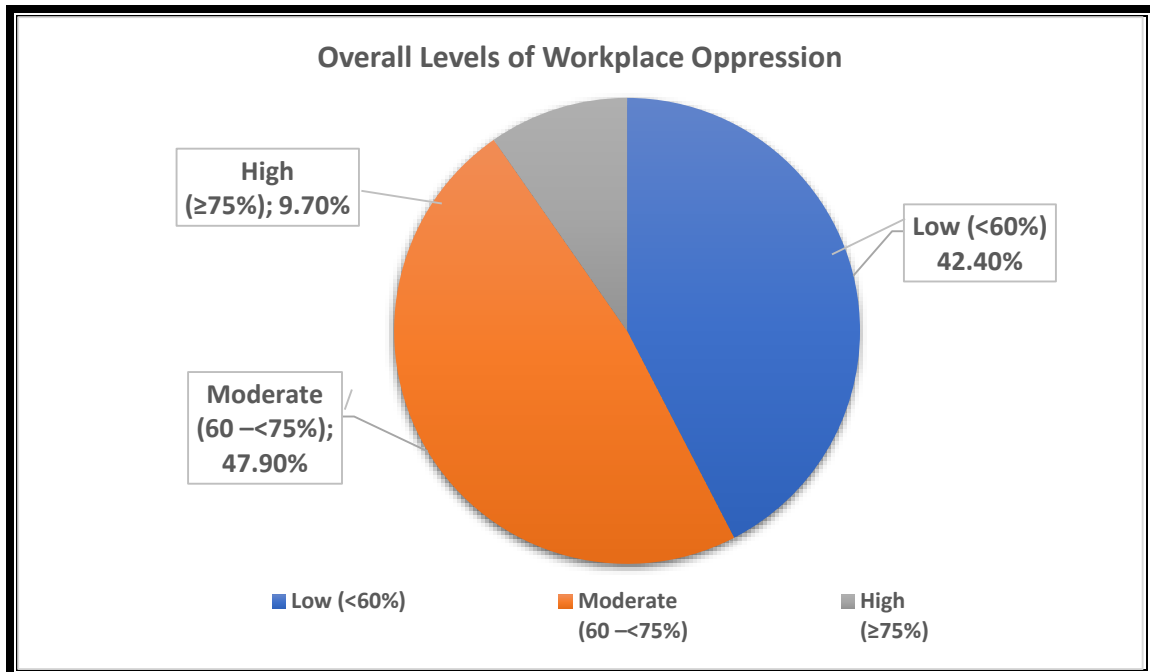


Figure (1): Overall levels of nurses' perceptions of workplace oppression

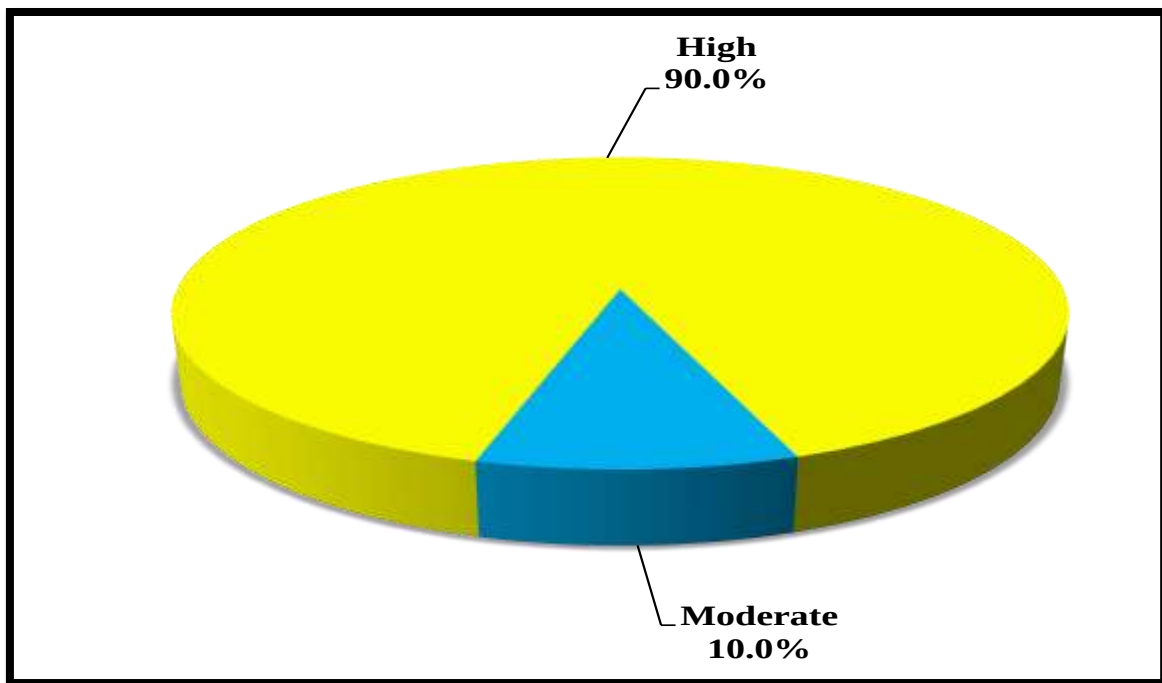


Figure (2): Overall levels of nurses' moral courage

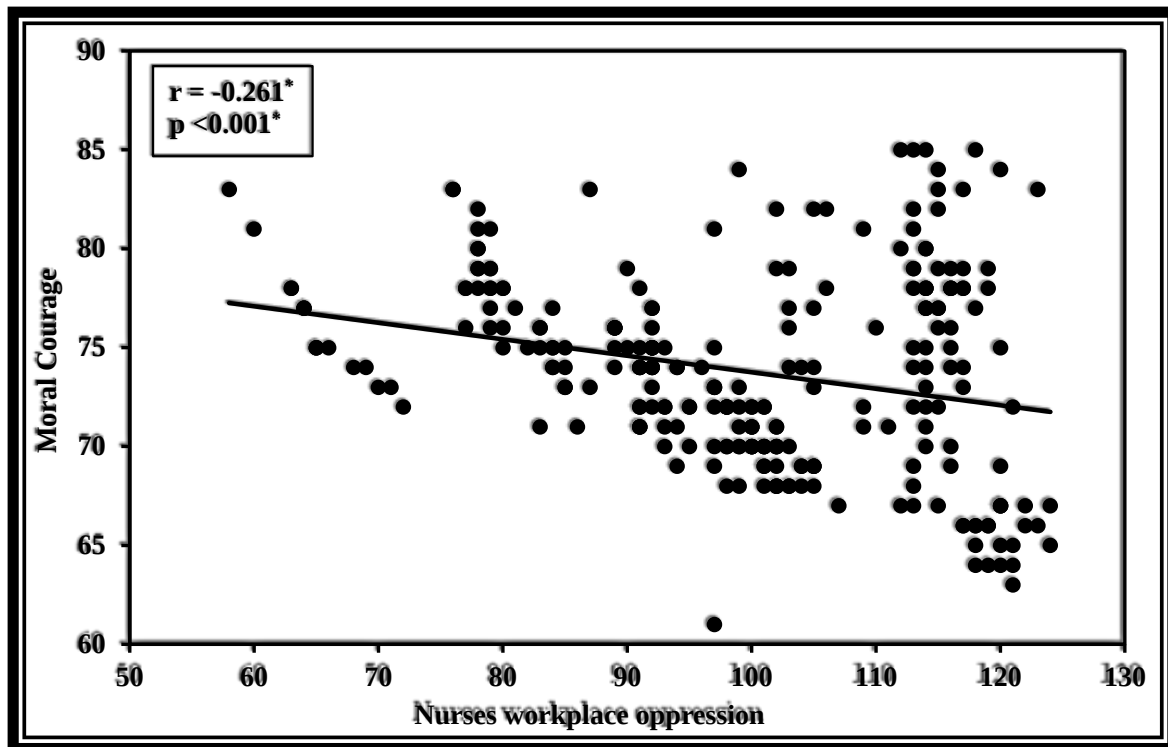


Figure (3): Correlation matrix between overall nurses' perceptions of workplace oppression and their moral courage

Table (4): Linear regression between nurses' perceptions of workplace oppression and their moral courage

Study's variable	B	Beta	t	P
Workplace Oppression	-0.083	-0.261	4.418*	<0.001*
$R^2=0.068$, adjusted $R^2=0.065$, $F=19.521$, $p<0.001$ *				

Discussion:

Workplace oppression is a crucial challenge that nurses face, leading to negative outcomes. It not only diminishes nurses' performance but also contributes to decrease levels of self-confidence, increase feelings of powerlessness, a lack of control, disappointment, aggression, and moral distress related to their work

environment. Workplace oppression has significant consequences for nurses' productivity and their tolerance for workload. Nurses need moral courage to act accordingly to be professional nurses. Therefore, this study aimed to assess the influence of workplace oppression on nurses' moral courage.

Nurses' workplace oppression

Results of the study showed that around half of nurses had a moderate perception level of workplace oppression, while slightly more than one-third of them had a low perception level and only a few percent of them had a high perception level of workplace oppression. These findings may be due to that more than half of the nurses had more years of experience that make them deal with oppression effectively. Moreover, nurses often do not speak up against unethical behavior or poor patient care practices because they fear job loss, exclusion, or further victimization by superiors and peers. This fear is a direct result of an oppressive system where reporting misconduct leads to negative consequences rather than corrective action.

These results in agreement with the study conducted by **Stanciel et al. (2022)** displayed that the vast majority of nurses experienced moderate workplace oppression. **Van Bewer, Woodgate, Martin & Deer (2021)**, claimed a moderate overall prevalence of workplace oppression among nurses due to nurses' keen to prove themselves in their work and positive contribution in quality of patient care. In this context, **Balanon-Bocato (2018)** highlighted the persistent culture of oppression within the nursing profession, which compels nurses to recognize their significance and

assertively advocate for their roles as integral members of a multidisciplinary health team.

Likewise, **Chakraborty, et al. (2021)** reported that nurses lower in the hierarchy experienced higher levels of oppression, which are linked to dominance, lack of initiative, and fear of retaliation. Negative consequences of oppression resultant decreased workforce performance, dissatisfaction, self-hatred behavior, submissive aggressive syndrome, horizontal and lateral violence, workplace bullying and poor retention of nurses in the same workplace.

On the other hand, **Slayter, Singh, & Johnson, (2023)** discovered that nurses experienced a high level of workplace oppression caused by disrespect from their colleagues and physicians, rather than receiving the respect, recognition, and rewards that could lead to satisfaction, improved workforce performance, and self-esteem. The studies of **Salami et al. (2023)** and **Butler & Robson (2021)** documented that nurses reported having low workplace oppression due to decreased workload and working hours.

Nurses' moral courage

The current study revealed that the vast majority of nurses had a high level of moral courage. This result may be attributed to the fact that nurses'

professional roles involve managing complex relationships with patients within the healthcare system. On a daily basis, the wide range of interactions at work necessitates greater power, specialized knowledge, and clinical skills, which in turn cultivate a higher level of moral courage. These nurses require moral courage to deliver basic care, which helps them avoid potential unethical behaviors and make sound ethical decisions.

Similarly, **Hthelee, Sadooghias, & Kermanshahi (2023)** explored the moral courage of Iraqi nurses during the COVID-19 pandemic and reported a high level of moral courage among this group. **Basri et al (2023)**, who reported that the majority of nurses had high moral courage due to defend the good rights of patients in the case of insufficient resources or professional competence, compromise or coercive practices that threaten the good care of patients.

Hu, Liu, Zhu, & Zhou (2022) noted an above-average level of moral courage in a tertiary hospital in Wuhan, China. In the same vein, the Egyptian study of **Atia & Abdelwahid (2023)** collected a simple random sample of nurses working in Alahrar Teaching Hospital, Zagazig, who, providing direct patient care, had high levels of moral courage. Moreover, **Shokouhi, Torabi, Salimi, & Hojilloo (2024)** displayed a high level of

professional moral courage, with an average mean score among emergency medical services providers.

Conversely, **Ali & Khalifa (2025)** study documented that more than half of the nurses had a moderate level of moral courage and more than one-quarter of them had a low level of moral courage. Moreover, **Heggestad, Konow-Lund, Christiansen & Nortvedt (2022)**, who stated that nurses with lower professional identity often exhibit less work enthusiasm, which in turn affects their moral courage.

Correlations between study variables

The present study's findings indicate a statistically significant negative correlation between nurses' moral courage and workplace oppression. This finding reflects that higher level of moral courage is associated with lower levels of workplace oppression and vice –versa. This is because nurse with moral courage is more likely to speak up against unethical practices or mistreatment, challenging oppressive behaviors of others. However, this courage often comes at the cost of negative personal consequences such as retaliation, isolation, or even job loss, which can be a form of oppression in itself.

Mollaei et al. (2025) concluded that higher levels of clinical work experience are often associated with increased moral courage and the ability to defend what is

right. while **Sadeghi, Hasani, Kordi, Roshanfekr, & Jalili (2025)** reported that nurses with official employment may exhibit higher levels of moral courage. Furthermore, **Mohammadi et al (2022)** discovered that older nurses with more work experience tend to show higher moral courage, suggesting a developmental aspect to confronting oppression situations.

On the other side, **Young et al. (2021)** displayed a significant association between workplace oppression and moral courage that found workplace oppression impacted negatively on nurses' moral courage. In the same context, **Dillard & Walker (2022)** reported that moderate workplace oppression negatively impacts on nurses' moral courage.

Regression between the study's variables

The study's results indicate a negative statistical contribution between nurses' workplace oppression and their moral courage; higher levels of oppression are linked to lower levels of moral courage. In agreement, **Alshammari & Alboliteh (2023)** who found that a constant state of oppression and moral distress that led to feelings of powerlessness, guilt, and a diminished sense of worth. This can make nurses less likely to speak up or act in a morally courageous way.

Furthermore, **Baumert, Merup, Klümper&Sasse (2024)**. documented that when nurses' moral courage is compromised, it can negatively affect their ability to provide quality patient care and can lead to poorer patient outcomes.

Khoshmehr, Barkhordari-Sharifabad, Nasiriani, & Fallahzadeh (2020) reported that workplace environments characterized by high levels of oppression directly contribute to a reduction in nurses' moral courage, which is essential for ethical practice and patient advocacy. When nurses feel silenced or undervalued, they may be less likely to speak up about patient safety concerns, workplace injustices, or ethical dilemmas. Additionally, **Rakhshan, Mousazadeh, Hakimi, & Hosseini (2021)** declared that fostering a culture of psychological safety and respect free from any forms of oppression contributes to empowering nurses to act with moral courage.

Conclusion

Based on the findings of the present study, it was concluded that less than half of nurses had a moderate perception level of workplace oppression; however, the vast majority of them had a high level of moral courage. Furthermore, a statistically significant negative statistical correlation was found between overall

nurses' perception of workplace oppression and their moral courage.

Recommendations

Based on the study's results, the following recommendations were suggested;

For hospital administrator:

- Develop policies and practices with clearer guidelines to avoid ambiguity regarding what nursing professionals should do while oppressed.
- Establish a training workshop for nurse managers about the meaning, reasons, and management of workplace oppression and its impact on nurses' moral courage.
- Build a resilient organizational culture that influences nurses' health and wellbeing, including job control and design, a feeling of being treated fairly, and job security.

For nurses:

- Promote a just culture that focuses on teamwork, communication, and a collaborative work environment to encourage nurses to speak courageously about safety concerns and unethical practices without fear of unfair blame.
- Allow nurses to choose the most appropriate method for reporting to choose the way that they are most comfortable with, increasing the likelihood of disclosure.
- Keep a detailed, factual, written record (a diary) of all incidents, including dates,

times, locations, what was said or done, and any witnesses to make a formal complaint.

- Access confidential counseling services to manage the psychological impact of oppression.
- Follow the formal grievance procedure outlined in the organizational policy.

For nursing education:

- Integrate the topic of workplace oppression into the nursing curriculum equips future nurses with the knowledge and skills to identify, address, and prevent these harmful dynamics, ultimately fostering safer work environments and improving patient care.
- Utilize established models and frameworks to help nursing students develop moral courage and navigate ethical dilemmas.
- Create safe learning environments where nursing students feel psychologically safe to speak up and report incidents without fear of reprisal.

For further research

- Conduct future research to categorize the adverse effects of workplace oppression, especially on nursing staff health, patients' safety, and organizational cost.

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Relation between Organizational Safety Climate and Continuity of Patients' Care among Nurses

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Abstract

Background: Healthcare organizational safety climate promotes nurses' adherence to safety regulations, reduces stress levels as well as medical errors, and can result in improving nurses' performance and continuity of patient care. **Aim of the study:** To assess the relation between organizational safety climate and continuity of patients' care among nurses. **Research design:** A descriptive-correlational research design was utilized. **Setting:** The study was preceded at Samannoud Central Hospital, affiliated to the Ministry of Health and Population. **Subject:** The study subject comprised a stratified random sample of (n=265) nurses. **Tools:** Two tools were used to collect data. Organizational Safety Climate Questionnaire, and Patient Continuity of Care Observational Checklist. **Results:** 40.4% of nurses had a moderate perception level of overall organizational safety climate. 80% of the studied nurses had satisfactory practice of continuing patient care. **Conclusion:** There was a statistically significant positive correlation between nurses' perception of organizational safety climate and level of continuity of patient care. **Recommendations:** The hospital management needs to conduct continuous in-service training for nursing staff to update nurses' knowledge and skills about organizational safety climate and best practice interventions.

Keywords: Continuity of Patient Care, Nurses, Organizational, Safety Climate

Introduction

Healthcare organizations strive to deliver safe, effective, and high-quality patient care. Nurses are responsible for providing direct patient care, which exposes them to numerous hazards, such as biological, physical, chemical, mechanical, ergonomic, and psychological hazards, including burnout and high stress levels. This stress can lead to emotional fatigue, increasing the risk of medical errors and missed or delayed nursing care, ultimately affecting the continuity of patient care **(Waterfield & Barnason, 2022; World Health Organization, 2025)**.

Organizational safety climate refers to nurses' perception of safety policies, practices, and procedures, as well as how they are prioritized and handled within the healthcare organization **(Rozani & Abdelhadi, 2025)**. A positive safety climate leads to a stronger, more positive organizational culture, improves nurses' morale, productivity, and job satisfaction, and reduces turnover **(Franco et al., 2024)**. In contrast, a negative organizational safety climate puts nurses at risk for errors, which in turn compromises patients' health **(Silva et al., 2021)**.

Organizational safety climate encompasses various dimensions: management commitment, management priority, organizational communication, and organizational participation. Management commitment is the senior

management's effort to address and manage nurses' wellbeing concerns, prevent stress, and provide support. Management priority arises when management prioritizes nurses' safety and emotional status over organizational productivity goals **(Jo, 2023)**.

Organizational communication helps nurses to feel safe to express their concerns and complaints, even when dealing with an unfavorable environment. Organizational participation raises nurses' safety awareness and enables them to collaborate with management to improve nurses' wellbeing and safety **(Hu, Dollard & Taris, 2022)**. A culture of organizational safety emphasizes open, shared communication, reporting possible dangers, and following patient safety rules, all of which improve the continuity of patient care **(Loureiro et al, 2023)**.

Continuity of patient care refers to the degree to which a sequence of medical events is coherent, interconnected, and aligned with the patient's needs and conditions **(Khatri et al., 2023)**. Continuity of patient care covers various dimensions, including giving medication, measurement and recording vital signs, assessment and recording fluid balance, laboratory investigation, and implementation of nursing intervention **(Abd El-Hamed, 2020)**.

Giving medication is a complex, risky procedure of direct administration of prescribed medicine to patients **(Tariq, Vashisht, Sinha & Scherbak, 2024)**.

Vital signs refer to measurements of the body's most basic functions, including temperature, pulse, respiration, and blood pressure (**Almarshad et al, 2022**). Fluid balance charts are used frequently by nurses to assess the patient's fluid status over 24 hours and include oral and intravenous fluids input and urine, vomit, and drains output (**Samoni et al., 2019**).

Laboratory investigations are systematic scientific processes to analyze blood, urine, or body tissue samples, starting from ordering an investigation, implementing it, sending it, and ending with getting the result (**Castillo, Sánchez & Peñafiel, 2024**). Nursing intervention is any action a nurse takes to help facilitate a patient's care plan and improve the patient's comfort and health (**Grand Canyon University, 2023**). The nurse's response refers to how nurses address and manage missing or delayed care, such as prioritizing patient safety, neglecting or reporting omitted care (**Nantsupawat et al., 2022**).

Significance of study:

Nurses practice in a fast-paced and challenging environment, where precise decisions are made, and minimizing medical errors is needed to deliver optimal patient care. A supportive organizational culture that values nurses and cares about their welfare and safety affects nurses' performance levels, makes nurses feel safe to voice safety issues without fear (**Pereira et al., 2024**). Prior studies found that nurses' perception of

an average workplace environment and a good culture that encourages patient safety correlated negatively with low missed nursing care (**Ibrahim & Abohabieb, 2020; Zeleníková, Jarošová, Plevová, & Janíková, 2020**).

As nurses are required to treat patients with evolving needs and complicated conditions, they suffer from increased workload, insufficient staff, inadequate resources, and ineffective communication. These factors have been found as contributing to omitted nursing care that can negatively affect nurses' abilities of continuing patient care (**Babaei et al, 2024**).

Aim of the study: The aim of the study was to assess the relation between organizational safety climate and continuity of patients' care among nurses.

Research Questions:

- What are the levels of nurses' perception of organizational safety climate?
- What are the levels of nurses regarding continuity of patient care?
- What is the relation between nurses' perception of organizational safety climate and continuity of patients' care?

Study Design

A descriptive-correlational research design was employed to achieve the aim of the study.

Setting

The study was conducted at Samannoud Central Hospital, affiliated to the Ministry of Health and Population,

located in El Gharbia Governorate. The hospital consists of two buildings with a 183-bed capacity. The hospital contained different Intensive Care Units (ICUs), different departments as Medical, Pediatric, Surgical, Gastrointestinal, Dialysis, Obstetrics and Gynecology, Emergency Reception Department, Gastrointestinal Endoscopy Unit, and two Operating Rooms for different specialties, and different outpatient clinics. The hospital included Ancillary Services such as Laboratory and Radiology Units, Blood Bank, Pharmacy, Laundry, kitchen, Central Sterilization Unit, Morgue Refrigeration Unit, and Medical Waste Disposal Unit.

Subjects

The study subjects comprised a stratified random sample of (n=265) nurses that was selected from the total number of (851). The technique for selecting the sample from the previously mentioned setting was proportional to the number in each department. The sample size and power analysis were calculated using the Epi-Info software statistical package version 7.2.5.0.

Tools of data collection

To achieve the aim of this study, the following two tools were used for data collection:

Tool I: Organizational Safety Climate Questionnaire: It included two parts:

Part (1): Nurses' characteristic data included age, sex, marital status, number of children, place of residency, level of

education, position, units name, years of experience, and attending training programs on organizational safety.

Part (2): Nurses' Perception of Organizational Safety Climate Structured Questionnaire: This tool was constructed by the researcher guided by **Schüler & Matuszczyk, 2022; Dirik et al., 2023; and Athanasios, 2024** to assess nurses' perception of organizational safety climate; it included a total of 28 items distributed into the following four dimensions: **Management commitment** included 6 items, **Management priority** included 5 items, **Organizational communication** included 10 items, and **Organizational participation** included 7 items.

Scoring system: Nurses' responses were measured on a five-points Likert Scale ranging from strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). The total score was categorized according to cutoff points. The total score represented different levels as illustrated:

- High level of perception on organizational safety climate >75 % (Scored >105 from total score)
- Moderate level of organizational safety climate 60 - 75 % (Scored 84-105 from total score)
- Low level of organizational safety climate <60 % (Scored <84 from total score)

Tool II: Patient Continuity of Care Observational Checklist: This tool

aimed to assess the continuity of patient care through an observational checklist. It was developed by the researcher based on **Goldenhart & Nagy, 2022; Ge et al., 2023; and Rego Barbosa et al., 2024**. It included a total of 61 items that covered the following 6 dimensions: **Assess giving medication**, included a checklist of 23 items, **Measure and record vital signs**, included 5 domains (7 checklist), **Assess and record fluid balance** included 4 domains (2 checklist), **Record laboratory investigations** included 4 items, and **Implement nursing intervention** included 47 items classified into 14 domains. **Assess nurses' response** to the missing nursing intervention. It included 17 items.

Scoring system: Observed continuity of patient care was checked against a 4-points Likert scale as follows: Done correctly (3), partially done (2), not done or wrongly done (1), and not applicable (0). The total score was summed up and classified at cutoff points into levels as follows:

- Satisfactory practice of continuing patient care ≥ 80 (Scored ≥ 147 from total score)
- Unsatisfactory practice of continuing patient care < 80 (Scored < 147 from total score)

Method

1. The permission of the official authorities to conduct the study was obtained from the dean of the Faculty of Nursing-Tanta University, as well as the

responsible authorities in Samannoud Central Hospital.

2. Ethical considerations:

- The approval of the Scientific Research Ethical Committee of the Faculty of Nursing, Tanta University, was obtained with code number (367-1-2024).
- The type of the present study did not harm or cause pain to the nurses.
- Nurses' oral consent to join the study was obtained after informing them about the privacy of the information obtained, and the confidentiality of their names. Their right to withdraw was reserved.
- The aim of the current study was clearly explained to nurses and hospital managers.
- **Tools of data collection** were constructed by the researcher, guided by recent related literature and translated into Arabic.
- The tools of data collection were tested by a jury of five experts in the Nursing specialty to check the content validity of the tools.
- The experts were one Professor and two assistant professors of Nursing Administration, one Professor of Medical-Surgical Nursing, and one assistant professor of Critical Care Nursing from the Faculty of Nursing, Tanta University.
- The jury of experts' responses were measured on a four-points Likert Scale ranging from (4-1); 4= strongly relevant,

3= relevant, 2= little relevant, and 1= not relevant.

- Required modifications were done, including the omission of certain items, clarification, and the use of work-related terms.

- Face validity content index of tool (I) was 76% and tool (II) was 79.5%

3. A pilot study was carried out on 10% (n=27) of nurses' sample, and they were not included in the study subject to test the tools for feasibility and reliability.

4. Cronbach's Coefficient Alpha Test was used to test the reliability of tool (I) was 0.878, and for tool (II) was 0.922

5. **Data collection phase:** The data was collected by the researcher from Samannoud Central Hospital. Before beginning to collect data from nurses, the researcher met nurses individually at their work setting, introduced herself to them, and explained the aim of the study.

- The researcher distributed the questionnaire sheet (Tool I), and it was completed in the presence of the researcher to ascertain that all questions were answered. The estimated time needed to complete the questionnaire was around 15 minutes.

- Continuity of patient care was assessed using an observational checklist (Tool II) to observe all nursing tasks and activities.

- The data of Tool II was collected by the researcher for each nurse three times on three different shifts (Morning, afternoon, and night). The mean scores

were calculated for the observation in three shifts. The estimated time needed to complete the observational checklist was around three hours.

- The data was collected over six months from June 2024 until November 2024.

6. Statistical Analysis:

Data were organized, tabulated, and statistically analyzed using SPSS v20.0. Qualitative data were described using numbers and percentages. The K-S test was used to verify the normality of the distribution. Quantitative data were described using range (Minimum and maximum), mean, standard deviation, and mean percentage. Pearson's r was used to calculate the correlation between two normally distributed quantitative variables.

Results

Table (1): illustrates nurses' characteristic data. The table shows that the mean age of nurses was 28.75 ± 3.533 years. Around two-thirds (62.6%) of nurses were in the age group between 21 to less than 30 years. Concerning sex and marital status, the majority (87.5% and 84.9%) of nurses were female and married, respectively. More than half (52.1%) of nurses had 1-2 children. Regarding place of residency, more than one-half (56.6%) of nurses lived in rural areas.

In relation to the level of education, the highest percentage (69.8%) of nurses had Associate Nursing Degrees. The table

also shows that the highest percentage (76.2%) of them were staff nurses. Around half (49.8%) had between 5 to less than 10 years of experience, with mean 7.30 ± 3.970 years of experience. More than three-quarters (77.7%) of nurses participated in training programs related to organizational safety.

Figure (1): illustrates nurses' distribution according to work units. It was observed that the highest percentage (10.6%) of nurses worked in the General ICU. An equal percentage (9.8%) of nurses worked in Medical, Pediatric, and Cardiac ICUs. And only (5.7%) of them worked in the Gastrointestinal ICU.

Figure (2): illustrates nurses' levels of overall perception of organizational safety climate. Less than half (40.4%) of nurses had a moderate perception level of overall organizational safety climate.

Figure (3): illustrates nurses' levels of perception regarding organizational safety climate dimensions. Less than half (46.8% and 40.4%) of nurses had a moderate level of perception regarding organizational communication and management priority dimensions of organizational safety climate, respectively.

Figure (4): illustrates nurses' levels of overall continuity of patient care. This figure shows that the majority (80%) of studied nurses had satisfactory practice of continuing patient care.

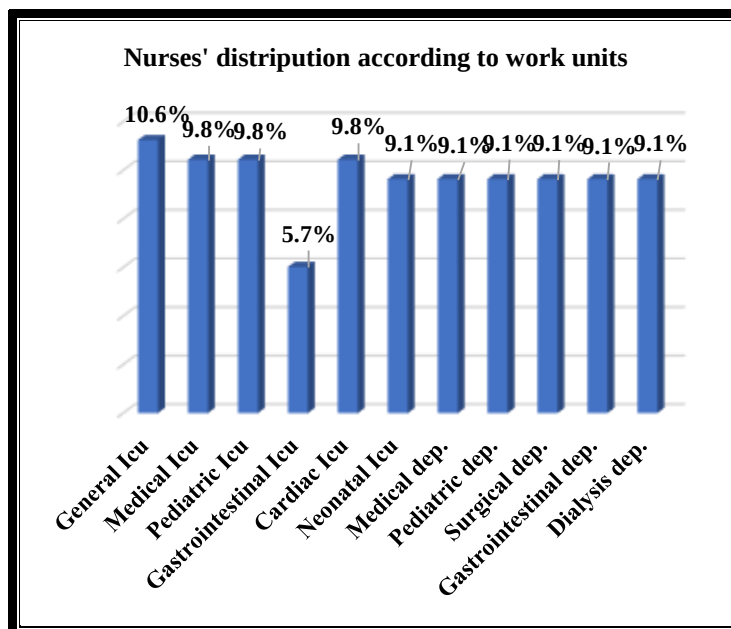
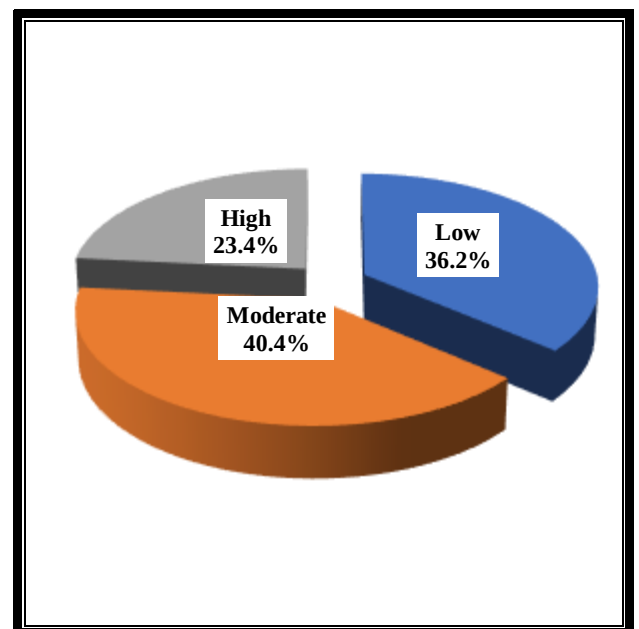
Table (2): illustrates nurses' ranking regarding continuity of patient care

dimensions. The highest-ranking dimension was giving medication, with a mean score of 2.95 ± 0.208 . The lowest ranking dimension was implementing nursing intervention, with a mean score of 83.27 ± 15.666 .

Figure (5): illustrates the correlation between nurses' perception level of organizational safety climate and levels of continuity of patient care. The figure revealed that there was a statistically significant positive correlation between nurses' overall perception levels of organizational safety climate and nurses' practice levels of continuity of patient care ($r = 0.633$, $P = 0.044^*$)

Table (1): Nurses' characteristic data. (n=265)

Characteristics	Nurses (n=265)		Characteristics	Nurses (n=265)	
	N	%		N	%
Age (in years)			Level of nursing education		
(21-<30)	166	62.6	Nursing Diploma	16	6.0
(30-<40)	99	37.4	Associate Nursing Degree	185	69.8
Range	(21-39)		Bachelor of Nursing Degree	48	18.1
Mean ± SD	28.75±3.533		Postgraduate studies	16	6.0
Sex			Position		
Male	33	12.5	Staff Nurse	202	76.2
Female	232	87.5	Registered Nurse	63	23.8
Marital status			Experience (in years)		
Married	225	84.9	(1-<5)	65	24.5
Unmarried	40	15.1	(5-<10)	132	49.8
No. of children			(10-<15)	52	19.6
None	76	28.7	(≥15)	16	6.0
1-2	138	52.1	Range	(1-21)	
3-4	51	19.2	Mean ± SD	7.30±3.970	
Place of residency			Training program on organizational safety		
Rural	150	56.6	Yes	206	77.7
Urban	115	43.4	No	59	22.3

**Figure (1): Nurses' distribution according to work units (n=265)**

High > 75 % Moderate (60-75) % Low < 60 %

Figure (2): Nurses' levels of overall perception of organizational safety climate. (n=265)

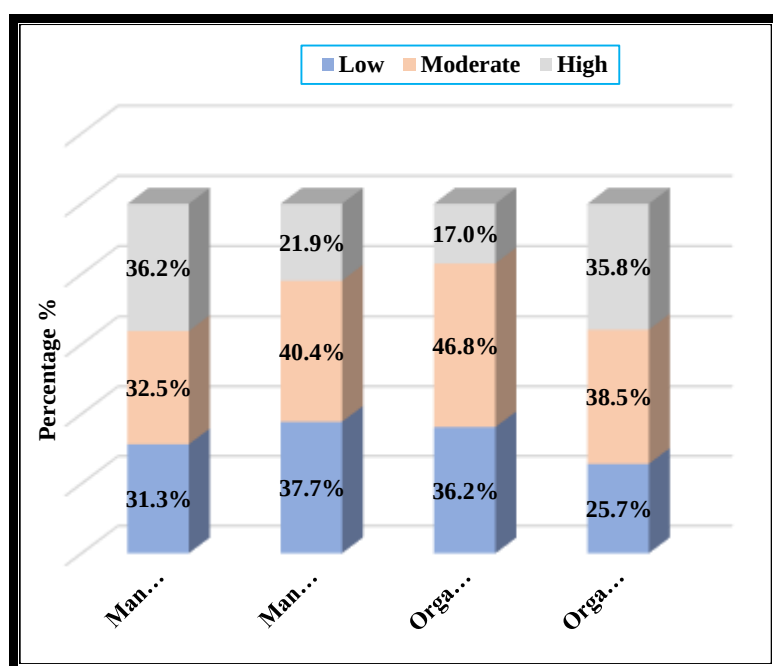
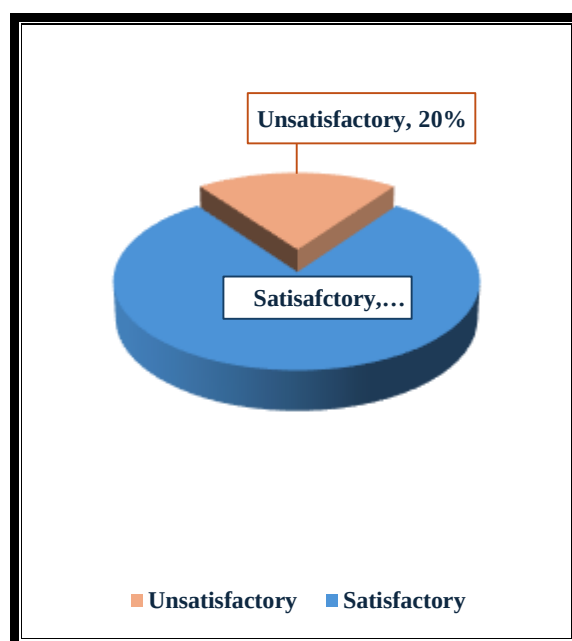


Figure (3): Nurses' levels of perception regarding organizational safety climate dimensions. (n=265)



(<80%) Unsatisfactory (≥80%) Satisfactory

Figure (4): Nurses' levels of overall continuity of patient care. (n=265)

Table (2): Nurses' ranking regarding continuity of patient care dimensions (n=265)

Continuity Dimensions	The studied nurses (n=265)					
	No items	Min	Max	Mean ± SD	Mean percentage %	Rank
Giving medication	1	2	3	2.95±0.208	98.3	1
Vital signs	5	7	15	12.67±1.953	84.5	2
Fluid balance	4	5	12	7.83±2.589	65.3	4
Laboratory investigations	4	4	12	10.07±3.241	83.9	3
Implement nursing intervention	47	61	135	83.27±15.666	59.1	5
Total continuity score	61	79	182	161.38±15.137		

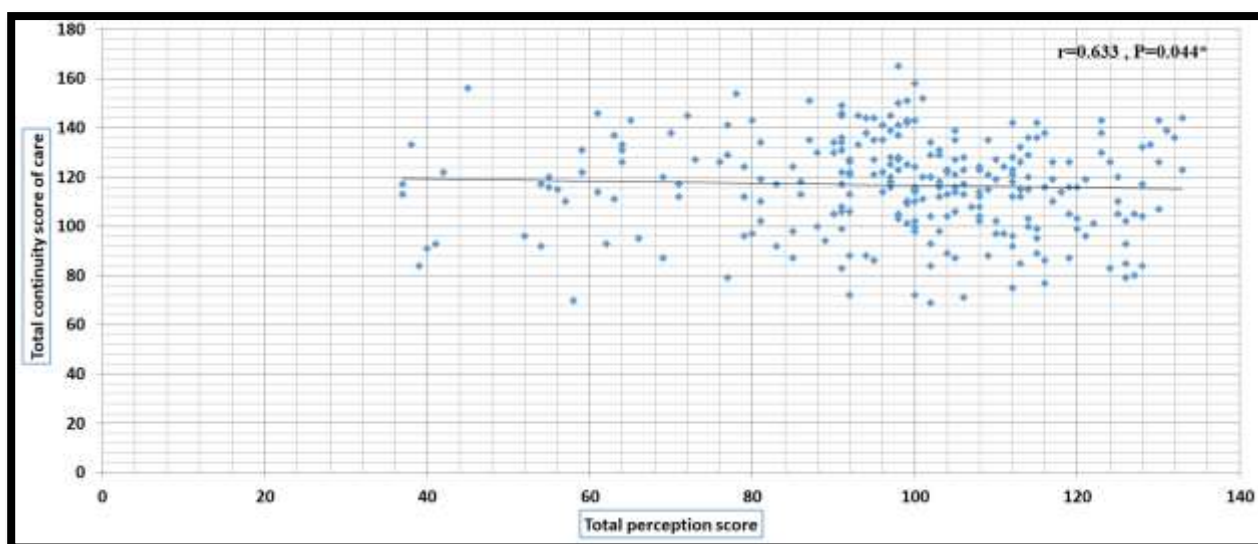


Figure (5): Correlation between nurses' perception level of organizational safety climate and nurses' practice levels of continuity of patient care

Discussion

The organizational safety climate reflects nurses' perception of how healthcare management prioritizes safety. A culture of safety improves risk management, reduces errors and associated costs, boosts nurses' productivity, and ultimately leads to better patient outcomes (**Schüler & Matuszczyk, 2019**).

Continuity of care involves nurses delivering coordinated, seamless, integrated, and high-quality patient care. Good continuity enhances patient health outcomes, better engagement, increases satisfaction, and decreases readmissions (**Wong, Tung, Peck & Goh, 2019**). Thus, the study aimed to explore the relation between organizational safety climate and continuity of patient care among nurses.

Nurses' perception of organizational safety climate.

Based on the results of the current study, less than half of nurses had a moderate perception level of overall organizational safety climate. This can be due to the highest percentage of nurses had less than 30 years of age, and the majority of them had less than 10 years of experience. This may also be justified as less than half of nurses had a moderate level of perception regarding organizational communication and management priority dimensions of organizational safety climate. Around one-third of nurses had low perception level regarding organizational communication and management priority dimensions of organizational safety climate.

The findings of the current study were consistent with **Kılıç & Altuntaş (2019)** presented that the staff had a moderate perception of the organizational climate. In contrast to these findings, according to **Ali et al., (2022)** nurses had a low and unfavorable perception of safety climate. According to **Abd-Alla et al., (2024)**, most nurses had a positive and high organizational safety climate perception.

The current study findings showed that less than half of nurses had a moderate perception level regarding the management priority dimension of organizational safety climate. This may be justified as less than half of nurses disagreed that hospital management viewed nurses' well-being as a priority and regarded their psychological health as important as productivity.

These results aligned with **Harendsa & Islami (2025)** revealed that there was a moderate perception regarding management priority among staff. While this finding was incongruent with **Abegaz, Deressa & Moen (2025)** found that staff perceive management priority as low.

The present study findings illustrated that less than half of the nurses had a moderate perception level concerning the organizational communication dimension of organizational safety climate. This can be owing to more than one-third of nurses disagreed that

hospital management listened to them and cared about their concerns, and more than one-quarter of nurses disagreed that hospital management discussed potential impacts of workplace conditions on psychological health and informed them about workplace well-being by supervisors.

In the same context, **Harendsa & Islami (2025)** showed that there was a moderate perception regarding organizational communication. The study disagreed with **Shohet, Naveh, & Shahin (2025)** noted that there was a high perception regarding organizational communication among workers. Conversely, **Christofilea et al., (2025)** showed that there was a low perception regarding organizational communication.

Nurses' continuity of patient care.

The results of the current study showed that the majority of nurses demonstrated satisfactory overall practice in continuing patient care. This may be due to the majority of nurses demonstrated satisfactory practice level regarding medication giving, vital signs measurement, and laboratory investigation dimensions of nurses' continuity of patient care, which were considered the core elements of nursing care practice.

This result was consistent with **Ghonem & El-Husany (2023)** demonstrated that a high percentage of nurses had satisfactory nursing practice.

This result was inconsistent with **Ahmed, Abo Elmagd & Hossny (2023)** noted that the majority of nurses had an average level of continuity of patient care.

Regarding giving medication dimension of nurses' continuity of patient care, the majority of nurses demonstrated a satisfactory practice level. This can be due to majority of nurses gave and documented medication orders. Further, this dimension was the highest-ranked dimension in mean percentage. This can be explained that most nurses adhered to medication guidelines and protocols, including the ten rights of medication administration. To ensure patient safety, nurses were aware of possible allergies and communicated with their patients to encourage them to address any concerns. This helped nurses to ensure safe and effective medication administration, resulting in improved patient outcomes.

This result aligned with **Al-Kasseh et al., (2023)** noted that most nurses had a high level of good medication administration performance. This result contradicted **Abozeid, Mohammed Sheble & Elshamy (2025)** presented that around half of nurses had unsatisfactory practice levels regarding medication administration.

Regarding the vital signs dimension of continuity of patient care, a high percent of nurses demonstrated

satisfactory practice level. This may be due to majority of nurses correctly measured vital signs. This result was supported by **Dall'Ora et al., (2021)** announced that the majority of nurses completely measured and recorded vital signs in the hospital. Additionally, **Peate (2024)** declared that pulse, respiration, and blood pressure were the most frequently documented vital signs among nurses. This result was inconsistent with **Considine et al., (2023)** noted that nurses measured respiratory rate less frequently, despite its significance in the detection of patients' deterioration.

Correlation between organizational safety climate perception level and continuity of patient care.

The results of the present study illustrated a statistically significant positive correlation between nurses' perception of their organizational safety climate and their level of patient continuity of care. From the researcher's point of view, this could be due to that a positive organizational safety climate made nurses dedicated to ensure safe patient care and felt empowered to recognize and report possible risks. Competent nurses in their practice were more inclined to be involved in their organization's safety climate and were more prone to identify and report safety issues. Furthermore, nurses who possessed the necessary knowledge, skills, and abilities to

provide safe care were less likely to make mistakes that could result in negative patient outcomes.

The findings of the current study were consistent with **Shahnavazi et al., (2021)** found that there was a statistically significant correlation between perceived organizational climate and nurses' job performance. Besides, **Baroun (2025)** demonstrated that organizational safety enhances job performance by fostering a nurturing workplace where staff members can express their concerns and suggestions without fear of repercussions.

Conclusion

Based on the findings of the present study, it can be concluded that less than half of nurses had a moderate perception level of overall organizational safety climate. The majority of nurses had satisfactory practice of continuing patient care. There was a statistically significant positive correlation between nurses' perception of organizational safety climate and nurses' level of continuity of patient care.

Recommendations

Based on the results obtained from the current study, the following were recommended:

For the hospital management:

- Conduct continuous in-service training for nursing staff to update nurses' knowledge and skills about

organizational safety climate and best practice interventions.

- Prioritize nurses' well-being and psychological health as important as productivity and declared this in hospital goals and policies.
- Establish an open-door policy, involve nurses in safety policies creation, and consider nurses' suggestions.
- Conduct stress reduction programs for nurses and training programs about effective communication.
- Provide support to clinical nursing leaders and ensure nurses' involvement in decision-making processes.

For head nurses:

- Encourage nurses to learn from own and other nurses' mistakes.
- Provide nurses with emotional support and act as a communication bridge between nurses and hospital management.
- Ensure adequate staffing and advocate for required resources needed for safety and high-quality patient care.

For nurses:

- Voice safety concerns to supervisors and provide feedback through communication channels.
- Collaborate with the college to encourage teamwork and peer support and boost morale.
- Continuously adhere to safety standards and procedures and evidence-based patient care protocols.

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Influence of Occupational Hardiness on Nurses' Quality of Work Life

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Abstract

Background: Addressing occupational hardiness is essential for enhancing intensive care nurses' job satisfaction, promoting emotional resilience, reducing burnout, and improving the ability to maintain work-life balance. **Aim:** To investigate the influence of occupational hardiness on nurses' quality of work life. **Research design:** A comparative-correlation design was utilized. **Setting:** The study was implemented in intensive care units at Tanta University Main and Kafr Elsheikh General Hospitals. **Subjects:** All (437) intensive care nurses were included in the study from both hospitals. **Tools:** To collect data of the present study two tools was used; Nurses' Occupational Hardiness Questionnaire, and Nurses' Quality of Work Life Questionnaire. **Results:** 66.8% of intensive care nurses at Tanta University Main Hospital and 61.5% at Kafr Elsheikh General Hospital had a high level of total occupational hardiness. 37.8% of intensive care nurses at Tanta had a high level, while 52.3% of nurses at Kafr El Sheikh had a low level regarding total quality of work life. **Conclusion:** There were statistically significant positive correlations between intensive care nurses' occupational hardiness and quality of work life at both hospitals. **Recommendations:** The hospital management at both hospitals need to implement strategies to enhance occupational hardiness and stress management skills to improve quality of work life.

Keywords: Intensive Care Nurses, Occupational Hardiness, Quality, and Work Life

Introduction

Hospitals are complicated healthcare facilities that offer services for patients 7/ days /24 hours through professionally trained nurses who must be knowledgeable about modern and medical and nursing sciences. Nurses are considered the backbone of any healthcare system that spends most of time at the hospitals **(Sibuea, Sulastiana, & Fitriana, 2024)**.

In particular, nurses working in Intensive Care Units (ICUs) have a serious role in the delivery of challenging and complex care, where the care provided is more critical than that provided in other hospital departments **(Ageel & Shbeer, 2022)**. So, IC nurses are required to be equipped with occupational hardiness skills to face unstable, complex, and unpredictable change in the healthcare environment **(Perveen, 2022)**.

Occupational hardiness is viewed as the capacity of IC nurses to cope successfully with environmental uncertainties while showing high resistance to occupational stressors. Occupational hardiness consists of three interrelated characteristics: commitment, control, and challenge **(Sultanov & Davydova, 2024)**.

First, commitment is defined as a tendency to participate deeply in life's activities and to be genuinely

interested in and curious about activities, things, and other people in the environment **(Ebrahimi et al., 2025)**. Second, control is related to the nurses' autonomy level and the ability to influence effectively on nurses' own life. And finally, challenge denotes the feeling of looking forward to change as an exciting opportunity for further development and represents a form of life energy that leads nurses to view obstacles as chances for personal growth rather than as dangers to life and health **(Bartone et al., 2023)**.

Nurses with a high level of hardiness typically employ more flexible coping mechanisms that encourage nurses to take actions to eliminate the main sources of stress, foster a strong sense of commitment, and active participation in life. As a result, occupational hardiness can lead to greater job satisfaction, and an overall enhancement in quality of work life **(Grala & Baka, 2022)**.

Quality of work life (QWL) is a complex and multi-dimensional concept that describes nurses' satisfaction with several work-life components, feeling secure at job, being satisfied at job, work environment, job affairs, career prospects, and nature of job. Nurses' quality of work life is defined as the

level to which IC nurses can meet the essential and personal needs through the experiences in the workplace. IC nurses' quality of work life consists of four main dimensions including: work life – home life, work design, work context, and work world (**Al Mutair et al, 2022**).

The dimension of work life-home life is known as the interface between the nurses' work and home lives. The dimension of work design is about the nurses' work and the description of the actual work that IC nurses perform. The dimension of work context encompasses the practice settings in which IC nurses' work and clarifies the effect of the work environment on both nurses and patients' systems. And finally dimension of work world which refer to the effects of societal influences and the changes on the nurses' performance (**Wang, Touré, Poder, 2023**).

Significance of the study

Nurses working in ICUs face highly demanding and stressful work conditions, including staff shortages, prolonged working hours, limited resources, and emotional exhaustion due to critical nature of patient care (**Mahmoud & Obied, 2022**). When IC nurses are unable to manage such workplace stressors, it can lead to

nurses' burnout, dissatisfaction, and will have serious implications for the quality of their work life. Which, in turn, can affect IC nurses' performance, quality of care provided, as well as the hospital's reputation and productivity (**Elbarbary, Shalaby, & Mohamed, 2023**).

Thus, hardiness can help IC nurses to feel supported, respected, maintain optimism during challenging conditions, enhancing job satisfaction, and reaching to patient desired outcomes. So, this study was carried out to shed light on the occupational hardiness and discover its effect on nurses' quality of work life at both settings.

Aim of the study

Investigate the influence of occupational hardiness on nurses' quality of work life.

Research Questions

1. What are the nurses' levels of occupational hardiness?
2. What are the nurses' levels of quality of work life?
3. What is the relation between occupational hardiness and nurses' quality of work life?

Subjects and Method

Research design:

A comparative-correlational design was used to carry out this study.

Setting:

This study was conducted at Tanta University Main and Kafr Elsheikh General Hospitals including (medical, cardiac, neurological, pediatric, and neonatal ICUs).

Subjects:

The study subjects included a convenient sample of all (N = 437) available nurses working in intensive care units. At Tanta University Main Hospitals (n = 307) and Kafr Elsheikh General Hospital (n = 130).

Tools of the study:

Tool I: Nurses' Occupational Hardiness Questionnaire.

It consisted of two parts: **Part 1: Personal Data:** Included age, sex, marital status, education level, average income, residence, and number of children.

Part 2 : Nurses' Occupational Hardiness Structured Questionnaire

: This part was developed by the researcher guided by **Grala and Baka, (2022) ; Moreno Jiménez, Rodríguez Muñoz, Garrosa Hernández, and Blanco Donoso, (2014)** to assess the occupational hardiness for nurses. It consisted of 26 items and divided into three dimensions as follow; **Commitment** included 7 items, **Control** included 7 items, **Challenge** included 12 items.

Scoring system:

Nurses' responses were measured by a five- points Likert Scale ranging from Strongly Disagree=1, Disagree=2, Neutral=3, Agree=4, and Strongly Agree=5. The score of each dimension summed up and converted to percent score. The total scores were summed up and classified into levels according to cut- off points where:

- $\geq 75\%$ indicated high level of occupational hardiness from (130 to 104) of total score
- 60-<75% indicated moderate level of occupational hardiness from (103 to 89) of total score
- < 60% indicated low level of occupational hardiness (< 89) of total score

Tool II: Nurses' Quality of Work Life Questionnaire. This tool was constructed by the researcher based on **Brooks, (2001); Suwandia, and Tentama, (2020)** to assess nurses' quality of work life. This tool consisted of 52 items, and it classified into four dimensions, as follows: **Work life/ home life** included 10 items, **Work design** included 18 items, **Work context** included 21 items, and **Work world** included 3 items.

Scoring system:

Nurses' responses were measured by a five-points of Likert Scale ranging

from Strongly Disagree =1, Disagree =2, Neutral=3, Agree =4 and Strongly Agree =5. The score of each dimension summed up and converted to percent score. The total scores were summed up and classified into levels according to cut - off points where:

- $\geq 75\%$ indicated high level of nurses' quality of work life from (260 to 208) of total score
- $60 < 75\%$ indicated moderate level of nurses' quality of work life from (207 to 177) of total score
- $< 60\%$ indicated low level of nurses' quality of work life (< 177) of total score

Method

1) The permission of Official authorities was obtained from the dean of Tanta Faculty of Nursing, Tanta University and was submitted to the responsible authorities at Tanta and Kafr Elsheikh Hospitals to conduct the study.

2) Ethical considerations:

- a. Approval from the Scientific Research Ethical Committee at Faculty of Nursing was obtained with code number (326-11-2023).
- b. The researcher introduced herself to the participants, a full explanation of the aim and

method of the study was done to obtain the acceptance and cooperation as well as their informed consent.

- c. The nature of the current study did not harm or cause pain to IC nurses.
- d. Confidentiality and the privacy were taken into consideration during collection of data. The nurses' names were replaced by code number.

3) Tools I and II were developed and translated into Arabic by the researcher and presented to a jury of five experts in the area of specialty to check their content validity. The experts were three professors, one assist professor, and one lecturer of Nursing Administration from the Faculty of Nursing Tanta University and the necessary modifications were done based on their opinions.

- The experts' responses were represented in four points rating scale ranged from 4= strongly relevant 3= relevant 2= little relevant and 1=not relevant. Necessary modifications were done including clarification and simplifying work related words. The content validity for tool (I) was 99,8% and for tool (II) was 100%.

4) A pilot study was carried out on a sample of (10%) of subjects $n=44$ collected from medical unit at Kafr Elsheikh University Hospital to check and ensure the clarity of the tools, identify obstacles and problems that encountered during data collection and modification was done. The pilot was excluded from the total study subjects. Time for answering each sheet took approximately 20 minutes.

5) Reliability of tools tested using Cronbach's Alpha coefficient factor, its value for tool I was 0.905 and for tool II was 0.960.

6) Data was collected by the researcher who distributed the questionnaires on nurses individually at their work setting during their work shifts morning and afternoon and according to their workload. The questionnaires were completed in the presence of the researcher.

7) Data was collected within five months from January to May 2024.

8) Statistical analysis: 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 percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution Quantitative data were described

using range (minimum and maximum), mean, standard deviation, median. Significance of the obtained results was judged at the 5% level. The tests used were, Chi-square test, Fisher's Exact, Student t-test, Mann Whitney test, Pearson coefficient, and ANOVA with repeated measures.

Results

Table (1): shows intensive care nurses' personal characteristic at both hospitals. At Tanta University main hospital, more than half (54.4%) of IC nurses fall in the age group $20 < 30$, high percent (83.7%, and 79.5%) of IC nurses were females and married, respectively. Around half (44.6%) of IC nurses had associate degree in nursing. Less than two third (62.5%) of IC nurses had not enough income monthly. According to residency, the majority (80.1%) of IC nurses were living in rural area. Around half (45.0%) of IC nurses had 1 -2 children.

Regarding Kafr El Sheikh General hospital. More than three quarters (76.2%) of IC nurses fall in the age group $20 < 30$. Around two third (68.5%, 66.2%) of IC nurses were females and married, respectively. Around half (47.7%) of IC nurses had bachelor degree in nursing science. More than half (52.3%) of IC nurses

had enough income monthly. According to residency less than three quarters (70.0%) of IC nurses were living in rural area. Around half (49.2%) of IC nurses had 1- 2 children.

Figure (1): illustrates intensive care nurses' total levels of occupational hardiness at both hospitals. There were no statistically significant differences between IC nurses at Tanta university and Kafr El Sheikh General Hospitals regarding total occupational hardiness. At Tanta University main hospital, more than two-thirds (66.8%) of IC nurses had a high level and more than one-quarter (29.3%) of IC nurses had a moderate level of perception regarding occupational hardiness. About Kafr El Sheikh General Hospital, less than two-thirds (61.5%) of IC nurses had a high level and more than one-third (35.4%) of IC had a moderate level of perception regarding occupational hardiness.

Table (2): shows IC nurses' levels of occupational hardiness dimensions at both hospitals. Regarding Tanta University Main Hospital, the majority (86.6%) of intensive care nurses had high perception level about the commitment dimension of occupational hardiness. Around two thirds (66.4%) of IC nurses and more

than half (55.4%) of IC nurses had a high-level about control and challenge dimensions of occupational hardiness, respectively.

At Kafr El Sheikh General Hospital, the majority (83.1%) of IC nurses had a high level regarding the commitment dimension of occupational hardiness. More than two thirds (67.7%) of IC nurses and around half (48.5%) of IC nurses had high perception level about control and challenge dimensions of occupational hardiness, respectively.

Figure (2): illustrates intensive care nurses' total levels regarding quality of work life at both hospitals. There were statistically significant differences between IC nurses at Tanta University and Kafr El Sheikh General Hospitals regarding total quality of work life at $p \leq 0.001$. At Tanta University Main Hospital, more than one third (37.8% and 33.9%) of intensive care nurses had a high and moderate level while, more than half (52.3%) of IC nurses at Kafr El-Sheikh General Hospital had a low perception level of quality of work life.

Table (3): shows intensive care nurses' levels of quality of work life dimensions at both hospitals. About Tanta University Main Hospital, around half (43.0%) of IC nurses had

a moderate perception level concerning work life -home life dimensions of quality of work life. While around half (41.4%, and 45.9%,) of IC nurses had high levels of perception regarding work design and work context dimensions of quality of work life, respectively. Moreover, around half (49.5%) of IC nurses had a low level of perception regarding work - world dimension of quality of work life.

At Kafr El Sheikh General Hospital, high percent (69.2 %, 60.8%, and 60.0%), and around half (42.3%) of IC nurses had a low-level of perception concerning work world, work design, work life - home life, and work context dimensions of quality of work life, respectively.

Figure (3): This figure shows correlation between IC nurses' occupational hardiness and their quality of work life at both hospitals. At Tanta University hospital there was positive statistically significant correlation between IC nurses' occupational hardiness and their quality of work life, where $r = 0.556$

and $p\text{-value} (<0.001)$. About Kafr El Sheikh General Hospital. There was positive statistically significant correlation between IC nurses' occupational hardiness and their quality of work life, where $r = 0.405$ and $p\text{-value} (<0.001)$.

Table (1): Intensive care nurses' personal characteristic at both hospitals (n = 437)

Intensive care nurses’ personal characteristic	Tanta university main hospital (n=307)		Kafr El Sheikh general hospital (n=130)		Test of sig.	P
	No.	%	No.	%		
Age (years)						
20 – <30	167	54.4	99	76.2	x ² = 25.814*	<0.001*
30 – <40	95	30.9	30	23.1		
40 – ≥50	45	14.7	1	0.8		
Min. – Max.	21.0 –52.0		21.0 –50.0		U= 14122.0*	<0.001*
Mean ± SD.	30.82 ± 7.12		27.05 ± 4.37			
Median	28.0		26.0			
Sex						
Male	50	16.3	41	31.5	x ² = 12.885*	<0.001*
Female	257	83.7	89	68.5		
Marital status						
Married	244	79.5	86	66.2	x ² = 8.770*	0.003*
Un married	63	20.5	44	33.8		
Educational level						
Nursing associate degree	137	44.6	56	43.1	x ² = 3.150	0.207
Bachelor degree of nursing	125	40.7	62	47.7		
Post graduate studies	45	14.7	12	9.2		
Average income/ month						
Not Enough	192	62.5	61	46.9	x ² = 9.609*	0.005*
Enough	114	37.1	68	52.3		
Enough and exceed	1	0.3	1	0.8		
Residence						
Rural	246	80.1	91	70.0	x ² = 5.311*	0.021*
Urban	61	19.9	39	30.0		
Number of children						
No	93	30.3	53	40.8	x ² = 13.126*	0.001*
1 – 2	138	45.0	64	49.2		
3 and more	76	24.8	13	10.0		
Min. – Max.	1.0 –5.0		1.0 –6.0		U= 6388.0*	0.002*
Mean ± SD.	2.16 ± 0.96		1.81 ± 0.92			
Median	2.0		2.0			

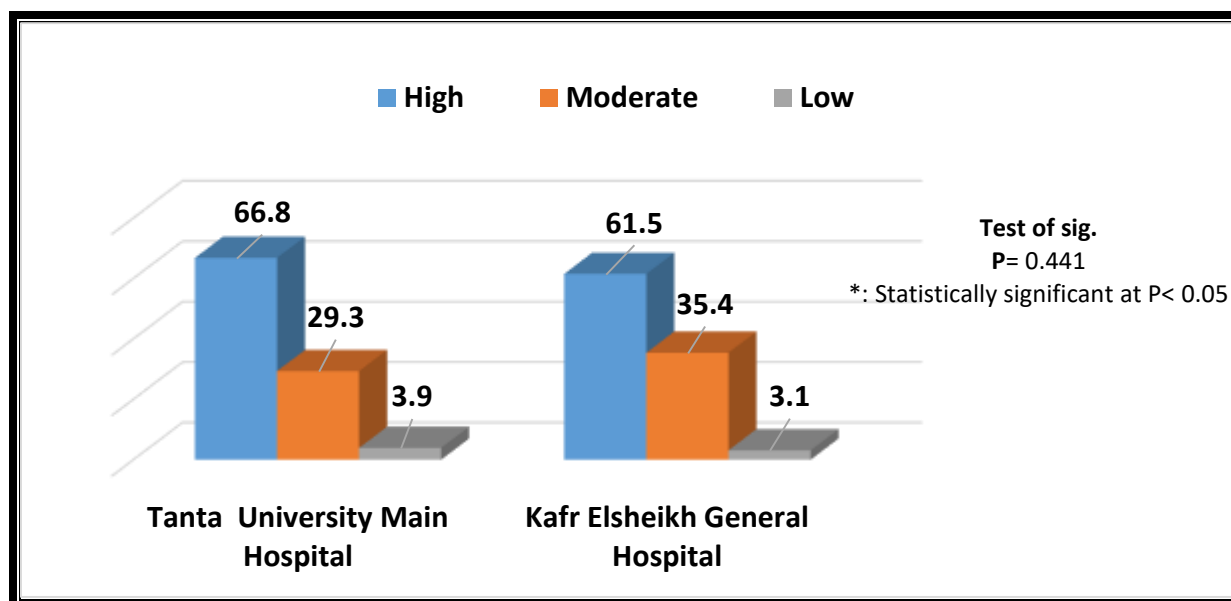


Figure (1): Intensive care nurses' total levels of occupational hardness at both hospitals (n = 437)

Table (2): Intensive care nurses' levels of occupational hardness dimensions at both hospitals (n= 437)

Nurses 'Occupational Hardiness	Tanta university main hospital (n=307)		Kafr El Sheikh General hospital (n=130)		X ²	P
	No.	%	No.	%		
Commitment						
Low (<60%)	12	3.9	5	3.8	1.280	0.527
Moderate (60 – <75%)	29	9.4	17	13.1		
High (≥75%)	266	86.6	108	83.1		
Control						
Low (<60%)	18	5.9	9	6.9	0.366	0.833
Moderate (60 – <75%)	85	27.7	33	25.4		
High (≥75%)	204	66.4	88	67.7		
Challenge						
Low (<60%)	35	11.4	16	12.3	1.824	0.402
Moderate (60 – <75%)	102	33.2	51	39.2		
High (≥75%)	170	55.4	63	48.5		

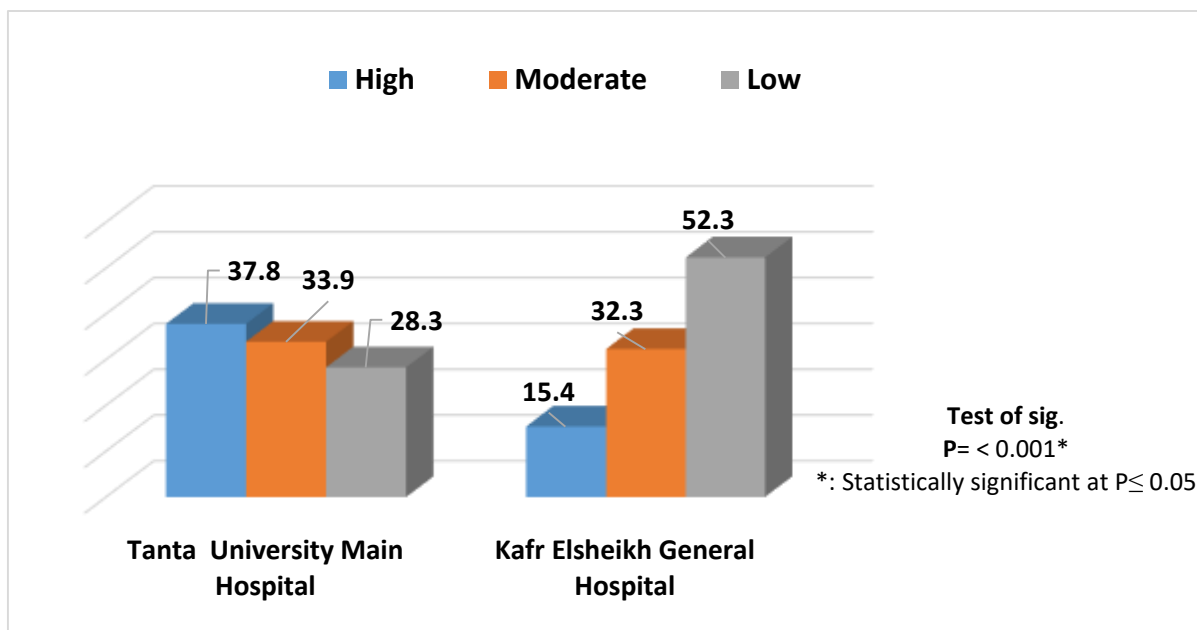


Figure (2): Intensive care nurses' total levels regarding quality of work life at both hospitals (n=437)

Table (3): Intensive care nurses' levels of quality of work life dimensions at both hospitals (n=437)

Nurses' quality of work life	Tanta university main hospital (n=307)		Kafr El Sheikh General hospital (n=130)		X ²	p
	No.	%	No.	%		
Work life –home life						
Low (<60%)	111	36.2	78	60.0	21.154*	<0.001*
Moderate (60 – <75%)	132	43.0	35	26.9		
High (≥75%)	64	20.8	17	13.1		
Work Design						
Low (<60%)	97	31.6	79	60.8	40.241*	<0.001*
Moderate (60 – <75%)	83	27.0	33	25.4		
High (≥75%)	127	41.4	18	13.8		
Work Context						
Low (<60%)	75	24.4	55	42.3	17.314*	<0.001*
Moderate (60 – <75%)	91	29.6	39	30.0		
High (≥75%)	141	45.9	36	27.7		
Work world						
Low (<60%)	152	49.5	90	69.2	15.669*	<0.001*
Moderate (60 – <75%)	42	13.7	15	11.5		
High (≥75%)	113	36.8	25	19.2		

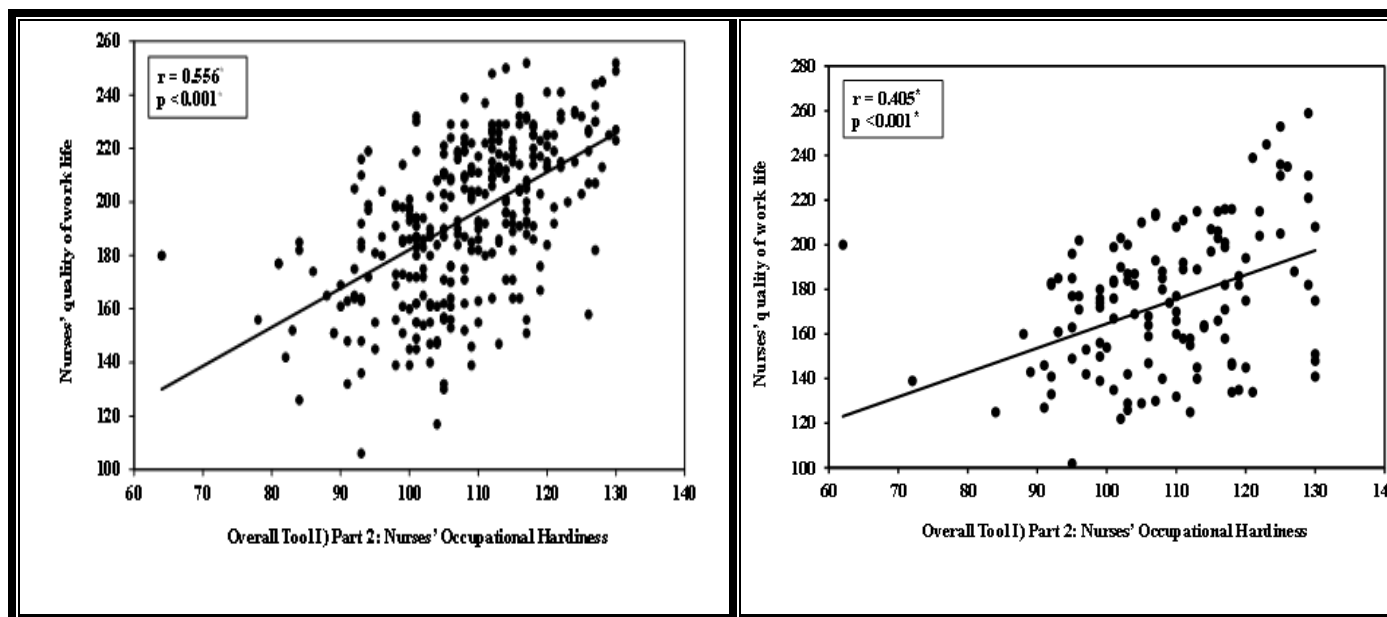


Figure (3): Correlation between intensive care nurses' occupational hardness and their quality of work life at both hospitals (n=437)

Discussion

Nursing is a demanding profession, as nurses constantly work under pressure and are exposed to a variety of complex situations in order to provide optimal care for patients. Intensive care nurses, in particular, frequently face more challenges and enormous workload in addition to the difficulty of care offered to critically ill patients. These factors, in turn, can have a significant impact on IC nurses' quality of work life, which is essential for maintaining nurses' wellbeing, commitment, and health care organization effectiveness. (Shawky Elbus, Elsaed, & Eldeep, 2023).

Occupational hardness plays a crucial role in enhancing IC nurses' emotional resilience and improving

the ability to maintain work-life balance (Grala & Baka, 2022).

Intensive care nurses' levels of occupational hardness.

The result of the current study demonstrates that more than one quarter of IC nurses at Tanta University Main and more than one third at Kafr El Sheikh General Hospitals had moderate levels of perception regarding total levels of occupational hardness. This result can be justified as a high percentage of IC nurses at both hospitals were female, married, and around half of them had between one to two children which increase the burden through carryout multiple responsibilities as wives, daughters, mothers, and working in high-stress areas characterized by shortage of staff, and

dealing with critically patients, so they experience lower levels of hardiness.

This result matches with study conducted by **Sekerci, Ayvazoglu, and Cekic, (2023)** showed that nurses had a moderate level of hardiness. While this result was incongruent with the results of by **Vagni, Maiorano, Giostra, Pajardi, and Bartone, (2022)** stated that healthcare nurses' including IC nurses had high level of hardiness during COVID-19 pandemic.

The present study illustrates that the majority of IC nurses at both hospitals had a high level of commitment dimension of occupational hardiness. This result can be due to most IC nurses at both hospitals agreed that they performed their work seriously, considered their work valuable for society, dedicated in their daily work, committed to complete their work tasks on time, and had a strong desire to be aware of all work tasks.

These results are similar to **Sadeghpour, Fereydooni-Moghadam, and Namnabati, (2021); Elham, (2024)** pointed out that commitment dimension had the highest mean score. On the opposite, this result was mismatched with **Al-Tayyebi et al., (2021)** clarified that commitment dimension had the lowest mean score.

The findings of the current study show that around one third of IC nurses at both Hospitals had a moderate level of control dimension of occupational hardiness. This result may be due to around one quarter of IC nurses at both hospitals reported a lack of support from their colleagues. They felt that their colleagues did not listen to them during difficult tasks, did not offer help when facing challenges, and they had little influence over events in their work and personal lives. These findings were similar to **Hassan and Alwan, (2023)** discovered that nurses had a moderate level of control dimension of hardiness. On the opposite this result was contradicted with **Yamaguchi et al, (2020); Guo, Yan, Yan, and Jiao, (2024)** revealed that control dimension had the first highest mean score.

In the current study around half of IC nurses at both Hospitals had between a moderate and low level of perception regarding challenge dimension of occupational hardiness. This result may be due to some IC nurses at both hospitals reported that they didn't like to choose new tasks that had challenges because it required extra effort and risks. Therefore, they felt safer within their comfort zones, afraid of mistakes or errors. Faced life and work problem with pessimistic, couldn't tolerate to

work in uncertain situations, and saw stressful events as a threat rather than opportunity for growth and development.

These findings were similar to **Ali and Husseian, (2023)** discovered that nurses had a moderate level of challenge dimension of hardiness. On the contrary, this result was mismatched with study of **Eldesouky, Mohamed, Elsherbiny, and Zaki, 2023;** **Gutierrez-Caballero, Blazquez-Manzano, and Feu, (2019)** found that challenge dimension had the highest mean score.

Present study demonstrates that there was not a statistically significant differences among IC nurses at Tanta University and Kafr El Sheikh General Hospitals regarding the total levels of occupational hardiness as well as its dimensions. This result could be due to IC nurses at both hospitals having slightly homogeneous characteristic data as educational level, and nature of work. This result goes in the same line with study of **Ghahramani, Lankarani, Marzaleh, Sayari, and Moradi, (2023)** found that there were no statistically significant differences in mean scores of hardiness among nurses working in COVID-19 and non-COVID-19 departments.

Intensive care nurses' levels of quality of work life

Present study displays that more than one third of IC nurses at Tanta University Main had a moderate level, and more than quarter had a low level, compared to more than half of IC nurses at Kafr El-Sheikh General Hospitals had a low perception level concerning total quality of work life.

This result can be justified as the insufficient nurses at both hospitals which resulted in a heavy workload, excessive stress, and burnout among IC nurses. Moreover, considerable percent of nurses at both hospitals received they had not enough income which, might lead to dissatisfaction, fatigue, and difficulties in managing personal and family commitments. The study result was supported by **Hosseini Zare et al., (2025); Khaghanizadeh, Ebadi, Cirati Nair, and Rahmani, (2022)** revealed that nurses had moderate level of QWL. In another scene, this result disagrees with **Korkmaz and Torlak, (2024); Navales, Jallow, Lai, Liu, and Chen, (2021)** found that IC nurses' total score of quality of work life was at high level.

The current study reveals that around half of IC nurses at Tanta University Main had a moderate level and around one third had a low level, compared to high percent of IC nurses at Kafr El Sheikh General Hospital had a low level of perception regarding work life -home life dimension of quality of

work life. This finding may be due to high percentage of IC nurses at both hospitals were female, married, around half of them had between one to two children, which increase the burden, made them hadn't energy after work to perform their family duties and unable to balance between work and family needs.

Adding to that more than one third of IC nurses at both hospitals informed that system of working schedule greatly influences the routine of life and no supportive services available to care for children and elderly parents. So, when requirements of work cannot combine with the obligations of personal life, this may lead to leave the workplace.

This result goes in the same line with **Tubsoongnoen, (2021); Jabari, and Salah, (2020)** found that nurses had moderate level regarding home life/work life dimension. While this finding was incongruent with **Ramadan Osman, Ali Omar, and Mohammed Elsayed, (2022)** showed that majority of nurses reported high level regarding work life - home life dimension of quality of work life.

The present study shows that one third of IC nurses at Tanta University and high percent of IC nurses at Kafr El Sheikh General Hospitals had a low level of perception regarding work design dimension of quality of work life. This result may be resulted

from some IC nurses at both hospitals reported a shortage of assistant nurses and performed many non-nursing tasks which, increased their workload and made them highly exhausted, and less focused on their work.

This result is matched with **Othman, El-Fattah, and Ragab, (2022)** found that nurses had lower level of work design dimension. While this result was mismatched with **Azhar, Sidin, and Rewa, (2022)** revealed that work design dimensions had the first highest mean score.

The current study demonstrates that around one third of IC nurses at Tanta University had a moderate level, and around quarter had a low level, compared to around half of IC nurses at Kafr El Sheikh General Hospital had a low level of perception regarding work context dimension of quality of work life. This result can be due to more than half of IC nurses at both hospitals reported that nurses' rest room was not comfortable, nurses' dressing room were not safe, adequate supplies and equipment were not available for patients' care, and policies adopted by hospital were not proper.

Furthermore, more than half of them at Kafr El Sheikh General Hospital reported that they did not receive support from supervisors to attend training program and did not receive support to complete post graduate

studies so, minor IC nurses had post graduate studies at Kafr El Sheikh General Hospital.

This result supports by **AlGrad, Dr. Pappiya, and Al Baalharith, (2020)** indicated that around half of nurses had low level with work context dimension of quality of work life. On the other hand, the current study contradicted with **Tokić, and Režić, (2022)** noted that work context dimension had the highest mean score.

The present study shows that, around half of IC nurses at Tanta University and high percent of IC nurses at Kafr El Sheikh Hospital had a low level of perception regarding work - world dimension of quality of work life. This can be justified as more than half of IC nurses at both hospitals reported that society did not have a correct image of nurses, because this image was based on misconceptions stemming from distorted image presented by media that nurses as doctors' helpers not as independent patient care providers.

These findings are similar to **Fotoohi, Jafar Jalal, and Haghani, (2021)** reported that the lowest mean scores were obtained in the work world dimension of quality of work life. On the other hand, this result was mismatched with **Hussein, Abd-El-Aal, and Ghanem, (2023)** clarified

that work world dimension had the highest mean score.

The current study reveals that there were positive statistically significant differences between IC nurses at Tanta University Main and Kafr El Sheikh General Hospitals regarding total quality of work life as well as its dimensions. These differences could be explained by work-related characteristics such as the hospital type. Tanta University Main Hospitals are a large teaching university affiliated with the Ministry of Higher Education and Scientific Research. It served the Delta region with a capacity of around one thousand beds and provided a wide range of specialties and subspecialties.

Comparatively, Kafr El Sheikh General Hospital, which is affiliated with the Ministry of Health and Population in Kafr El Sheikh Governorate, had a limited bed capacity of around four hundred beds and a limited scope of specialties. This finding was consistent with **Ayalew, Ma, Tamir, and Mitiku, (2024)** found that there were statistically significant differences between health institution types across all dimensions of QWL.

Correlation between IC nurses' occupational hardiness and quality of work life in both hospitals.

The result of the present study indicated that there was positive

statistically significant correlation between total IC nurses' occupational hardiness and quality of work life at both hospitals. This indicated that higher level of occupational hardiness was accompanied by an improvement in the quality of work life. This could be attributed to the role of occupational hardiness in enhancing IC nurses' ability to cope with workplace stress, maintain a sense of control and commitment, and find meaning in their work, which collectively contribute to higher levels of job satisfaction and quality of work life.

This result was consistent with **Samir, (2021); Mohammadi, Bagheri, Salevati-Ghasemi, Rasouli, and Miraki, (2024)** found that there was a positive significant correlation among nurses' hardiness and quality of life at work.

Conclusion

In the light of the current study results, it can be concluded that more than two-thirds of IC nurses at Tanta University Main Hospital and less than two-thirds of IC nurses at Kafr Elsheikh General Hospital had a high level of total occupational hardiness. In addition, there were not statistically significant differences between the two hospitals regarding IC nurses' occupational hardiness. More than one third of IC nurses at Tanta

University Main Hospitals had both high as well as moderate levels of total quality of work life. While more than half of IC nurses at Kafr Elsheikh General Hospital had a low level of total quality of work life. Furthermore, there were statistically significant differences between the two hospitals concerning IC nurses' quality of work life. Also, there was a statistically significant positive correlation between IC nurses' occupational hardiness and their quality of work life at both hospitals.

Recommendations

For hospital management:

- Implement strategies to enhance nurses' occupational hardiness and stress management skills to improve quality of work life.
- Establish a reward system to enhance nurses' job satisfaction through recognition, bonuses, promotions, and certificates of appreciation.

For head nurses:

- Guide and assist nurses in applying effective strategies to cope with work stress, such as time management, relaxation, and mindfulness.
- Provide flexible work schedules to decrease work life conflict and promote stability.

For IC nurses:

- Maintain self-care practice such as, good nutrition, sufficient sleep, and exercise to enhance hardiness and overall wellbeing.
- Participate in public health initiatives and community programs to improve the image of the nursing.

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Efficacy of Tele-Lactation Nursing Intervention on Initiation of Breast Feeding and Maternal Outcomes

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Background

Abstract: Tele-Lactation acts as a powerful digital bridge, ensuring that expert nursing guidance is consistently available to optimize all aspects of the breastfeeding journey, leading to healthier outcomes for both the mother and the infant. **The aim of this study** was to evaluate the efficacy of tele-lactation nursing interventions on the initiation of breastfeeding and the associated maternal outcomes. **Subjects and Method:** A quasi-experimental research design (study and control groups) was adopted to conduct the study on 200 pregnant women who met the inclusion criteria from the antenatal and postnatal outpatient units of 3 major hospitals at El Gharbia governorate, Egypt. Four tools were used for data collection, Tool I: Structured interviewing questionnaire, Tool II: The postpartum bonding questionnaire (PBQ), Tool III: Mother infant attachment scale and Tool IV: Maternal satisfaction of tele-lactation service. **Results:** The results of this study highlighted significant enhancements in the participants' level of knowledge and practices regarding breastfeeding, as well as improvement in their mother- infant relationship (bonding and attachment). They also become more satisfied for reaching immediate and continuous support after implementing the tele-lactation nursing intervention than their counterparts in the control group ($P=0.0001$). **Conclusion:** Tele-lactation nursing interventions has a positive impact on the initiation of breastfeeding and the associated maternal outcomes. **Recommendations:** Healthcare providers including maternity nurses, as well as policymakers should work together to disseminate and promote tele-lactation as a reliable source of information and proper support for maternal and child health.

Keywords: Tele-Lactation, Initiation of Breast Feeding, Maternal Outcomes, Nursing Intervention

Introduction:

Globally, tele-lactation has rapidly evolved into an innovative, effective strategy for supporting breastfeeding mothers. It is a service delivered by lactation/trained' professionals using digital technologies including video conferencing, phone calls, and mobile applications to provide professional real-time remotely breastfeeding guidance **(Johnson & Lee, 2023)**.

Breastfeeding (BF) is widely recognized as a fundamental component of both infant and maternal health. Therefore, tele-lactation serves as a critical, accessible tool to support parents in achieving their breastfeeding goals and maximizing these health benefits **(Purkiewicz et al., 2025)**

Human milk provides neonates with dynamic bioactive components and antibodies that reduce the incidence of infectious diseases, such as otitis media, respiratory and gastrointestinal infections, malnutrition, as well as chronic conditions like obesity, hypertension and type 2 diabetes later in life **(Muro-Valdez et al., 2023)**.

For mothers, breastfeeding contributes to the improvement of postpartum recovery, reduces risk of postpartum hemorrhage and postpartum depression. It also significantly lowers lifetime risk of breast and ovarian cancers **(Singh & Patel, 2022; Chua, 2023)**.

Therefore, WHO and UNICEF recommend early initiation of breastfeeding within the first hour of birth; exclusive breastfeeding, not even water, during the initial 6 months of life; and continuing BF alongside the provision of nutritionally adequate and safe complementary foods at 6 months up to the age of 2 years **(World Health Organization, 2023)**.

Nevertheless, many mothers encounter obstacles that postpone the start of breastfeeding or cause them to cease early **(Smith, Johnson & Lee, 2022)**. Mostly, timely breastfeeding initiation is impacted by several factors, including a lack of professional support, misinformation, restrictive social and cultural norms, geographical access and pandemic-related limitations, workplace-related obstacles, as well as maternal psychological distress particularly anxiety **(Garcia et al., 2021; Nguyen & Tran, 2023; Iamchareon & Maneesriwongul 2025)**.

Likewise, early breastfeeding obstacles include latch and positioning difficulties, sore or cracked nipples, perceived low milk supply, breast engorgement, as well as concerns about infant weight gain/intake. These obstacles often lead to early cessation of breastfeeding if left unaddressed **(Roberts & Chen, 2023; Martinez et al., 2024)**.

Therefore, comprehensive understanding of these multifactorial obstacles within the local healthcare context is essential for developing effective novel interventions that in turn improve breastfeeding outcomes, as well as maternal and neonatal health **(Johnson & Lee, 2023)**.

Offering prompt, tailored coaching and troubleshooting, effective tele-lactation nursing intervention can significantly help mothers overcome breastfeeding obstacles **(Roberts & Chen, 2023; Martinez et al., 2024)**.

In addition, mothers who receive tele-lactation support will have increased confidence, satisfaction, improvements in breastfeeding initiation rates within the first hour, and a significant sustain in breastfeeding 6 weeks postpartum **(Anderson et al., 2023; Martinez et al., 2024)**.

Moreover, tele-lactation removes constraints associated with distance and transportation, reduces inequalities in breastfeeding assistance among underprivileged and rural groups **(Garcia et al., 2021)**. Tele-lactation is a promising strategy for health systems looking to increase maternal-child health equity because of its ability to democratize breastfeeding support **(Singh & Patel, 2022; Chua, 2023)**.

Nursing professionals providing tele-lactation interventions can reach broader demographic groups. They

can ensure equitable access to expert lactation care and enhancing maternal and neonatal health outcomes at the community level **(Johnson & Lee, 2023)**.

Significance of the study:

Optimal breastfeeding plays a vital role for achieving Egypt's Sustainable Development Goals (SDGs) by enhancing maternal and child health, reducing poverty, and supporting long-term development. It directly aligns with SDG 3 (Good Health and Well-being) through its contribution to lower infant morbidity and mortality and its positive impact on cognitive growth, which also supports progress toward SDG 2 (Zero Hunger). Moreover, breastfeeding contributes to SDG 1 (No Poverty) by providing an accessible, cost-effective source of nutrition, and supports SDG 5 (Gender Equality) by facilitating healthy birth spacing and strengthening women's health and empowerment. **(Souza, C. B. D., Melo, D. S., Relvas, G. R. B., Venancio, S. I., & Silva, R. P. G. V. C. D. 2023)**.

In contrast, suboptimal breastfeeding practices are substantial factors contributing to under-five mortality, attributed to deaths from neonatal infections (45%), diarrhea (30%), and acute respiratory infections (30%). However, national data from Egypt reveals significant challenges in achieving optimal breastfeeding

standards. Specifically, nearly half (47%) are given non-human milk supplementation during the first three days of life and only 29% of infants aged 4–5 months are exclusively breastfed (Fadl & Haile, 2021).

These low rates underscore a critical public health gap that necessitate the provision of innovative, accessible and a viable solution. Tele-lactation has emerged as a crucial tool to help improve breastfeeding initiation, duration, and satisfaction rates, particularly for those in rural or underserved, and pandemic-affected populations where face-to-face consultation may be limited or unavailable (Garcia et al., 2021; Martinez et al., 2024; Nguyen et al., 2021). Therefore, as nurse researchers and healthcare providers, our role in optimizing breastfeeding practices through tele-lactation nursing intervention involves assessing mothers' needs, providing real-time guidance on positioning and latch techniques, addressing breastfeeding challenges promptly, and empowering mothers with evidence-based education and continuous emotional support to ensure successful and sustained breastfeeding, and this represent the aim of this study.

Aim of the study:

The aim of this study was to evaluate the efficacy of tele-lactation nursing interventions on the initiation of

breastfeeding and maternal outcomes.

Research hypothesis:

H1: Primipara mothers' knowledge regarding breastfeeding along with early initiation and maintenance of exclusive breastfeeding are expected to be enhanced post-tele-lactation nursing intervention.

H2: Primipara mothers–infant bonding and attachment are expected to be enhanced post-tele-lactation nursing intervention.

H3: Primipara mothers' level of satisfaction is anticipated to be increased post-tele-lactation nursing intervention.

Operational definitions:

Tele-lactation nursing intervention

refers to a nursing health education strategy that ensures daily access to lactation support during the morning, afternoon, and evening. Mothers' inquiries are addressed, and breastfeeding-related information is delivered by the researchers through phone calls, text messages, and audiovisual platforms (such as videoconferencing) using smartphones, computers, or tablets.

Maternal outcomes in this study refer to the mother's knowledge, practices, postpartum bonding, satisfaction and emotional/psychological responses related to breastfeeding.

Subjects and Method:

Study Design: A quasi-experimental research design (study and control

groups) was adopted to conduct the study. This design is appropriate to evaluate the effect of tele-lactation nursing intervention. It aims to test a cause-and-effect relationship between the intervention (Tele-lactation nursing intervention (independent variable) and the outcome (initiation of breastfeeding and the associated maternal outcomes (dependent variable).

II) Research Setting:

The research was conducted at the antenatal and postnatal outpatient units of three major hospitals in Tanta City, El Gharbia Governorate, Egypt, which collectively act as the central providers of maternal and neonatal health services. This multi-site approach included: (1) Tanta University Hospital (a leading academic and specialized referral center under Ministry of High Education and Scientific Research), (2) El-Menshawy General Hospital (a key public hospital serving the general community with a comprehensive maternity care under Ministry of Health and Population), and (3) Al-Mabara Hospital (providing services to insured beneficiaries affiliated with the Health Insurance Organization). The multi-site approach is crucially important for the research, because it significantly enhances the generalizability, diversity, and statistical power of the findings.

III) Research Subjects:

A purposive sample of 200 pregnant women from the aforementioned settings was recruited. Purposive sampling was intentionally used to guarantee that all participants meet the specific research criteria and are most likely to provide relevant and rich data for assessing the effectiveness of the tele-lactation nursing intervention.

Participants were considered eligible for inclusion if they were

(a) Pregnant during the late second to third trimester (Approximately 28 weeks onwards) as the key to successful breastfeeding is preparedness, and the antenatal period is ideal for building knowledge and self-efficacy; (b) Primigravida because this group represents the population with the greatest need for education and support; (c) Literate to ensure their ability to access, understand, and interact with written and visual information delivered remotely; (d) Own a smartphone capable of installing applications. Additional eligibility requirements included (e) Carrying a single, viable fetus at term with no congenital anomalies, (f) Plan for a normal vaginal delivery, and (g) Free from any medical or psychological disorders.

The exclusion criteria comprised multigravida women, those who underwent cesarean delivery, women with multiple pregnancies such as twins, and those who were illiterate.

The sample size was determined using sample size calculation formula as follows:

The sample size was calculated based on data obtained from the statistical offices as follows: Tanta University hospital (n= 1000), El-Menshawy hospital (n= 600), and Al-Mabara Hospital (n=400). Considering the flow rate of pregnant women attending each setting, totally (n=2000), the calculation was performed with a significance level of 5%, a statistical power of 80%, and a two-sided test, using the following formula:

$n = [2(Z_{\alpha/2} + Z_{\beta})^2 \times p(1-p)] / (p_1 - p_2)^2$, where n is the required sample size per group, p is the pooled proportion, $p_1 - p_2$ represents the difference in proportions between the two groups, $Z_{\alpha/2}$ $Z_{\alpha/2} = 1.96$ for a 5% significance level, and Z_{β} $Z_{\beta} = 0.84$ for 80% power. Based on these parameters, the estimated sample size was 98.5 participants per group. Accordingly, the minimum required sample size was set at 100 participants in each group, with figure (1) rounded up to ensure adequate statistical power and to compensate for potential attrition during the study.

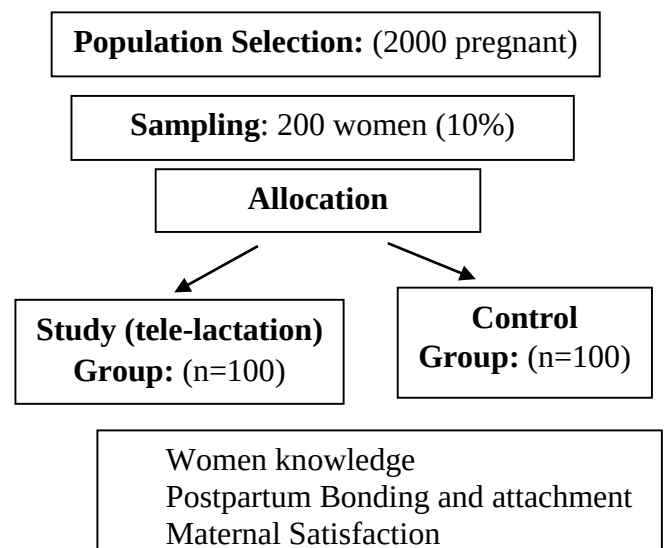
Eligible participants were then assigned to either the study or the control group through simple randomization using the lottery method. For this process, the names of women attending the prenatal

clinics were written on identical slips of paper, folded uniformly, thoroughly mixed, and randomly drawn until both groups were equally constituted as follows:

Control group: Comprised 100 pregnant women who received only the routine protocol of hospital care (RPHC) included in scheduled visits with regular maternal and fetal assessment, brief basic health education covers general topics as nutrition, exercise, warning signs and sometimes, just a general recommendation for breastfeeding without in-depth instruction.

Study (tele-lactation) group: Consisted of 100 pregnant women who received the routine protocol of hospital care as a continuous, personalized professional support, plus tele-lactation. The innovative educational approach was delivered remotely when the mother is at home and facing real-world challenges.

Figure (1) Population Selection



IV) Tools of data collection:

Four tools were used for data collection:

Tool I: Structured interviewing schedule: This tool was adapted by the researchers from **Aldairy, A., et al., (2025); Osman, N. E., Hassan, S. I., Wady, D. E. A., and Abd El-hamed, M. A. (2023); Rashed, B., Hamdio, S., and Saleh, N. (2021); Abuidhail et al. (2017)**. It comprised the following three parts: -

Part one: This part was used to collect women's basic sociodemographic characteristics that included age, level of education, occupation, residence, age at marriage, duration of the current marriage, family income and sources of breastfeeding information.

Part two: Knowledge of primigravida women about breastfeeding: It consisted of 19 open and close ended questions covered various aspects of breastfeeding. It included definition, benefits for both the infant and the mother, different types of breast milk, and the role and effectiveness of colostrum. It also addressed the recommended time for initiating breastfeeding, its optimal duration, and practical components such as proper techniques and breastfeeding positions. Furthermore, the tool examined knowledge regarding the

indicators of adequate, insufficient, and excessive breastfeeding. In addition, it explored awareness of common breastfeeding related problems such as breast engorgement, cracked nipples, and inverted nipples highlighting for each (their definition, risk factors, signs and symptoms, possible complications, effects on the infant, and appropriate maternal self-care practices for relief).

The scoring system allocated one point for each correct answer and zero for incorrect answers, with a total possible score of 38. A total score of less than 50% (below 19 points) indicated a poor level of knowledge, while scores between 50% and 75% (19–28.5 points) reflected a moderate level. Scores exceeding 75% were categorized as demonstrating good knowledge.

Part three: It encompassed 2 open ended questions about the exact time of initiating their breastfeeding after current delivery and their compliance with exclusive breastfeeding.

Tool II: The Postpartum Bonding Questionnaire (PBQ): This tool was adapted by the researchers from **Busonera, A., Cataudella, S., Lampis, J., Tommasi, M., and Zavattini, G. C. (2017) and Garcia-Esteve, L., et al., (2016)**. This tool consisted of 25 questions designed to

evaluate maternal attitudes toward their newborns. Participants selected one of six options, from "always" to "never." To ensure consistency, the scoring was adjusted for item valence: responses to positive statements were

scored from 0 to 5 (lowest for "always") and responses to negative statements were scored from 5 to 0 (highest for "always"). The total score ranged from 0 to 125, with higher scores indicating poorer bonding.

Table (1): Summary of the Postpartum Bonding Questionnaire (PBQ).

PBQ Subscale	Number of Items	Description / Interpretation	Items of PBQ
Impaired bonding	12	Assesses difficulties in establishing emotional connection with the infant; high scores suggest impaired bonding, anxiety, obsessions, or anger.	I feel close to my baby. I feel distant from my baby. I love to cuddle my baby. The baby doesn't seem to be mine. I love my baby to bits. I feel happy when my baby smiles or laughs. I enjoy playing with my baby. I feel trapped as a mother. My baby is the most beautiful baby in the world. My baby makes me feel anxious. I am afraid of my baby. I feel confident when caring for my baby.
Rejection & pathological anger	7	Evaluates maternal feelings of rejection and expressions of pathological anger toward the infant.	I wish the old days when I had no baby would come back. I regret having this baby. My baby winds me up. My baby irritates me. I feel angry with my baby. I resent my baby. I wish my baby would somehow go away.
Infant-focused anxiety	4	Measures maternal anxiety specifically directed at the infant.	My baby cries too much. My baby makes me feel anxious. I am afraid of my baby. My baby is easily comforted.
Incipient abuse	2	Detects early signs of potential abusive thoughts or behaviors toward the infant.	I have done harmful things to my baby. I feel like hurting me.
Total score	25	Ranges from 0–125. Higher scores indicate poorer mother infant bonding.	

Tool III: Mother infant attachment scale:

This scale was adapted by the researchers from **Bhakoo, O. N., Pershad, D., Mahajan, R., and Gambhir, S. K. (1994)**. It was designed to evaluate the quality of attachment between mothers and their infants. It comprised 15 statements that reflect different maternal attitudes and perceptions toward the child, with responses measured on a five-point Likert scale ranging from strongly agree, agree, don't know, disagree and strongly disagree. The items address aspects regarding maternal love, pride, worry, anger, annoyance, expectations, and perceptions of the child's temperament and behavior. It is composed of the following statements (1. I feel that this child does not love me, 2. I love this child so much that I can't bear to be away from him/her even for a short time, 3. This child is difficult to bring up, 4. I am extremely proud of this child, 5. When this child is out of my sight I always worry that something may not happen to him/her, 6. I am annoyed by this child, 7. It seems that this child has great fortune, 8. It seems that this child obeys me, 9. This child has troubled me a lot, 10. This child is of my expectation, 11. This child has increased our difficulties, 12. I feel angry with this child, 13. This child is

much affectionate to me, 14. This child seems to be a promising child, and 15. This child has a lot of patience.).

Scoring system: Each response is scored from 1 to 5, with 5 given to the most favorable response and 1 to the least favorable. The overall score ranged from 0 to 75, and higher total scores reflected weaker or poorer levels of mother infant attachment.

Tool IV: Maternal satisfaction of tele-lactation service:

It was developed by the researchers, grounded in an extensive review of the recent, relevant literature DeYoreo, M., et al., (2025); Uscher-Pines, L., et al., (2025); Chua, C. M. S., Mathews, J., Ong, M. S. B., Liew, K. K., & Shorey, S. (2023)., to evaluate maternal perceptions of tele-lactation service. The tool comprised 11 items that explored multiple dimensions of tele-lactation. It included the following items: nursing tele-lactation information is clear, it provides simple and comprehensive information regarding breast-feeding, its language is suitable, and the extent to which the service conserved time and effort. Further items assessed effectiveness of tele-lactation service in enhancing mothers' knowledge and practices regarding breastfeeding such as resolving breastfeeding difficulties,

promoting the continuation of breastfeeding, as well as the likelihood of recommending the service for future pregnancies, relatives and friends, or for integration into routine hospital care.

Scoring system: Responses were measured using a three-point Likert scale (3= satisfied, 2= partially satisfied, 1= not satisfied), with total scores categorized as follows: <18= not satisfied, 18–<25= partially satisfied, and ≥ 25 = satisfied.

Method

The study was conducted according to the following steps:

1. Official letter outlining the study's purpose was obtained from the Faculty of Nursing, Tanta University, Egypt. This letter was then submitted to the authorities responsible for the selected settings to obtain their approval and cooperation to carry out the study.

2. Ethical Considerations:

The study was initiated following approval from the Research Ethics Committee at Faculty of Nursing, Tanta University, Egypt (Code: 762). All participants provided written informed consent after being fully informed about the study's purpose, objectives, potential risks, and benefits. They were assured that their data will remain confidential and will

only be used for the purpose of this study, as well as they can withdraw from the study at any point without any consequences.

3. Validity and reliability:

Validity: Five nursing experts specializing in Maternal and Neonatal Health Nursing evaluated the tools and suggested modifications, such as revising some sentences for better clarity.

Reliability: The internal consistency of the tools was evaluated using Cronbach's alpha. The results showed a reliability of 0.95 for the second part of tool I, 0.98 for tool II, and 0.94 for tool III and 0.90 for tool IV.

4. Pilot study:

A pilot study was carried out on 10% of the participants (n= 20 Primigravida women) to assess clarity and applicability of the tools, and to estimate the time required to complete them. Necessary adjustments were made based on the findings. The participants who were involved in this pilot study were not included in the main study sample.

5. Field work:

- This study was carried out at the previously mentioned settings in a period of nine months started from January 2025 to September 2025. Data collection took place between 9:00 a.m. and 12:00 p.m. on Saturdays,

Sundays, Mondays, and Wednesdays, continuing until the target sample size of participants was achieved. The research process was structured into four sequential stages: the assessment stage, where participants' baseline information and relevant data were collected; the planning and preparatory stage, which involved planning and preparing the tools and resources; the implementation stage, during which the tele-lactation nursing intervention were carried out; and the outcome evaluation stage, in which the effects and results of the tele-lactation nursing intervention were measured and analyzed. **The four sequential stages of the study were as follows:**

1. Assessment stage (pretest):

- This stage was done before implementing the tele-lactation nursing intervention. At morning on the previously mentioned days, the researchers reviewed the selected hospitals' registration records to identify expectant mothers who met the inclusion criteria. Then, each eligible woman was approached individually and asked to participate in the study after clear explanation of the study's purpose and expected time commitment. Written informed consent was obtained from all participants prior to enrollment.

- After that, participants completed the pretest using Tool I, which gathered socio-demographic characteristics, knowledge about breastfeeding and sources of breastfeeding information. This allowed the researchers to determine the participants' baseline knowledge and needs prior to the tele-lactation nursing intervention.

2. Planning and preparatory stage:

Based on the data collected in the assessment stage about participants' knowledge regarding breastfeeding, appropriate educational program was prepared and planned by the researchers according to the following steps:

A- Preparation of the educational booklet and teaching methods:

-An educational booklet was developed and designed by the researchers in a structured manner. The booklet was aligned with the study objectives, based on participants' needs and the recent related literature review, as well as having been confirmed by experts to enhance participants' knowledge and practices regarding breastfeeding and its problems. It was designed using simple Arabic language and different illustrative pictures to facilitate the participants understanding of its contents. The booklet included two

main parts: theoretical part and practical part.

-The theoretical part of the booklet covered the following items: Definition of breastfeeding, its benefits for both the infant and the mother, different types of breast milk, the role and effectiveness of colostrum, the recommended time for initiating breastfeeding and its optimal duration. Furthermore, it included knowledge regarding the indicators of adequate, insufficient, and excessive breastfeeding. In addition, it covered common breastfeeding related problems such as breast engorgement, cracked nipples, and inverted nipples highlighting for each (their definition, risk factors, signs and symptoms, possible complications and effects on the infant).

-The practical part of the booklet covered the following items: Proper breastfeeding techniques and positions, as well as appropriate maternal self-care.

Teaching methods: Variety of interactive and multimedia teaching methods, including animations, videos, power-point presentations, scenario-based discussions, and a colored electronic booklet to enhance understanding, engagement, and

practical application of breastfeeding knowledge.

b. The studied' participants were allocated into two groups (control and study (tele-lactation) groups) as previously mentioned. The control group received RPHC while the tele-lactation group received RPHC plus the tele-lactation nursing intervention.

- To facilitate interaction and effective learning, participants of the tele-lactation group were divided into subgroups, 10 women in each group. They were instructed to download WhatsApp and Zoom applications on their smartphones. These platforms served as a medium for the online educational materials and sessions that were designed by the researchers to improve breastfeeding knowledge and practices. The study participants received guidance, asked questions, and received support remotely.

3. Implementation stage (educational sessions):

- Each subgroup of the participants in the tele-lactation group received 4 online educational sessions, 2 sessions per day over two days at a rate of two groups per week.

-Each session lasted approximately 30 to 45 minutes. The sessions were applied separately to each group: These sessions were as follows:

-The first session (theoretical session): This session aimed to build motivation among participants in the study group and enhance their knowledge regarding the value of exclusive breastfeeding. It focused on definition of breastfeeding, the overall importance of breastfeeding, emphasizing the maternal benefits (such as enhanced bonding, reduced postpartum bleeding and depression, and decreased risk of certain cancers) and infant benefits (including improved immunity, optimal growth, and reduced risk of infections). It also included knowledge about the composition of breast milk (including colostrum and mature milk), factors influencing successful breastfeeding, such as maternal health, psychological readiness, and environmental support.

-The second session (theoretical session): The aim of this session was to provide the participants in the study group with knowledge about common breastfeeding difficulties including breast engorgement, cracked nipples, and inverted nipples highlighting for each (definition, risk factors, signs and symptoms, possible complications and effects on the infant).

-The third session (practical session): This session focused on enhancing participants' practical skills

regarding breastfeeding techniques and positions to ensure proper latch and comfort for both mother and infant.

-The fourth session (practical session): Focused on the appropriate maternal self-care practices to relief common breastfeeding related problems, providing step-by-step strategies to address challenges and ensure continuation of breastfeeding

-Participants in the tele-lactation group who had additional questions or were facing any further breastfeeding related problem communicated with the researchers via the WhatsApp Tele-Lactation Group at any time, ensuring continuous access to immediate support and to address minor concerns rapidly, preventing them from escalating into major problems that could lead to early breastfeeding cessation. This group also used to deliver the breastfeeding electronic booklet, videos and animations related to breastfeeding positioning and techniques.

4. Evaluation stage (Outcome):

Following delivery, Tool I, parts 2 and 3; Tool II and Tool III were used to evaluate knowledge, breastfeeding initiation, and mother–newborn relationship (including bonding and attachment) among participants of both the tele-lactation and the control

groups. Additionally, a follow-up assessment was conducted three months postpartum to evaluate knowledge, bonding, attachment, and exclusive breastfeeding in both groups using the same assessment tools and format.

- Finally, maternal satisfaction with the breastfeeding tele-lactation service was specifically evaluated by the tele-lactation group to assess the acceptability and perceived benefit of the online program.

Statistical Analysis:

All data were analyzed using **SPSS for Windows, version 21.0 (SPSS, Chicago, IL)**. Continuous normally distributed variables were presented as means and standard deviations (SD), while categorical variables were expressed as frequencies and percentages. Comparisons between two groups for continuous data were performed using the student's t-test, and the Chi-square test was applied for comparisons between categorical variables. A p-value of less than 0.05 was considered statistically significant, while a p-value less than 0.01 was considered highly significant.

Results:

Table 2: Reveals that the socio-demographic characteristics of the tele-lactation and control groups were

comparable, with no significant statistical differences.

Figure 2: Demonstrates that friends constituted the leading source of breastfeeding information for 79% of the tele-lactation group and 49% of the control group, whereas fewer than one half in either group obtained this knowledge primarily from family members.

Table 3: Reveals that prior to the tele-lactation nursing intervention, knowledge about breastfeeding did not differ significantly between the two groups ($p = 0.469$). In contrast, immediately after childbirth and at the three-month follow-up, significant improvements were observed in the tele-lactation group ($p = 0.000$).

Table 4: Illustrates that 88% of women in the tele-lactation group had initiated breastfeeding within 30–60 minutes postpartum, in contrast to only 8% in the control group, with the difference being highly significant ($p = 0.000$).

Table 5: Shows that postpartum bonding differed significantly between the study (tele-lactation) and the control groups both immediately after delivery, and three months (follow-up) after the tele-lactation nursing intervention ($p = 0.000$).

Table 6: Indicates a significant difference in the total mean score of

maternal and infant attachment immediately after delivery ($p= 0.041$), and a highly significant difference three months (follow- up) after the tele-lactation intervention ($p = 0.000$).

Figure 3: Demonstrates that exclusive breastfeeding was predominant among primiparous women in the tele-lactation group immediately after delivery, and three months (follow-up) after the tele-lactation nursing intervention.

Figure 3: Demonstrates that exclusive breastfeeding was predominant among primiparous women in the tele-lactation group.

Figure 4: Shows that majority of the primiparous women in the tele-lactation group expressed satisfaction with the tele-lactation nursing intervention as a source of breastfeeding support and consultation.

Table (1): The studied participants' socio-demographic characteristics (n= 200)

Socio-demographic characteristics	Tele-lactation group (n=100)		Control group (n= 100)		Test of significance	p-value
	No.	%	No.	%		
Age						
20- 23 years	63	63	60	60		
24-29 years	26	26	25	25	3.05	0.217
30 -35 years	11	11	15	15		
Mean ± SD	29.02 ± 9.78		30.0 ± 8.6		t= 0.40	0.68
Age at marriage (years)	23.3 ± 3.7		25.1 ± 6.6		t= 0.62	0.70
Mean ± SD						
Educational level						
Read or write	20	20	18	18		
Middle	75	75	72	72	X2= 1.84	0.387
Higher or more	5	5	10	10		
Residence						
Rural	88	88	80	80	X2=1.71	0.274
Urban	12	12	20	20		
Occupation						
Working	17	17	20	20	X2 3.24	0.072
Housewife	83	83	80	80		
Income level						
Enough	45	45	48	48	X ² = 0.343	0.558
Not Enough	55	55	52	52		

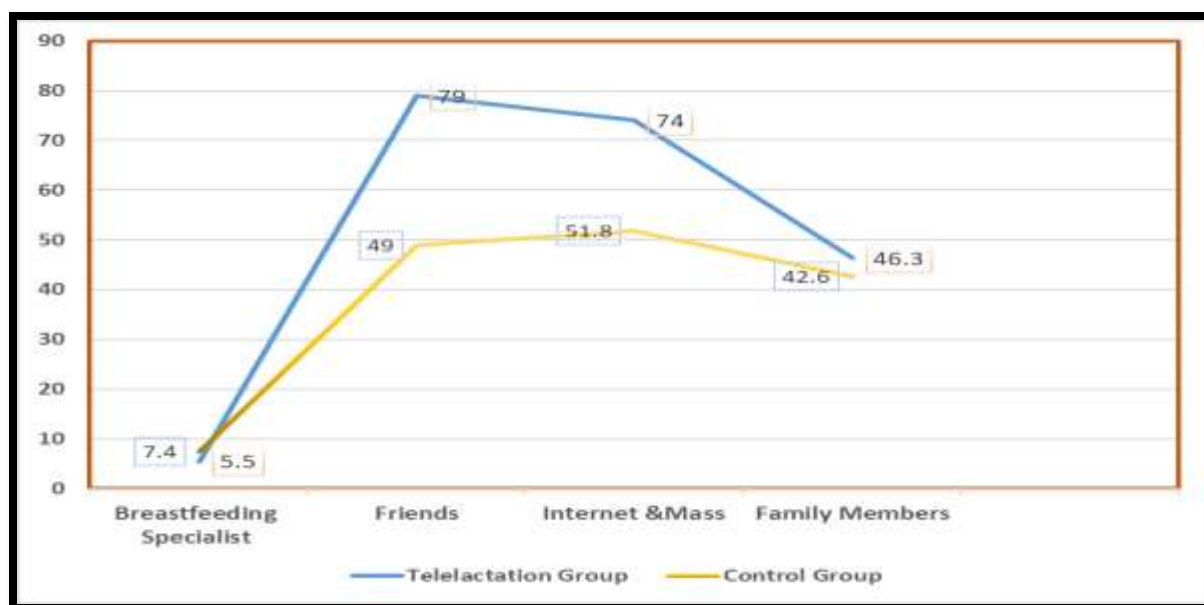


Figure (1) The studied participants' sources of knowledge regarding breastfeeding (n= 200)

Table (2): The studied' participants' total mean score of knowledge regarding breast feeding before the tele-lactation intervention, immediately after delivery

Women's knowledge regarding BF	Tele-lactation group (n=100)	Control group (n= 100)	t-test	p-value
	Mean $\pm$ SD	Mean $\pm$ SD		
Before Delivery (before Tele-lactation)	18.07 $\pm$ 2.07	15.79 $\pm$ 1.8	0.726	0.469
Immediately after delivery	35.20 $\pm$ 4.02	20.11 $\pm$ 2.43	22.02	0.000
Follow up (3 months after tele-lactation intervention)	28.22 $\pm$ 2.62	22.74 $\pm$ 2.83	23.29	0.000

Statistically significant at $p < 0.05$

Table (3): The studied participants' initiation of breastfeeding after delivery (n= 200)

Initiation of breastfeeding	Tele-lactation group (n=100)		Control group (n= 100)		Test of significance	p-value
	No.	%	No.	%		
30-60 Minutes	88	88	8	8	23.99	0.000
From (1-2) hour	10	10	79	79		
More than 2hours	2	2	13	13		

Statistically significant at $p < 0.05$.

Table (4): The studied participants' total mean score of postpartum bonding immediately after delivery, and three months (follow- up) after the tele-lactation intervention (n= 200)

Bonding time	Tele-lactation group	Control group	t-test	p-value
	Mean $\pm$ SD	Mean $\pm$ SD		
Immediately after delivery	30.01 $\pm$ 7.55	75.59 $\pm$ 7.16	5.34	0.000
Follow up (3 months after tele-lactation intervention)	35.88 $\pm$ 5.82	53.27 $\pm$ 9.31	10.07	0.000

Statistically significant at $p < 0.05$.

Table (5): The studied participants' total mean score of maternal and infant attachment immediately after delivery, and three months (follow- up) after the tele-lactation intervention (n= 200)

Attachment	Tele-lactation Group	Control group	t-test	p-value
	Mean $\pm$ SD	Mean $\pm$ SD		
Immediately after delivery	20.27 $\pm$ 2.14	50.25 $\pm$ 2.74	2.07	0.041
Follow up (3 months after tele-lactation intervention)	25.67 $\pm$ 1.20	48.23 $\pm$ 2.35	6.97	0.000

Statistically significant at $p < 0.05$

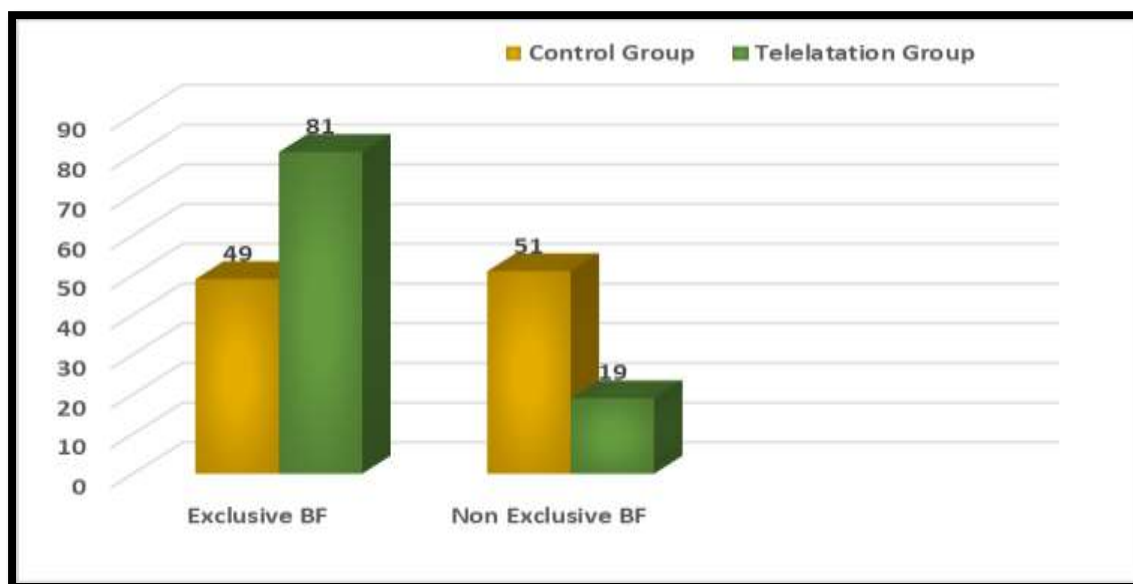


Figure (2) The studied participants' exclusivity of breastfeeding immediately after delivery, and three months (follow- up) after the tele-lactation intervention (n= 200)

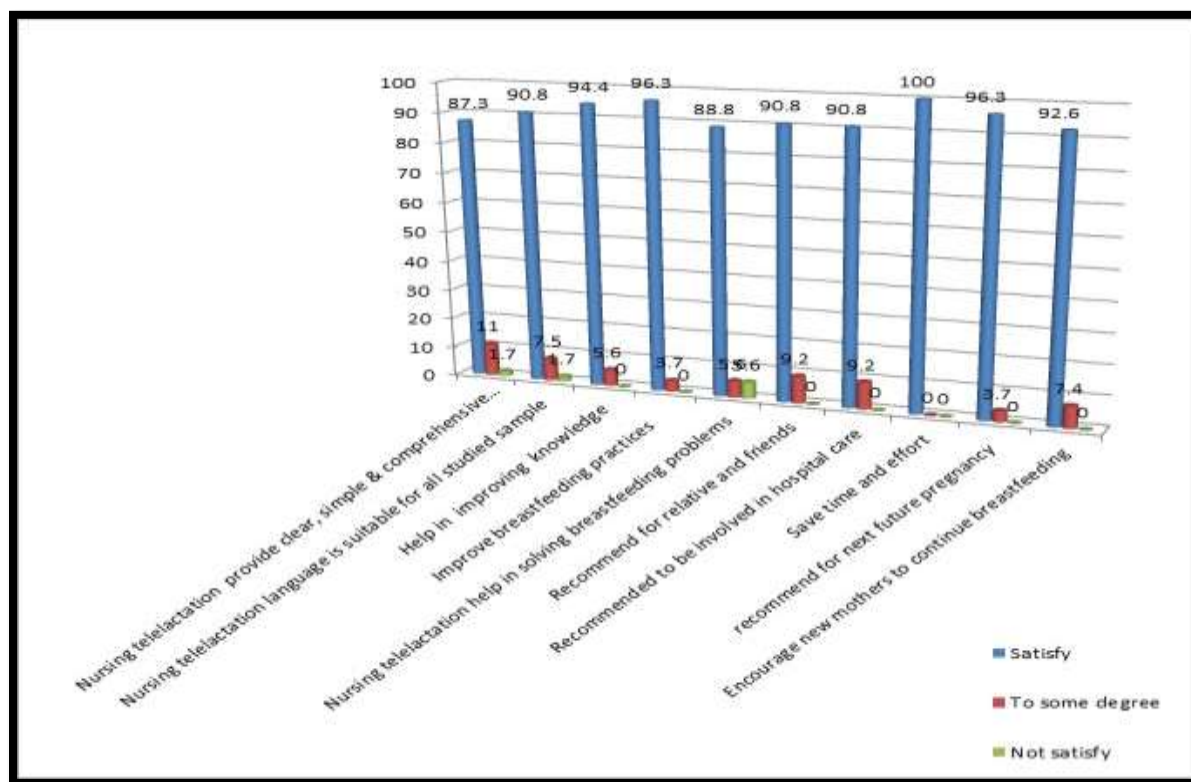


Figure (3): The study group's satisfaction with the tele-lactation interventions (n=100)

Discussion:

Breastfeeding is an essential practice for infant feeding, offering extensive preventive health benefits for both mothers and infants. The American Academy of Pediatrics and the World Health Organization recommend specific durations for breastfeeding to ensure optimal nutrition and health protection. Despite these guidelines, national and local breastfeeding rates continue to fall below the benchmarks set by Healthy People 2020 (**Prentice, A. M. (2022).**

Tele-lactation nursing intervention uses remote technology that can

enhance initiation of breast feeding and maternal outcomes. Scarce research exists in this area. To address this gap, the aim of the present study was to evaluate the efficacy of tele-lactation nursing intervention on initiation of breast feeding and maternal outcomes. Four tools were used to collect the data of this study. The results of the current study revealed that concerning women's socio-demographic characteristics, there was no statistically significant differences between the intervention and control groups. This means that the study subjects were homogenous.

Regarding the primary sources of breastfeeding knowledge, the present study found that fewer than one-tenth obtained information from specialists. In contrast, more than three-quarters of women in the tele-lactation group compared to nearly one half in the control group identified friends as their main source of breastfeeding knowledge, whereas family members represented another important source. These findings are supported by **El-Sakka, E., Yacout, D., & Moustafa, A. (2022)**, who reported that family members were the primary source of mothers' breastfeeding information. Similarly, **Barnard, M. (2021); Harger, H., & Cartagena, D. (2025)**, explained that this reliance on family is linked to close relationships and cultural factors, where mothers feel comfortable seeking advice from relatives without hesitation.

However, the current results contradict those of **Yilmaz et al. (2017); Najem, B., & Dh, A. D. L. (2011)**, who noted that breastfeeding knowledge was not typically obtained through social relationships. **Kamal, N. N., Ismael, F. H., Abdelrehim, M. G., & El-Khateeb, A. S. (2021)** are also in contrast with results of this study. They found that mothers primarily considered doctors as their main source of breastfeeding

information, attributing this to the belief that physicians, as authoritative figures of science, are best positioned to provide guidance and correct misconceptions.

Related to the initiation of breastfeeding immediately after childbirth, the current study revealed that nearly one half of primiparous women in the tele-lactation group began breastfeeding within 30–60 minutes postpartum, compared to fewer than one-quarter of primiparous women in the control group. A highly statistically significant difference was observed between the two groups regarding breastfeeding initiation ($p = 0.000$). These findings are consistent with **Osman, N. E., Hassan, S. I., Wady, D. E. A., & Abd El-hamed, M. A. (2023)** who reported that nearly one half of mothers-initiated breastfeeding within the first hour, and about one-quarter within the second hour after birth. Similarly, **Iamchareon, T., & Maneesriwongul, W. (2025)** found that the majority of mothers placed their infants to the breast within one hour following delivery. Early initiation of breastfeeding is widely recognized as a critical practice for improving neonatal health outcomes, as it facilitates colostrum intake, promotes maternal-infant bonding,

and reduces the risk of neonatal morbidity and mortality. Therefore, the present results highlight the effectiveness of the tele-lactation nursing intervention in promoting timely initiation of breastfeeding and underscore the need for continued efforts to support early breastfeeding practices.

Conversely, **Branco, J., et al., (2023)** observed that just over one-third of mothers in their study began breastfeeding within the first hour after birth, while fewer than three-quarters initiated within two hours. They highlighted maternal illness, cesarean delivery, and preterm birth as key factors contributing to delay in breastfeeding initiation. The discrepancy with the present study may stem from that the tele-lactation group had received antenatal breastfeeding education and the predominance of vaginal deliveries, both of which facilitated earlier initiation of breastfeeding, compared to women undergoing cesarean births. A wealth of literature supports the notion that cesarean section is a major impediment to early breastfeeding, with barriers including postoperative pain, difficulty positioning the infant to the breast, delayed skin-to-skin contact, impaired milk production, restricted mobility, and greater

dependence on external assistance.

Additionally, findings from the current study demonstrated that primiparous women in the tele-lactation group developed earlier and stronger bonding with their newborns both immediately after delivery and at the three-month follow-up, compared to those in the control group. These results contradict the findings of **Mendu, S. B., Neela, A. R., Tammali, S., Kotha, R., & Kotha Sr, R. (2024)** who reported higher bonding scores among mothers in the control group during the first few weeks and at 12 weeks postpartum.

With regard to maternal infant attachment, the present study also showed that primiparous in the tele-lactation group achieved greater attachment levels, with highly statistically significant differences favoring them at both post-test and follow-up. This outcome is consistent with **Wang, X et al., (2023)** who found that breastfeeding mothers demonstrated stronger attachment and greater sensitivity in dyadic interactions with their infants three months postpartum than mothers who bottle fed.

From the researchers' perspectives, the positive impact of breastfeeding on maternal–infant bonding and attachment can be explained by

several physiological and psychosocial mechanisms. Breastfeeding stimulates the release of oxytocin, often referred to as the “bonding hormone,” which enhances maternal feelings of closeness, reduces stress, and promotes nurturing behaviors. Furthermore, practices commonly associated with breastfeeding, such as skin-to-skin contact, frequent physical closeness, and eye-to-eye interaction, reinforce emotional connection and secure attachment between the mother and her infant. In addition, the support and education provided through the intervention may have improved mothers’ confidence and self-efficacy in breastfeeding. Thereby, strengthening their responsiveness and sensitivity to their infants’ needs. Similarly, **Linde, K., Lehnig, F., Nagl, M., & Kersting, A. (2020)** demonstrated that a longer duration of breastfeeding was positively linked to maternal sensitive responsiveness and secure attachment. This relationship may be explained by the influence of the educational sessions provided. With respect to adherence to exclusive breastfeeding, the present study revealed that majority of the primiparous in the tele-lactation group exclusively breastfed their infants, whereas less than half of the

primiparous in the control group did so. These findings are consistent with those of **Brani, P., et al., (2024)**, who reported that about three quarters of cases had exclusive breastfeeding following an intervention. Such outcomes highlight the beneficial impact of educational sessions that emphasized the importance of maintaining exclusive breastfeeding for an extended period.

In contrast, the findings of **Gavine, A., et al., (2022)** indicated that over one-third of the mothers in their study maintained exclusive breastfeeding for six months. They further reported that, besides the factors with a statistically significant effect on breastfeeding duration, variables such as low maternal and paternal education, absence of antenatal breastfeeding education, nipple complications, infrequent night feeding, irregular breastfeeding patterns, bottle or pacifier use, and insufficient social support were associated with early discontinuation of breastfeeding.

In terms of satisfaction with tele-lactation as an educational intervention, the findings of the current study highlighted that the majority of primiparous in the tele-lactation group reported being highly satisfied with using tele-lactation as a

means of receiving breastfeeding education and consultation. Mothers indicated that the service was accessible, convenient, and provided timely support when needed, which enhanced their confidence in breastfeeding practices. These results are in line with **DeYoreo, M et al., (2025)** who reported high satisfaction rates among mothers utilizing tele-lactation services for breastfeeding education and support.

Furthermore, the outcomes of this study make it evident that tele-lactation, when applied during both the antenatal and postnatal periods, had a notable positive impact on multiple maternal and neonatal outcomes. Specifically, women in the tele-lactation group demonstrated greater improvement in breastfeeding knowledge, earlier initiation of breastfeeding after childbirth, and higher adherence to exclusive breastfeeding, compared to those in the control group. In addition, the intervention contributed to strengthening mother–infant bonding and attachment, which are essential elements for healthy psychosocial and emotional development of the child. Taken together, these findings underscore the effectiveness of tele-lactation not only as a tool to improve breastfeeding knowledge and

practices but also as a comprehensive support system that fosters maternal satisfaction, enhances self-efficacy, and promotes both nutritional and relational benefits in the early postpartum period (**Uscher-Pines, et al., 2025**).

Conclusion:

This study concluded that the use of tele-lactation educational intervention had a significant positive impact on maternal and neonatal outcomes in the tele-lactation group. Specifically, marked improvements were observed among the study group in breastfeeding knowledge, earlier initiation of breastfeeding, stronger maternal–infant bonding, enhanced attachment, and higher adherence to exclusive breastfeeding, compared to the control group. In addition, tele-lactation nursing intervention was associated with greater maternal satisfaction, as most new mothers reported that it was a convenient, accessible, and effective method for receiving breastfeeding education and consultation which validated the research hypotheses.

Recommendations

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

- Primiparous women should be encouraged to adopt tele-lactation as a

modern educational method to enhance their knowledge regarding breastfeeding and effectively address common breastfeeding challenges.

- Healthcare providers and policymakers should work to disseminate and promote the culture of telehealth technologies, such as tele-lactation, as reliable sources of information and support for maternal and child health.
- Further studies are recommended to compare tele-lactation with other educational methods to determine its relative effectiveness in improving maternal knowledge, breastfeeding initiation, and exclusive breastfeeding rates.
- Future research should be conducted on larger samples and in diverse healthcare settings to strengthen the evidence base and ensure the generalizability of results across different populations and contexts.

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Professional Nurses' Decisional Involvement and its Relation to Their Turnover Intention

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Abstract

Background: Nursing represents a fundamental component of healthcare system, their involvement in decision-making processes is a significant determinant of organizational effectiveness and job satisfaction. Nevertheless, restricted participation in decision-making may result in frustration, reduced motivation, and an increased intention to leave the organizations. **Aim:** The aim of the study was to assess professional nurses' decisional involvement and its relation to their turnover intention. **Design:** A descriptive correlation research design was used for conducting this study. **Setting:** The study was conducted in ICUs at Tanta University Main Hospital. **Subjects:** All (N=352) intensive care nurses in the previously mentioned setting. **Tools:** Two tools were used: **Tool (I):** Professional Nurses Decisional Involvement Scale and **Tool (II):** Professional Nurses Intention to Turnover Questionnaire. **Results:** More than half (59.7%) of the professional nurses reported a low level of decisional involvement, while less than half (41.8%) of the professional nurses had a low level of turnover intention. **Conclusion:** There was a statistically significant negative correlation between professional nurses' decisional involvement and their turnover intention. **Recommendations:** Hospitals managers should empower nurses to participate in critical decisions related to staffing, recruitment, and practice standards. Also, provide leadership and decision-making training which can prepare nurses to actively engage in policy, staffing, and quality improvement decisions.

Keywords: Decisional involvement, Professional nurses, Turnover intention.

Introduction

The nursing profession, is an essential component of the multidisciplinary framework in modern healthcare systems, encompasses a wide array of professional tasks across various healthcare levels. Moreover, nurses engage in activities that may not initially seem directly associated with the profession, like managing the healthcare system, advocating for patients' rights, promoting and implementing environmental protection measures, conducting scientific research, and actively participating in the creation of health policies (Salihu, 2024).

Nurses are essential in fostering and maintaining health and providing care during illness or injury. Coordinating patient care across different healthcare settings and disciplines is a critical function of nurses (Brino, 2023). Nurses as essential members of the healthcare delivery team, they deliver and coordinate of care, prevent of adverse events, and optimize of health service productivity and patient outcomes. Nurses are attentive and practice shared decision-making to determine medically achievable goals that reflect patient needs (Kenny & Treyball, 2025). Clinical decision-making is a correct judgment based

on knowledge and cognitive skills. It has an effective role in providing safe and effective nursing care (Latifi, Roohi, Mahmoodi-Shan, & Tatari, 2024). Professional nurses require the ability to make clinical decision and the most important factor affecting the quality of care is their ability to make a successful clinical decision. Nurses as decision-makers in health care organizations must choose the best choices for allocating resources, selecting treatments, triaging patients, and choosing affordable interventions (Tazebew, Mulugeta, & Boka, 2023).

Nurses' decisional involvement is the extent to which healthcare organizations can allow or encourage nurses to share in the organizational process (Arab, Sayed, & Awad, 2023). Also, it involves participating in the process of deciding a crucial or necessary decision that affects the patients' outcomes (Ebrahim, Sayed, & Ali, 2023). The dimensions of professional nurses' decisional involvement are quality of professional practice, professional recruitment, unit staffing, unit leadership, quality of support staff practice and clinical liaison. **Quality of professional practice** describes nurses' active participation in decisions that determine, monitor, and enhance the standards and

effectiveness of nursing care (**De Lima Trindade et al., 2025**).

Professional recruitment is defined as the active participation of nurses in decisions regarding the selection, hiring, and retention of nursing personnel. This involvement allows nurses to influence workforce composition and ensures that new staff meet clinical and professional standards, nurses can enhance team cohesion, job satisfaction, and patient care quality (**Mrayyan et al., 2024**).

Unit staffing as a dimension involves decisions related to the scheduling and allocation of nursing staff within the unit. It covers who decides on shift assignments, staffing levels, and workload distribution to ensure adequate patient care coverage. Also, **unit leadership** encompasses participation in leadership and governance structures at the unit level. Nurses have a say in selecting unit leaders, shaping policies, and influencing management decisions that affect the nursing practice environment (**Bartmess, Myers, & Thomas, 2022**).

Quality of support staff practice; effective nursing care supported by roles, responsibilities, and performance of supporting staff, who assist nurses, such as nursing assistants or clerical staff. **Clinical**

liaison refers to nurses' involvement in collaborative activities and communicates with other departments, healthcare professionals, and external agencies to coordinate patient care and unit operations (**Nakai, Nitta, & Hashimoto, 2022**).

The patient care quality improves when nurses actively participate in decision-making. Professional nurses who participate in decision-making, enhance their job satisfaction, sense of belonging, and improve their resilience, moreover, reducing their intention to leave (**Abdelallem, Asal, Zeid, Hendy, & El-Sayed, 2024; Poku, Bayuo, Agyare, Sarkodie, & Bam, 2025**).

Turnover intention of professional nurses means pertaining propensity to leave their current positions and explore new prospects, this is a critical indicator of turnover. However, it does not invariably translate to actual turnover (**Xiao et al., 2025**). Also, it means encompasses the likelihood of quitting the existing position, the motivation for seeking new job, and the probability of obtaining another job (**Hu, Wang, Lan, & Wu, 2022**). Several main factors influencing professional nurses' turnover intention. It is frequently noted that low job satisfaction and dissatisfaction with pay are

significant predictors, and nurses who feel inadequately rewarded or unhappy with their compensation are more likely to consider leaving their jobs. Additionally, interpersonal conflict, such as disagreements with colleagues or supervisors, increases turnover intention (**Liu, Duan, & Guo, 2023**).

As well as, there are factors that cause exacerbated stress and burnout among nurses including work-related factors, individual factors, and psychological factors. Work-related factors like staffing shortages and resource insufficiency that led to increased workload on the existing staff (**Hajizadeh et al., 2025**). In addition, individual factors such as single status, being young, or having a lower educational attainment are associated with high turnover intention. Psychological factors including low work engagement and resilience influence nurses' intentions, nurses with less engaged or resilient are more likely to intend to leave their jobs (**Poku, Bayuo, Agyare, Sarkodie, & Bam, 2025**).

Professional nurses' turnover intention has significant negative impacts on patient outcomes, organizational effectiveness, and healthcare systems. Nurses with high turnover intention are more likely to have higher actual turnover, which disrupts continuity of care, leads to

staffing shortages, and excessive workloads on the remaining staff, all of which higher rates of burnout and job dissatisfaction. Also, it compromises the quality and safety of patient care (**Moscelli, Mello, Sayli, & Boyle, 2024; Mostafa, Mohammed, & Mohamed, 2024**).

Beyond that, organizations incur significant costs related to recruitment, orientation, and training of new nurses, with estimates of tens of thousands of dollars per nurse replaced. Total aggregate costs for the healthcare system in the billions each year (**Alharazi, Naholi, & Aljedaani, 2024**).

Significance of the study:

Nurses are the largest professional group in the health care system and comprise over half the workforce in the care area. Also, they operate in a dynamic health-care environment where their roles and functions are always developing and varying to satisfy the requirement of patients. So, when nurses are given support in making the range of profession decisions, this affects positively on both the quality of patient care, nursing work, and their job performance (**Arab, Sayed, & Awad, 2023**). Enhancing nurses' decision-making roles not only improves healthcare systems but also aligns with international goals to empower nursing professionals,

optimize care delivery and decrease nurses' intention to leave their position (**Fedele, 2025**).

Increasing in turnover intention among nurses directly adds peer's workload burdens, creating a feedback loop that undermines workforce stability and healthcare delivery. Also, the recruitment procedure to replace departed nurses is costly and time-consuming, prolonging understaffing and workload issues (**Galanis et al.,2025; Avcı & Avcı, 2025**).

Aim of the Study:

The current study aimed to assess professional nurses' decisional involvement and its relation to their turnover intention.

Research questions:

1. What are the levels of decisional involvement among professional nurses?
2. What are the levels turnover intention of among professional nurses?
3. What is the relation between professional nurses' decisional involvement and their turnover intention?

Research design:

A descriptive-correlation study design was used to conduct this study.

Setting:

The study was conducted at Tanta International Teaching Hospital,

which affiliated to Ministry of Higher Education and Scientific Research, in different intensive care units including General, Neonate, Pediatric, Cardiac and Medical Intensive Care Units.

Subjects:

The study subjects included all professional nurses (N=352) who were working in previously mentioned settings, and they were available at the time of data collection.

Tools of data collection:

To achieve the purpose of this study, two tools were used:

Tool I: Professional Nurses Decisional Involvement Scale This tool was developed by **Ebrahim, El Sayed and Ali (2023)** and adopted by researcher. It used to assess professional nurses' decisional involvement. This tool was including two parts as follows:

Part (1): Personal characteristics of professional nurses, it was included age, sex, place of residence, marital status, qualifications, years of experience, work unit, participation in hospital committees and attending training courses.

Part (2): Professional nurses' decisional involvement scale: It consisted of 28 items categorized into six subscales:

- **Quality of professional practice:** include 5 items.

- **Professional recruitment:** include 8 items.
- **Unit staffing:** include 5 items.
- **Unit leadership:** include 4 items.
- **Quality of support staff practice:** include 3 items.
- **Clinical liaisons:** include 3 items.

Scoring system:

Professional nurses' responses were measured by five points Likert Scale ranging as following: (5) professional nurses only, (4) primarily professional nurses-some and management, (3) equally shared by management and professional nurses, (2) primarily management and some professional nurses, (1) management only. The total score be represented at varying levels as the following (Ebrahim et al., 2023):

- High level of staff nurse's decisional involvement (66.7 - 100%).
- Moderate level of staff nurse's decisional involvement (33.4- 66.6%).
- Low level of staff nurse's decisional involvement ($\leq 33.3\%$).

Tool 2: Professional Nurses Intention to Turnover Questionnaire

This tool was modified by researcher based on Cuixain (2019) to assess turnover intention among professional nurses. It consisted of 14 items.

Scoring system:

The professional nurses' responses were measured on five points Likert Scale ranging 1-5 as follows: 5 =Always, 4= often, 3= sometime, 2= rarely and 1= never. The total score was calculated by summing scores of all items and divided according to statistical cutoff points as follows:

- High staff nurses' turnover intention ($\geq 75\%$).
- Moderate staff nurses' turnover intention (60% -<75%).
- Low staff nurses' turnover intention (<60%).

Method

1. An official permission was obtained from the Dean of the Faculty of Nursing for the director of Tanta International Teaching Hospital, who was informed about the study objectives, and his permission was taken to collect the data from the previously mentioned setting.

2. Ethical considerations:

- a) The researcher was introducing herself to the participant, a full explanation of the aim and methods of the study will be done to obtain their acceptance, cooperation and informed consent.
- b) The right to obtain participation at any time was respected c. Informed consent was obtained from the study's participants after explanation of the study's aim.

c) The nature of the study not cause any harm or pain for entire subjects.

d) Assuring nurses about the privacy and confidentiality of collected data that be used only for the study purpose.

3. Validation: The study tools were translated into Arabic and presented to a jury of five experts in the area of specialty to check their content, validity and clarity of questionnaire.

4. The face validity value of professional nurses' decisional involvement was 92.2%, and the turnover intention of professional nurses was 93.9%.

5. A pilot study was carried out on 10% of the subjects (n=35).

6. Reliability of tools was tested using the Cronbach's Alpha Coefficient test. Reliability of the decisional involvement of professional nurses' questionnaire=0.896 and reliability of the turnover intention of professional nurses' questionnaire = 0.827.

7. The data was collected for a period of six months, starting from November 2024 to April 2025.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 26.0. Qualitative data were described using number and percentage. Quantitative data

were described using range (minimum and maximum), mean, standard deviation, Comparisons between different categories for categorical variables were assessed using Chi-square test. Pearson coefficient was used to correlate between normally distributed quantitative variables. Significance of the results obtained was judged at the 5% level.

Results

Table (1): Represents personal and work-related characteristics of professional nurses. The table reveals that more than half (54.0%) of the professional nurses aged from (25-<30) with mean (29.62±5.03). Regarding sex, the majority (79.0%) of professional nurses were female. More than half (59.1%) of professional nurses were living in urban areas and two thirds (66.8%) of them were married. More than half (58.0%) of professional nurses had a bachelor's degree in nursing science, followed by about one third (32.7%) of them had a Nursing Associated Degree, while the minority (9.3%) had post-graduate nursing studies. Regarding nurses' years of experience, less than half (41.8%) of them had (5-<10) years of experience with mean (7.76±4.62). The majority (84.1%) of professional nurses did not participate in hospital committee

while two thirds (66.8%) attended training courses as first aid course, infection control course and quality course

Figure (1): Shows total levels of professional nurses' decisional involvement among nurses. This figure shows that more than half (59.7%) of professional nurses reported a low level of decisional involvement. Also, more than one third (35.2%) of them informed a moderate level, while the minority (5.1%) indicated a high level of involvement.

Table (2): Represents levels of professional nurses' decisional involvement dimensions. The table showed that the highest proportion (73.0% ,65.6 %, and 64.8%) of the professional nurses reported a low level of decisional involvement in professional recruitment, quality of professional practice and unit leadership, respectively. Also, less than half (44,3% and 41,5%) of the professional nurses had a low level of decisional involvement in unit staffing, and quality of support staff practice respectively. On the other hand, 18.8% of them reported high level of decisional involvement regarding clinical liaison.

Figure (2): Illustrates total levels of professional nurses' turnover intention among nurses. It shows that less than half (41.8%) of

the professional nurses had a low level of turnover intention, followed by almost one third (32.1%) of them who had a high level, while about less than one quarter (26.1%) of them had a moderate level of turnover intention.

Figure (3): Shows correlation between professional nurses' decisional involvement and their turnover intention. As shown in the figure, there was a negative statistically significant correlation between professional nurses' decisional involvement and their turnover intention.

Table (1): Personal and work characteristics of professional nurses (n=352)

Professional nurses personal and work-related characteristics	Professional nurses	
	No	%
Age:		
<25	28	8.0
25-<30	190	54.0
30-<35	71	20.1
35-<40	41	11.6
40-<45	19	5.4
>45	3	0.9
Mean ± SD	29.62±5.03	
Gender		
Male	74	21.0
Female	278	79.0
Place of residence		
Rural	144	40.9
Urban	208	59.1
Marital status		
Married	235	66.8
Un married	117	33.2
Qualification		
Nursing Associated Degree	115	32.7
Bachelor's Degree in Nursing Science	204	58.0
Post- graduate nursing Studies	33	9.3
Years of experience as a professional nurse:		
<5	96	27.3
5-<10	147	41.8
10-<15	67	19.0
15-<20	32	9.1
>20	10	2.8
Mean ± SD	7.76±4.62	
Working place		
Anesthesia ICU	65	18.5
Neonate ICU	78	22.2
Pediatric ICU	65	18.5
Cardiac ICU	71	20.1
Medical ICU	73	20.7
Participation in hospital committees		
Yes	56	15.9
No	296	84.1
Attend training courses		
Yes	235	66.8
No	117	33.2
If yes, what is it (n = 235)		
First Aid	64	27.2
ICU	49	20.9
CPR	83	35.3
Infection control	75	31.9
Quality	85	36.2
Others	37	15.7

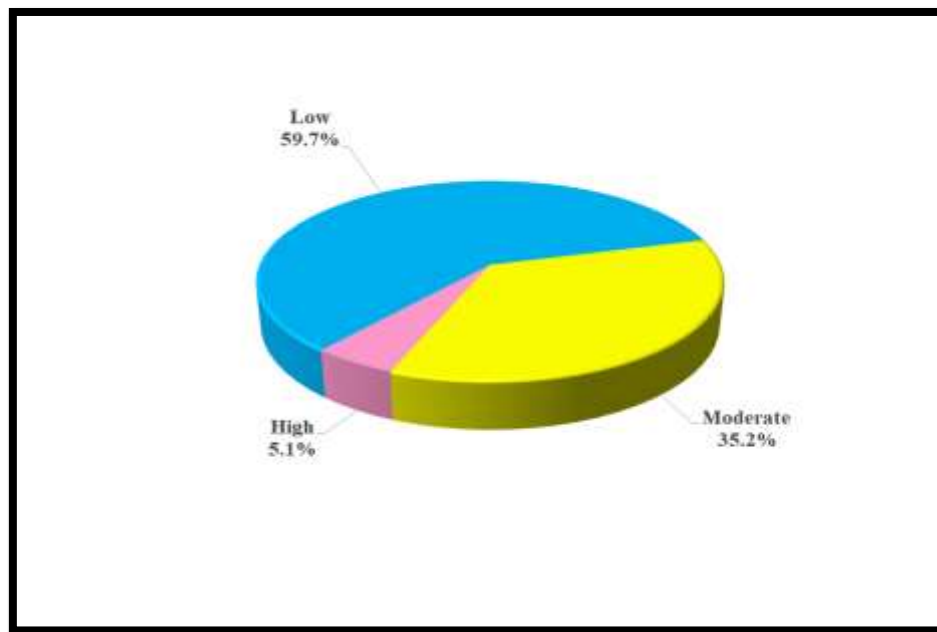


Figure (1): Total levels of professional nurses' decisional involvement (n=352)

Table (2): Levels of decisional involvement dimensions(n=352)

Professional nurses' decisional involvement dimensions	Levels of professional nurses' decisional involvement opinion					
	High		Moderate		Low	
	No.	%	No.	%	No.	%
Quality of professional practice	17	4.8	104	29.6	231	65.6
Professional recruitment	21	6.0	74	21.0	257	73.0
Unit staffing	82	23.3	114	32.4	156	44.3
Unit leadership	26	7.4	98	27.8	228	64.8
Quality of support staff practice	60	17.0	146	41.5	146	41.5
Clinical liaison	66	18.8	124	35.2	162	46.0
Overall Professional nurses' decisional involvement	18	5.1	124	35.2	210	59.7

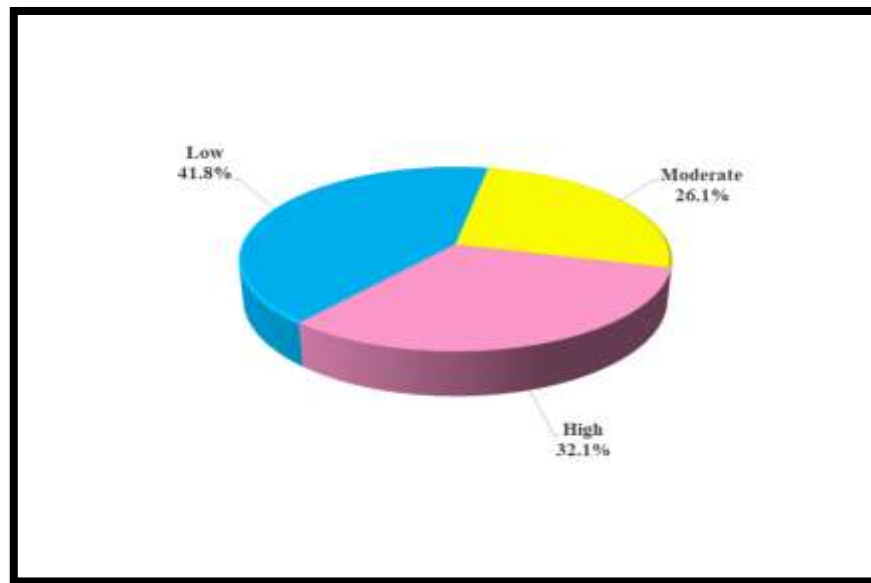


Figure (2): Total levels of professional nurses' turnover intention

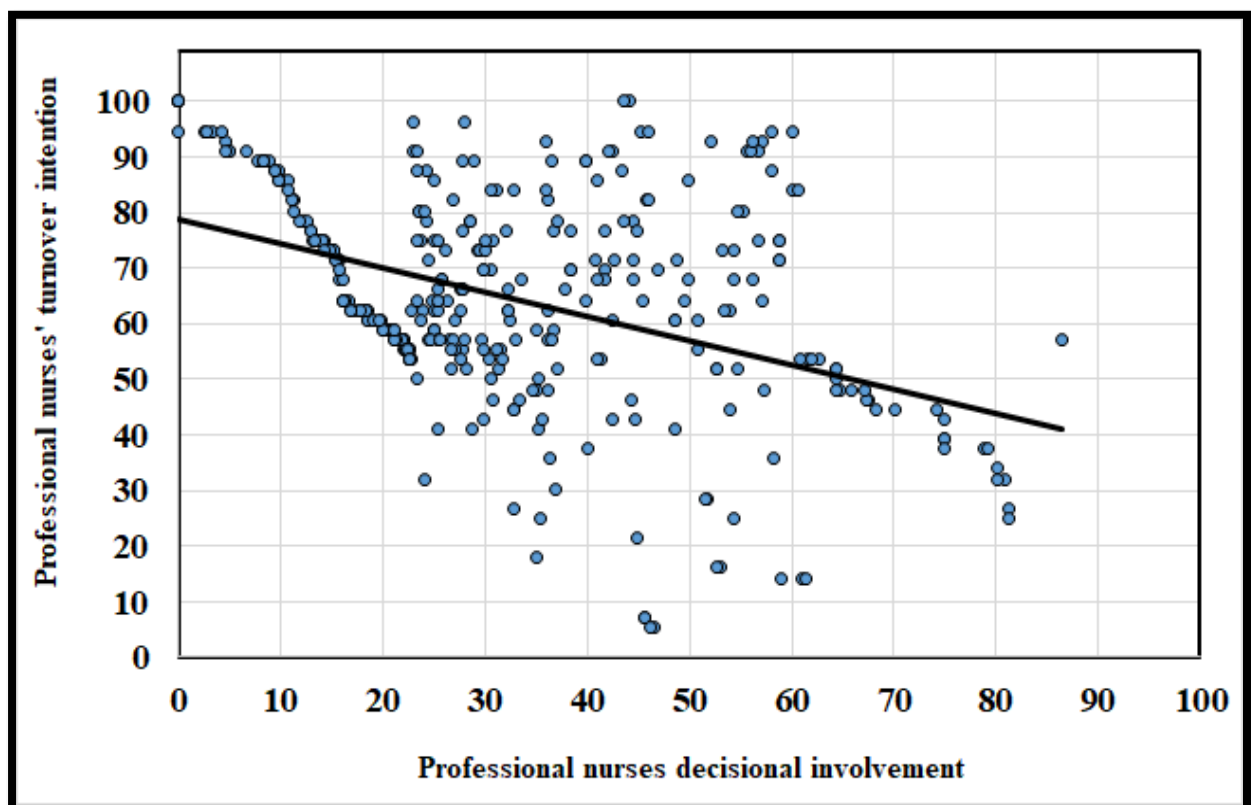


Figure (3): Correlation between professional nurses' decisional involvement and their turnover intention

Discussion

Nursing is a vital and dynamic health profession that involves promotion, maintenance, and restoration of health through the care of individuals, families, and communities. The profession requires a combination of scientific knowledge, clinical skills, advocacy, and emotional resilience that help them to participate in any decisions in healthcare organization (Cao et al., 2023). Active participation of nurses in decision-making processes, particularly those associated with caring and working circumstances, is positively correlated with improved contextual effectiveness, job performance, satisfaction and may reduce their turnover intention (Shabestari et al., 2024; Panda et al., 2023). High turnover rates among nursing staff are not only costly for healthcare organizations but also disrupt continuity of care, increase workload for remaining staff, and also declines in patient satisfaction and outcomes (Molina-Mula & Gallo-Estrada, 2020; Mistri, Badge, & Shahu, 2023; Tazebew, Mulugeta, & Boka, 2023).

Professional nurses' decisional involvement

The study showed that the high percentage of professional nurses reported a low level of decisional

involvement, while the minority of them indicated a high level of involvement. This may be due to many healthcare organizations operating with hierarchical decision-making structures where managerial and administrative levels retain control over key decisions, which limit nurses' ability to actively engage in important decisions. Additionally, insufficient training in decision-making skills hinders nurses' involvement. According to Fetouh et al. (2023), most staff nurses believe that administrator makes the majority of decisions, particularly in areas such as staffing, recruitment, and support staff quality. Nurses showed a desire for more collaborative or nurse-led choices, although they reported little engagement in practice. Organizational considerations were considered important impediments to nurses' engagement in decision-making.

The present study revealed that a significant proportion of the professional nurses reported a low level of decisional involvement in quality of professional practice. Nurses' participation in quality decisions may be restricted by hospital rules, regulations, and administrative policies, which are often bound by institutional standards and legal frameworks that place responsibility with management. This consistent with

Latifi et al. (2024) who reported that nurses being minimally involved in decisions directly affecting the quality of their practice. Organizational factors, such as hospital policies and leadership styles, have emerged as key barriers to limiting nurses' decisional involvement. Additionally, **Shabestari et al. (2024)** observed that many nurses feel excluded from key organizational decisions that affect quality care and contribute to low involvement and feelings of uncertainty in practice responsibilities.

The present study revealed that around three quarters of the professional nurses reported a low level of decisional involvement in professional recruitment. This could be explained by nurses who are unprepared or have lacked training to engage fully in recruitment decisions, causing hesitancy or exclusion from these roles. These findings align with **Fetouh et al. (2023)** who showed that most staff nurses perceived that actual decision-making, including professional recruitment, is controlled by administration with little involvement of the nurses. Also, **Ebrahim et al. (2023)** noted that decisional involvement throughout various nursing domains, including professional recruitment, is limited for staff nurses, which further reiterates a

stronger administrative involvement in these decisions. Moreover, **Bordbar et al. (2025)** explored that participation of nurses within organizational decisions reiterates administration-led recruitment, with marginal involvement by nurses. The reasons for this distribution of power are structural and systemic factors.

Also, the study showed that more than half of professional nurses stated a high to moderate levels of decisional involvement in unit staffing. This may be caused by nurse managers providing opportunities for nurses to express opinions, suggested staffing adjustments, and engaging in team-based decision-making that makes them feel included. This in line with **Yu et al. (2024)** found that nurse staffing decisions are influenced by multiple factors including workforce aging, high workload, and organizational climate, which may limit direct input from staff nurses, and this contributes to a minority reporting significant decisional involvement about staffing. Moreover, **Li et al. (2024)** highlighted that nurse decisional involvement in staffing and may restricted by leadership styles, organizational hierarchies, and a lack of empowerment, underlining that a minority of nurses perceive high involvement in these decisions.

Additionally, the study showed that a considerable proportion of the professional nurses reported a low level of decisional involvement in unit leadership. This is possibly because most nurses have a lack of formal training or leadership education; this reduces their preparedness or confidence to be more actively involved in making leadership decisions, hence limiting their decisional involvement. Also, there is a lack of clarity on the leadership roles and responsibilities of the nurses, which may discourage involvement in unit leadership. This is in accordance with **Porter-O'Grady (2025)** who discussed how nursing professional governance structures are imperative to empowering a nurse-driven culture of practice and leadership. Despite the advocacy of such models, found that many health facilities still demonstrate a very low level of active nurses in unit leadership.

Furthermore, the study showed that the majority of professional nurses reported a moderate to low level of decisional involvement in quality of support staff practice. These results may be because of role ambiguity, where decisions regarding support personnel are perceived to lie beyond the nurses' professional scope and hence limit their involvement. Aligning

with the present findings **Latifi et al. (2024)** showed that decisional involvement is generally dominated by administration, with nursing staff having minimal participation in unit decisions, including quality of support staff. Whereas nurses wanted more shared decision-making, only a minority reported meaningful involvement in supporting staff quality decisions. Also, **Ebrahim et al. (2023)** indicated that nurses' decisional involvement is associated with increased job satisfaction and retention, but generally, nurse participation in making decisions regarding quality of support staff remains.

Furthermore, lower percentage of them reported high level of decisional involvement regarding clinical liaison. This may result from high workload and time constraints leave nurses little time to become meaningfully engaged in clinical liaison activities, with effects on their decisional involvement. These findings align with **Arab, et al. (2023)** revealed that most nurses report little influence over decisions in the majority of nursing domains, such as leadership, recruitment, and practice quality. Their research highlighted that administration makes most of the decisions with little input from nurses. They suggest updating hospital rules to increase nursing participation in choices,

especially those pertaining to hiring and staffing that have an immediate impact on nursing practice. Also, **Tazebew et al. (2023)** highlighted that staff nurses have low levels of decisional participation in unit leadership and governance, professional recruitment, and staffing. The study called for increased training and structural changes to empower nurses to take a more active role in decision-making. Similarly, **Agure, Miyeso, and Abdullahi (2024)** evaluated the programs that help nurses make evidence-based decisions and concluded that, on average, nurses don't participate in decision-making, particularly when it comes to staffing and support roles. To increase engagement, policies and training should be enhanced.

On other hand, **Bordbar, Radinmanesh, Bahmaei, Rad, and Yusefi, (2025)** demonstrated that moderate to high levels of nurses' involvement in doctors' clinical choices were discovered significant positive correlations between nurses' clinical involvement and individual, social, organizational, and clinical factors were found in the study, demonstrating that nurses' abilities and intimate patient relationships allow them to make valuable contributions to clinical liaison and decision-making roles.

Professional nurses' turnover intention

The study showed that majority of the nurses reported a low level of turnover intention, but almost one third reported a high level of turnover intention. Low turnover intention may be attributed to their concern about the inability to have another job opportunity to meet their personal needs. While high turnover intention may be facing workplace stressors such as high workload, inadequate staffing, sleep deprivation, exposure to workplace violence, or lack of managerial support. Along with the present study finding, **Abdelhamed (2025)** at the Al-Aharar Teaching Hospital in Egypt, found less than half of professional nurses reported low turnover intention, while almost one-third were with a high level. He explained that two factors that proved influential for turnover intentions included resilience and harsh supervision. Abusive supervision was reported to be the cause of high turnover intention. Negative leadership greatly increased a nurse's desire to quit, emphasizing the use of effective leadership.

According to **O'Callaghan et al. (2025)** they found in a healthcare workforce review that approximately less than half of nurses reported low turnover intention. The primary causes

stem from workplace support systems and job satisfaction and professional advancement opportunities. Moreover, **Hu et al. (2025)** studied turnover intention among nurses in China. They found that nurses had lower turnover intention and reasons included varying levels of work-family conflict, social support, and resilience, which significantly influenced intention to leave. On contrary this result has been criticized by **Metersky et al. (2025)** reviewed clinical nurse educators' job satisfaction worldwide and noted turnover intentions vary greatly but often exceed moderate levels due to job stress, low organizational commitment, and insufficient career advancement opportunities, especially in hospital settings.

Correlation between professional nurses' decisional involvement and their turnover intention

The current study shows that a negative statistically significant correlation was found between professional nurses' decisional involvement and their turnover intention. Although there is a negative statistically significant correlation, there is low turnover intention. This may be caused by nurses' concerns about the inability to find another job opportunity to meet their family and personal responsibilities.

The result consistence with **Valdez, Ajzoon, Zuwameri, and Javier (2025)** found that nurses with higher involvement in decision making process in organization experienced less burnout and consequently reported lower turnover intentions, confirming the protective effect of involvement in decisions. In contrast, **Li et al. (2025)** found that relational job characteristics, including participation in decision-making process, positively affect nurses' well-being, which mediates a reduction in turnover intention. Empowered nurses, especially in involvement in decisions, showed lower turnover intention.

Additionally, **Arab, et al. (2023)**, who illustrated that enhancing staff nurse's involvement in the decision-making process contributes to increasing staff nurse's retention and recruitment. Likewise, **Tazebew et al. (2023)** concluded that staff nurse decisional involvement has a great significance in organizations such involvement affects staff nurses' retention.

Conclusion

The current study showed that majority of professional nurses have a low level of decisional involvement. In addition, less than half of the professional nurses had a low level of turnover intention. Furthermore, the study showed that a negative statistically significant

correlation was found between professional nurses' decisional involvement and its dimensions and their turnover intention.

Recommendations: The findings of the present study are directed at recommending the following:

For hospital administrator

- Revise hospital rules and regulations to explicitly and encourage nurses to participate in decision making, particularly in nursing-related concerns such as staffing, recruitment, and nursing support staff quality.
- Increasing nurses' representation in hospital administrative boards and decision-making committees formalizes their role in hospital governance and gives them greater voice at the higher organizational levels.
- Provide regular staff development and training for nurses on decision-making skills, critical thinking, and leadership.

For nurse managers

- Encourage open communication and actively support the sharing of ideas, opinions, and feedback on how things work and are decided upon by staff nurses.
- Promote shared decision-making at the unit level, involve staff nurses in planning, implementing, and evaluating nursing care and operational decisions to increase the degree of engagement,

autonomy, and professional fulfillment for nurses.

- Model supportive leadership by providing management support, positive feedback, and recognition of contributions to decision making by nurses. Feeling appreciated reduces burnout and turnover intention.

For professional nurse

- Empower themselves through the development of critical thinking, problem-solving, and decision-making skills.
- Active participation in unit and hospital committees, quality improvement projects, and shared governance structures is encouraged.
- Continuous learning and professional development contribute positively to improving knowledge, clinical competency, and oneself.
- Collaborate openly and constructively with the nurse manager and peers through active communication of ideas, concerns, and suggestions.

For further research

- Assess the impact of artificial intelligence supported decision-making tools on nurses' decisional involvement and job retention, particularly in complex clinical settings.
- Evaluate the effectiveness of participative decision-making models on patient outcomes, job satisfaction,

and nurse retention over a long period in various types of hospitals.

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Effect of Implementing Physical Restraint Nursing Guidelines on Accidental Endotracheal Tube Displacement and Neurovascular Complications among Critically Ill Patients

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Abstract

Background: Most of critically ill patients are mechanically ventilated and attached to multiple invasive devices. Physical restraint is used to protect these patients from removing medical equipments connected to their body. **Aim:** This study evaluated the effect of implementing physical restraint nursing guidelines on accidental endotracheal tube displacement and neurovascular complications among critically ill patients. **Design & Setting:** A quasi- experimental research design was utilized in Surgical Intensive Care Unit at Tanta Emergency Hospital affiliated to Ministry of Higher Education and Scientific Research. **Subjects:** Convenience sampling of (80) adult patients divided into two equal groups. Control group who received routine nursing care. Study group who received nursing guidelines of physical restraint by the researcher. **Tools:** Data were collected using Tool I, critically ill patient's assessment tool and Tool II, physically restraint patient's clinical outcomes. **Results:** Following the implementation of the physical restraint nursing guidelines, regards study group after applying physical restrain in 1st day, near half (47.5%) of the studies patients were restless. While, at 4th day more than two third (75.0%) of patients in study group were alert & calm. Regarding control study the group about (45.0%) of patient's improvement neurological disorders **at 4th day.** **Conclusions** the findings of the study indicated that the implementing of physical restraint guidelines in critical care setting significantly reduced the incidence of accidental tube displacement and minimized neurovascular complications such as (no changes at skin colour, normal capillary refill and normal pulse). **Recommendations:** Implementation of standardized physical restraint nursing guidelines should be adopted to all critical care units to reduce the risk of accidental tube displacement. Continuous in-service training program for nurses should be conducted regularly to improve the staff knowledge and skills.

Keywords: Critically Ill Patients, Endotracheal Tube Displacement, ICU Neurovascular Complications, Physical Restraint.

Introduction:

Critically ill patients are characterized by having life threatening illnesses or injuries which need continuous monitoring and intensive care. Patients are admitted to intensive care units (ICU) often need more invasive interventions which mostly aimed at life-support and the support of different organs in the body. These invasive interventions include oxygen and other respiratory support machines such as mechanical ventilation (MV) (**Baker et al., 2025**).

Mechanical ventilation has become the most commonly used device of life support among critical ill patients today. Mechanical ventilation or assisted ventilation is the medical term for using a ventilator machine to fully or partially provide artificial ventilation. (**Riaz et al., 2025**).

Although MV is a lifesaving intervention, it is capable of producing many of the complications divided into those resulting from endotracheal intubation (ventilator-associated pneumonia, tracheal stenosis, vocal cord injury, and, very rarely and tracheal-esophageal or tracheal-vascular fistula) (**Guo et al., 2025**).

Complications of ongoing mechanical ventilation itself include

pneumothorax, hypotension, oxygen toxicity and ventilator-associated lung injury. In addition, immobility can contribute to prolonged disability after mechanical ventilation (**Jiang et al., 2025**).

These complications are unpleasant for patients and often interfere with care and safety and uncontrolled behaviors that may result in the displacement of the endotracheal tube or other medical devices that may lead to failure to implement the planned treatment of the patient. (**Hwang et al., 2025**).

Physical restraints are used and accepted as presumed protective measures for ICU patients worldwide. In the intensive care setting, they may increase the risks of agitation, self-extubation, and device removal. They may also increase the prevalence of post-traumatic stress disorder (PTSD) in ICU survivors. Although physical restraint is used to prevent the removal of tubes in patients with delirium, it increases the delirium of these patients even more and can produce of neurovascular complications (**Hakverdioğlu Yönt et al., 2025**).

Multiple clinical complications of physical restraint effects on patients are associated with physical restraints in ICUs including neurovascular complications (for

example edema, redness, alteration color and limb movement complications), pressure injuries, nerve damage, if neurovascular trauma is not adequately assessed and treated, it might result in the development of ischemia, necrosis, and neurological deficit. Additionally, psychological complications as agitation, delirium, post-traumatic stress disorder, depression, anxiety, anger, social isolation, and reduction of personal autonomy and accidental tube displacement **(Lotfy et al., 2024)**.

Unplanned extubation (UE) can occur when the patient dislodges their tube by pulling on it (self-extubation) or when an external force is applied to the tube during movement of the patient or other nursing care (accidental extubation). Unplanned extubation (UE) can occur in any setting where intubated patients are cared for, including the operating room, intensive care unit, the emergency department, diagnostic imaging suites. **(Carvalho et al., 2025)**.

Human factors in the ICU can also play a role in increasing risk and have been linked to unplanned or accidental intubation, including fatigue, level of critical care nurses experience, and inadequate staffing patterns. The need for reintubation

after accidental extubation is higher and carries a poorer prognosis compared to reintubation after patient self-extubation. Complications associated with UE, especially if they increase hospital or ICU length of stay, can significantly increase hospital costs **(Gao et al., 2025)**.

The need for mechanical ventilation in the ICU, even in the absence of complications, adds to hospital costs. A major first step in prevention is to increase awareness of the problem. An important first step to increase awareness of the problem is staff education for providers caring for intubated patients about the risk factors and how to monitor for patients at risk. Several hospitals have introduced quality improvement initiatives using multidisciplinary interventions to prevent unplanned extubation and improve outcomes **(Peck& Schwartzstein, 2025)**.

The main reason for the use of physical restraint around ICU is to prevent patients from accidentally removing the catheters or devices needed to protect their safety. The physical restraint at critical care areas must be developed and implemented with nursing guidelines to assist critical care nurses (CCN) and other health care professionals in caring of critically ill patient's **(Zhu et al., 2025)**.

Physical restraint in critically ill patients must be used cautiously, ethically, and in compliance with institutional policies. The goal is to ensure the patient's safety while minimizing risks associated with restraint use. Critical care nurses play an essential role in providing safe care to people in all care settings **(Tanios et al., 2025)**.

This role requires that critical care nurses provide effective, evidence-based care, including comprehensive assessment, prevention and management of behavioral emergencies. So, the assigned nurse should be alert for any signs and symptoms as; aggressive behavior/agitated or confusion. If she found these signs and symptoms should be obtain the patient history as past medical history, medication, allergies, present illness/circumstances, precipitating factors and behavior exhibited **(Lewis et al., 2025)**.

Significance of the study

Most incidences of accidental tube displacement are patient-initiated and tend to occur among who exhibiting restlessness, agitation and improper physical restraint particularly when combined with inadequate sedation and in those who are being weaned from mechanical ventilation. In Egypt **(Abbas& Lutfy, 2019)** accidental

tube displacement represented 40.3% of the studied patients in the ICU. Moreover, inappropriate use of physical restraint may result in adverse events, which should be taken into consideration by critical care nurses such as detrimental physical, psychological, and neurovascular complications such as skin injuries, tissue injury, and delirium, which may lead to post-traumatic stress disorders **(Ertuğrul& Özden, 2023)**. Despite the wide are of physical restraint in (ICU) there is still limited research regarding the effect of implementing nursing guidelines on both accidental endotracheal tube displacement and neurovascular complications. Most previous studies focus either on accidental extubation or on restraint related complication separation **(Cui, et al., 2025)**. So, the present study will be designed to evaluate the effect of implementing physical restraint nursing guidelines on accidental endotracheal tube displacement and neurovascular complications among critically ill patients.

Aim of study was to :

Evaluate the effect of implementing physical restraint nursing guidelines on accidental endotracheal tube displacement and neurovascular complications among critically ill patients.

Research hypothesis:

H1-The patients who are exposed to nursing guidelines of physical restraint are expected to decrease a neurovascular complications, improved hemodynamic parameters as (oxygen saturation within normal range (above 95) and heart rate (60-100).

H2-The patients who are exposed to nursing guidelines of physical restraint are expected to decrease rate of accidental tube displacement.

H3-The patients who are exposed to nursing guidelines of physical restraint are expected to decrease the incidence of delirium.

Subject and methods:

Study design: Quasi-experimental research design.

Study settings: Design: A quasi-experimental research design was utilized in this study. **Setting:** The study was conducted in surgical Intensive Care Unit at Tanta Emergency Hospital affiliated to Ministry of Higher Education and Scientific Research.

Subjects: Convenience sampling of (80) adult patients from the previously mentioned setting who fulfilled the inclusion and exclusion criteria was assigned based on the on Epi -Info 7 software Statistical Program according to the total population admitted per year to ICU

and undergo endotracheal intubation (200) in 2023 and the sample size was calculated as the following:

- Z = Confidence level 95%,
- d= Error proportion(0,05),
- p= population (200).

The patients were divided randomly and alternatively, into two equal groups; 40 patients each as follows:

Control group: - consisted of 40 patients who received routine nursing care as removed restraint each shift

Study group: - consisted of 40 patients who received nursing guidelines of physical restraint that was implemented by the researcher.

Two tools were used in this study:-

Tool I: Critically Ill Patient Assessment Tool.

This tool was developed by the researcher after reviewing the related literatures (Qiu, et al., 2023, Namigar, et al., 2023, Teasdale, 1974, Sessler et al., (2002), Lim et al., 2015). It included four parts as follows:-

Part (a): Bio-Demographic Characteristics:

This part included demographic data include age, gender, patient past and present medical history, medical diagnosis, weight, and height and body mass index.

Scoring system:-

This part was scored as present and not present problem

- Presence of problem was taken score (1)
- Not present of problem was taken score (0)

Part (b): Ventilator and Hemodynamic Parameters Assessment Sheet:

It was used to assess mode of ventilator, ventilator parameters as (Tidal Volume, Positive End-Expiratory Pressure (PEEP), oxygen saturation, Fio2, Heart rate, mean arterial blood pressure and body temperature.

Part (c): Glasgow Coma Scale (GCS):

This scale originally created and developed by **Graham Teasdale and Bryan Jennett in 1974** to assess the level of consciousness. It consists of three categories of patient responses. Eye opening scored (1-4) Verbal response scored (1-5) Motor response scored (1-6) .The total score of GCS is between 3 and 15, with 3 being the lowest and 15 being the highest.

Part (d): Richmond Agitation-Sedation Scale (RASS):

The scale was adopted by **Sessler et al., (2002)** and is used by the researcher for assessing arousal and guide sedation therapy to assess readiness for extubation **scoring system (Lim et al., 2015)**. The

RASS is a 10-point scale ranging from -5 to +4.

Levels of sedation from -1 to -5

Levels of agitation from +1 to +4

-RASS level 0 is “alert and calm.” .

Tool II: Physically Restraint Patient's Clinical Outcomes:

Part (a): Assessment of Neurovascular Complications:

This part was developed by the researcher after reviewing the relevant related literatures (**Couture, et al., 2023**) to assess the restrained parts as pulses, capillary refill, skin color, temperature, sensation, and edema for restrained parts.

Scoring system:-

This part was scored as present and not present problem

- Presence of problem was taken score (1)
- Not present was taken score (0)

Part (b): Behavioral pain scale for restrained part

The BPS was developed by **Hsiung et al (2016)** to assess pain among unconscious, mechanically ventilated patients. The BPS is based on the total score of three behavioral expressions: 1) facial expression, 2) upper limb movements, and 3) compliance with mechanical ventilation. The BPS allows the assessor to derive a score between 3 (no pain) and 12 (highest pain score).

Each item scored from 0-4 and the total score is 12. **Scoring system:**

No pain (3), mild (4–6), moderate (7–9), or severe (10–12) pain

Part (c): Confusion Assessment

Method for the ICU (CAM-ICU):

This scale was adopted from **Tate& Happ, (2018)** and the CAM-ICU is modified from the Confusion Assessment Method (CAM). It will be used by the researcher for assesses delirium in critically intubated patients.

This scale is four features: -

1. Acute change or fluctuation in mental status from baseline,
2. Inattention.
3. Altered level of consciousness
4. Disorganized thinking.

Scoring system: - The CAM-ICU is positive, and the patient is considered to have delirium, if Features 1 and 2 and *either* Feature 3 or 4 is present. Each feature relies on components considered to be standard neurologic assessments and provides objective evaluation of each.

Part (d): Endotracheal Tube Displacement Assessment Sheet:

This part was developed by researcher after reviewing the relevant literatures **Zhang& Liu, (2022)**. To assess unplanned tube displacement for critically ill patients; frequency of accidental tube displacement every shift, patient's

condition during accidental tube displacement as follow:

1-Patients Indicators:-

Change color (cyanosis), decrease Sao₂, asymmetrical chest elevation, decrease lung sound, tube at fixation position decrease and displacement of tube beyond the point of fixation.

Scoring system:-

This part was scored as present and not present problem

- Presence of problem was taken score (1)
- Not present was taken score (0)

2.Mechanical Indicators:-

Presence of ventilator alarm, Presence of air leak, decreased Fio₂, decreased PEEP, and decreased respiratory rate.

Scoring system:-

This part was scored as present and not present problem

- Presence of problem was taken score (1)
- Not present was taken score (0)

Method

This study was accomplished through the following steps:

1. **An Official Permission** was obtained from the responsible authorities at the Faculty of Nursing, Tanta University to the director of the intensive care unit emergency hospital in Tanta University Hospital.

2. Ethical considerations:

- a. Ethical committee approval was obtained from the Faculty of Nursing code number 309-10-2023.
- b. Nature of the study will not cause any harm to the entire subjects.
- c. Informed consent was taken from the family members after explanation of the aim of the study.
- d. Confidentiality and anonymity were maintained by use of code number instead of name and privacy of the patients was taken into consideration regarding data collection.

3. Tool development

The study tools I part (a, b) and part II part (a, c) was developed by the researcher after review of the relevant literatures (Qiu, et al., 2023, Namigar, et al., 2023). Tool (II) was developed by part (A) was adapted by Couture, et al., 2023).

4. Content validity:

The developed tools were tested for content validity and clarity of questionnaire by a jury of three experts in the field of Critical Care and Emergency Nursing and accordingly needed modifications were done, it was valid.

5. Reliability of the tool

Reliability of the developed tool using Cronbach's alpha test.

- **Cronbach's Alpha** for **tool I** is **0.806** for 21 items applied on 8 critically ill patients.

- **Cronbach's Alpha** for **tool II** is **0.972** for 22 items applied on 8 critically ill patients, which indicate higher reliable tool.

- Additionally, tool I part (C) had a reliability of 0.86 (Reith, Synnot, Van Den Brande, Gruen, & Maas, 2017), part (d) had a reliability of 0.98 (Rasheed, Amirah, Abdallah, Issa, & Alharthy, 2019) and tool II part (b) had a reliability of 0.99 (Hylén, Akerman, Alm-Roijer, & Idvall, 2016).

6. Pilot study

It was conducted on 10% (8) of patients to test the feasibility and applicability of the tools and to determine any obstacles that may encountered during the period of data collection, and needed modification were done.

7. Data Collection:

Data were collected over a period of about 12 months started from February 2024 to February 2025.

Implementing physical restraint nursing guidelines was conducted on four phases as follows:

A-Assessment Phase:

A primary assessment was done on the first day for all patients at the

previous mentioned setting to determine which patient met the inclusion criteria of the study. Assessment of patient bio-Socio demographic data, ventilation and hemodynamic parameters, Glasgow Coma Scale (GCS and Richmond Agitation-Sedation Scale (RASS)

B. Planning phase: -The modified nursing guidelines for physical restraint technique were developed. Based on the study subjects' needs assessments and literature review (**Graham Teasdale and Bryan Jennett in 1974, Sessler CN (2002), Payen et al (2016) and Tate& Happ, (2018).**

Expected Outcomes of the study:

Goals and expected outcomes criteria were taken into consideration when planning for patient care included: -

- Improve Keeping of endotracheal tube in site
- Hemodynamic stability.
- Decrease the occurrence of any neurovascular complications.
- Decrease the rate of delirium.

C. Implementation phase: -

Control group:

Was received the routine nursing care introduced in the intensive care unit which included:

- Apply routine physical restraint as needed.

Study Group

In this phase, the modified nursing guidelines for physical restraint technique by the researcher was applied by the researcher. The content of guidelines item was applied consequently.

Application of physical restraint: -

The researcher applied restraint according to standards and evidence-based guideline.

- Each patient in the study group was followed by the researcher for four consecutive days.

During the period, physical restraints applied for short intermitted periods of 5-10 min every 2 hours. During morning and afternoon shift. At the night shift, the nurse in the shift followed the patient. This duration was selected based on the principle of minimized harm and aiming to reduce

During restraint, the researcher;

- Monitor the patient closely for agitation, attempts to remove endotracheal tube or self-harm.
- Check the restraint limbs for skin color, temperature, sensation, measure capillary refill and signs of injury or swelling.
- Assessment states and signs of delirium.
- Ensure proper position and padding.
- Assess monitor hemodynamic parameters as heart rate, mean

arterial blood pressure and body temperature.

D- Evaluation Phase:

Evaluation was done for both control and study groups by using Tool (I) part (b, c and d) and Tool (II), which was applied three times before, during and after restrain application for four consecutive days from admission.

Results:

Table (1) illustrated distribution the both studied groups regarding their bio demographic characteristic.

Regarding the age, about two third (65.0%) and (67.5%) of the studied patients in both control and study group were aged above ≥ 50 years old respectively. Additionally, there was no statistically significant difference between both groups in relation to their bio-demographic characteristics.

Table (2) represents the distribution of the both studied groups regarding their clinical data. Regarding past medical history, the majority (80.0%) and (90.0%) of both the studied patients' groups had respiratory disorders respectively. As a regard diagnosis, a higher percent (37.5%) and (47%) in control and study group were diagnosed with neurological disorders respectively. Additionally, there was no statistically significant difference between both groups in

relation to past medical history and current diagnosis.

The table (3) presents the assessment of consciousness level using Glasgow coma scale (GCS) of the both studied groups at 1st and 4th days of implementation. In this table, statistically significant differences were observed among both groups regarding level of consciousness $P < 0.05$.

Table (4) represents that distribution of both studied groups regarding Richmond agitation-sedation scale. As regards Study group after applying physical restrain in 1st day, near half (47.5%) of the studies patients were restless. While, at 4th day more than two third (75.0%) of patients in study group were alert & calm.

Table (5) illustrates the assessment of pain severity level using behavioral pain scale of both studied groups throughout periods of implementation. More than two third (70.5%) and (75.0%) had no pain at 1st day and 4th days respectively. There were statistically significant differences between control and study group in the 1st and 4th day after intervention $p, 0.000^*$.

Table (6) shows relation between diagnosis of the studied patients and their confusion level for the ICU (CAM-ICU) at 4th day of implementation. In the study group

about (45.0%) of patients with neurological disorders hadn't acute onset or fluctuating and calm. **As regard renal impairments** in control group, lower percentage (20.0%) had the adjective of Inattention of patients, but in the study group (17.50%) had organized thinking.

Table (7) represents relation between total consciousness score, total RASS score and total pain severity score of the studied patients and their confusion level in ICU (CAM-ICU) after 4th day of implementation. There was no significant relation between total GCS score and confusion level among study group, whereas there was a significant relation between total RASS score and confusion level in study group at acute onset or fluctuating course and altered level of consciousness at 4th day after intervention where $P = (6.087, 0.018^*, 5.753, 0.021^*)$ respectively. Also, there was a significant relationship between total pain severity score and confusion level at study group in 4th day after intervention $p, 4.344, 0.044^*$.

Table (1): Distribution of the both studied groups regarding their socio-demographic characteristics

Characteristics	The studied critically ill patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Age (in years)					
▪ (21-<30)	1	2.5	2	5.0	
▪ (30-<40)	4	10.0	2	5.0	1.038
▪ (40-<50)	9	22.5	9	22.5	0.792
▪ (≥ 50)	26	65.0	27	67.5	
Range	(26-60)		(26-60)		t=0.48
Mean $\pm$ SD	51.08 $\pm$ 8.75		52.00 $\pm$ 8.43		P=0.631
Sex					
▪ Male	23	57.5	24	60.0	FE
▪ Female	17	42.5	16	40.0	1.00
Wight (in Kg)					
▪ Range	(60-100)		(59-105)		t=0.37
▪ Mean $\pm$ SD	75.95 $\pm$ 9.95		75.13 $\pm$ 10.06		P=0.713
Height (in cm)					
▪ Range	(154-172)		(150-173)		t=0.23
▪ Mean $\pm$ SD	162.55 $\pm$ 4.42		162.80 $\pm$ 5.40		P=0.821
Body mass index					
▪ Normal weight (18.5–24.9)	7	17.5	9	22.5	0.405
▪ Overweight (25–29.9)	19	47.5	19	47.5	0.817
▪ Obesity (≥ 30)	14	35.0	12	30.0	
Range	(21.63-39.06)		(21.63-41.02)		t=0.38
Mean $\pm$ SD	28.81 $\pm$ 4.06		28.45 $\pm$ 4.30		P=0.702

FE: Fisher' Exact test

Table (2): Distribution of the both studied groups regarding their clinical data

Clinical data	The studied critically ill patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
# Past medical history					
▪ Respiratory disorders	32	80.0	36	90.0	
▪ GIT disorders	10	25.0	7	17.5	
▪ bnNeurological disorders	12	30.0	14	35.0	4.276
▪ Endocrine and Renal disorders	16	40.0	13	32.5	0.118
▪ Cardiovascular disorders	26	65.0	30	75.0	
Diagnosis					
▪ Neurological disorders	15	37.5	19	47.0	
▪ Renal impairments	10	25.0	8	20.0	0.837
▪ Respiratory disorders	15	37.5	13	32.5	0.658

More than one answer was chosen

Table (3): Assessment of consciousness level using Glasgow Coma Scale (GCS) of the both studied groups at 1st and 4th days of implementation

Consciousness level	The studied critically ill patients (n=80)									
	Control group (n=40)				χ^2 P	Study group (n=40)				χ^2 P
	1 st day		4 th day			1 st day		4 th day		
	N	%	N	%		N	%	N	%	
▪ Severe (Coma) ▪ Moderate conscious) ▪ Mild (Semi-	0	0.0	7	17.5	18.76 0.001*	0	0.0	5	12.5	32.08 0.000*
40	100.0	28	70.0	39		97.5	18	45.0		
0	0.0	5	12.5	1		2.5	17	42.5		
Range Mean ± SD	(9-12)		(5-14)		t=1.49	(9-13)		(5-14)		t=3.72
	9.90±0.78		10.48±2.29		P=0.138	10.15±0.83		11.58±2.28		P=0.001*

Severe (Coma) (≤ 8)

Moderate (Semi-conscious) (9–12)

Minor (conscious) (≥ 13)

Table (4): Distribution of the both studied groups Richmond Agitation-Sedation Scale (RASS) throughout periods of implementation

Term		The studied critically ill patients (n=80)													
		Control group (n=40)						χ^2 P	Study group (n=40)						χ^2 P
		Before		During		After			Before		During		After		
		N	%	N	%	N	%		N	%	N	%	N	%	
1 st day	▪ Combative	3	7.5	0	0.0	0	0.0		3	7.5	0	0.0	1	2.5	
	▪ Very Agitated	6	15.0	3	7.5	6	15.0		9	22.5	4	10.0	1	2.5	
	▪ Agitated	5	12.5	4	10.0	6	15.0		9	22.5	13	32.5	2	5.0	
	▪ Restless	5	12.5	8	20.0	7	17.5	28.74	3	7.5	5	12.5	19	47.5	45.69
	▪ Alert & Calm	0	0.0	6	15.0	0	0.0	0.026*	0	0.0	2	5.0	3	7.5	0.000*
	▪ Drowsy	8	20.0	6	15.0	12	30.0		11	27.5	11	27.5	11	27.5	
	▪ Light sedation	7	17.5	9	22.5	5	12.5		3	7.5	2	5.0	3	7.5	
	▪ Moderate	6	15.0	4	10.0	4	10.0		2	5.0	3	7.5	0	0.0	
	▪ Deep sedation	0	0.0	0	0.0	0	0.0		0	0.0	0	0.0	0	0.0	
4 th day	▪ Very Agitated	11	27.5	6	15.0	8	20.0		2	5.0	1	2.5	0	0.0	
	▪ Agitated	9	22.5	8	20.0	13	32.5		4	10.0	0	0.0	0	0.0	
	▪ Restless	5	12.5	9	22.5	6	15.0	16.11	18	45.0	17	42.5	3	7.5	64.74
	▪ Alert & Calm	0	0.0	6	15.0	3	7.5	0.187	1	2.5	11	27.5	30	75.0	0.000*
	▪ Drowsy	9	22.5	8	20.0	8	20.0		14	35.0	10	25.0	7	17.5	
	▪ Light sedation	6	15.0	3	7.5	2	5.0		1	2.5	1	2.5	0	0.0	
	▪ Moderate	0	0.0	0	0.0	0	0.0		0	0.0	0	0.0	0	0.0	

* Statistically significant level at P<0.0

Table (5): Assessment of pain severity level using behavioral pain scale of the both studied groups throughout periods of implementation

Pain severity level	The studied critically ill patients (n=80)													
	Control group (n=40)						χ^2 P	Study group (n=40)						χ^2 P
	Before		During		After			Before		During		After		
	N	%	N	%	N	%		N	%	N	%	N	%	
1 st day														
▪ No pain	13	32.5	5	12.5	5	12.5		30	75.0	30	75.0	31	77.5	
▪ Mild	24	60.0	26	65.0	18	45.0	18.74	9	22.5	10	25.0	9	22.5	2.29
▪ Moderate	3	7.5	9	22.5	16	40.0	0.005*	1	2.5	0	0.0	0	0.0	0.683
▪ Severe	0	0.0	0	0.0	1	2.5		0	0.0	0	0.0	0	0.0	
Range	(3-8)		(3-9)		(3-11)		F=11.84	(3-9)		(3-6)		(3-6)		F=0.126
Mean ± SD	4.40±1.34		5.63±1.59		6.13±1.91		P=0.000*	3.48±1.13		3.40±0.81		3.38±0.81		P=0.882
Control Vs Study														
t	3.34		7.86		8.39									
P	0.001*		0.000*		0.000*									
4 th day														
▪ No pain	4	10.0	4	10.0	4	10.0		30	75.0	30	75.0	30	75.0	
▪ Mild	15	37.5	14	35.0	16	40.0	0.430	6	15.0	6	15.0	6	15.0	0.00
▪ Moderate	16	40.0	16	40.0	14	35.0	0.999	4	10.0	4	10.0	4	10.0	1.00
▪ Severe	5	12.5	6	15.0	6	15.0		0	0.0	0	0.0	0	0.0	
Range	(3-11)		(3-11)		(3-11)		F=0.06	(3-9)		(3-9)		(3-9)		F=0.00
Mean ± SD	6.75±2.35		6.90±2.35		6.75±2.33		P=0.947	3.88±1.73		3.88±1.73		3.88±1.73		P=1.00
Control Vs Study														
t	6.23		6.56		6.27									
P	0.000*		0.000*		0.000*									

No pain (3)

Mild (4–6)

Moderate (7–9)

Severe (10–12)

Table (6): Relation between between diagnosis of the studied patients and their confusion level (CAM-ICU) at 4th day of implementation

CAM-ICU	The studied critically ill patients (n=80)													
	Diagnosis													
	Control group (n=40)						χ^2 P	Study group (n=40)						χ^2 P
	Neurological disorders (n=15)		Renal impairments (n=10)		Respiratory disorders (n=15)			Neurological disorders (n=19)		Renal impairments (n=8)		Respiratory disorders (n=13)		
	N	%	N	%	N	%		N	%	N	%	N	%	
Feature 1: Acute onset or fluctuating course	6	15.0	1	2.5	4	10.0	2.717	18	45.0	5	12.5	11	27.5	4.591
▪ No														
▪ Yes	9	22.5	9	22.5	11	27.5	0.257	1	2.5	3	7.5	2	5.0	0.101
Feature 2: Inattention	6	15.0	2	5.0	5	12.5	1.102	16	40.0	5	12.5	10	25.0	1.525
▪ Attentive														
▪ Adjective	9	22.5	8	20.0	10	25.0	0.576	3	7.5	3	7.5	3	7.5	0.466
Feature 3: Altered Level of Consciousness	6	15.0	1	2.5	5	12.5	2.698	18	45.0	5	12.5	10	25.0	4.467
▪ Calm														
▪ Unconscious	9	22.5	9	22.5	10	25.0	0.259	1	2.5	3	7.5	3	7.5	0.107
Feature 4:Disorganized thinking	4	10.0	1	2.5	3	7.5	1.042	17	42.5	7	17.5	11	27.5	0.167
▪ Organized														
▪ Disorganized	11	27.5	9	22.5	12	30.0	0.594	2	5.0	1	2.5	2	5.0	0.920

Table (7): Relation between Both Total Consciousness Score, Total RASS Score and Total Pain Severity Score of the Studied Patients and their Confusion Level (CAM-ICU) after 4th Day of Implementation

CAM-ICU	The studied critically ill patients (n=80)					
	Total GCS score		Total RASS score		Total pain severity score	
	Control group (n=40)	Study group (n=40)	Control group (n=40)	Study group (n=40)	Control group (n=40)	Study group (n=40)
Feature 1: Acute onset or fluctuating course						
▪ No	9.73±2.832	10.41±1.131	3.64±1.433	5.18±0.459	5.64±2.014	3.85±1.811
▪ Yes	10.76±2.047	10.67±1.506	4.00±1.648	4.67±0.516	7.17±2.331	4.00±1.265
t, P	1.632, 0.209	0.235, 0.631	0.415, 0.523	6.087, 0.018*	3.711, 0.062	0.036, 0.850
Feature 2: Inattention						
▪ Attentive	10.23±2.166	10.29±1.216	4.00±1.528	5.19±0.477	6.23±2.006	3.58±1.523
▪ Adjective	10.59±2.390	11.00±0.866	3.85±1.634	4.78±0.441	7.00±2.465	4.89±2.088
t, P	0.213, 0.647	2.649, 0.112	0.075, 0.785	5.458, 0.025*	0.956, 0.334	4.344, 0.044*
Feature 3: Altered Level of Consciousness						
▪ Calm	9.33±2.807	10.33±1.216	3.83±1.193	5.18±0.465	5.75±1.658	3.70±1.667
▪ Unconscious	10.96±1.895	11.00±0.816	3.93±1.741	4.71±0.488	7.18±2.465	4.71±1.890
t, P	4.624, 0.038*	1.900, 0.176	0.030, 0.864	5.753, 0.021*	3.352, 0.075	2.057, 0.160
Feature 4: Disorganized thinking						
▪ Organized	11.25±1.982	10.46±1.146	4.00±1.773	5.14±0.494	5.50±2.204	3.77±1.682
▪ Disorganized	10.28±2.359	10.40±1.517	3.88±1.561	4.80±0.447	7.06±2.285	4.60±2.074
t, P	1.141, 0.292	0.010, 0.921	0.039, 0.845	2.151, 0.151	3.031, 0.090	1.007, 0.322

Discussion

Physical restraints are considered a protective nursing measure that the medical staff of the intensive care unit (ICU) uses to prevent accidental extubation, falls, and other unanticipated catastrophes. Despite the fact that physical restraints can help nurses prevent immediate risks, they can also cause patients a great degree of physical and/or psychological problems, such as cutaneous, vascular, and musculoskeletal injuries (Lei et al., 2022).

Part 1: Socio-demographic characteristics and clinical data of both studied groups:

The result of the present study revealed that there was no statistically difference between both groups in relation to their bio-demographic characteristics and this indicated that the studied groups are homogenous in their characteristics and the total number of patients' sample in the present study were (80) patients divided equally in control group and study group.

Regarding age, the present study observed that about more than two third of the studied patients in both control and study group were aged above ≥ 50 years. This may due to patients admitted to the ICU also tend to be older moreover; the physical and

cognitive functions of individuals deteriorate with increasing age.

The findings of this study was align with those of **El-saboure et al., (2024)** who reported that around half and more than two third of the study and control groups' ages, respectively, were more than 50 years. While, this result disagreed with **Mohamed Kamel et al., (2025)** who showed that nearly one-third of the study and control groups their age ranged between "30– 39" years old with mean age $\pm$ SD (39.9 ± 12.87) and (40.1 ± 13.56).

On observation of sex, more than half of them in both control and study group were male. The finding of this study is explained by the researcher perspectives that; males have a higher risk than females because of high exposure to major stresses, occupational related hazards, and frequent use of cigarettes.

The results are aligned with similar study by **El-saboure et al., (2024)** who concluded that the highest percentage among both control and study groups were males. Also, this is in accordance with **Cui & Mohmmmed, (2018)** who found that more than half of the studied groups were male.

Concerning body mass index, near half of both control and study group were overweight (25–29.9). From the research point of view, this may be due

to traditional Egyptian meals are energy-dense and low in protein and limited physical activity due to urbanization and lack of facilities.

This result agreed with **Yaseen et al., (2024)** who revealed that more than one-quarter were overweight. On the other hand, this result disagreed with **Wang et al., (2023)** who concluded the average BMI of patients was 22.17.

Regarding past medical history, the present study cleared that **more than two third** of patients in both control and study group was respiratory disorders. This may due to respiratory disease are the most widely recognized diagnosis among ICUs and need to mechanical ventilated patients and physical restraint.

This result supported by **Kisacik & Çoşgun, (2019)** who found that more than one third of the patients had a respiratory diagnosis.

The current study finding has contradicted with **Weheida et al., (2022)** who said that medical history, highest percentage of the study and control group had a medical history of cerebrovascular stroke, diabetes, and cerebral hemorrhage

In Relation to current diagnosis, a **higher percent** in control and study group were diagnosed with neurological disorders followed by disorders respiratory disease. This finding could be due to the nature of

ICU admission as it was an emergency ICU that received many patients traumatized by a road traffic accident. And older individuals are at an enhanced risk of stroke, falling from bed and self-injury.

This result was congruent with **El-saboure et al., (2024)** who reported that **higher percent** of the study and control groups were diagnosed with stroke. Also, more than two third of the study group, compared to more than one third of the control group, was diagnosed with trauma. Also, this result agreed with **Ahmed et al., (2023)** who showed that more than two thirds of the study and control groups the greatest purposes behind patient's admission were a head injury. Likewise, this result agreed with **Kisacik & Çoşgun, (2019)** who reported that more than a quarter of them had a neurological diagnosis.

On the other hand, this result not supported by **Mohamed Kamel et al., (2025)** who concluded that about one quarter of the study and control groups the main cause was respiratory disease followed by cardiac diseases. Likewise, this outcome wasn't consistent with the study conducted by **Amin et al., (2023)** who found that more than half of study group and control group, the leading cause of ICU admission was respiratory diseases.

Part2: Glasgow Coma Scale (GCS)

Concerning to Consciousness level in both control and study group. It was seen that higher percentage of consciousness level of the studies patients at 1st day. While, at 4th day, it was noticed that, near half of patients are semi-conscious in study group. And there was statistically significant difference at study group in the 1st and 4th day after intervention. This enhanced level of consciousness in this group may be linked to the integration of instructional guidelines into patient care **Moradimajd et al., (2015)**.

This result was in agreement with **Elhady et al., (2025)** who revealed that a statistically significant enhancement in the level of consciousness was observed before and after the application of instructional guidelines ($p < 0.001$).

This result was agreed with **Mohamed et al., (2020)** who revealed the significant increase in the conscious level in the study group compared to the control group in the 7th and 5th days with statically significant difference between the groups. Also, this result supported by **Moradimajd et al., (2015)** who reported that more than half of studied patient were Glasgow Coma Scale score of 9– 12 and revealed a significant difference among the studied intensive care units and also among the three phases of using restraint (i.e. before, during, and

after restraint use) regarding the rate of applying restraint standards. While, this result disagreed with **Steiner et al., (2016)** who found that there is no statistically significant difference in the level of consciousness between the care group and the control group among patients with traumatic brain injuries. This finding may be explained by the fact that a majority of the sample had a Glasgow Coma Scale (GCS) score of less than 7, which could impair the patients' visual, verbal, and motor responses, thereby affecting their level of consciousness and ultimately reducing the effectiveness of the applied instructional guidelines.

Part3: Richmond Agitation-Sedation Scale (RASS)

the current study represented that study group after applying physical restraint in 1st day; near half of the studies patients were restless. While, at 4th day more than two third of patients in study group were alert & calm. Additionally, there were statistically significant difference at study group in the 1st and 4th day after receive nursing guidelines of physical restraint.

This result was supported by Gad et al., (2025) who showed that the frequency of agitation was significantly reduced in the multi-component intervention group

compared to the routine care group on days 4 and 5.

In line with the present study's findings, **Sayed et al., (2020)** conducted research to establish whether multi-component nursing interventions are an effective strategy for managing agitation among ICU patients. They concluded that multi-component nursing interventions reduced the frequency of agitation among ICU patients, hence improving the general status of the patient

This result is supported by **Ertuğrul & Özden, (2019)** who revealed that nurses did not regularly check the restrained wrist and did not focus on the peripheral circulation. It is necessary to develop training programs, standards, and appropriate follow-up strategies in intensive care units in Turkey.

Additionally, this result parallel with a study by **Taran et al., (2019)** who used the sedation protocol were significantly in the ideal range (-1, 0, and 1) ($P < 0.001$).

Part4: Behavioral pain scale for restrained part

As regards Upper limbs, this table represented, it observed that, the majority of at study group patients had no movement at 1st day and 4th day respectively after implementation. Concerning Compliance with ventilation, in Study group the majority of the studied patients

tolerating movement at 1st day and 4th day after implementation. Moreover, a highly statistically significant improved was observed between the two groups regard pain scale after nursing guidelines intervention.

This result supported by **Wojnar-Gruszka et al., (2022)** who found that pain increased significantly during interventions in patients on BPS and then returned to values close to the resting period.

This finding was in agreement with a study done by **Sedighi et al., (2019)** who indicated that the use of BPS scale has been effective in diagnosing and monitoring pain in patients with decreased consciousness and has led to optimal changes in the use of non-pharmacological pain relief medications as complementary therapies in intensive care units. Also, this result was in the same hand with **Oliveira et al., (2019)** who concluded that the adoption of pain assessment scales in critical patients, such as the Behavioral Pain Scale consequently improve the quality of care and patient's recovery.

Part 5: Regarding to relationship with diagnosis of neurological disorder and CAM-ICU that in study the group, majority of patients hadn't acute onset or fluctuating and calm disorders respectively. As a regard renal impairments, it was observed that in the study group more

percentage were organized thinking of patients.

This result was in agreement with the study by **von Hofen-Hohloch et al., (2020)** who reported that a positive delirium screening with both CAM-ICU in neurocritical care and stroke unit patients was found to be significantly associated with the presence of neurological deficits.

This result supported by **Orman et al., (2015)** who studied “found that the confusion assessment method for the intensive care unit in patients with cirrhosis” In critically ill patients with cirrhosis, delirium/ coma as measured by the RASS and CAM-ICU is associated with increased mortality and hospital length of stay. For these patients, these measures provide valuable information and may be useful tools for clinical care.

This result was contraindicated with study by **Bakošová et al., (2024)** who suggested that the ICDSC may be more suitable tool for delirium screening than the CAM-ICU in patients with neurological deficit. NCSE as a mimic of delirium seems to be less common in the acute phase of stroke than previously reported.

As regard relation between total consciousness score of the studied patients and their confusion method for the ICU (CAM-ICU) after 4th day of implementation, the current study showed that there was no

significant relation between total GCS score and confusion method for the ICU in study group.

This result in the same line with **Delilah & Lydia, (2022)** who concluded that the outcome as predicted by GCS at admission was not a significant predictor of actual patient outcome at the end of the evaluation (after 14 days). Also, this result agreed with **Nik et al., (2018)**, who reported that there was no significant relation between GCS score and patient confusion.

While, this result was inconsistent with a study at Egypt by **Mahmoud et al., (2022)**, who concluded that GCS was predictability full recovery for patient, conscious level and length of stay at hospital. In addition, this result not matched with **Locihová & Pelikánová, (2022)**, who concluded that there was a statistically significant relationship between delirium and the studied patient parameter GCS score.

Concern the relation between total RASS score and total pain severity score of the studied patients and their of confusion method for the ICU (CAM- ICU) after 4th day of implementation, the present study showed that there was a significant relationship between total RASS score and confusion method for the ICU in study group at acute onset or fluctuating course and altered level of

consciousness at 4th day after intervention.

This result agreed by **Khan et al., (2017)**, who reported that there was a relation between Richmond Agitation-Sedation Scale (RASS), conscious and reliable delirium severity measure among ICU patients.

On the other hand, this result disagreed with **Rashidi et al., (2020)**, who reported that while RASS is effective for monitoring sedation and agitation, it may not fully capture the complexity of confusion or delirium, especially in hypoactive cases.

Regarding the relation between total pain severity score of the studied patients and their of confusion method for the ICU (CAM-ICU) after 4th day of implementation, the present study showed that there was a significant relationship between total pain severity score and confusion method for the ICU at study group in 4th day after intervention $p = 4.344, 0.044^*$.

This result was in the same hand with **Wu et al., (2023)**, who concluded that the presence of any pain (mild, moderate, or severe) was not associated with delirium.

Conclusions: The findings of the study indicated that the implementing of physical restraint guidelines in critical care setting significantly reduced the incidence of accidental tube displacement and minimized neurovascular complications. Also, the

structured applications of restraint with continuous monitoring patient's assessment ensure patients safety and adherence to evidence-based practices.

Recommendations :

-Implementation of standardized physical restraint nursing guidelines should be applied to all critical care units to reduce the risk of accidental tube displacement.

-Integration of physical restraints guidelines into nursing curriculum to ensure early competency development

- Further research should be conducted can large and more diverse population to validate the effectiveness of physical restraint nursing guidelines in different care setting.

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Influence of Performance Appraisal Challenges Facing Nurses on their Job Involvement

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Abstract

Background: Performance appraisal challenges are obstacles that hinder fair evaluation, including appraiser bias, unclear criteria, and inadequate feedback. In nursing, these challenges can reduce motivation, job involvement, and professional commitment, adversely affecting patient care quality and organizational effectiveness.

Aim: To assess the influence of performance appraisal challenges facing nurses on their job involvement. **Design:** A descriptive- correlational research design was used.

Setting: The study was carried out at Tanta International Teaching - Hospital.

Subjects: It included all nurses (N=1104) at the previous mentioned setting of working. **Tools:** Two tools were used: a structured questionnaire on performance appraisal challenges and nurses' job involvement scale.

Results: Nearly half (48.9%) of nurses had a low level of perception about challenges of performance appraisal. As well as, more than half (50.8%) of nurses had a low level of job involvement.

Conclusion: There was a negative significant correlation between performance appraisal challenges and nurses' job involvement. **Recommendations:** Enhancing fairness, and transparency, providing regular feedback, and involving nurses in goal setting to strengthen their job involvement.

Keywords: Job involvement, Nurses, Performance appraisal challenges.

Introduction

Nurses are regarded as the most vital part of a hospital, making performance appraisal challenging. The goal of performance appraisal is to examine the applied system and provide feedback to nurses on the quality of their performance as well as job difficulties. Performance appraisal is a common technique that is overly expensive and works against desired outcomes. It is usually undertaken with good intent to manage and improve the performance of the personnel and promotes overall hospital efficiency, effectiveness, and productivity (**Ahmed, Fakhry, & Kamel, 2024**).

Implementing performance appraisal systems in organizations, despite their significant advantages presents numerous challenges that can impede their effectiveness. These challenges can be related to the process of performance appraisal, organization, nurse managers and nurses (**Rajapakse, 2024**).

Challenges of the performance appraisal related to process refer to the problems that arise from how the appraisal system is designed and implemented. These challenges include unclear or poorly defined performance criteria, lack of standardized evaluation methods, lack of clear objectives, and infrequent or inconsistent reviews (**Na-Nan,**

Joungtrakul, Smith, & Sanamthong, 2022; Erialdy, 2024).

The challenges of the performance appraisal within the organization refer to the difficulties encountered in maintaining an effective system for evaluating nurses' performance. These challenges may include inconsistent appraisal policies, busy nature of health care environment, and poor alignment between appraisal outcomes and organizational goals (**Kutty & Varghese, 2024**). Challenges of the performance appraisal related to nurse managers are the issues and barriers they face in fairly and effectively assessing the performance of nurses.

Nurse managers often struggle with time constraints due to heavy workloads, lack of proper training in evaluation techniques, and difficulty maintaining objectivity when appraising team members, they work closely with (**Opoku, Osman & Kyeraa, 2024**). Challenges of the performance appraisal related to nurses are the obstacles that nurses conceptualize when being evaluated on their job performance. These challenges include considering the appraisal process a waste of time, lack of understanding of the appraisal criteria, and feelings that the process is unfair or biased. Nurses may also suffer from limited opportunities to discuss

their performance openly due to heavy workloads or time pressures (Sepahvand, Mohammadipour, Parvizi, Tafreshi, Skerrett, & Shoorideh, 2020 ; Shawn, 2023). While performance appraisal systems are vital for effective human resource management, their successful implementation requires careful attention to the challenges that can undermine their effectiveness. Addressing biases in evaluations, ensuring adequate training for appraisers, overcoming communication barriers and transparently linking appraisals to rewards are all crucial steps in ensuring that appraisal systems achieve their intended outcomes of enhancing nurses' performance, organizational success, and maintaining job involvement (Belayhun, 2024).

Job involvement is described as a motivational state in which nurses experience strong mental focus, personal responsibility, and willingness to go beyond basic job requirements (Jain, Chawla, & Arya, 2021). Also, job involvement refers to the degree of psychological and physiological participation in the work task, which reflects a person's identification with the current work and state of engagement (Jiang, Geng, Zhang, Meng, Li, & Peng, 2025). Job involvement leads to greater job

satisfaction, higher productivity at the workplace and impacting on overall job performance and creativity (Arulsenthilkumar, 2024; Abuzaid, 2024).

Job involvement has three dimensions: vigor, dedication, and absorption. Vigor is defined as bringing elevated levels of energy and mental resilience to work. Dedication is defined as being highly involved in work with enthusiasm, a feeling of importance, and challenge. Absorption is defined as being completely concentrated and engrossed in one's job. These dimensions of job involvement are complementary and provide critical support for organizations to perform, grow, and secure a competitive advantage (Islam, Alam, Somu&Abdullah, 2025).

Significance of the Study

Performance appraisal systems play a crucial role in the domain of human resource management, specifically at health care organization by providing a structured method for evaluating nurses' performance. These systems are designed to assess nurses' job performance, provide feedback, identify areas for improvement, and make decisions related to promotions, bonuses, and training opportunities. A well-designed and executed performance appraisal system have a significant impact on nurses'

involvement as It provides nurses with a clear understanding of their goals and expectations (**Al-Assaf, Alzahmi, Alshaikh, Bahrour & Ahmed, 2024**). But applying performance appraisal faces many challenges and addressing these problems is essential to ensure that performance appraisal serves as a constructive tool for motivation, growth, and involvement rather than a source of dissatisfaction or conflict (**Jaber et al., 2025**). So, this study was conducted to assess the influence of performance appraisal challenges facing nurses on their job involvement.

Aim of the study was to:

Assess the influence of performance appraisal challenges facing nurses on their job involvement.

Research questions:

- What are the performance appraisal challenges as perceived by nurses?
- What are the levels of nurses' job involvement?
- What is the relation between performance appraisal challenges and levels of nurses' job involvement?

Subjects and Method

Research design

A descriptive correlational research design was used to carry out this study.

Setting:

This study was conducted at Tanta International Teaching Hospital which is affiliated to the Ministry of Higher

Education and Scientific Research with total bed capacity 225 beds which provides wide range of healthcare services. It includes all inpatient departments as General Surgery, Neurological, Vascular, Cardiothoracic, Oncology, Dialysis and all Intensive Care Units (Anesthesia, Cardiac, Medical, Pediatric, Burn, and Neonates)

Subjects:

This study included all nurses (N=1104) who were working in the previously mentioned setting and were available during the time of data collection.

Tools of the study

Tool (I): Performance Appraisal Challenges Structured Questionnaire.

Part 1: Nurses personal and work-related data: It included age, sex, marital status, educational level, working unit and nursing experience and attending training program about performance appraisal.

Part 2: Perception of nurses about challenges of performance appraisal:

It was developed by the researcher based on related literatures (**Sualihu, 2014; Cudjoe, 2021; Bediako, 2023**) to assess performance appraisal challenges as perceived by nurses. This tool consisted of 29 items and it divided in four dimensions as follow:

- **Challenges related to process of performance appraisal** included 10 items.

- **Challenges related to organization** included 5 items.
- **Challenges related to nurse managers** included 9 items.
- **Challenges related to nurses** included 5 items.

Scoring system

Responses of nurses were measured using a five- points Likert Scale ranging from 1 to 5 where strongly disagree =1, disagree =2, not sure =3 , agree =4, strongly agree =5. 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:

Levels of nurses' perception:

- High level of perception about challenges >75% of total score (equal 110-145).
- Moderate level of perception about challenges 60% - 75% of total score (equal 87-109).
- Low level of perception about challenges < 60% of total score (equal 29-86).

Tool (II): Job Involvement Scale:

It was developed by **Schaufeli et al. (2002)** and was adopted by the researcher to assess nurses' job involvement. It consisted of three main dimensions as follows:

- **Vigor** included 6 items.
- **Dedication** included 5 items.

Absorption included 5 items.

Scoring system

Responses were measured using a five – Points Likert Scale ranging from 1 to 5 where never =1, rarely =2, sometimes =3, most of the time=4, always=5. Total score was categorized according to statistical cutoff points into levels.

Levels of nurses' job involvement:

- High level of nurses' job involvement > 75% of total score (equal 60 -80).
- Moderate level of nurses' job involvement 60%-75% of total score (equal 48-59).
- Low level of nurses' job involvement <60% of total score (equal 16-47).

Method

1. An official permission was obtained from the Dean of Faculty of Nursing-Tanta University and the responsible authorities of the study setting, after explanation of the purpose of the study.

2. Ethical considerations:

- a. A research approval was obtained from Scientific Research and Ethical Committee at the Faculty of Nursing-Tanta University, prior to the start of the study with code number (449-4-2024).
- b. An informed consent was obtained from the study subjects after

- explanation of the aim and method of the study.
- c. Anonymity of the study subjects was maintained.
 - d. Privacy and confidentiality of the collected data were maintained in this study and explain that it was used for the study purpose only.
 - e. The nature of the study wasn't causing any harm for the entire sample.
 - f. The right to refuse to participate or withdraw from the study was assured during this study
3. Tools I and II were translated to Arabic and were presented to a jury of five experts in the area of specialty to check their content validity. They were three professors and two assistant professors of Nursing Administration from Faculty of Nursing Tanta University and the necessary modifications were done based on their opinions. The experts' responses were represented in four points rating scale ranging from 4= strongly relevant, 3= relevant, 2= little relevant, and 1= not relevant. Necessary modifications were done including clarifying and simplifying work-related words. The content validity for tool (I) was 100% and for tool (II) was 99.4%.
 4. A pilot study was carried out on 10% n= (111) of subjects to test the clarity, reliability of tools, identify obstacles and problems that might be encountered during data collection and modification was done.
 5. A suitable statistical test was used to test the tools for their reliability. Reliability of tools was tested using Cronbach's Alpha coefficient factor, its value for the tool I was (0.915) and for tool II was (0.849).
 6. Data collection phase: Data was collected by the researcher through self-administered questionnaires. The questionnaires were hand-delivered to the study subjects in their work settings after explaining the aim of the study, during morning and afternoon shifts, according to their workload. The researcher met the nurses individually and in small groups.
 7. The questionnaires were completed by nurses in the presence of the researcher to ensure all items were answered and provide explanations required. The estimated time needed to complete the questionnaire items was 20- 30 minutes.
 8. The data was collected within five months starting from the beginning of December 2024 up to the end of April 2025.
- ### Results
- Table 1** demonstrates distribution of nurses according to their personal and

work- related data. Regarding the age more than half of nurses (54.0%) were in the age group <30 with a mean score of $\pm$ SD 30.04 ± 5.97 . More than seventy percent of nurses (79.8% & 73.6%) were female and married. Regarding educational level, more than half of nurses (52.5%) had associate nursing degree and more than one- third of them (35.3%) had a bachelor science in nursing. In terms of working units, the highest percent of nurses (12.2%) worked at dialysis unit. Regarding years of experience, 67.2% of nurses had <10 years of experience with a mean score of $\pm$ SD 7.65 ± 6.24 . Regarding attendance of performance appraisal programs, more than half of nurses (55.0%) didn't attend the training programs.

Figure 1 demonstrates overall levels of nurses' perception about challenges of performance appraisal. The figure shows that in overall nearly half (48.9%) of nurses had a low level of perception about challenges of performance appraisal followed by more than thirty (34.1%) had a moderate level of perception, while more than sixteen (16.9%) had high level of perception.

Table 2 shows levels of nurses' perception about challenges of performance appraisal. The table shows that 58.2% of nurses had low level of perception about challenges related to

nurses, followed by 47.8% for challenges related to nurse managers, then 44.2% for challenges related to performance appraisal process and 33.9% for challenges related to organization.

Table (3) demonstrates mean percent scores of nurses' perception about challenges of performance appraisal. The table showed that overall mean percent score for performance appraisal challenges was 58.92 ± 16.56 . The highest mean percent score related to organizational challenges (64.31 ± 20.66) followed by (59.21 ± 21.83) for challenges of performance appraisal process and (59.86 ± 18.90) for challenges related to nurse managers. Finally, the lowest mean percent score was (51.13 ± 25.23) for challenges related nurses.

Figure 2 demonstrates overall levels of nurses' job involvement. The figure shows that more than half (50.8%) of nurses had a low level of job involvement followed by nearly third (31.8%) had a moderate level while little percent (17.4%) had high level of job involvement.

Table (4) demonstrates levels of nurses' job involvement dimensions. The table shows that 57.5 % of nurses had a low level of job involvement in vigor then 53.1% in absorption. While 37.7%, 34.4% of nurses had a low and high

level of job involvement in dedication dimension.

Table (5) demonstrates mean percent score for nurses' job involvement. The table shows that overall mean percent score of job involvement was 57.73 ± 19.41 . The highest mean percent score of job involvement (64.51 ± 25.05) was for dedication dimension and then (55.21 ± 24.17) for absorption. Finally, the lowest mean percent score was (54.19 ± 21.26) for vigor.

Figure 3 demonstrates correlation between perception of nurses about challenges of performance appraisal and job involvement. The figure shows that there was a negative correlation between perception of nurses about

challenges of performance appraisal and job involvement.

Table (1): Distribution of nurses according to their personal and work related-data (n = 1104)

Personal and work related data	No.	%
Age		
<30	596	54.0
30 – 40	440	39.8
>40	68	6.2
Min. – Max.	22.0 – 58.0	
Mean $\pm$ SD.	30.04 ± 5.97	
Sex		
Male	223	20.2
Female	881	79.8
Marital status		
Married	812	73.6
Unmarried	292	26.4
Educational level		
Secondary nursing diploma	90	8.2
Associate nursing degree	580	52.5
BSc in nursing	390	35.3

Post graduate studies	44	4.0
Working unit		
Surgery	100	9.1
Neurological	78	7.1
Vascular	74	6.7
Cardiothoracic	50	4.5
Oncology	66	6.0
Dialysis	135	12.2
Anesthesia Icu	91	8.2
Cardiac Icu	84	7.6
Medical Icu	94	8.5
Pediatric Icu	122	11.1
Burn Icu	94	8.5
Neonates Icu	116	10.5
Years of experience		
<10	742	67.2
10 – 20	312	28.3
>20	50	4.5
Min. – Max.	1.0 – 37.0	
Mean $\pm$ SD.	7.65 $\pm$ 6.24	
Attendance of performance appraisal programs		
Attend	497	45.0
Not attend	607	55.0

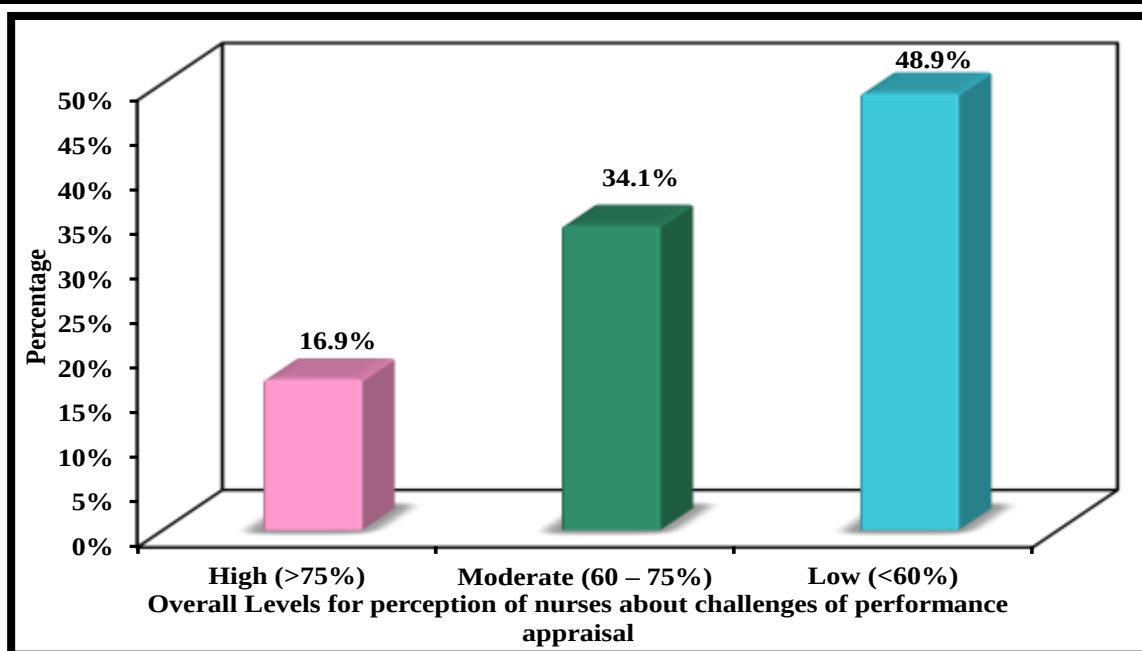


Figure (1): Overall levels of nurses' perception about challenges of performance appraisal (n = 1104)

Table (2): Levels of nurses' perception about challenges of performance appraisal dimensions (n = 1104)

Challenges of performance appraisal dimensions	High (>75%)		Moderate (60 – 75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Process of performance appraisal	242	21.9	374	33.9	488	44.2
Organization	320	29.0	410	37.1	374	33.9
Nurse managers	277	25.1	299	27.1	528	47.8
Nurses	193	17.5	269	24.4	642	58.2

Table (3): Mean percent scores of nurses' perception about challenges of performance appraisal (n = 1104)

	Score Range	Total score		% Score	Rank
		Min. – Max.	Mean ± SD.	Mean ± SD.	
Process of performance appraisal	(10 – 50)	10.0 – 49.0	33.94 ± 7.56	59.86 ± 18.90	2
Organization	(5 – 25)	5.0 – 25.0	17.86 ± 4.13	64.31 ± 20.66	1
Nurse managers	(9 – 45)	9.0 – 45.0	30.32 ± 7.86	59.21 ± 21.83	3
Nurses	(5 – 25)	5.0 – 25.0	15.23 ± 5.05	51.13 ± 25.23	4
Overall	(29 – 145)	36.0 – 140.0	97.35 ± 19.21	58.92 ± 16.56	

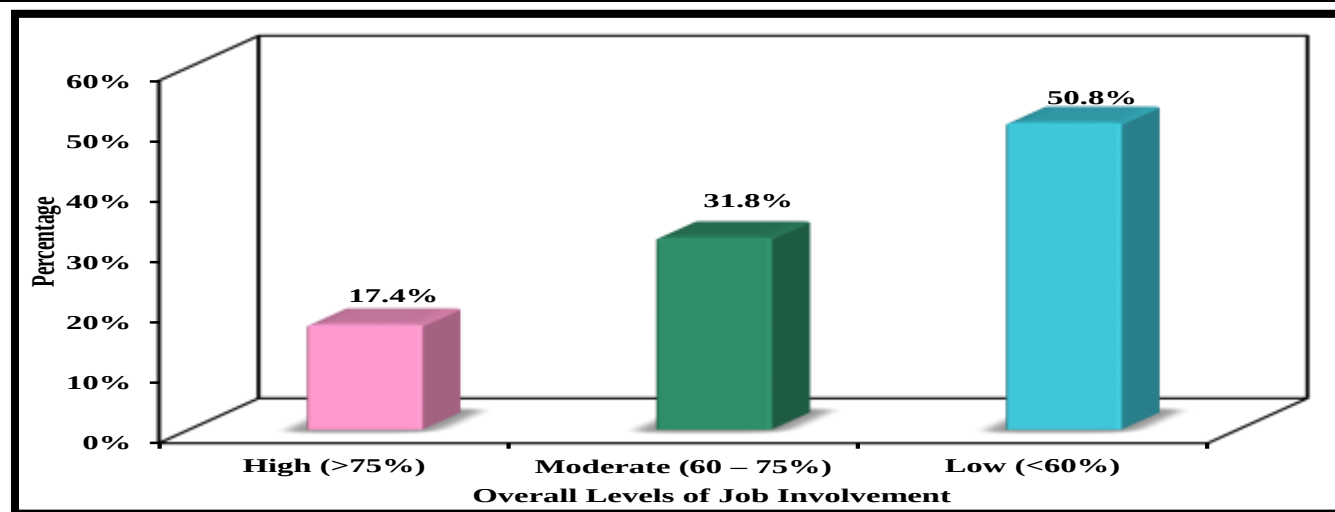
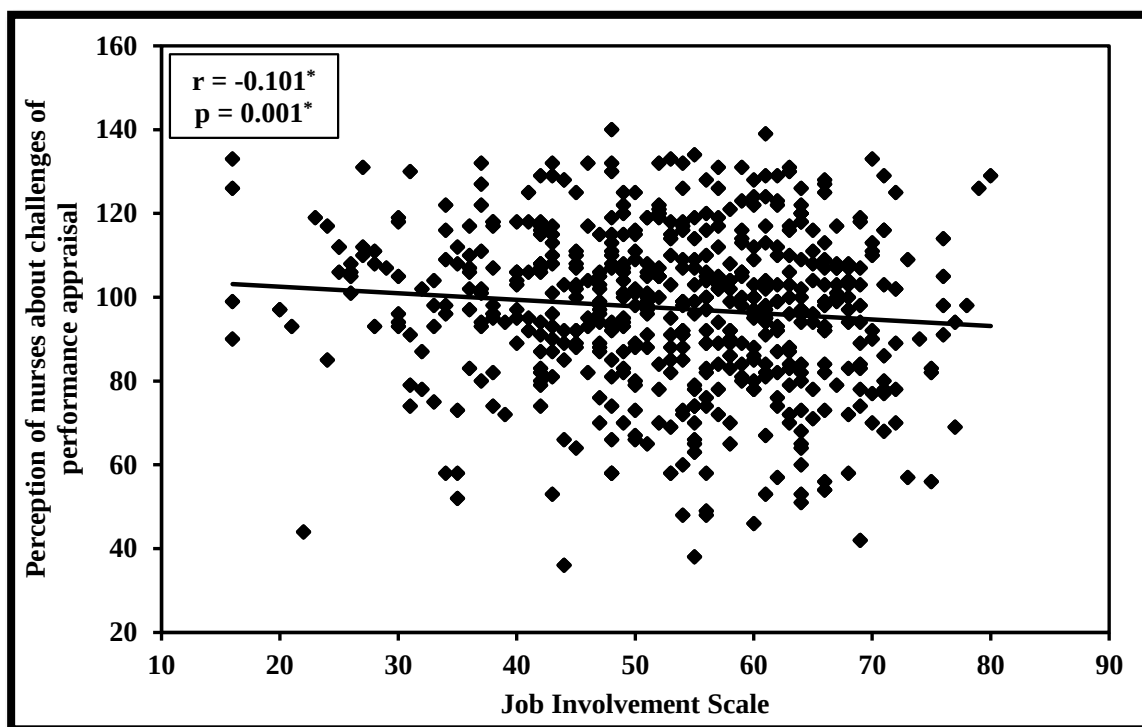
**Figure (2): Overall levels of job involvement (n = 1104)**

Table (4): Levels of nurses' job involvement dimensions (n = 1104)

	Levels of job involvement					
	High (>75%)		Moderate (60 –75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Vigor	140	12.7	329	29.8	635	57.5
Dedication	380	34.4	308	27.9	416	37.7
Absorption	208	18.8	310	28.1	586	53.1

Table (5): Mean percent scores for nurses' job involvement (n = 1104)

	Score Range	Total score		% Score	Rank
		Min. – Max.	Mean ± SD.	Mean ± SD.	
Vigor	(6 – 30)	6.0 – 30.0	19.01 ± 5.10	54.19 ± 21.26	3
Dedication	(5 – 25)	5.0 – 25.0	17.90 ± 5.01	64.51 ± 25.05	1
Absorption	(5 – 25)	5.0 – 25.0	16.04 ± 4.83	55.21 ± 24.17	2
Overall	(16 – 80)	16.0 – 80.0	52.95 ± 12.42	57.73 ± 19.41	

**Figure (3): Correlation between perception of nurses about challenges of performance appraisal and job involvement (n = 1104)**

Discussion

Healthcare systems are fast-developing systems that require nurses to update their knowledge and skills effectively (**Ali, Abd-El-Aal & Elksas, 2024**). Performance appraisal is a fundamental practice within organizations that evaluates nurses' job performance against predetermined criteria and objectives. This structured process provides organizations with a means to deliver feedback, identify strengths and areas for improvement (**Amoke, Kinikanwo, Nwosu & Ikeotuonye, 2024**). However, there are challenges within the appraisal process can negatively impact nurses' job involvement as lack of standardized criteria for evaluating nursing performance, inconsistencies and biases in performance ratings, unclear job expectations and limited opportunities for self-assessment or personal development feedback which can lead to lower trust in management and the appraisal system (**Kutty et al., 2024**). Thus, the aim of the study was to assess the influence of performance appraisal challenges facing nurses on their job involvement.

Challenges of performance appraisal

The results of the current study revealed that overall, nearly half of nurses had a low level of perception regarding performance appraisal challenges, followed by more than thirty who had a moderate level of perception while more than sixteen had a high level of perception. These results may be due to performance appraisal is done as a routine administrative task rather than a developmental one and limited training or orientation of nurses about the process of performance appraisal can reduce their recognition about the difficulties that affect it such as bias and unclear criteria. These results supported with the study conducted by **Homauni, Mosadeghrad, & Jaafaripooyan (2021)**, a study conducted in Irian concluded that employees in the health sector had a low perception of the performance appraisal challenges. In contrast, **Hamdeen, Elewa & Mohamed (2022)** found that nurses had a high perception about challenges of performance appraisal as a result of head nurses understand performance appraisal process, apply standards effectively, provide constructive feedback, perform regular assessment of needs for development and maintain good relationships with nurses. Also,

Sarhan, Abd El-Rahman & Elzohairy (2023) found that study subjects moderately perceived challenges of performance appraisal.

Challenges related to organization

The result of study indicated that organizational challenges were the first challenges in performance appraisal. This is due to high percent of nurses agreed that the health care environment had a busy nature; needed resources are unavailable to carry out an effective appraisal e.g. (budget, personnel and time) and organization separate performance review from reward. This result supported by **Jaber, et al., (2025)** who found significant impact of inappropriate performance appraisal systems due to inefficient instruments. On the other hand, a study performed by **Alagbariya, Ayanponle & Ogedengbe, (2022)** reported that implementation of effective performance appraisal requires assessment of organizational readiness. Organizations must identify potential barriers to implementation, such as resistance to change, lack of resources, or insufficient technological infrastructure.

Challenges related to performance appraisal process

The study results revealed that challenges of performance appraisal related to its process ranked as the

second performance appraisal challenges. This is due to more than sixty of nurses agreed that ineffective communication between appraiser and nurses leading to misunderstood of expectation, the job and organization expectation not discussed regularly. This finding goes in the same line with **El-Sayed, (2021)** who found most of nurses perceived that the efficiency of performance appraisal process is low. Most nurses perceived that they weren't involved in the process of appraising the performance, On the other hand, this result is antagonized by **Fahmy, Shazly, & Soliman (2020)** who found that the majority of nurses had a positive overall opinion of performance appraisal as fairness of appraisal, clarity of appraisal criteria feedback, and communication with supervisors.

Challenges related to nurse manager

The result showed that nurse manager challenges were ranked as the third challenges of performance appraisal. This is due to more than three fifths of nurses agreed that positive or negative impressions on nurses can affect performance appraisal process and also more than half of nurses agreed that nurse managers are incompetent in appraisal process, lack of careful supervision due to limited time of

nurse manager, manager focus on nurses personality not on their behaviors, actions, and outcomes of performance, not allowing nurses to share their ideas for strengthening their performance and unfairness from supervisors in performance appraisal of nurses. This result matched with a study carried out by **Dasanayaka, Abeykoon, Ranaweera & Koswatte, (2021)** who found in their study that most of the nurses were unsatisfied with the conducted performance appraisal and their supervisor. On the other hand, **Abdelrahim, Shetaway, Ayed, Abdallah & Rashed, (2023)** concluded that the majority of nurses have a high level of perception and satisfaction toward all domains of performance appraisal as performance fairness, performance incentives and performance errors.

Challenges related to nurses

The result of study found that challenges related to nurses ranked in the last challenges. Near half of nurses disagreed that they consider the appraisal process a waste of time, nurses cannot relate the appraisal process to their personal development, nurses believe that the appraisal process is only used as a tool for victimizing some nurses. While more than forty of nurses agreed that they do not benefit from

previous appraisal results and nurses do not believe that feedback reflects their levels of performance. The results of this study match up with **Armstrong, (2022)** who found that nearly three quarter of nurses perceived inconsistency reflects a systemic issue of subjectivity in performance evaluations, caused by the absence of predefined standards or objective performance indicators. On the other hand, **Khalil, Hassan & Abdelaziz, (2024)** found more than two third of nurses perceived performance appraisal as fair, transparent and based on clear criteria so they feel valued and recognized. Also, **Ghani, Malik & Memon, (2024)** found that the majority of nurses believe the process of performance appraisal provides valuable insights into their professional development, highlights areas where they can enhance their abilities,

Job involvement among study subjects

The result reflected that overall, more than half of nurses had low level of job involvement. More than half of nurses had a low level of job involvement in vigor and in absorption and more than thirty in dedication. This may be attributed to heavy work load and inadequate support for nurses at work. In this concern, **Hegazy, Ibrahim &**

Shokry, (2022) who found more than half of nurses had a low level of job involvement and engagement dimensions especially the absorption. Also **Wei et al., (2023)** who found that studied nurses had a low level of job involvement as a result of difficult working conditions. As well as **Ahmed, Hassan & Mohammed, (2024)** reported that studied nurses had low level of job involvement due to limited autonomy, recognition or opportunity for professional growth so they become detached from their work role.

The study findings opposite with **Abd Elmohsen, Mostafa & Elsayed, (2022)** and **Ahmed, Shazly & Abd El Azeem, (2024)** found that more than half of the studied nurses had a moderate level of total job involvement level. Furthermore, **Ahmed, Hassan & Abd El-hamid, (2023)** and **Hu, Gu & Zhang, (2023)** concluded that more than two-thirds of the studied participants had a high level of job involvement.

Correlation between nurses' perception about challenges of performance appraisal and nurses' job involvement

The current study clarified that there was a negative significant correlation between nurses' perception about challenges of performance appraisal and their job involvement. This indicated how challenges in

performance appraisal make nurses feel that efforts aren't recognized or rewarded appropriately, leading to reduced job involvement and their sense of ownership and responsibility towards achieving organizational goals.

In this concern, **Na-Nan, Kanthong, Joungrakul, & Smith, (2020)** who found that the problems of the performance appraisal process negatively impact nurses' commitment and involvement at their work. Also, **Darmawan (2021)** who state that performance appraisal bias and challenges affect negatively on employee satisfaction and involvement and sense of belonging to the organization. On the other hand, **Vidè, Micacchi, Barbieri & Valotti, (2023)** who found that developmental performance appraisal affected positively on the job involvement. The study results also revealed that there was a significant negative correlation between challenges related to process of performance appraisal, challenges related to organization, challenges related to nurse managers and all job involvement dimensions except absorption. While, there was no significant correlation between challenges related to nurses and all job involvement dimension except dedication. This result may be due to the organizational and managerial

barriers that can shape nurses' involvement.

This result supported with **El Dahan, Kassem, Shoma & Mohammed, (2024)** who revealed the impact of organizational and managerial obstacles in shaping nurses' perception of performance appraisal and their intention to remain in their work and also found that perceived unfairness in appraisal was negatively associated with job involvement and retention. On the other hand, **Ali et al., (2024)** who found that all domain of performance appraisal has a- positive relation with job involvement dimensions.

Conclusion

The findings of the current study concluded that nearly half of nurses had a low perception level of performance appraisal. Specifically, the organizational challenges were the first challenges in performance appraisal then the challenges related to performance appraisal process. Next, the challenges related to nurse manager were the third. Finally, the challenges related to nurses were the last one. As well as, more than half of nurses had low level of job involvement specifically, the dedication was the first dimension of job involvement then the absorption was the second dimension finally, the vigor was the last dimension of job involvement.

Recommendations

For hospital administrator

- Improvising psychological support and promoting positive work environment to enhance nurses' involvement.
- Standardize appraisal tools and criteria to promote consistency and objectivity across all nursing units.
- Train appraisers and supervisors regularly on unbiased evaluation, effective communication, and constructive feedback techniques.

For nurse managers

- Conduct performance appraisals objectively and consistently, using clear, evidence-based performance indicators.
- Provide constructive and timely feedback that focuses on improvement, encouragement, and growth rather than criticism.
- Encourage open communication and allow nurses to share their opinions.

For Nurses

- Participate actively in the performance appraisal process by preparing self-assessments and documenting personal achievements.
- Seek feedback regularly and apply recommendations for performance improvement and professional growth.

For further research

- More researches should conduct longitudinal studies to explore the influence of performance appraisal challenges on nurses' job

involvement and related work outcome.

- Additional studies about factors affecting job involvement and engagement at work environment.

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Nurses' Performance and Attitude toward Initiation of Advanced Cardiac Life Support and Defibrillation Shocks at Intensive Care Units

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Abstract

Background: Advanced cardiac life support, involving chest compressions and ventilation, is essential for reducing organ damage and enhancing survival rates following cardiac arrest. The expertise and skills of nurses in providing advanced cardiac life support are essential for providing successful resuscitation and improving patient outcomes. **Aim:** Evaluate nurses' performance and attitudes for initiating advanced cardiac life support and defibrillation shocks in intensive care units. **Subjects and Method:** A descriptive cross-sectional research design was utilized in the current study. **Subjects:** All nurses (187) 48 nurses work in Cardiac Care Unit, 43nuses work in Medical Intensive Care Unit and 96 nurses' work in Surgical Intensive Care Unit. **Tools:** The researcher developed three tools, as following. **Tool (I)** Nurses' Knowledge Regarding Initiation of Advanced Cardiac Life Support and defibrillation shocks; **Part (a)** Nurses' Patients' clinical data, as well as their sociodemographic characteristics. **Part (b):** Nurses' knowledge regarding initiation of Advanced Cardiac Life Support and defibrillation shocks. **Tool (II):** Observational Check List of Nurses' Practice toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks. **Tool (III):** Nurses' Attitude toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks. **Results:** it was found that low level of nurses' knowledge was associated with high level (78.07%) of unsatisfactory practice level and 76.47% of low attitude level regarding initiation of advanced cardiac life support and giving defibrillation shocks among the studied nurses. There was no significant relation between socio-demographic characteristics of the studied nurses and their knowledge score or practice score or attitude score were observed where $p > 0.05$. **Conclusions:** The studied nurses had low level of nurses' knowledge associated with high level of unsatisfactory practice level and negative attitude regarding advanced cardiac life support and defibrillation shocks. **Recommendations:** Create polices, protocols and effective comprehensive training programs to update nurses' knowledge and skills in Advanced Cardiac Life Support (ACLS) in ICUs.

Keywords: Advanced Cardiac Life Support, Defibrillation shocks, Intensive Care Units, Nurse's performance and attitude.

Introduction:

Cardiac arrest (CA) is a serious health problem that accounts for more than 20% of all deaths in industrialized nations. Cardiac arrest is responsible for more than 50% of all cardiovascular deaths. In the United States, an estimated 200,000 people experience sudden cardiac arrest and require advanced cardiac life support. **(Ashine et al., 2024).**

The rate of cardiac arrest in Cairo University Hospital's medical intensive care unit was 2.27%, and current cohorts showed no significant reduction in overall frequency range when compared to earlier study conducted over 30 years. Over time, the disease severity has increased together with a large improvement in critical care therapies, so that a preserved incidence of Intensive Care Unit Cardiac Arrest in the face of an increased severity of illness may signify a management progress. **(Nassar, Fathy, Sabri, Gaber, & Mokhtar., 2024).**

In hospital cardiac arrest (IHCA), one-quarter (23.6%) of individuals treated by a hospital's resuscitation team remain to be discharged. More than four out of five (83%) who survive until hospital discharge have a neurological consequence. The most common causes of in hospital cardiac

arrest in general wards include hypoxia, acute coronary syndrome (ACS), arrhythmias, hypovolemia, infection, and heart failure. **(Allencherril, Lee, Khan, Loya, & Pally, 2022; Gardiner et al., 2021).**

Regardless of the cause of cardiac arrest, the most critical measures are universal and follow the chain of survival. These include early recognition and calling for help, management of the deteriorating patient to avoid cardiac arrest, prompt defibrillation and high-quality cardiopulmonary resuscitation (CPR) with minimal interruption of chest compressions, treatment of reversible causes, and post-resuscitation care **(Lott et al., 2021)**

Advanced cardiac life support (ACLS) is a clinical guideline for the prompt treatment of life-threatening cardiovascular illnesses such as cardiac arrest. It relies on BLS but includes current procedures, medications, and technology. ACLS includes additional medications and sophisticated methods used by doctors, nurses, and caretakers, such as the intubation of the trachea, a rapid process induction, cardiac defibrillation, transcutaneous pacing, intravenous cannulation, and administering medication

(Mudigoudra, Pujari & Deelip., 2025).

Successful resuscitation needs prompt and coordinated response by trained experts, each with a key role within an organizational framework. Willing observers, property owners who maintain high quality cardiopulmonary resuscitation (CPR), advanced life support (ALS), and providing defibrillation shocks all contribute to efficient resuscitation after cardiac arrest. **(Medical Development Division, Ministry of Health Malaysia 2022).**

Defibrillation is the only treatment that can successfully restore heart circulation in the event of ventricular fibrillation. It is a procedure in which an electronic device administers an electric shock to restore regular contraction rhythms in a heart suffering from severe arrhythmia or cardiac arrest. It restores the correct rhythm of ventricular fibrillation, also called VF, or ventricular tachycardia without a pulse (VT), both of which can be deadly **(Elbaih, and Alissa., 2020).**

Nurses are among the first to reach at the bedside of patients suffering from cardiac arrest, so they must be educated in CPR. Previous research supported by the Japanese Association for Acute Medicine of Kanto

established the effect of trained workers on resuscitation outcomes, with one study finding that the presence of a highly skilled person can have a significant impact on resuscitation the outcomes. The most crucial factors impacting the outcome of CPR are untrained workers and delayed CPR delivery **(Kuchaki, Taheri, Esfahani, & Erfanifam, 2022; Takahashi et al., 2025).**

Significance of the study

A cross-sectional evaluation of 100 nurses' theoretical understanding of CPR revealed that 46% had inadequate knowledge, while 54% had moderate knowledge **(Al Nasri, & Al Bulushi, 2020).**

The knowledge gaps in CPR guidelines among nurses vary across research. In order to respond quickly to an emergency, nurses must possess acute awareness, rapid clinical reasoning, technical proficiency, and emotional composure. As a result, nurses need to be competent and skilled in administering safe and efficient resuscitation treatments. Poor post-cardiac arrest outcomes and patient survival have been linked to a lack of knowledge and abilities. **(Khattab, Aljeesh, Awad & Mousa., 2025).** So, the aim of the study was assessed nurses' performance and attitude toward initiation of advanced cardiac life support and defibrillation shocks at intensive care units.

Aim of the study

The aim of the study was to assess nurses' performance and attitude toward initiation of advanced cardiac life support and defibrillation shocks at intensive care units.

Research questions:

- What is the level of nurses' knowledge toward initiation of advanced cardiac life support and defibrillation shocks?
- What is the level of nurses' practice toward initiation of advanced cardiac life support and defibrillation shocks?
- What is the level of nurses' attitude toward initiation of advanced cardiac life support and defibrillation shocks?
- What is the relation between nurses' performance and their attitude toward initiation of Advanced Cardiac Life Support and defibrillation shocks at Intensive Care Units?

Subjects and Method:

Research Design:

Study design: A descriptive cross-sectional study design was utilized to conduct this study.

Study Setting: The study was conducted at Cardiac, Medical Intensive Care Unit at Tanta Main University Main Hospital and Surgical Intensive Care Unit at Emergency Tanta University Hospital.

Study Subjects: A convenient sample of 60 adult patients Sampling of all nurses (187) 48 nurses work in Cardiac Care Unit, 43 in Medical

Intensive Care Unit and 96 in Surgical Intensive Care Unit who provide direct care to critically ill patients.

Tools of Data Collection:

Three tools were used for data collection:

Tool I: Nurses' Knowledge Regarding Initiation of Advanced Cardiac Life Support and Defibrillation Shocks: It was consisting of two parts as the following: -

Part(a): Socio Demographic Characteristics of the Studied Nurses, it included age, gender, level of qualifications, years of experience and previous courses and training regarding advanced cardiac life support (ACLS) and defibrillation shocks.

Part (b): Nurses' knowledge regarding Initiation of Advanced Cardiac Life Support and Defibrillation Shocks

This part was developed by the researcher after reviewing recent related literature, the questions was derived from a standard reference namely American Heart Association guideline for CPR, which is used to train BLS and ACLS 2020 (Alaryani, Alhofaian & Elhady.,2021) (Ming, Lam & Jia., 2025) (Nagy., 2025). It assessed nurses' level of knowledge regarding definition of

cardiopulmonary arrest, signs and symptoms of cardiac arrest, recent American Heart Association guidelines regarding advanced cardiac life support, time of initiation, the rate of chest compression, and the medications utilized in CPR, high quality CPR, code blue, roles of the leader and members of a high-performance team, indications of defibrillation, contraindications of defibrillation, complications of defibrillation

Scoring System:

Scoring system for nurse's knowledge was as the following:

- Correct answer was scored (1) and incorrect answer was scored (0)

The overall scoring system of nurses' knowledge was computed and classed as follows:

- $\geq 80\%$ was considered high level of knowledge.
- From $60\% < 80\%$ was considered moderate level of knowledge.
- Less than 60% was considered low level of knowledge

Tool II: Observational Check List of Nurses' Practice toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks

This tool was developed by the researcher after reviewing related literature (Paddock, 2021, Saiboon et

al., 2025) to assess nurses' level of practice regarding the detection of cardiopulmonary arrest, activation of code blue, first actions to perform when the nurse identifies cardiopulmonary arrest, techniques of chest compression, technique of providing ventilation with advanced airway, practices regarding use of defibrillation.

Scoring System:

Scoring system for nurses' practice was scored as following: -

- Correctly done was scored (1)
- Incorrectly done was scored (0)

The total scoring system of nurses' practice was calculated and classified as the following:

- Less than 80% was considered unsatisfactory.
- $\geq 80\%$ was considered satisfactory.

Tool III: Nurses' Attitude toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks.

This tool was developed by the researcher after reviewing the recent related literature (Adal & Emishaw., 2023, Pérez-Ibáñez, Almodóvar-Fernández, Gregori Roig & Sánchez-Thevenet, 2025) to assess nurses' attitude toward initiation of advanced cardiac life support and defibrillation shocks, their confidence in performing CPR and hesitance

toward mouth-to-mouth ventilation, inclusion of ACLS in the academic curriculum. LIKERT scale was used. The questions used 5 grading (strongly agree, agree, neutral, strongly disagree and disagree).

Scoring System:

Scoring system for nurses' attitude was scored as following: -

-Strongly disagree was scored (1)

-Disagree was scored (2)

-neutral was scored (3)

-Agree was scored (4)

-Strongly disagree was scored (5)

The total scoring system of nurses' attitude was calculated and classified as the following:

-<60% was considered negative attitude.

-(60-75) % was considered neutral attitude.

- >75% was considered positive attitude.

Methods

An official permission to carry out the study was obtained from the responsible authorities at Faculty of Nursing, Tanta University to the director of Tanta University Hospital.

1. Ethical considerations:

- Scientific Research Ethical Committee approval of the Faculty of Nursing Tanta University was obtained with code (386- 2- 2024).

- The study had no adverse effects on the participants.
- Nurses' confidentiality and privacy were considered during data collecting.
- After describing the study's purpose, nurses provided informed consent to participate. All participants were told of the study's purpose and given the option to withdraw at any time.
- The researcher designed tools I, II, and III for this investigation after examining relevant literature.

2. Tool validity:

- The content validity of the developed tools was tested for clarity and applicability by nine experts in the field of critical care nursing and biostatistics to ensure their validity and modifications were done.

3. Pilot study:

A pilot study was done on (10%) of nurses to assess the feasibility and applicability of the tools and the needed modifications was being done

4. Reliability of the tools:

Tools I, II and III were tested for reliability by using appropriate statistical test. Cronbach's Alpha for tool I was 0.951 ,for tool II was 0.881, for tool III was 0.826 and for the studied sheet in total is 0.850.

- 5. .Data collecting took place during a six-month period, beginning in

September 2024 and ending in March 2025.

6. The researcher met the respondents during their working hours; however, respondents working in the night were met when they turn on the morning shifts. The respondents were making their response in the presence of the researcher.
7. Nurses were given a questionnaire sheet to complete regarding their knowledge and attitudes. The researcher also examined each nurse's practice during ACLS work in the morning and afternoon shifts to measure their performance.

Statistical analysis:

The acquired data was processed, tabulated, and statistically analyzed using the SPSS statistical computer package version 26. For quantitative data, the range, mean, and standard deviation were determined. For qualitative data, comparison was done using Chi-square. t

test (χ^2). A paired samples t-test was performed to compare the means of two variables within a group. The F-value of analysis of variance (ANOVA) was calculated to compare means for variables over three periods of intervention in a group or for more than two variables.

Results: -

Table (1) shows distribution of the studied nurses according to their socio-demographic characteristics.

Regarding age, more than one third (37.79%) of the studied nurses were in the age group of (20-<30) years where 43.85% of them were in the age group of (30-<40) years, with the mean age of 33.22 ± 7.326 years. Concerning gender and marital status, the majority (81.82%) of the studied nurses were females and nearly three quarters (72.19%) of them were married.

In relation to qualifications and experience; about two thirds (67.38%) of the studied nurses had baccalaureate degree and 51.78% of them had (5-10) years of experience. Regarding pervious courses and training, 41.18% of the studied nurses received previous training courses with the large percent (49.35%) of them received previous course entitled ACLS course.

Table (2) depicts the distribution of the studied nurses based on mean scores of knowledges domains about initiation of advanced cardiac life support (acls) and defibrillation shocks

This table shows that 78.33%, 56.89%, and 46.50% of the nurses' answers were correct regarding definition, indications of ACLS, successful compression during ACLS, and using automated external defibrillator.

Moreover, this table presented that the mean of the total knowledge score of the studied nurses toward initiation of advanced cardiac life support (ACLS) and defibrillation shocks was (14.88 ± 2.975).

Table (3) illustrates Assessment of the Studied Nurses According to Their Total Knowledge Level about Initiation of Advanced Cardiac Life Support (ACLS) and Defibrillation Shocks

It was found that that the majority (94.12%) of the studied nurses had low knowledge level toward initiation of advanced cardiac life support and giving defibrillation shocks.

Table (4) shows mean Score and Ranking of Practice Domains of the Studied Nurses Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks.

This table shows that post cardiac arrest care algorithm had the highest percentage value (82.29%) of practicing among studied nurses with the mean (5.76 ± 1.725). While cardiac arrest, ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT) algorithm and ACLS bradycardia algorithm had the least percentage value of correct performance (59.00%) among studied nurses with the mean 8.93 ± 3.786 and 4.13 ± 1.303 , respectively.

Also, an equal proportion (64.00 %) of the studied nurses had mean score of performance of 5.76 ± 1.912 and 3.88 ± 1.101 regarding cardiac arrest: pulseless electrical activity (PEA) and asystole algorithm and ACLS tachycardia algorithm, respectively. additionally, this table concluded that the cumulative mean score of the practice domains among the studied nurses was 28.47 ± 8.4 .

Table (5) represents Distribution of Total Practice Level of the Studied Nurses toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks. This table showed that the majority (83.96%) of the studied nurses had unsatisfactory practice level toward initiation of advanced cardiac life support and giving defibrillation shocks.

Table (6) reveals the Mean Scores and Ranks of Nurses' Attitude Domains Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks.

This table shows that the highest positive attitude percentage value (64.67% and 64.48 %) was toward initiation of CPR and ACLS training courses with the mean of 48.5 ± 4.457 and 16.12 ± 3.453 , respectively. While, nurses' positive attitude toward towards CPR guidelines represented

57.65 % with the mean of 11.53 ± 2.496 . Additionally, this table concluded that the total mean of nurses' attitude domains toward initiation of advanced cardiac life support and giving defibrillation shocks was 76.15 ± 5.695 .

Table (7) shows Distribution of Total Nurses' Attitude toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks.

This table shows that 82.35% of the studied nurses had negative attitude toward initiation of advanced cardiac life support and giving defibrillation shocks.

Table (8) shows relation between knowledge of the studied nurses and both of their practice and attitude levels toward initiation of advanced cardiac life support and giving defibrillation shocks.

This table concluded that low level of nurses' knowledge was associated with high level (78.07%) of unsatisfactory practice level and 76.47% of negative attitude regarding initiation of advanced cardiac life support and giving defibrillation shocks among the studied nurses.

Table (9) illustrates correlation between attitude domains of the

studied nurses and both of their and Giving Defibrillation Shocks.

The findings showed that there were no statistically significant correlations between nurses' attitudes and their corresponding knowledge or practice domains across all items. The correlation coefficients (r-values) ranged from -0.134 to 0.143 , and all p-values were greater than 0.05, indicating a weak and non-significant relation between attitudes, knowledge, and practice.

Table (1) Distribution of The Studied Nurses According to their Socio–Demographic Characteristics

Characteristics	The studied nurses (n=187)	
	N	%
Age (in years)		
▪ (20-<30)	71	37.97
▪ (30-<40)	82	43.85
▪ (40-<50)	25	13.37
▪ (50-60)	9	4.81
Range	(23-54)	
Mean ± SD	33.22±7.326	
Gender		
▪ Male	34	18.18
▪ Female	153	81.82
Marital status		
▪ Single	27	14.44
▪ Married	135	72.19
▪ Divorced	14	7.49
▪ Widow	11	5.88
Qualifications		
▪ Technical institute	42	22.46
▪ Bachelor	126	67.38
▪ Post studies	19	10.16
Experience (in years)		
▪ < 5	27	14.44
▪ (5-10)	97	51.87
▪ >10	63	33.69
Previous courses and training regarding advanced cardiac life support		
▪ Yes	77	41.18
▪ No	110	58.82
Title of training course	(n=77)	
▪ ACLS	38	49.35
▪ BLS	7	9.09
▪ CPR	19	24.68
▪ ACLS & BLS	13	16.88

Table (2): Distribution of the Studied Nurses According to Mean Scores of Knowledges Domains About Initiation of Advanced Cardiac Life Support (ACLS) And Defibrillation Shocks

Knowledge domains	The studied nurses (n=187)					
	No items	Min	Max	Mean $\pm$ SD	Mean percentage %	Rank
A. Definition, indication of ACLS	3	0	3	2.35 $\pm$ 0.912	78.33	1
B. Successful compression during ACLS	9	2	9	5.12 $\pm$ 1.398	56.89	2
C. Advanced air way management and breathing	7	0	5	2.45 $\pm$ 1.304	35.00	4
D. Using automated external defibrillator	6	0	6	2.79 $\pm$ 1.095	46.50	3
E. Emergency drugs using during ACLS	7	0	5	2.16 $\pm$ 1.162	30.86	5
Total knowledge score	32	7	21	14.88$\pm$2.975		

Table (3): Distribution of the Studied Nurses According to their Total Knowledge Level About Initiation of Advanced Cardiac Life Support (ACLS) and Defibrillation Shocks

Total knowledge level	The studied nurses (n=187)	
	N	%
▪ Low	176	94.12
▪ Moderate	11	5.88

<60% Low

(60-<80) % Moderate

($\geq$ 80) % High**Table (4): Mean Score and Ranking of Practice Domains of the Studied Nurses Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks**

Practice domains	The studied nurses (n=187)					
	No items	Min	Max	Mean $\pm$ SD	Mean percentage %	Rank
A. Cardiac arrest: Ventricular Fibrillation (VF) or Pulseless Ventricular Tachycardia (VT)	15	0	15	8.93 $\pm$ 3.786	59.53	4
B. Post Cardiac arrest care algorithm	7	0	7	5.76 $\pm$ 1.725	82.29	1
C. Cardiac arrest: Pulseless electrical activity (PEA) and a	9	0	9	5.76 $\pm$ 1.912	64.00	3

systole algorithm						
D. ACLS bradycardia algorithm	7	0	7	4.13±1.303	59.00	5
E. ACLS tachycardia algorithm	6	0	6	3.88±1.101	64.67	2
Total practice score	44	0	40	28.47±8.4		

Table (5): Represents Distribution of Total Practice Level of the Total Studied Nurses Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks

Total practice level	The studied nurses (n=187)	
	N	%
▪ Unsatisfactory	157	83.96
▪ Satisfactory	30	16.04

<80% Unsatisfactory

≥80% Satisfactory

Table (6): Reveals the Mean Scores and Ranks of Nurses' Attitude Domains Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks

Attitude domains	The studied nurses (n=187)					
	No items	Min	Max	Mean ± SD	Mean percentage %	Rank
A. Attitude of nurses toward initiation of CPR	15	38	62	48.5±4.457	64.67	1
B. Attitudes towards ACLS training courses	5	7	23	16.12±3.453	64.48	2
C. Attitudes towards CPR guidelines	4	6	19	11.53±2.496	57.65	3
Total attitude score	24	63	90	76.15±5.695		

Table (7): Shows Assessment of Total Nurses' Attitude Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks

Total attitude level	The studied nurses (n=187)	
	N	%
▪ Negative	154	82.35
▪ Positive	33	17.65

<60% Negative

>60% Positive

Table (8): Shows Percentage Relationship Between Knowledge of The Studied Nurses and Both of Their Practice and Attitude Levels Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks

	The studied nurses (n=187) Total knowledge level				χ^2 P
	Low (n=176)		Moderate (n=11)		
	N	%	N	%	
Total practice level					
▪ Unsatisfactory	146	78.07	11	5.88	FE
▪ Satisfactory	30	16.04	0	0.00	0.217
Total attitude level					
▪ Negative	143	76.47	11	5.88	FE
▪ Positive	33	17.65	0	0.00	0.217

Table (9): Illustrates Correlation Between Attitude Domains of The Studied Nurses and Both of Their Knowledge and Practice Domains Toward Initiation of Advanced Cardiac Life Support and Giving Defibrillation Shocks.

	The studied nurses (n=187) Attitude domains							
	Attitude toward initiation of CPR		Attitudes towards training		Attitudes towards CPR guidelines		Total attitude score	
	r	P	R	P	r	P	r	P
1.Definition, indication of ACLS	0.117	0.112	0.045	0.543	0.056	0.447	0.143	0.051
2.Successful compression during ACLS	0.058	0.431	0.017	0.816	-0.097	0.188	0.013	0.857
3.Advanced air way management and breathing	0.071	0.334	-0.051	0.485	-0.024	0.746	0.014	0.850
4.Using automated external defibrillator	-0.134	0.067	0.028	0.705	0.124	0.092	-0.034	0.646
5.Emergency drugs using during ACLS	0.062	0.396	-0.017	0.820	-0.050	0.496	0.017	0.821
Total knowledge score	0.069	0.347	0.003	0.968	-0.013	0.862	0.050	0.494
1.Cardiac arrest: VF or VT	0.092	0.213	0.044	0.552	-0.035	0.637	0.083	0.259
2.Post Cardiac arrest care algorithm	0.004	0.955	0.076	0.301	-0.013	0.859	0.044	0.554

3.Cardiac arrest: PEA and a systole algorithm	0.109	0.136	0.034	0.648	-0.060	0.418	0.080	0.277
4.ACLS bradycardia algorithm	0.013	0.855	0.055	0.454	-0.044	0.553	0.025	0.736
5.ACLS tachycardia algorithm	0.048	0.513	0.004	0.960	-0.038	0.609	0.023	0.750
Total practice score	0.075	0.305	0.052	0.479	-0.044	0.553	0.071	0.331

r: Pearson' correlation coefficient

* Significant at level $P < 0.05$.

** Highly significant at level $P < 0.05$.

Discussion

The aim of the current study was to assess nurses' performance and attitude toward initiation of advanced cardiac life support and defibrillation shocks in the intensive care units. Nurses are the first medical team that involved in advanced cardiac life support, so practice as well as scientific, managerial, educational, and social skills are very important to improve. The increasing incidence of cardiovascular disease, and consequently cardiac and respiratory arrest, requires nurses to be familiar with advanced life support (ACLS) and giving defibrillation shocks (Pérez-Ibáñez, Almodóvar-Fernández, Gregori, & Sánchez-Thevenet, 2025).

Part I: Socio-demographic characteristics of the studied nurses:

Regarding age, the results of the present study revealed that the majority of the studied nurses were in the age group of (30-<40) years. This

result can be explained by the nature of the intensive care units, as a result, older nurses may struggle to cope with the physical workload.

and working under stress, while younger age of nurses gifted the ability to overcome hard effort and gain information, change behaviour based on submission of up-to-date knowledge. Moreover, the nurses after 40 years old usually promoted to a supervisory position and perform administrative tasks.

This finding was supported with **Nasri & Bulushi, (2020)** and **Alaryani, Alhofaian, & Elhady, (2021)** who reported that most of the studied nurses were in the group of (31-<40) years. On the other hand, this finding was incongruent with **Ali, El-Aziz, Mervat, Mohamed, & Ahmed, (2023)** who reported that most of studied nurses were in the age group of (20-<30) years.

Concerning gender, the findings of the present study showed that the majority of the studied nurses were

females. This result could be due to nursing has historically been a feminine profession which always associated with care giving, patience and gifting that are naturally seen more in females. This result was in line with **Sultana, Dewan & Chakraborty, (2024)** who found that most of the studied sample were females. While, this result was contradicted by **Kassie & Salih, (2021)** who reported that most of the studied nurses were males.

Also, the present study results revealed that about three thirds of the studied nurses were married. This may be due to most of the studied nurses were in the age group (31-<40) years. This result was supported by **Marznaki, et al., (2022)** who showed that the highest percentage of the studied nurses was married.

Regarding studied nurses' qualifications, the findings of the current study illustrated that about two thirds of the studied nurses had bachelor's degree. This result could be explained by the preference of many hospitals to qualify nurses with Bachelor of Science in Nursing (BSN) degrees to work in the Intensive Care Unit due to the advanced knowledge and critical thinking skills that they have. This finding was disagreed by **Nasri & Bulushi, (2020)** & **Ali et al.,**

(2023) who concluded that minority of the studied nurses had bachelor's degree.

Regarding years of experience, the present study results showed that slightly above half of the studied nurses had experience of 5-10 years. This result might be due to most of the studied nurses in the range of 30 to 40 years old. This finding was in line with **Nasri & Bulushi, (2020)** who showed that most of studied nurses had 6-10 years of experience. On the other hand, this result was incongruent with **Adal & Emishaw, (2023)** who reported that the majority of the studied nurses had 4-5 years of experience.

Concerning previous training courses, the current result showed that less than half of the studied nurses received previous training courses entitled "Advanced Cardiac Life Support Training Program". This result was in the same line with **Adal & Emishaw, (2023)** who reported that below fifty of the studied nurses received previous advanced cardiac life support training courses. On the other hand, **Nambiar, Nedungalaparambil, & Aslesh, (2016)** observed that the majority of the surveyed nurses did not get advanced cardiac life support training courses.

Part II: Nurses' knowledge regarding initiation of advanced cardiac life support and defibrillation shocks.

This study presented that the majority of the studied nurses had low knowledge level toward initiation of advanced cardiac life support and giving defibrillation shocks. This result might be due to lack of motivation of nurses to learn about advanced cardiac arrest or might they did not realize the importance of learning or update their knowledge regularly.

This result was in accordance with **Adal & Emishaw (2023)** who discovered that most of the studied nurses had low knowledge level. On the other hand, this result was inconsistent with **Alaryani, Alhafaian & Elhady, (2021)** who stated that less than two thirds of the studied nurses had moderate level of knowledge regarding initiation of advanced cardiac life support and giving defibrillation shocks.

Part III: Nurses' practice regarding initiation of advanced cardiac life support and defibrillation shocks.

The current results revealed that the majority of the studied nurses had unsatisfactory practice level toward initiation of advanced cardiac life

support and giving defibrillation shocks. This might be due to several reasons, such as insufficient training on ACLS, high work load and stress that leaving little time for training and education and they might did not receive adequate assessment and feedback on their skills which can make it difficult to identify areas for improvement. This result was supported with **Gambo, et al., (2023)** who found in a study that about two thirds of the studied nurses had unsatisfactory practice level. Also, this result was parallel to the result of **Senbeta, Seid, Wudineh, & Abayneh (2023)** who found that about quarter of the studied nurses had unsatisfactory level of practice. On the other hand, the result was incongruent with **Nabil, Elsayed & Abouda, (2022)** who reported that most of the studied nurses had satisfactory level of practice.

Part IV: Assessment of nurses' attitude regarding initiation of advanced cardiac life support and defibrillation shocks.

The current study results showed that the majority of the studied nurses had negative attitude toward initiation of advanced cardiac life support and giving defibrillation shocks. This could be due to lack of confidence, fear of causing harm or catching

infection, and inadequate training. Specifically, a lack of experience, high workload, and perception of their role as a doctor's assistant.

This result was supported with **Ihunanya, Oke Michael, Babcock, Amere & RPHN, (2020)** who stated that the majority of the studied nurses had negative attitude. Additionally, this result was parallel to **Tíscar-González, Blanco-Blanco, Gea-Sánchez, Molinuevo, & Moreno-Casbas, (2019)** who stated that most of the studied nurses had negative attitude. On the other hand, this result was contradicted with **Silverplats, Strömsöe & Södersved Källestedt, (2022)** who reported that most of the studied nurses had positive attitude toward initiation of advanced cardiac life support and defibrillation shocks.

Part V: Relation and Correlation between knowledge, practice and attitude of the studied nurses.

The current result presented that low level of nurses' knowledge was associated with high level of unsatisfactory practice level and negative attitude. This could be explained by knowledge provides the "how-to" for effective advanced cardiac life support and defibrillation shocks, while attitude determines the "will-to-do" it properly, without a solid knowledge base, a nurse cannot

perform advanced cardiac life support and defibrillation shocks correctly, leading to poor practice. Similarly, if a nurse has a negative attitude of advanced cardiac life support and defibrillation shocks fearing legal issues, finding it too complex, or lacking confidence they may hesitate, perform the steps incorrectly, or fail to perform CPR at all, regardless of their knowledge level.

This study result was similar to **Adal & Emishaw (2023)** who found that low nurses' knowledge toward advanced life support and defibrillation shocks was associated with low practice level of advanced cardiac life support and defibrillation shocks also, negative attitude of nurses toward advanced life support and defibrillation shocks was associated with low practice level. Additionally, this result was supported with **Senbeta., et al (2023)** who found that low level of knowledge and practice of nurses toward advanced cardiac life support was associated with low level of practice. Conversely, the study was disagreed with **Vincelette, Lavoie, Fortin & Quiroz-Martinez (2018)** who found that high level of knowledge toward advanced life support and defibrillation shocks was associated with high practice level. Also, positive

attitude of nurses toward advanced life support and defibrillation shocks was associated with high practice level.

Also, this result showed that there were no statistically significant correlations between nurses' attitudes and their corresponding knowledge or practice domains across all items. That might be due to nurses' fear and anxiety of causing harm to the patient that resulted from lack self-confidence of their abilities to perform advanced cardiac life support and give defibrillation shocks. This also suggests that although nurses may hold generally positive or neutral attitudes toward ACLS and defibrillation, these attitudes do not necessarily translate into higher knowledge levels or better practical performance. In other words, attitude alone may not predict actual competence or adherence to ACLS guidelines.

This result was supported with **Papi, Hakim & Bahrami., (2020)** who announced that that there were no statistically significant correlations between nurses' attitudes and their corresponding knowledge or practice domains regarding advanced cardiac life support and defibrillation shocks. Conversely this result was contradicted with **Nti-Darkwah, Somuah, Otuah & Agongo., (2025)**

who showed that there were positive statically significant correlations between nurses' attitudes and their corresponding knowledge or practice domains regarding advanced cardiac life support and defibrillation shocks.

Conclusion

From this study, it can be concluded that: The studied nurses had low level of nurses' knowledge associated with high level of unsatisfactory practice level and negative attitude regarding advanced cardiac life support and defibrillation shocks

Recommendations

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

1. The implementation of effective comprehensive training programs to enhance nurses' knowledge and skills about Advanced Cardiac Life Support (ACLS).
2. Address nurses' negative attitudes towards performing ACLS, potentially through educational interventions and exposure to successful resuscitation scenarios.
3. Hospitals and healthcare organizations should establish mandatory, regular ACLS training programs for all nurses, not just those in critical care units. This training should be updated regularly

to reflect current guidelines and best practices.

4. Advanced Cardiac Life Support training should be integrated into the core curriculum for nursing education programs, rather than being an elective or optional component. This ensures that all nurses, regardless of their specialization, have a foundational understanding of ACLS principles and practices.
5. Nurses' ACLS skills should be regularly assessed and evaluated through practical simulations and other methods. This will help identify areas where further training or support may be needed

For future research:

Replication of the study on a larger sample size and with long term follow up can validate and help generalize the results

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Effect of Healthy Work Environment on Compassion Competence and Missed Nursing Care among Intensive Care Nurses

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Abstract

Background: A healthy work environment that support nurses' well-being plays a crucial role to enhance nurses' compassion competence, reduce missed nursing care, and improve overall patient outcomes. **Aim of the study:** to assess the effect of healthy work environment on compassion competence and missed nursing care among intensive care nurses. Research design: A descriptive correlation design was used to conduct this study. Setting: The study was conducted at Tanta University Hospitals. Tools: Three tools were employed for data collection: Healthy Work Environment Structure Questionnaire, Compassion Competence Scale and Observational Checklist of Missed Nursing Care Activity. Results: 78.8% of IC nurses perceived unhealthy work environment, 32.7% of them had moderate level of compassion competence. and 52.1% of IC nurses had moderate level of missed nursing care. Conclusion There was a significant positive correlation between healthy work environment and compassion competence. There was a significant negative correlation between healthy work environment and missed nursing care and between compassion competence and missed nursing care. Recommendations: Ensure availability of appropriate staff number and mix, ensure availability of resources and apply call light system to ensure quicker and more efficient response to patient need, enhancing patient satisfaction.

Key words: Compassion competence, Healthy work, Intensive care, Missed Nursing care, Nurses, Work Environment.

Introduction

Nurses, particularly intensive care nurses who care for patients with life-threatening conditions, are regarded as one of the healthcare system's most vital human resources. To offer safe and high-quality care for patients, critically ill patients' complex conditions necessitate prolonged treatment and care from appropriately qualified intensive care nurses who possess expertise and nontechnical abilities including compassion and family participation **(Palmryd et al., 2025)**.

Understanding the nursing work environment and the traits of intensive care nurses that affect nursing staff performance competency is under pressure due to the significant increase in critically ill patients in hospital settings **(Sarıköse & Göktepe, 2022)**.

Additionally, healthy nursing work environment can be defined as a safe empowering and satisfying workplace in which the whole health care staff function diligently for providing an optimal health care **(Emiralioglu & Sönmez, 2025)**.

Nursing work environment plays a critical role in shaping quality of nursing care. Standards to create a healthy work environment is including nurses' participation in hospital affairs, nursing foundations for quality of care, nurse manager

leadership ability and support of nurses, staffing and resource adequacy and collegial nurse-physician relations **(Walker, 2025)**. Nurses' participation in hospital affairs dimension, which reveals the nurse' participation in hospital decision-making enables nursing to manage uncertainty and prevent occurrences that could negatively affect nursing practice **(Nagel et al., 2022)**. Nurses' foundations for quality of care dimension, which emphasizes all practicing occupational health nurses required to adhere the various standards, regulations, and guidelines that apply to delivery of nursing care in their practice context **(Metin & Yildiz, 2023)**.

Nurse manager leadership ability and support of nurses' dimension focusing on the competence of nurse manager to lead and support the health care team. Staffing and resource adequacy dimension which refers to assuring the availability of various human and material resources to provide high quality patient care **(Perez-Gonzalez et al., 2024)**. Also, collegial nurses-physician relation dimension describes the inter professional collaboration and, they plan the most appropriate care for patients **(Warshawsky et al., 2022)**.

A healthy work environment with compassion is one in which staff feel safe, respected, valued, and supported both physically and emotionally, while being encouraged to grow and perform their best practice. It combines the principles of a safe, positive, and collaborative workplace with a culture of empathy and kindness in all interactions **(Ramachandran, et al 2024)**. Compassion is a deep awareness of human suffering and involves taking action to relieve such suffering **(Gilbert & Van Gordon, 2023)**. Thus, the compassion concept entails action, and distinguished from empathy and sympathy, which are passive emotions **(Ho et al., 2021)**. Compassion competence aspects are establishing a patient nurse relationship also, accomplishing a real understanding of patients' suffering, acting to assist the patients and enhance patients' empowerment. Compassion competence consists of three dimensions involving communication, sensitivity and insight. Communication assesses nurses' skills necessary to care for patients from various cultures, also, sensitivity measures nurses' ability to manage patients' emotions, and to enhance the quality of care as well as insight to clearly understand patients' needs in different situations **(Naseri et al., 2022)**.

Missed nursing care refers to omitted in whole or delay of mandatory patient care or providing inadequate nursing care that critically impacts patient outcomes, quality of nursing care and patient safety **(Janatolmakan & Khatony, 2022)**. Missed nursing care activities including patient assessment, medication administration, patient education, patient feeding, hygiene, patient mobilization, response to patient need, attending interdisciplinary conferences and documentation dimension **(Rooddehghan et al., 2024)**. Patient assessment in which nurse collect information is obtained relative to some known objectives or goal. Medication administration focuses on giving out medication to the patient in order to treat or prevent disease or complication. Regarding patient education, it is any combination of learning experiences designed to help patient and communities improve their health, by increasing their knowledge or influencing their attitudes **(Li, et al., 2024)**. Patient feeding is provided to each patient according to the specific diet required for their recovery. Hygiene encompasses the practices that ensure cleanliness and health, whereas patient mobilization is the process of getting a patient to be

physically active, and the level of that activity can cause specific physiological changes (**Borzykh, et al., 2022**). Response to patient need dimension or requirement is expressed by a patient related to their health. Nurse attending interdisciplinary conferences are defined as a gathering for discussion or deliberation, a nursing intervention with health professionals (**Zumstein-Shaha, et al., 2023**).

Documentation of assessment data, performed every shift, is essential for achieving patient safety and better patient outcomes. Nurses who demonstrate compassion and competence can meet diverse patient needs in a caring manner and are less likely to neglect required nursing care. (**Tölli et al., 2020**).

Significance of the study.

The nursing work environment encompasses the conditions under which IC nurses carry out their patient care activities, and it is considered the foundation for delivering quality care. It is a critical component of nursing practice. Furthermore, healthy work environment not only improves patient safety but also enhances nurse compassion, which directly influences the quality of patient care (**Kim & Lee, 2020**). A healthy work environment is not limited to just the

physical setting it includes factors like organizational culture, support systems, workload, and available resources. When these elements are optimized, nurses are better equipped to offer compassionate care, which ultimately leads to better patient outcomes (**Marenus. et al., 2023**). Therefore, its focus on the necessity of improving the work conditions for nurses. By enhancing these conditions, it is possible to improve the quality of care provided to patients, especially in ICUs. (**Flaubert et al., 2021**).

The aim of the study was to:

Assess the effect of healthy work environment on compassion competence and missed nursing care among intensive care nurses.

Research questions:

- 1- What are the levels of healthy nursing work environment from intensive care nurses' perspective?
- 2- What are the levels of intensive care nurses' compassion competence?
- 3- What are the levels of missed nursing care in intensive care units?
- 4- What is the relation between intensive care nurses' perception regarding healthy nursing work environment and nurses compassion competence and their missed nursing care?

Subjects and Method

Study design:

A descriptive correlational design was used to carry out this study.

Study settings:

The present study was conducted at Tanta University Main Hospitals, which is affiliated to the Ministry of Higher Education and Scientific Research.

Study subjects:

The subject of this study included a stratified proportional randomized sampling of nurses (n= 165) who were working in previously mentioned settings and available at the time of data collection, including Neurology ICU (n= 49 from 100), Neonate ICU (n=52 from 72) and Cardiac ICU (n=64 from 114).

Tools of data collection:

Tool I: Healthy Work Environment Structure Questionnaire. This tool was developed by the researcher guided by **Lake (2002); Osman et al., (2019); Ghafourifard et al., (2023).** It was used to assess healthy work environment for intensive care nurses. It consisted of two parts:

Part (1): Personal and work characteristics of intensive care nurses included age, sex, marital status, number of children, educational level, years of experience, residence, ICU name, common shift worked, intention of leave and number of patients in last shift.

Part (2): Healthy Work Environment Questionnaire; It included 30 items classified to the following five dimensions: **Nurse's participation about hospital affairs,** (5items). **Nursing foundations for quality of care,** (7 items). **Nurse manager leadership ability and support of nurses,** (9 items). **Staffing and resource adequacy,** (6 items). **Collegial nurse-physician relations,** (3 items).

Scoring system: Responses of intensive care nurses were measured using a five points Liker Scale ranging 1-5 as follows; (1) not at all, (2) only a little, (3) to some extent, and (4) rather much, (5) very much. Nurses' perception levels regarding healthy nursing work environment was classified into two levels according to cut-off points: Healthy nursing work environment $\geq 70\%$, and this equals ≥ 105 from the total score.

Unhealthy nursing work environment $< 70\%$ and this equals 104 from the total score.

Tool II: Compassion Competence Scale

This tool was developed by the researcher guided by **Lee and Seomun (2016); Osman et al. (2019).** It was used to assess compassion competencies from IC nurses' point of view. The

compassion competence scale was included 17 items classified into three subscales **Communication**, (8items). **Sensitivity**, (5 items). **Insight**, (4 items).

Scoring system: Responses of intensive care nurses were measured using a five points Liker Scale ranging 1- 5 as follows; (1) strongly disagree, (2) disagree, (3) partially agree, and (4) agree, (5) strongly agree.

Levels of intensive care nurses' compassion competence were classified according to:

- High compassion level >75% and this equals > 64 from the total score.
 - Moderate compassion level from 60% to 75% and this equals < 51- 63from the total score.
 - Low compassion level <60% and this equals 50.9 from the total score.
- Tool III: Observational Check list of Missed Nursing Care Activity:**

This tool was developed by the researcher guided by **Kalisch and Williams (2009); Kalish et al. (2011)**. To assess missed nursing care. It was consisted of two parts as follows:

Part I: Nurses' code and type of shift.

Part II: Missed nursing care activities observational checklist.

It included 60 items classified into eleven subscales as follow:

Patient assessment (12 items).

Total Medication administration divided into (10 items patients' medication right) and 7 items.

Health education (7 items).

Patient feeding (3 items).

Hygiene (6 items).

Patient mobilization (2 items).

Response to patient need (5 items).

Privacy (4 items).

Surveillance (2 items).

Attending interdisciplinary conferences (2 items).

Documentation (10 items).

Scoring system

The total observational scores were calculated by summing scores of all categories into the following levels.

- High level of missed nursing care < 60% and this equals 107from the total score.

- Moderate level of missed nursing care 60-75% and this equals 108- 135from the total score.

- Low level of missed nursing care >75% and this equals 136 from the total score.

Method

An official permission was obtained from the Dean of Faculty of Nursing to the authoritative personal at Tanta University Main Hospitals.

Ethical considerations:

- An approval of the Scientific Research Ethical Committee at

Faculty of Nursing was obtained code No: (277- 7- 2023).

-Participants informed about purpose of the study.

- Informed consents were obtained from the study's participants after explanation of the study's aim.

- The researcher ensured that the nature of the study wouldn't cause harm for participants.

- Confidentiality and anonymity maintained regarding data collection and the participants had the right to withdrawal at any time of the study.

- Tools I, II, III were developed by the researcher based on review of related literatures and translated into Arabic.

- Tools were presented to a jury of five experts to check their content validity. The experts were three Professors and two Assistant Professors of Nursing Administration, Faculty of Nursing, Tanta University.

- The experts' responses were collected on a four-points Likert Scale ranging from (4-1); 4= strongly relevant, 3= relevant, 2= little relevant, and 1= not relevant. Necessary modifications were done including clarification, omission and adding others. The face validity value of Health Work Environment questionnaire was 99.5%, Compassion Competence questionnaire was 99.4% and Missed

nursing care observational check list was 99.03%.

- A pilot study carried out on (10%) of the subjects $n=17$ to test the clarity, reliability of tools, identify obstacles and problems that may be encountered during data collection and modifications. This sample was excluded from the study's subjects.

- Reliability of tools were tested using Cronbach's Alpha test, reliability of nursing staff perception regarding Health Work Environment was=0.933, reliability of nursing staff perception of Compassion Competence was=0.908 and reliability of observation nursing staff of missed nursing care was=0.966.

Results

Table (1): Shows characteristic data of intensive care nurses. The table revealed that the age of IC nurses ranged between 22 to 51 years with mean age 29.16 ± 6.64 . Also, around three quarters (72.7 %) of IC nurses fall in the age group from 25 up to less than 35 years old. Majority (80.6%) of IC nurses were females and more than two thirds (70.9%) of them were married. The highest and nearly equal percent (44.8% and 44.9%) of IC nurses had between no children and 1-2 children respectively.

Regarding educational level, it was noticed that more than two fifth

(43.6% and 43.0%) of IC nurses had Associated Degree and Bachelor of Science in Nursing respectively. Regarding years of experience in nursing, majority (79.4%) of IC nurses had less than ten years of experience with mean years of experience 6.64 ± 6.85 . Also. This table showed that around two thirds (65.5%) of IC nurses lived in rural areas.

Figure (1): Shows IC nurses' overall opinion regarding healthy work environment. More than three quarters (78.8%) of IC nurses perceived unhealthy overall nursing work environment. While, less than quarter (21.2%) of IC nurses perceived healthy overall nursing work environment.

Table (2): Shows intensive care nurses' levels of perception regarding healthy work environment dimensions. More than half (55.8%) of IC nurses perceived nurses' foundations for quality of care as healthy work environment. More than one third (33.9%) of IC nurses had perceived collegial nurse-physician relations as healthy work environment. The majority (85.5%) of IC nurses perceived staffing and resource adequacy dimensions as unhealthy work environment. Around three quarters (76.4% and 72.1%) of IC nurses perceived nurses' participation in hospital

affairs and nurse manager leadership dimensions as unhealthy work environment respectively.

Figure (2): Shows intensive care nurses' overall levels regarding compassion competence. Around two thirds (61.2%) of IC nurses had high level of compassion competence. While, around one third (32.7%) of IC nurses had moderate level of compassion competence.

Table (3): Represents intensive care nurses' levels of compassion competence dimensions. More than two thirds (68.5% and 64.8%) of IC nurses had high level regarding sensitivity and insight dimensions of compassion competence respectively. While, around one third (33.3%) of IC nurses had moderate level regarding communication of compassion competence.

Figure (3): Shows intensive care nurses' overall levels regarding missed nursing care activity. More than half (52.1%) of IC nurses had moderate level of missed nursing care. While, more than two fifths (41.2%) of IC nurses had high level of missed nursing care.

Table (4): Shows levels of IC nurse's missed nursing care activity dimensions. This table shows that majority (96.4%) of IC nurses had low missed nursing care regarding documentation dimension. Also, more than one third (39.4%) of IC

nurses had low missed nursing care regarding medication administration. Moreover (100%, 80.0%, 73.9% and 72.7%) of IC nurses had high level of missed nursing care regarding patient mobilization, attending interdisciplinary conferences, health education, response to patient need, patient mobilization and surveillance respectively.

Table (5): Shows correlations between intensive care nurses' perception of healthy work environment and compassion competence. The table shows that there were significant positive correlations between communication, sensitivity, insight and overall of compassion competence scale with all healthy work environment subscales at P

value ≤ 0.001 except manager leadership and staffing and resource adequacy with communication dimension where there was no statistically significant correlation.

Table (6): Shows correlation between total nurse's healthy work environment, compassion competence and missed nursing care activity. The table shows that there was a significant positive correlation between healthy work environment and compassion competence at ($P < 0.001$). Also, there was a significant negative correlation between healthy work environment and missed nursing care activity at ($P < 0.001$) and between compassion competence and missed nursing care activity at ($P < 0.001$)

Table (1): Characteristic data of intensive care nurses' (n = 165)

Personal characteristics	IC nurses	
	No.	%
Age		
<25	17	10.3
25-<35	120	72.7
35-<40	11	6.7
≥ 40	17	10.3
Min. – Max.	22.0 – 51.0	
Mean $\pm$ SD.	29.16 $\pm$ 6.64	
Sex		
Male	32	19.4
Female	133	80.6
Marital status		
Married	117	70.9
Unmarried	48	29.1
Number of children		
No	74	44.8
1-2	74	44.9
< 3	17	10.3
Education level		

Secondary Nursing Diploma	16	9.7
Associated degree in Nursing	72	43.6
Bachelor of Science in Nursing	71	43.0
Post-graduates Studies	6	3.6
Residence		
Rural	108	65.5
Urban	57	34.5
Years of experience		
<10	131	79.4
10-<15	18	10.9
15-<20	5	3.0
≥20	11	6.7
Min. – Max.	1.0– 33.0	
Mean ± SD.	6.64 ± 6.85	

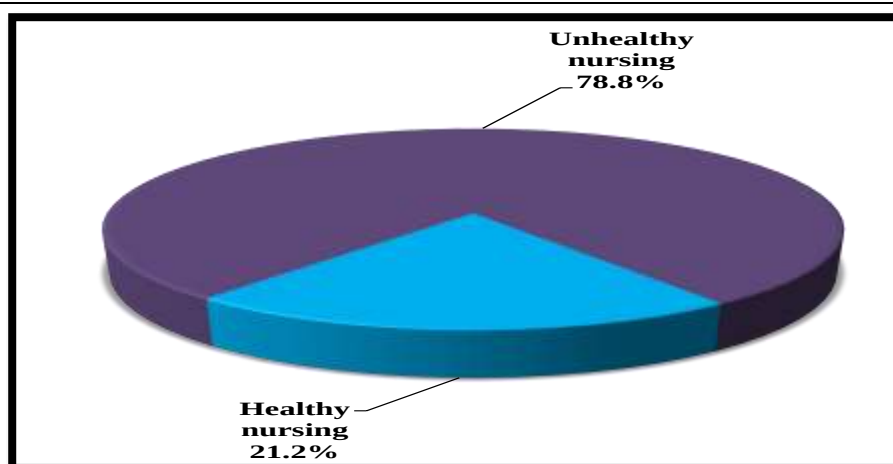


Figure (1): Intensive care nurses' overall opinion regarding healthy work environment

Table (2): Intensive care nurses' levels of perception regarding healthy work environment dimensions (n = 165)

Dimensions	IC Nurses			
	Healthy work environment		Unhealthy work environment	
	No.	%	No.	%
Nurses' participation in hospital affairs	39	23.6	126	76.4
Nurses' foundations for quality of care	92	55.8	73	44.2
Nurses' manager leadership	46	27.9	119	72.1
Staffing and resource adequacy	24	14.5	141	85.5
Collegial nurse-physician relations	56	33.9	109	66.1

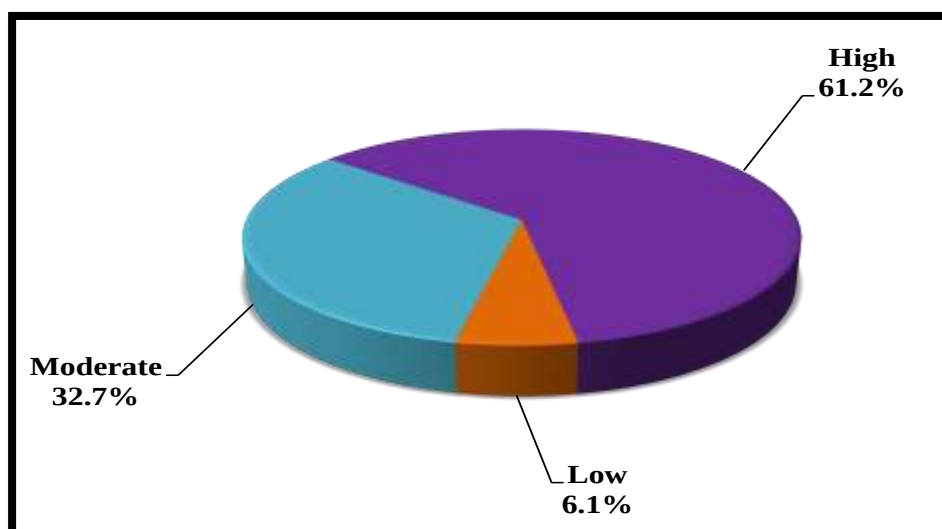


Figure (2): Intensive care nurses' overall levels regarding compassion competence

Table (3): Intensive care nurses' levels of compassion competence dimensions (n = 165)

IC nurses' Compassion competence dimensions	IC nurses compassion competence					
	High		Moderate		Low	
	No.	%	No.	%	No.	%
Communication	89	53.9	55	33.4	21	12.7
Sensitivity	113	68.5	42	25.5	10	6
Insight	107	64.9	38	23.0	20	12.1

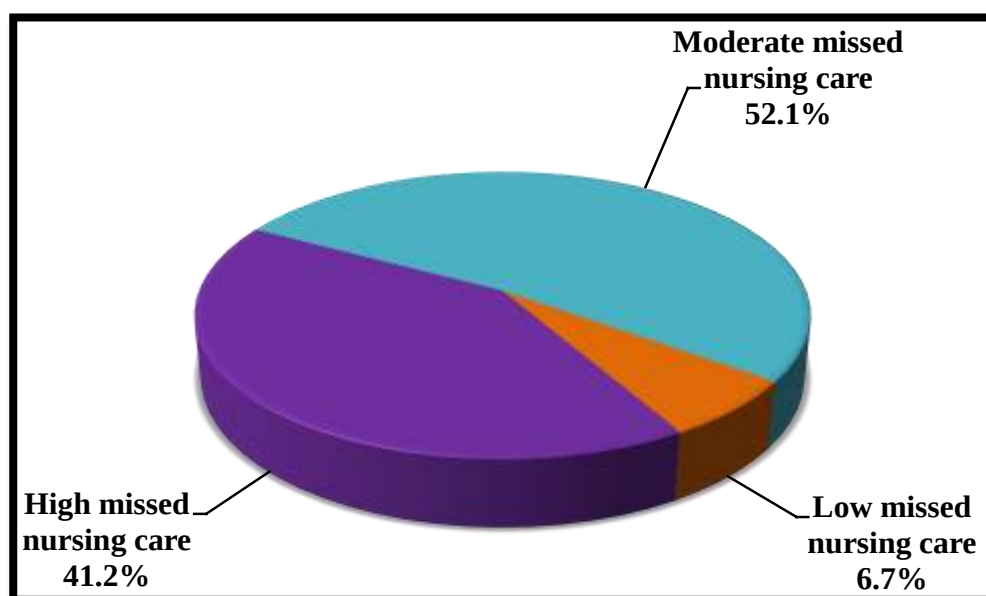


Figure (3): Intensive care nurses' overall levels regarding missed nursing care activity

Table (4): Levels of IC nurses' missed nursing care activity dimensions (n = 165)

Missed nursing care activity dimensions	IC nurses of missed nursing care					
	High missed nursing care		Moderate missed nursing care		Low missed nursing care	
	No.	%	No.	%	No.	%
Nursing assessment of patient needs	73	44.3	70	42.4	22	13.3
Medication administration	18	10.9	82	49.7	65	39.4
Health education	132	80.0	11	6.7	22	13.3
Patient feeding	50	30.3	88	53.3	27	16.4
Hygiene	91	55.1	43	26.1	31	18.8
Patient mobilization	165	100.0	0	0.0	0	0.0
Response to patient need	122	73.9	26	15.8	17	10.3
Privacy	89	53.9	48	29.1	28	17.0
Surveillance	120	72.7	6	3.6	39	23.6
Attending interdisciplinary conferences	165	100.0	0	0.0	0	0.0
Documentation	0	0.0	6	3.6	159	96.4

r: Pearson coefficient, *: Statistically significant at $p \leq 0.05$ **Table (5): Correlation between IC nurses' perception of healthy work environment and compassion competence (n = 165)**

Healthy work environment	Compassion Competence Scale							
	Communication		Sensitivity		Insight		Overall	
	R	p	R	P	r	P	R	P
Participation	0.187*	0.016*	0.211*	0.006*	0.241*	0.002*	0.233*	0.003*
Foundations	0.364*	<0.001*	0.526*	<0.001*	0.420*	<0.001*	0.477*	<0.001*
Manager leadership	0.033	0.674	0.101	0.198	0.077	0.326	0.071	0.363
Staffing and resource adequacy	0.106	0.173	0.225*	0.004*	0.209*	0.007*	0.186*	0.017*
Collegial nurse-physician relations	0.240*	0.002*	0.314*	<0.001*	0.188*	0.016*	0.278*	<0.001*
Overall	0.203*	0.009*	0.314*	<0.001*	0.265*	0.001*	0.281*	<0.001*

r: Pearson coefficient, *: Statistically significant at $p \leq 0.05$

Table (6): Correlation between total nurse's healthy work environment, compassion competence and missed nursing care activity (n = 165)

Study variable	R	P
Healthy work environment vs. Compassion Competence	0,281	<0.001*
Healthy work environment vs. Missed Nursing care activity	-0.330*	<0.001*
Compassion Competence vs. Missed Nursing care activity	-0.225	0.004*

r: Pearson coefficient, *: Statistically significant at $p \leq 0.05$

Discussion

Healthy work environment that supports decent and appropriate work, ensures the health, safety, and nursing staff well-being, result in high quality of patient care. Health work environment can enhance compassion competence and decreased missed nursing care especially in intensive care unit by evaluating the basics that cause missing care activities (Montgomery & Lainidi, 2024). lack of healthy work environment could impact the development of compassionate care and prevent missed nursing care in intensive care units (Zarrinkolah, Ghafourifard & Dehghannezhad, 2025).

Health Work Environment perception of intensive care nurses:

Results of the current study revealed that more than three quarters of IC nurses perceived unhealthy overall nursing work environment. **This can be interpreted by** nurse's perception of inadequate staffing and resources, inadequate participation in hospital

affairs as well as inadequate manager leadership.

The current study findings matched with **Shamkh, Mohammed and Al-Abedi, (2022)** reported that about three quarters of nurses perceived unhealthy occupational environment. On the contrary, **Mohamed and Mohamed (2024), Ageel and Shbeer, (2022)** clarified that less than three quarters of studied nurses had a high level of perception regarding healthy nurse work environment. And, **Bruyneel et al., (2025)** showed that more than two thirds of nurses had healthy nursing working environment.

Intensive Care Nurses' Levels of perception regarding healthy work environment dimensions:

The present study revealed that the majority of IC nurses perceived unhealthy staffing and resources adequacy of unhealthy work environment. This can be explained by inadequate supervisory staff that was supportive of the nurses and provide inadequate support resources

that allow appropriate patient care. Also, inadequate existence of enough staff to get the work done and provide quality patient care. This may be rationalized by the universal shortage of nursing staff, ambiguous roles, poorly defined for job description, conflict between nurses, and heavy workloads which lead to unhealthy work environment and staff turnover. **(Ahmed, et al., 2023)**

The current study findings matched with **Antoszevska and Gutysz–Wojnicka, (2024)**, identified that more than half of IC nurses had unhealthy work environment regarding nurse's perception for staffing and resource adequacy. Conversely **Bruyneel et al., (2024)** and **Zhang et al., (2024)** revealed that more than half of ICU nurses had healthy nurse work environment regarding staffing and resource adequacy dimension.

Intensive care nurses' perception of compassion competence:

The present study finding demonstrated that around two thirds of IC nurses had high level of compassion competence regarding sensitivity and insight. **Where**, more than half of the studied nurses had high level regarding insight, and more than two third of them had high level of sensitivity and insight. **This may be interpreted by** the IC nurses deal with critically ill patients who require

special care and treating them with empathy compassionate. And around one third of IC nurses had moderate level regarding communication dimension. The reason about two-thirds of studied intensive care unit (ICU) nurses have high compassion competence was likely due to a combination of factors, including a strong sense of empathy, highly developed communication skills, and a professional drive to provide patient-centered care, which were fundamental to the nursing profession. The present results in the same line with the findings of the study by **Maher, (2024)** and **Arli, (2023)** revealed that the majority of the studied nurses had high level of compassion. On the contrary, **Korkmaz, Guler and Gur, (2023)**, asserted that nurses generally experienced compassion fatigue.

Intensive care nurses' levels of compassion competence dimensions:

The present study revealed that around one third of IC nurses had moderate level regarding communication dimension of compassion competence. **Where**, around half of ICNS strongly agreed that supported patients to overcome their problems and provided the required emotional support to patients. The studied nurses expressed compassion toward patients through

communication, communicated with patients for encouragement, used proper body language when communicating with patients, developed my interpersonal relationship skills with patients and provided the required emotional support to patients appropriately.

This may be interpreted by IC nurses' good communicators, have communication skill forms a therapeutic relationship and becomes a medium for professional interactions with patients. Good communication is used in ICUs for ICU patients to ensure their dignity, allow them to express needs, participate in their care, and improve psychological well-being. For the healthcare team, it reduces medical errors, improves patient safety, and helps in collaborative decision-making and coordinated care.

(Rashid, et al., 2025)

The present results in the same line with the findings of the study by **Setoodeh, Shafieejahromi, Zarshenas and Tehranineshat, (2025), Maher, (2024) and Jeong and Seo, (2022)** reported that the majority of nurses studied had a high level of communication competence related to compassion, with about two-thirds demonstrating strong communication skills.

Furthermore, it was found that when nurses had moderate

communication competency, especially in responding to inpatient needs, their ability to communicate effectively led to improved patient satisfaction with nursing care, highlighting the importance of communication competence as a strategy for enhancing nurses' compassion and promoting patient centered care.

The results revealed that near than two thirds of the studied nurses had high level of sensitivity. **This can be confirmed by** more than half of the studied nurses strongly agreed with avoiding hurting patient's feelings through their speech, behaviors and paying attention to what patients say and being aware of changes in patients' emotional condition. **This may be rationalized by** the majority of IC nurses' working in intensive care unit that may be increased sensitivity feeling and IC nurses' dealing with critically ill patients which requires more sensitivity. IC nurses needed sensitivity due to the high-stress environment, complex ethical dilemmas, and vulnerable patient populations they care for. Sensitivity crucial for them to recognize and respond to patients' physical and psychological needs, make sound ethical decisions, and provide compassionate, patient-centered care. This heightened awareness helps prevent errors,

advocates for patient safety, and manages the emotional burden of critical care.

The present results in the same line with the findings of the study by **Maher, (2024) and Afrasiabifar, Mosavi, Dehbanizadeh, and Khaki, (2021)**, declared that the majority of the studied nurses had high level of sensitivity, also, found that more than half of nurses had high level of moral sensitivity.

Contradictory with **Xie et al., (2021) and Khanjani, Asmari, Foroughi and Yousefi, (2021)**, reported that over half of the nurses demonstrated a low level of sensitivity on the compassion scale, suggesting a disparity in the levels of compassion competence and sensitivity among nurses in different settings.

The current study results stated that near than two thirds of IC nurses had high level of insight. **where** more than half of intensive care nurses strongly agreed with empathized well with patients' difficulty, intuitive about patients because of experience and looked after patients without being influenced by personally challenging. **This can be rationalized by** the majority of IC nurses had about 10 years concerning years of experience that may be increased level of insight. Insight is crucial for ICU nurses as it allows them to interpret complex patient data, predict deterioration,

make high-risk decisions, and improve patient care by quickly responding to changes. It fosters professional growth, enhances job satisfaction through critical reflection, and improves patient safety by enabling early detection of issues. The present results in the same line with the findings of the study by **Maher, (2024)** presented that near than three quarters of the studied nurses had high level of insight.

On conversely, **Ye et al., (2024)**, showed that more than half of subjects had low level of insight in compassion scale. Also, **Fidan, Köktaş and Zeyrek, (2024)**, revealed that near than two thirds of intensive care nurses had low level of insight concerning compassion level.

Levels of IC nurse's missed nursing care activity dimensions:

As regards levels of IC nurses of missed nursing care activities, the present study showed that the majority of the studied IC nurses had low missed nursing care regarding documentation dimension. **This can be justifying by** all of IC nurses completely done documenting assessment data conducted to patient every shift, patient vital signs, patient intake/output, clear and legible patients' information, ensure security and privacy of patient's information and document patient list medication chart.

This may be rationalized by the majority of the studied nurses working in intensive care unit that is patients need to more extensive and intensive care, this leading to good documentation. which, it was critical for ensuring patient safety, facilitating clear communication among the healthcare team, and providing continuity of care. It serves as a legal record, supports quality improvement initiatives through data analysis, and is essential for reimbursement and research purposes. In the high-risk environment of an ICU, accurate records prevent errors in medication, diagnosis, and treatment.

This study results matched with **Bruyneel et al., (2025)** discovered that regarding missed nursing care, almost all of IC nurses had low level in documentation dimension.

On conversely with **Ali, Helal and Ismail, (2024)**, reported that around half of the studied nurses had moderated level in documentation dimension concerning missed nursing care.

The result study revealed that more than one third of IC nurses had low missed nursing care regarding medication administration. **This can be justified by** all of IC nurses had completely done check of right patient, more than delayed or partial done administer of medication within 30 minutes according to scheduled

time and more than one thirds of them right time and follow standard precautions for medication administration. Also, more than two thirds of IC nurses did not do right to refuse, right education new medication requests respond to within 15minutes as needed and did not done checked expired date before use.

This may be rationalized by increased number of patient ratio per shift and more than half of IC nurses were assigned to work with from 3 to 4 patients per shift. This may due to inadequate staffing, unhealthy work environment, lack of training and education for IC nurses, poor communication between nurses and lack of patient monitoring in ICU. In agreement with **Abere et al., (2024)**, showed that more than two thirds of nurses in Northcentral Ethiopia had low missed nursing care concerning medication administration. On conversely with **Ali, Helal and Ismail, (2024)**, they reported that more than half of the studied nurses had moderated level in medication administration dimension concerning missed nursing care.

The present results showed that all of the studied IC nurses had high level of missed nursing care activity regarding patient mobilization. **This can be interpreted by** all nurses had not done helping patient ambulation three times per day or as doctor order, also

more than half of them not done changing comatose patient position every 2 hours.

This may be rationalized by patient mobility is a crucial aspect of IC recovery, and neglecting it may lead to complications and slow down the healing process.

In the same line with **Kim and Ko, (2025)**, showed that more than half of nurses had high-level in-patient mobilization of missed nursing care activity. Also, **Danielis et al., (2021)**, illustrated that the majority of nurses had high level of missed nursing care activity regarding patient mobilization.

On contrast, **Mohammadi, Souza Nogueira, Hanifi, and Bahraminejad, (2023)**, reported that more than half of medical IC nurses had moderate level in patient mobilization and motion dimension regarding missed nursing care. Moreover, the present study reported that all of the studied IC nurses had high level of missed nursing care activity regarding attending interdisciplinary conferences. **This can have confirmed by** all of IC nurses not attend on and off duty conferences. **This may be interpreted by** due to work in high pressure environments with limited time due to the critical nature of their patients, workload and stress for IC nurses and lack of incentive or

support and lack of clear expectations for participation leading to nurses being unaware of their role.

In the same line with **Daraghmeh, Ayed, Salameh, and Fashafsheh, (2024) and Alsalem et al., (2023)**, showed that more than two thirds of nurses had low level of attending interdisciplinary conferences in missed nursing care.

On country with **Ahmadzadeh-Zeidi, Rooddehghan and Haghani, (2024)**, revealed that more than two thirds of Jordanian and Iranian nurses had moderate level of attend interdisciplinary care conferences scores of missed nursing care.

The current results revealed that the majority of the studied nurses had high level regarding health education. **This can be interpreted by** more than three quarters of IC nurses had not done health education about important exercise such as deep breathing and cough. And more than two thirds of IC nurse did not do health education about healthy diet, medication to follow up after discharge and daily living activities. **This may be rationalized by** lack of supplies that facilitate health education, workload and patient mental state.

In agreement with **Ali, Helal and Ismail, (2024)**, reported that near than half of the studied nurses had high level in education dimension

regarding missed nursing care. On contrast with **Mohammadi, Souza Nogueira, Hanifi, and Bahraminejad, (2023)**, reported that more than three quarters of medical IC nurses had low level and not applicable in patient education dimension regarding missed nursing care.

The present study result illustrated that around three quarters of the studied nurses had high level of missed nursing care activity regarding response to patient need. **This can be interpreted by** all nurses had not done to response to call light is initiated within 5 minutes of request if present. And more than two thirds of them not done for assist with toileting needs within 5 minutes of request, and provide time for patient to ask and answer his question. **This may be rationalized by** critically ill patients require highly complex care.

The study results matched with **Li et al., (2024), Karadaş, Ergün and Kaynak, (2024)** reported that the majority of nurses had high level in response to patient need of missed nursing care activity concerning response to patient need. On contrast with **Mohammadi, Souza Nogueira, Hanifi, and Bahraminejad, (2023)**, reported that more than half of IC nurses had moderate level in response to patient's needs and call light within 5 min dimension regarding missed

nursing care. The result of the study showed that near than three quarters of the studied nurses had high level regarding surveillance. This can be confirmed by more than half of the studied nurses not carry out unit round every shift to detect any changes and near than one third of them not monitor urgent patient condition continuously. This may be rationalized by increased number of patient per shift and more than half of IC nurses were assigned to work with from 3 to 4 patients per shift.

In supported with **Alfuqaha, Alhalaiqa, Alqurneh and Ayed, (2023)**, reported that the majority of nurses had high level in patient surveillance of missed nursing care. On conversely with **Lee and Kalisch, (2021)**, showed that low level in surveillance regarding the level of missed nursing care reported by Korean nurses was lower than that of United States nurses.

The present study revealed that more than half of the studied nurses had high level of missed nursing care activity regarding privacy. **This may be rationalized by** near than two thirds of the studied nurses not respect patient decision about refusing medication, near than one third of them do not expose patient data to unauthorized person and keep patient condition confidentially, and more than one quarter not keep patient

privacy when exposing body parts. **This can be justified by** time constraints and heavy workload, also many patients are unconscious, making it difficult for nurses to ensure confidentiality while prioritizing urgent medical interventions and inadequate resources which lack of private rooms make protecting confidentiality physically difficult. This study results consistent with **Caillet, Dauvergne, Poiroux, Blanchard and Bruyneel, (2025), Ali, Helal & Ismail, (2024)** reported that more than two thirds of nurses had high level in privacy dimension concerning missed nursing care activity. On country with **AbuAlRub, Mahmmoud, Dalky and Alkhawaldeh, (2025)**, revealed that more than two thirds of nurses had moderate level of privacy dimension in missed nursing care activity.

Correlation between IC nurses' perception of healthy work environment, compassion competence and missed nursing care activity:

The current study results revealed that there was a significant positive correlation between healthy work environment and compassion competence. **This may be rationalized by** nurse age and years of experiences help them to deal well in critical situation and control her emotions.

This study results matched with **Chen et al., (2025) and Liu et al., (2025)** found that positive statistically correlation between nursing work environment and compassion dimensions. On conversely with **Zarrinkolah, Ghafourifard and Dehghannezhad, (2025)**, showed that negatively significant correlation between the total compassion competence score of nursing students and their positive work environment. Also, the present study results reported that there was a significant negative correlation between healthy work environment and missed nursing care activity. **This can be confirmed by** more than three quarters of the studied nurses had reported unhealthy work environment. **This may be interpreted by** healthy nursing work environment be able to effect on level of missed nursing care activity.

In agreement with **Ali, Helal and Ismail, (2024)**, reported that there was a positive strong highly statistically significant correlation between total workplace and missed nursing care among the staff nurses. On conversely with **Dutra and Guirardello, (2021)**, revealed that there was positive correlation between nurse work environment and missed nursing care activity.

The current study results showed that there was a significant negative correlation between compassion

competence and missed nursing care activity. In the same line with **Jia et al., (2025)**, highlighted that Spearman correlation showed that a significant negative relationship between compassion and missed nursing care among IC nurses.

On the other hand, not in the same with **Zarrinkolah, Ghafourifard and Dehghannezhad, (2025)**, studied that there was a significant positive correlation between the total compassion competence and quality of nursing care.

Conclusion

Intensive care nurses' more than three quarters of IC nurses perceived unhealthy overall nursing work environment. Around one third of IC nurses had moderate level of compassion competence. More than half of IC nurses had moderate level of missed nursing care. There was a significant positive correlation between healthy work environment and compassion competence. Also, there was a significant negative correlation between healthy work environment and missed nursing care and between compassion competence and missed nursing care.

Recommendations

Based on the findings of the present study, the following recommendations were suggested:

For Hospital administration

- Ensure availability of resources to provide high-quality patient care.
- Ensure availability of appropriate staff number and mix in all work shift.
- Design and implement continuous training programs for IC nurses and newly hired, to equip them with essential knowledge and skills for effective health work environment and missed nursing care.

For Head Nurse need to:

- Utilize mistakes as learning opportunities, not for criticism to promote work environment and enhance IC nurses' development.
- Use Fair Patient assignments and distribution to ensure continuity of care.
- Encourage IC staff nurses report their concerns and responds to improve nurses' commitment.

For ICU staff nurses

- Allocate enough time for discuss patient care problems.
 - Join hospital and nursing department committees to enhance collaboration and improve the quality of care.
 - Provide patients with health education about medications discharge to ensure proper follow-up care.
- Attend training program conferences to update knowledge about healthy work environment and missed nursing care.

Further research

- Investigate the impact of healthy work environment on patient safety culture.
- Investigate the impact of health work environment and compassion competence on nurse retention.

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Effect of Health Instructions on Mothers' Perception and Practices about Management of Febrile Convulsions for Their Children

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Abstract

Background: Febrile convulsions are the most common types of seizures in children. Febrile convulsion is a seizure in association with febrile illness, in the absence of other causes of seizures. **The study aimed to:** Evaluate the effect of health instructions on mothers' perception and practices about febrile convulsions for their children. **Study design:** A Quasi experimental study design was used in this study. **Study setting:** This study conducted in the largest two Maternal and Child Health Care centers (MCH) affiliated with the Ministry of Health and Population at Tanta city. **Study subjects:** A convenience sampling of 120 mothers who attended the previous mentioned settings was included in this study. **Tools of data collection:** **Tool I:** - Assessment of mothers' perception about febrile convulsions for their children based on Huang Febrile Seizures Questionnaire (HFSQ) it consisted of 3 parts. Part 1: - Socio-demographic characteristics of the studied mothers and their children, part 2: - Medical history of the children, and part 3: - Mothers' perception about febrile convulsions (FCs). **Tool II:** - Assessment of mothers' reported practices about management of febrile convulsions based on Huang Febrile Seizures Questionnaire (HFSQ). **Results:** There was positive correlation between total score of mothers' knowledge and their reported practices about febrile convulsions pre implementation of health instructions. Regarding post health instructions correlations, there was positive correlation between total score of mothers' knowledge and attitudes, knowledge and practices, attitudes and practices at <0.001. **Conclusion:** The result concluded that the health instructions significantly brought out improvement in knowledge, attitudes and practices of the studied mothers regarding febrile convulsion. **Recommendations:** Continuous teaching sessions should be applied for all mothers to improve their knowledge, comply with medical treatment, and recommended and non-recommended practices of febrile convulsion at primary health care centers.

Keywords: Febrile convulsion, Seizures, Mothers teaching.

Introduction

Febrile convulsions (FCs) are the most prevalent kind of seizures that affect youngsters. Feverish convulsion is the term used to describe a seizure that coincides with a fever and for which no other cause can be found. **(Leung, 2024)**. In addition, it is one of the most common reasons for children to be admitted to hospitals. When a body temperature of more than 38°C is present, a febrile convulsion can occur. This phenomenon is associated with the lack of a central nervous system infection, metabolic illness, electrolyte imbalance, trauma, or drunkenness, as well as the absence of a history of seizures. Even though they are thought to be a self-limiting ailment, FCs lead to anxiety in parents who regard them as frightening. **(Abd-Almuhsen, & Yassin, 2025; Semple, Dill, & O'Brien, 2020)**.

Febrile convulsions mainly occur in children aged 5 months to 5 years, but it is rare before or after this period, with a global incidence of 2%–5% **(Kajiwara, & Koga, 2022)**. Febrile convulsions account for 2 to 14% of all childhood seizures, and one-third of febrile convulsions are complex febrile convulsions. Febrile convulsions are most reported in winter, corresponding with peaks in the occurrence of febrile illnesses in

young children **(Semple, Dill, & O'Brien, 2020)**. In Egypt, 20% is the prevalence of febrile convulsions and the recurrence is high between 30-60% according to CAPMS **(Central Agency for Public Mobilization and Statistics, 2023)**.

The primary factors influencing febrile convulsions include gender, positive family history, age, maturation, and genetic predisposition. Having a sibling with febrile convulsions elevates the risk by 10%, while a parent with a positive history raises the risk to 50% **(Smith, Sadler & Benedum, 2019)**. Febrile convulsions can be attributed to various factors, including urinary tract infections (UTIs) and upper respiratory infections, typically associated with elevated temperature. Viral infections are more prone to induce febrile convulsions. Roseola infection caused by herpes simplex virus-6 accounts for about 20% of first febrile convulsions, whereas influenza is linked to recurrent febrile convulsions. **(Fang, Zhou, Fan, Zhang, & Yang, 2023; Whitney, Samanta, Sharma, & Jain, 2024)**.

Febrile convulsions are categorized as simple, complex, and febrile status epilepticus, depending on duration, the presence of focal characteristics, and recurrence. The

primary clinical manifestations include abrupt loss of consciousness, accompanied by localized or generalized muscular tonic and colonic convulsions. The clinical signs vary by type and typically include body jerking or twitching, eye rolling, teeth clenching, and foaming at the mouth. **(Corsello, et al,2024; Carman, et al ,2019; Eilbert & Chan, 2022; Leung, Leung, Wong & Hon, 2019).**

While the majority of febrile convulsions are self-limiting and exhibit a favorable prognosis, infrequent complications may arise, such as unexpected mortality, subsequent epilepsy, encephalopathy, autism spectrum disorder, intellectual disability and attention -deficit/ hyperactivity disorder, Tourette syndrome, allergic rhinitis, asthma, head trauma, oral and dental injuries, cerebral damage, neck asphyxiation, and recurrent seizures. **(Offringa, Newton, Nevitt, & Vraka,2021; Sawires, BATTERY, Fahey,2022).**

No specific intervention for mild or complex febrile convulsion is warranted beyond supportive care and assessment for potential underlying etiologies of the fever. Treatment for FCs is divided into emergency interventions for extended or repeated episodes and preventive strategies. Targeted

therapies are typically superfluous except for the management of chronic febrile conditions **(Raghavan, Porter, Neuman, & Lyons, 2021).**

Significance of the study:

For most mothers, febrile convulsions are emotionally traumatic condition, and they thought that their children were dying during the seizure attack. This family may have changes in behavioral and daily activities with a settling sense of fear of fever and febrile seizures itself **(Cappellari, Mariani, & Bruschi, 2023; Deswita, Herawati, Gafar, Hardoni & Adinda, 2025; Fang, Zhou, Fan, Zhang, Yang, 2023).**

Febrile convulsions are most prevalent neurological disorder in childhood affecting 2-5% of children particularly between 5monthes and 5 years of age. Febrile convulsions are frightening for mothers, who may mistakenly believe they lead to or cause choking, brain damage, epilepsy or intellectual disability like (mental retardation and learning disorders) **(Owusu, 2022; Verity, Greenwood, & Golding2022).** Therefore, the current study was conducted to evaluate the effect of health instructions on mothers' perception and practices about management of febrile convulsions for their children.

Aim of the study:**The aim of the study was to:**

Evaluate the effect of health instructions on mothers' perception and practices about febrile convulsions for their children.

Research hypotheses:

1- Mothers' perception about management of febrile convulsions for their children is expected to be improved after implementing the health instructions.

2- Mothers' practices about management of febrile convulsions for their children are expected to be improved after implementing the health instructions.

Subjects and Method**Research design:**

A Quasi experimental study design was used in this study.

Study settings:

The study was conducted at the largest two Maternal and Child Health Care centers (MCH) affiliated with the Ministry of Health and Population at Tanta city (Medical Center at Sigar and Dr Mohamed Mashally Primary Health Care Center at Saied Street).

Study subjects:

A Convenience sampling of 120 mothers who attended the previous mentioned settings with their child seeking physical checkup, immunization and / or visiting the

well-baby clinic included in this study.

The sample size was calculated using Epi-Info7 software program. For the selection of sample to evaluate the effect of the intervention, the criteria were: 95% confidence limit, 80% power of the study. The estimated number of mothers with good level of good perception of febrile seizure was at 40% to be increased to 70% after intervention.

The sample size was based on the previously mentioned criteria, which was 114 and was increased to 120 to increase validity of results. These mothers were taken from each Maternal and Child Health Care Center selected according to their acceptance to participate in this study and the age of their children ranged from 6 months to 5 years of age.

Tools of data collection:

Two tools were used by the researcher in order to collect the necessary data for this study.

Tool I- Assessment of mothers' perception about febrile convulsions for their children based on Huang Febrile Seizures Questionnaire (HFSQ). The HFSQ was developed in Taiwan by (Huang, Huang, & Thomas, 2006). The HFSQ was adapted by the

researcher in this study. It was structured into the following parts:

Part (1): Socio-demographic characteristics of the studied mothers and their children.

It included the following data:

A: Socio-demographic data of the mothers which included data about mother's age, marital status, level of education, occupation, family income, place of residence, consanguinity between parents, occupation, family structure, number of family members, number of their children, number of rooms in the house, medical history of their children, and family experiences of febrile convulsions such as history of febrile convulsions among family's children (age at occurrence, frequency of attacks and any disability or health problems).

B: Socio-demographic characteristics of the child who attended with his mother to the Maternal and Child Health Care centers (MCHs) which included: Child age, sex, birth order and child feeding.

Part (2): Medical history of children.

This part was developed by the researcher to collect data about past and present health history of the child who attended with his/ her mother to the Maternal and Child Health Care centers (MCHs) which

included: (number and causes of previous hospital admission, presence of chronic diseases as D.M, chest sensitivity or respiratory problems, and history of febrile convulsions or epileptic seizures.

Part (3): Mothers' perception about febrile convulsions (FCs).

This part included: -

1- Mothers' knowledge about febrile convulsions (FCs) (Duthie & Begley, 2021; Gould, Delavale, Plovnick, Wisniewski & Devinsky, 2023 and Huang, Huang, & Thomas, 2006).

It included (7) questions about general knowledge, (4) questions about causes and risk factors, (5) questions about types, (3) questions about signs and symptoms, (6) questions about prevention, (9) questions about first aids, (4) questions about treatment, (4) questions about complication of febrile convulsion and finally one question about the mother's source of information . This domain consisted of (43) true/false questions with a "don't know" category provided for each

Scoring system:

Correct answers were received 1 point; incorrect and "don't know" answers were received zero point. This score summed up and the total score was converted into percentage and classified as following:

1. Low level of knowledge: < 60% of the total score.
2. Moderate level of knowledge: 60% - < 70% of the total score.
3. High level of knowledge: $\geq 70\%$ of the total score.

Mothers' attitudes about febrile convulsions (Huang, Huang, & Thomas, 2006). It included mothers' opinions about febrile convulsions treatment, examination, daily care, and relevant sociocultural perspectives. It consisted of (16) statement and was based on five – point Likert scale. The questionnaire was composed of two correlated subscales including the statement number described questions that denoted positive attitudes which were ten questions (3-5-9-11-13-15-16) rated on five Likert scales as follows: strongly agree =5, moderately agree =4, mildly agree =3, moderately disagree =2 and strongly disagree =1.

Other six questions were described as negative responses (1-2-4-10-12-14) rated on a five Likert scales as following: strongly agree =1, moderately agree =2, mildly agree =3, moderately disagree =4 and strongly disagree =5.

All scores summed up, converted into percent, and classified as:

1. Positive attitudes: $\geq 60\%$ from the total score.

2. Negative attitudes: < 60% from the total score.

Tool II- Assessment of mothers' reported practices about management of febrile convulsions based on Huang Febrile Seizures Questionnaire (HFSQ). (Huang, Huang, & Thomas, 2006). The HFSQ was adapted by the researcher in this study. It comprised of (18) statement to assess recommended practices. (Lower the child's body temperature, Protect the child on a soft and safe surface , Place the child on his/her side, Keep calm , and Observe seizure manifestations and duration as well as Ask argent assistance in the case of (The seizure lasts for more than five minutes, The child stops breathing or turns blue, Tremors in one part of his body or the seizure returns within 24 hours, His neck is stiff, The child becomes dehydrated, feels very tired, or sleeps a lot after the seizure) and no recommended practices (Rush the child to a doctor, Shake and rouse the convulsing child, Pry the convulsing child's clenched teeth apart and put something in his/her mouth, Attempt mouth-to-mouth resuscitation , Suck discharge from the child's nose and mouth , Cardiac massage , Restrain the convulsing child , Stimulate the convulsing child , and No response).

Scoring system:

All practices items checked and scored as done (1) and not done scored (0). The score of negative items reversed as done (0) and not done (1). Scores of practices items summed up and the total score converted into percentage.

The total score of mothers' practices categorized as follows:

1. Satisfactory practices: $\geq 60\%$ of the total score.
2. Unsatisfactory practices: $< 60\%$ of the total score.

Method

1-Obtaining approval:

An official permission obtained from the Dean of Faculty of Nursing, Tanta University and directed to the manager of outpatient clinics of Ali bin Abi Talib at health insurance in Tanta city to obtain the approval and cooperation to carry out this study.

2-Ethical considerations:

- Approval of the Scientific Research Ethical Committee of the Faculty of Nursing, Tanta University was obtained to conduct the study (code number 496/7/2024).
- An informed consent was obtained from all the study mothers to participate in the study after providing an appropriate explanation about the purpose of the study.
- Each mother informed her that she had the right to withdraw or terminate from the study at any time.

- The nature of the study did not cause any harm and pain for the entire sample.

- Confidentiality for data and privacy for participants were considered.

3-Developing the study tools:

- Tools (I and II) were developed and adapted by the researcher in this study and translated into Arabic to suit the language of the included mothers.

- **The study tools were tested to face and content validity:** by distribution it to a jury of five professors' expertise in the field of community health nursing before conducting the study. The mean test validity was 91.8%.

4- Pilot study:

A pilot study was carried out by the researcher on 10% of mothers (12 mothers) for testing the tool for its clarity, organization, applicability, comprehension and to identify obstacles that may be encountered with the researcher during data collection from each mother to detect any ambiguity of the statement questions. No modifications were made so this sample was included in the study.

5- Reliability of the study tools: -

By using Cronbach's Alpha test, it was found to be (0.794) for all the study tools, for knowledge (0.751), for attitudes (0.887), and for reported practices (0.723).

6- The actual study:

- The data collection of the present study was done by administration individually to each mother to assess her perception and practices about febrile convulsions for their children.
- The researcher met mothers at previously mentioned setting 2days per week (Monday and Wednesday from each week).
- The average time spent collecting data from each mother was 20-30min.
- The average number of mothers ranged from (2-3) per day.
- The study period continued during a period of six months starting in September 2024 and ending in February 2025.

7- Developing health instructions:

Health instructions were carried out according to the following four phases:

1-Assessment phase:

The data was collected by using the previously mentioned tool (I and II) through interviewing each mother to collect the baseline data as a pre-health instruction assessment (Pretest) before providing any information.

2-Planning phase:

Health instructions booklet about FCs was planned according to mothers needs and from literature review. It included the following steps:

A-Setting objectives of health instructions: -

- **General objective:** The objective of health instruction is to enable mothers to gain knowledge and improve their attitudes and practices that help them to manage febrile convulsions and how they prevent recurrent attacks of it.
- **Specific objectives:** At the end of health instructions, the mothers were able to:
 1. Define febrile convulsion.
 2. Differentiate febrile convulsion from epilepsy.
 3. Discuss causes, risk factors, types of febrile convulsion.
 4. List diagnosis, treatment, and first aids.
 5. Discuss how to prevent recurrent attack of febrile convulsion.
 6. Demonstrate first aids for febrile convulsions.
 7. Demonstrate correct practices to manage febrile convulsions.

b- Preparing contents:

According to the pre- determined needs of mothers and reviewing literatures to meet the educational needs of the studied mothers the researcher used a booklet as a teaching aid. It included introduction, definition of febrile convulsions, causes and risk factors

of febrile convulsions, types of febrile convulsion, how to manage febrile convulsions and prevent its recurrent attack, necessary medical evaluation, risk of FC recurrence or developing subsequent epilepsy and recommended/ non-recommended practices for seizures.

c-Determine the teaching methods and audiovisual materials that were used in the instructions:

- Lectures, group discussion and demonstration were used as a teaching method.
- Booklet and videos were used as teaching aids.

3-Implementation phase:

- The researcher met mothers in waiting area of the previously mentioned settings to conduct the health instructions after the pretest.
- The education of instructions was presented to the mothers by the researcher. In which the health instructions booklet was distributed to each mother also used during presentation.
- Three sessions were provided for mothers according to actual needs about febrile convulsion and its preventive measures.
- The researcher communicated with mothers (face to face or through the telephone).
- The duration of each session ranged from 30-45 minutes.

The sessions were as follows:

Session (1): Importance of health instructions, orientation, and expectations.

The aim of this session was to orient the mothers about the importance of the instructions, their sessions and to assess their expectations from each session.

Session (2): An overview about febrile convulsion.

The aim of this session was to give mothers an overview about febrile convulsion (meaning of febrile convulsion, causes & risk factors and types of febrile convulsion).

Session (3): Management and preventive measures used to prevent recurrent attack of febrile convulsion:

The aim of this session was to educate mothers about preventive measures and management of febrile convulsions, how to manage it and prevent their recurrent attack, necessary medical evaluation, risk of FC recurrence or developing subsequent epilepsy, and recommended/ non-recommended practices for seizures.

4-Evaluation phase:

The aim of this phase was to evaluate the effectiveness of the health instructions on knowledge, attitudes and practices of the mothers studied.

This evaluation was done two times:

1. **First time (pretest):** before implementation of the health instructions by using tool I and II
2. **Second time:** one month after implementation of the health instructions using tool I (part 3) and tool II.

8- Statistical analysis:

The statistical analysis of the data was performed using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011). Categorical data were summarized as numbers and percentages. For continuous data, normality was assessed using the Kolmogorov-Smirnov test. Quantitative data were described using range (minimum and maximum), mean and standard deviation.

Results:

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

The table illustrates that about half (49.2%) of the studied mothers, their age ranged between 22-33 years, with a mean age of 27.41 ± 7.69 year. The majority (91.7%) of the studied mothers were married and more than two thirds (68.3%) of them lived in urban area. Regarding educational level, working status, and family income of the studied mothers (59.2%, 47.5 & 30%

respectively) of them were highly education, housewife and their family income was not enough.

Regarding the crowding index 82.5% of studied mothers were having crowding index between 1-2 and only 7.5% of them were having crowding index of > 2 . Concerning the relationship between parents, just (10.8%) of the studied mothers had relationship with the husband.

Regarding health history of their children, more than three quarters of them (80.8%) had not have any diseases, only (4.2%) had psychological problem, (94.2%) did not have any disability or health problem, and just (5.8%) had previous febrile convulsions.

Table (2): Distribution of the studied mothers according to their total score and Mean $\pm$ SD of their knowledge about febrile convulsions.

The table reveals that Mean $\pm$ SD score of mothers' knowledge about general information, causes, types of febrile convulsions pre implementation of health instructions was (0.78 ± 0.83 , 0.70 ± 0.73 , 0.87 ± 0.74) respectively while after the implementation of health instructions score of mothers' knowledge about general information, causes, types, symptoms and prevention of febrile

convulsions was (6.08 ± 2.32 , 3.50 ± 1.33 , 4.34 ± 0.97 , 2.63 ± 1.0 , 5.75 ± 0.83). Regarding Mean $\pm$ SD score of mothers' knowledge about symptoms, prevention, first aids, treatment and complication of febrile convulsions pre implementation of health instruction was (0.42 ± 0.57 , 1.45 ± 0.74 , 1.45 ± 0.74 , 0.79 ± 1.59 , 0.79 ± 1.59) respectively while after the implementation of health instructions the score of mothers' knowledge about first aids, treatment and complications was (10.27 ± 3.45 , 3.13 ± 1.63 , 3.03 ± 1.43) respectively. For overall score of mothers' knowledge, Mean $\pm$ SD was (9.13 ± 5.53) pre implementation of health instructions and post implementation was (38.73 ± 10.04). There was a statistically significant improvement regarding all items of the studied mothers' knowledge about febrile convulsions at $P < 0.001$.

Table (3): Distribution of the studied mothers according to their level of knowledge about febrile convulsions. The table shows that all of the studied mothers had low level of knowledge about general information, types, and the prevention of febrile convulsions before implementation of health instructions. Also, most (98.3%, 95.8%, 91.7%, & 80%) of them had

low level of knowledge regarding causes, symptoms, first aids and complications respectively. After the implementation of health instructions, most mothers (91.7%, 87.5%, 85.8%, & 87.5% respectively) had high level of knowledge about prevention, causes, types, and symptoms of febrile convulsions post implementation of health instructions.

For overall score of mothers' knowledge, before implementation of health instructions all the mothers had low level of knowledge, but after the implementation of health instructions, most mothers 80% had high level of knowledge with statistically significance improvement pre and post implementation of health instructions at $P < 0.001$.

Figure (1): Distribution of the studied mothers according to their sources of knowledge about febrile convulsions. This figure illustrates that 45.8% of the studied mothers had their knowledge from social media and only 16.7% of them from scientific books and journals.

Table (4): Distribution of the studied mothers according to their level and total score of mothers' attitudes about febrile convulsions. The table shows that the majority (85.3) of the studied mothers had negative attitudes about

febrile convulsion before implementation of health instructions. While after instructions implementation the majority (95.8%) of the studied mothers had positive attitudes and only (4.2%) had negative attitudes with statistically significant improvement between their level and total score of mothers' attitudes about febrile convulsions pre and post health instructions implementation at $P < 0.001$.

Regarding total score of mothers' attitudes, Mean $\pm$ SD was 30.88 ± 14.22 pre implementation of health instructions, after implementation of health instructions became 70.33 ± 7.71 .

Table (5): Distribution of the studied mothers regarding their level of reported practices about febrile convulsions. The table shows that more than half (58.3% & 96.7% respectively) of the studied mothers had unsatisfactory practices in recommended and non-recommended practices for management of febrile convulsion pre implementation of health instructions. While after the implementation of health instructions (87.5% & 95% respectively) of the studied mothers had satisfactory practices in recommended and non-

recommended practices for management of febrile convulsion post implementation of health instructions and there was a statistically significant improvement of the studied mothers' reported practices about febrile convulsions pre and post implementation of health instructions at $p < 0.001$.

Table (6): Correlation between total score of mothers' knowledge, attitudes, and reported practices about febrile convulsions. The table shows that there was positive correlation between total score of mothers' knowledge and reported practices about febrile convulsions pre implementation of health instructions. Regarding post health instructions correlations, there was positive correlation between total score of mothers' knowledge and attitudes, knowledge and practices, attitudes and practices at < 0.001 .

Table (1): Distribution of the studied mothers according to their socio-demographic characteristics (n = 120)

Socio-demographic characteristics	No.	%
Mother's age in years		
< 22	28	23.3
22 – <33	59	49.2
≥ 33	33	27.5
Min. – Max.	16.0 – 45.0	
Mean ± SD.	27.41 ± 7.69	
Marital status		
Married	110	91.7
Divorce	7	5.8
Widow	3	2.5
Residence		
Rural	38	31.7
Urban	82	68.3
level of education		
Illiteracy	4	3.3
Read and write	10	8.3
Basic education	10	8.3
General/technical secondary education	25	20.8
University/post-university education	71	59.2
Occupation		
Housewife	36	30.0
Works in the medical sector	25	20.8
Professional work	35	29.2
Craftsmanship	7	5.8
Freelance work	17	14.2
Number of children		
Only one	62	51.7
2-3 children	47	39.2
4-5 children	11	9.2
Number of family		
3 – 4	97	80.8
>4	23	19.2
Number of rooms in the house		
2	59	49.2
3 – 4	51	42.5
>4	10	8.3
Crowding index		
<1	12	10.0
1 – 2	99	82.5
>2	9	7.5
Min. – Max.	0.60 – 3.50	
Mean ± SD.	1.48 ± 0.51	

Continue Table (1):

Socio-demographic characteristics	No.	%
Family income		
Not enough	57	47.5
Enough	54	45.0
Enough and save	9	7.5
Family type		
The nuclear family	108	90.0
Extended family	4	3.3
A family centered on the mother only	8	6.7
Consanguinity		
Yes	13	10.8
No	107	89.2
If the answer is yes, what is the relationship? N=13		
Cousin/uncle	6	46.15
Cousin/aunt	3	23.08
From the family	4	30.77
#Children suffer from chronic diseases		
Nothing	97	80.8
Diabetes	10	8.3
Chest sensitivity	11	9.2
Rheumatic fever	2	1.7
Congenital heart defects	2	1.7
#Children suffer from disability or health problems		
Nothing	113	94.2
Physical (polio, etc.)	1	0.8
Psychological (distraction, hyperactivity, etc.)	5	4.2
Mental (delayed mental development, etc.)	1	0.8
Children suffer from febrile convulsion		
Yes	7	5.8
No	113	94.2
Age of child when febrile convulsion occurred (in months)		
Min. – Max.		3.0 – 24.0
Mean ± SD.		12.33 ± 7.55

#More than one choice was allowed

Table (2): Distribution of the studied mothers according to their total score and Mean $\pm$ SD of their knowledge about febrile convulsions (n = 120)

Score of Mothers` knowledge about febrile convulsions	Pre implementation	Post implementation	Z	P
General information about febrile convulsions				
Total Score (0 – 7)				
Min. – Max.	0.0 – 3.0	0.0 – 7.0	9.194	<0.001*
Mean $\pm$ SD.	0.78 $\pm$ 0.83	6.08 $\pm$ 2.32		
Average Score (0 – 1)(Mean $\pm$ SD.)	0.11 $\pm$ 0.12	0.87 $\pm$ 0.33		
Causes of febrile convulsions				
Total Score (0 – 4)				
Min. – Max.	0.0 – 3.0	0.0 – 4.0	9.220	<0.001*
Mean $\pm$ SD.	0.70 $\pm$ 0.73	3.50 $\pm$ 1.33		
Average Score (0 – 1) (Mean $\pm$ SD.)	0.18 $\pm$ 0.18	0.88 $\pm$ 0.33		
Types of febrile convulsions				
Total Score (0 – 5)				
Min. – Max.	0.0 – 2.0	2.0 – 5.0	9.592	<0.001*
Mean $\pm$ SD.	0.87 $\pm$ 0.74	4.34 $\pm$ 0.97		
Average Score (0 – 1) (Mean $\pm$ SD.)	0.17 $\pm$ 0.15	0.87 $\pm$ 0.19		
Symptoms of febrile convulsions				
Total Score (0 – 3)				
Min. – Max.	0.0 – 2.0	0.0 – 3.0	9.327	<0.001*
Mean $\pm$ SD.	0.42 $\pm$ 0.57	2.63 $\pm$ 1.0		
Average Score (0 – 1) (Mean $\pm$ SD.)	0.14 $\pm$ 0.19	0.88 $\pm$ 0.33		
Preventing febrile convulsions				
Total Score (0 – 6)				
Min. – Max.	0.0 – 3.0	3.0 – 6.0	9.652	<0.001*
Mean $\pm$ SD.	1.45 $\pm$ 0.74	5.75 $\pm$ 0.83		
Average Score (0 – 1) (Mean $\pm$ SD.)	0.24 $\pm$ 0.12	0.96 $\pm$ 0.14		
First aid for febrile convulsions				
Total Score (0 – 13)				
Min. – Max.	0.0 – 11.0	1.0 – 13.0	9.053	<0.001*
Mean $\pm$ SD.	3.33 $\pm$ 2.52	10.27 $\pm$ 3.45		
Average Score (0 – 1) (Mean $\pm$ SD.)	0.26 $\pm$ 0.19	0.79 $\pm$ 0.27		
Treatment of febrile convulsions				
Total Score (0 – 4)				
Min. – Max.	0.0 – 4.0	0.0 – 4.0	8.413	<0.001*
Mean $\pm$ SD.	0.79 $\pm$ 1.59	3.13 $\pm$ 1.63		

Continue Table (2):

Score of Mothers` knowledge about febrile convulsions	Pre implementation	Post implementation	Z	P
Average Score (0 – 1) (Mean ± SD.)	0.20 ± 0.40	0.78 ± 0.41		
Complications of febrile convulsions				
Total Score (0 – 4)				
Min. – Max.	0.0 – 4.0	0.0 – 4.0	7.539	<0.001*
Mean ± SD.	0.79 ± 1.59	3.03 ± 1.43		
Average Score (0 – 1) (Mean ± SD.)	0.20 ± 0.40	0.76 ± 0.36		
Overall				
Total Score (0 – 46)				
Min. – Max.	1.0 – 25.0	13.0 – 46.0	9.508	<0.001*
Mean ± SD.	9.13 ± 5.53	38.73 ± 10.04		
Average Score (0 – 1) (Mean ± SD.)	0.20 ± 0.12	0.84 ± 0.22		

Table (3): Distribution of the studied mothers according to their level of knowledge about febrile Convulsions (n = 120)

Level of knowledge	Pre implementation		Post implementation		MH	P
	No.	%	No.	%		
General information about febrile convulsions						
Low	120	100.0	15	12.5	0.000	<0.001*
Moderate	0	0.0	105	87.5		
High	0	0.0	0	0.0		
Causes of febrile convulsions						
Low	118	98.3	15	12.5	101.010	<0.001*
Moderate	0	0.0	0	0.0		
High	2	1.7	105	87.5		
Types of febrile convulsions						
Low	120	100.0	13	10.8	212.000	<0.001*
Moderate	0	0.0	4	3.3		
High	0	0.0	103	85.8		
Symptoms of febrile convulsions						
Low	115	95.8	15	12.5	63.342	<0.001*
Moderate	5	4.2	0	0.0		
High	0	0.0	105	87.5		
Preventing of febrile convulsions						
Low	120	100.0	10	8.3	39.557	<0.001*
Moderate	0	0.0	0	0.0		
High	0	0.0	110	91.7		
First aid for febrile convulsions						
low	110	91.7	20	16.7	55.018	<0.001*
Moderate	6	5.0	19	15.8		
High	4	3.3	81	67.5		
Treatment of febrile convulsions						

	Low	96	80.0	27	22.5	99.010	<0.001*
	Moderate	0	0.0	0	0.0		
	High	24	20.0	93	77.5		
Complications of febrile convulsions							
	low	96	80.0	36	30.0	94.010	<0.001*
	Moderate	0	0.0	0	0.0		
	High	24	20.0	84	70.0		
Overall							
	Low	120	100.0	19	15.8	199.500	<0.001*
	Moderate	0	0.0	5	4.2		
	High	0	0.0	96	80.0		

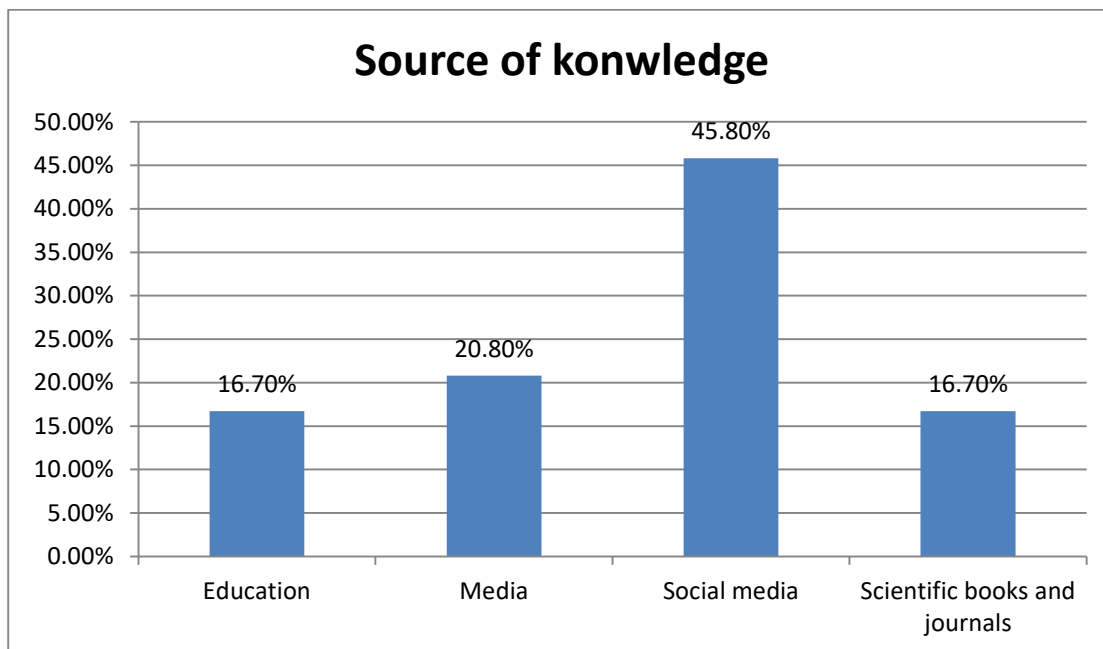


Figure (1) Distribution of the studied mothers according to their sources of knowledge about febrile convulsions (n = 120)

Table (4): Distribution of the studied mothers according to their level and total score of mothers' attitudes about febrile convulsions

Mothers' attitudes	Pre		Post		Test of Sig.	P
	No.	%	No.	%		
Negative attitudes	103	85.8	5	4.2	McN= 94.090	<0.001 [*]
Positive attitudes	17	14.2	115	95.8		
Total Score (16 – 80)					Z= 9.443	<0.001 [*]
Min. – Max.	17.0 – 69.0		48.0 – 80.0			
Mean ± SD.	30.88 ± 14.22		70.33 ± 7.71			
Average Score (1 – 5) (Mean ± SD.)	1.93 ± 0.89		4.40 ± 0.48			

Table (5): Distribution of the studied mothers regarding their level of reported practices about febrile convulsions (n = 120)

Mothers' reported practices	Pre implementation		Post implementation		McN	P
	No.	%	No.	%		
Recommended practices for management of febrile convulsion						
Unsatisfactory	70	58.3	15	12.5	49.424*	<0.001*
Satisfactory	50	41.7	105	87.5		
Non recommended practices for management of febrile convulsion						
Unsatisfactory	116	96.7	6	5.0	108.009*	<0.001*
Satisfactory	4	3.3	114	95.0		
Overall						
Unsatisfactory	120	100.0	3	2.5	115.009*	<0.001*
Satisfactory	0	0.0	117	97.5		

Table (6): Correlation between total score of mothers' knowledge, attitudes, and reported practices about febrile convulsions. (n = 120)

	Pre implementation		Post implementation	
	r _s	P	r _s	P
Knowledge vs. Attitudes	-0.133	0.149	0.710*	<0.001*
Knowledge vs. Practices	0.326*	<0.001*	0.678*	<0.001*
Attitudes vs. Practices	-0.038	0.684	0.446*	<0.001*

*: Statistically significant at $p \leq 0.05$ **: highly statistically significant at $p \leq 0.01$.

Discussion:

Febrile convulsions represent the predominant category of seizures in pediatric populations. Approximately 2.5% of neurologically healthy infants and children experience at least one seizure induced by a simple

fever. Demographic studies have revealed that the probability of epilepsy after febrile convulsions varies between 2 and 5.2%. Febrile convulsions in a kid can be an emotionally distressing event for families. (Tarhani, Nezami, Heidari,

& Dalvand ,2022). So, the aim of the current study was to evaluate the effect of health instructions on mothers' perception and practices about febrile convulsions for their children.

Understanding febrile convulsions is crucial to mitigate parental fear and anxiety, alleviate the distress experienced by parents, ensure appropriate home management, prevent unnecessary emergency room visits, enhance health-seeking behavior, reduce the financial strain on families and healthcare systems, and enable a focus on severe cases. With better-informed mothers, healthcare providers can allocate resources towards managing genuinely serious conditions that may arise from elevated fever, rather than benign febrile convulsions. **(Said, & El-Maghawry,2020).**

The current study's findings indicate that the Mean $\pm$ SD scores of mothers' knowledge prior to the implementation of health instructions regarding general information, causes, types, symptoms, prevention, first aid, treatment, and complications of febrile convulsions were 0.78 ± 0.83 , 0.70 ± 0.73 , 0.87 ± 0.74 , 0.42 ± 0.57 , 1.45 ± 0.74 , 3.33 ± 2.52 , 0.79 ± 1.59 , and 0.79 ± 1.59 , respectively. The mean $\pm$ SD scores of mothers' knowledge following the implementation of health instructions

regarding general information, causes, types, and symptoms were (6.08 ± 2.32 , 3.50 ± 1.33 , 4.34 ± 0.97 , and 2.63 ± 1.0) respectively. The mean $\pm$ SD scores of mothers' knowledge concerning prevention, first aid, treatment, and complications of febrile convulsions were (5.75 ± 0.83 , 10.27 ± 3.45 , 3.13 ± 1.63 , and 3.03 ± 1.43) respectively **(Table 2).**

The overall score of mothers' knowledge was (9.13 ± 5.53) prior to the adoption of health instructions and (38.73 ± 10.04) subsequent to their implementation. This finding indicates a statistically significant enhancement in all aspects of the examined mothers' knowledge concerning febrile convulsions at $P < 0.001$ **(Table 2).** From the researcher's perspective, this enhancement is attributed to health directives and the dissemination of instructional booklets to moms. According to **Paudel, Rana, & Lopchan (2018)** in their study titled "Mother's Knowledge and Attitude Regarding Febrile Convulsion in Children, Chitwan, Nepal," the Mean $\pm$ SD scores for management, symptoms, complications, and treatment of febrile convulsions were 7.96 ± 2.28 , 4.89 ± 1.39 , 1.25 ± 0.94 , and 0.87 ± 0.33 , respectively. The overall mean knowledge score regarding febrile convulsions was 27.73, with a

standard deviation of 5.23. The results of the current study align with those of **El-Esrigy, Farahat & Othman (2021)**, who indicated that the mean knowledge score was statistically significantly elevated following the educational program. This study parallels the research conducted by **Najimi, Dolatabadi, Esmaeili & Sharifirad, 2013**), titled "The Effect of Educational Program on Knowledge, Attitude, and Practice of Mothers Regarding Prevention of Febrile Seizure in Children at Isfahan City, Iran." Their findings indicated that prior to the educational intervention, mothers exhibited a moderate mean $\pm$ SD knowledge score of 52.48 ± 10.8 , which significantly increased to 66.78 ± 9.9 following the intervention. Similar to **Oche & Onankpa (2013)**, whose study titled "Using Women Advocacy Groups to Enhance Knowledge and Home Management of Febrile Convulsion Amongst Mothers in a Rural Community of Sokoto State, Nigeria" revealed that the mean knowledge score pre-intervention was 35.3 ± 10.75 , whereas post-intervention, the mean knowledge score increased to 77.69 ± 9.48 . The results of the current study align with those of **Tabassum & Parvaiz (2018)**, whose research titled "Effectiveness of Structured Teaching Program on Knowledge

Regarding Management of Febrile Convulsions Among Mothers of Under-Five Children, India" reported a mean $\pm$ SD of knowledge prior to the teaching program as (34.62 ± 7.19) , which increased to (41.82 ± 6.59) following the program.

The results of the current study contradict those of **Jones (2021)**, whose research titled "A Multimodal Educational Approach for Caregivers of a Febrile Child" indicated that knowledge scores were not significantly higher post-multimodal educational approach (MEA) (Mdn = 7) compared to pre-MEA (Mdn = 6), $p = .054$; nonetheless, the differences were clinically significant. The relationship between pre- and post-education knowledge scores was non-significant ($p > .05$).

The current study indicates that all participating mothers possessed a limited understanding of general information, types, and prevention of febrile convulsions prior to the implementation of health instructions. Additionally, the majority exhibited insufficient knowledge concerning causes, symptoms, first aid, and complications, resulting in an overall low level of knowledge before the health instructions were administered. **(Table 3)**. The findings of the current study align with those of **Antar Hussien, El-aty, Saad & Mohammed, 2025**), whose research

titled "Knowledge and Attitudes of Mothers Regarding Febrile Convulsions Among Children Under Five Years in Assiut City, Egypt" revealed that 65.2% of the mothers surveyed possessed inadequate knowledge, while 22.5% exhibited moderate knowledge and 12.3% demonstrated proficient knowledge concerning febrile convulsions. According to **Paudel, Rana, & Lopchan (2018)**, 17.4% of respondents exhibited poor knowledge, 29.4% shown strong knowledge, and 53.2% possessed fair knowledge.

In a study by **Hamed et al. (2021)** titled "Effect of Video Assisted Teaching Program on Mothers' First Aid Management of Convulsions for Their Children, Egypt," it was discovered that 90% of participants possessed a low level of general knowledge regarding febrile convulsions, 86% had a low understanding of the types of febrile convulsions, 82% demonstrated inadequate knowledge of clinical manifestations and management, and 80% exhibited insufficient awareness of first aid for febrile convulsions. Conversely, following the instructional program, the percentages of knowledge attainment increased to 90%, 78%, 80%, 76%, and 70%, respectively.

Additionally, **Mohammed, Soliman, Hassan & Abd El-Ghany, (2022)** conducted a study titled "Effect of Educational Program on Mothers' Knowledge and Practices Regarding Care for Their Children with Febrile Convulsions in Benha University Hospital, Egypt," which revealed that only 3.8% of the mothers exhibited adequate knowledge prior to the program's implementation, whereas this figure increased to 92.5% following the program's completion.

The current study reveals that nearly half of the surveyed mothers acquired their knowledge about febrile convulsions from social media, while approximately one-fifth obtained their information from scientific books and journals (**Figure 1**). These findings contrast with those of **Wuni et al., (2021)**, who reported that 62%, 32%, and 6% of their participants sourced their information about febrile convulsions from family members, health professionals, and the internet, respectively. From the researcher's perspective, this outcome can be rationalized by the limited internet penetration in Ghana, where women rely on information derived from the experiences of family and friends, in contrast to Egypt, where social media is becoming increasingly prevalent. Conversely, the findings of the current study align with those of (**Mohammed, Salih, Alghamdi,**

Alghamdi, & Alghamdi, 2024), which indicated that 31.1% and 56.1% of their participants sourced information about FC from health professionals and social media, respectively. However, this contrasts with the 25.3% of their participants who obtained information about FC from educational campaigns.

Anticonvulsant medications are essential for managing prolonged febrile seizures to terminate seizure activity and for feverish status epilepticus. For uncomplicated febrile seizures, which are prevalent and typically brief, the administration of anticonvulsants is generally unnecessary for continued management, as the potential adverse effects surpass the advantages of preventing a transient seizure that has already ceased. Therefore, educating and reassuring mothers is crucial to rectify misconceptions regarding anticonvulsant medications and to facilitate their use under a physician's supervision (**Oh, & You, 2021**).

The findings of the current study indicate that the majority of the mothers surveyed exhibited negative attitudes towards febrile convulsions prior to the implementation of health instructions, with a Mean $\pm$ SD of 30.88 ± 14.22 . Following the implementation of health instructions, the majority of these mothers demonstrated positive attitudes,

reflected in a Mean $\pm$ SD of 70.33 ± 7.71 , with a statistically significant improvement in their overall attitudes towards febrile convulsions pre- and post-implementation (**Table 4**). From the researcher's perspective, this outcome is attributed to the impact of health instructions; a positive attitude, bolstered by accurate knowledge, fosters a more composed and appropriate response, thereby benefiting both the child and the mother by reducing potential complications, alleviating emotional distress, improving beliefs, and enhancing decision-making regarding management.

The results of the current study on the assessment of pre-health instructions regarding mothers' attitudes contradict those of **Antar Hussien et al. (2025)**, who indicated that a substantial percentage (61.3%) of mothers exhibited positive attitudes towards febrile convulsions, while 38.7% demonstrated negative attitudes. Additionally, **Paudel, Rana, and Lopchan (2018)** reported that over three-quarters (74.6%) of the mothers surveyed maintained a moderate attitude towards febrile convulsions in children, whereas one-quarter (25.4%) held a favorable attitude. Notably, none of the mothers expressed an unfavorable attitude towards febrile convulsions in children.

The findings of the current study align with those of **(Kausar, Kouser, Aziz & Bibi, 2020)**, whose research titled "The effect of educational interventions on knowledge, attitude, and practices of mothers regarding febrile convulsions in children, Pakistan" reported a significant increase in the mean scores of mothers' attitudes, with pre-intervention scores at Mean $\pm$ SD (71.02 $\pm$ 6.8) and post-intervention scores at (75.5 $\pm$ 3.6).

Adhering to recommended practices for managing febrile convulsions is crucial for ensuring the child's safety and maintaining airway patency. For mothers, proper guidance is essential in recognizing when to seek emergency care, particularly for seizures exceeding five minutes, as well as understanding preventive measures such as adhering to vaccination schedules, which can mitigate the risk of infections that lead to fever and febrile seizures. Compliance with these practices can diminish the likelihood of complications such as self-biting or aspiration. Knowledge of the appropriate response enhances safety for children and instills confidence in mothers **(Ambika & Pinto, 2025)**.

This study indicates that the majority of mothers exhibited satisfactory practices regarding febrile convulsions following the

implementation of health instructions, with a statistically significant improvement observed compared to the pre-implementation phase **(Table 5)**. This enhancement in practices may be attributed to the structured health instructions, which effectively improved mothers' comprehension of febrile seizures, resulting in superior management practices during episodes, as evidenced by the positive outcomes of targeted educational interventions.

The findings of the current study align with that of **(Mohammed, et al., 2022)**, whose research titled "Effect of Educational Program on Mothers' Knowledge and Practices Regarding Care for Their Children with Febrile Convulsions" indicates that 95% of the participating mothers exhibited satisfactory practices concerning febrile convulsions following program implementation, demonstrating a statistically significant difference when compared to pre-program results. In alignment with **Molan et al., (2024)**, who reported that only 5.2% of the examined mothers exhibited good practices regarding FC, while 20.5% and 74.3% demonstrated poor and fair practices, respectively. Additionally, **Hamed et al. (2021)** discovered that 88% of mothers had unsatisfactory practices prior to the program's implementation, whereas

post-implementation, 76% exhibited satisfactory practices and 24% remained unsatisfactory. The study indicates a positive correlation between mothers' total knowledge scores and their reported practices regarding febrile convulsions prior to the implementation of health instructions. Following the health instructions, positive correlations were observed among mothers' total knowledge scores, attitudes, and practices, with statistical significance at ($p < 0.001$) **(Table 6)**.

The findings of this study align with those of **(Mohammed, et al., 2022)**, which indicated a positive correlation between the overall knowledge of the studied mothers and their reported practices before and after program implementation, with a statistically significant difference ($p < 0.001$). **Additionally, Najimi et al., (2013)** conducted a study titled "The Effect of Educational Program on Knowledge, Attitude, and Practice of Mothers Regarding Prevention of Febrile Seizure in Children in Isfahan City, Iran," which also reported a positive correlation between the total scores of mothers' knowledge, attitudes, and practices ($p < 0.001$). According to **Elewa, Berdida, fathy, & mahfoz, (2025)**, their study titled "Effect of Empowerment Program on Mothers' Knowledge and Home

Management of Febrile Convulsion Among Children Under Five Years, Egypt" revealed a statistically significant difference and positive correlations between knowledge and practices regarding children's febrile convulsions ($p < 0.001$). Conversely, the current study's findings contradict those of **Paudel, Rana, & Lopchan (2018)**, who identified a positive correlation between mothers' knowledge and attitude scores, with a correlation value of 0.287, significant at $p < 0.001$. Febrile convulsions are a prevalent pediatric condition characterized by a significant recurrence rate. Nonetheless, the overall prognosis remains favorable, with a minimal risk of developing epilepsy. The lack of awareness regarding effective management can result in perilous complications; therefore, it is imperative to prioritize family education and counseling, ensuring that accurate information is communicated both verbally and in writing. Families should be reassured that the condition is likely to resolve with appropriate management over the ensuing years without enduring complications. Furthermore, it is essential to clarify that not all subsequent infections or febrile seizures will inevitably provoke another seizure, thereby alleviating "fever-phobia" **(Hossain & Saha,**

2021). Lastly, it is advisable to arrange consultations and educational sessions with families to facilitate suitable management and interventions for febrile convulsions.

Conclusion

The findings of the current study indicated that health instructions significantly enhanced the knowledge, attitudes, and practices of the mothers regarding febrile convulsions.

Recommendations

Based on the findings of the present study, the following recommendations were suggested: -

- Continuous bite-sized teaching sessions should be applied for all mothers to improve their knowledge, comply with medical treatment, and practices of febrile convulsion at primary health care centers.
- Booklets and posters about febrile convulsion and its first aids should be available at maternal and child health care centers.
- Implementation of the video-assisted teaching program is highly recommended for mothers to improve their first-aid management of febrile convulsions knowledge and practices.

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Effect of Abdominal Massage on Enteral Feeding Tolerance for Critically Ill Patient

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Abstract

Background: Abdominal massage is universally effective method on critically ill patients. **Aim:** Evaluate the effect of abdominal massage on enteral feeding tolerance for critically ill patients. **Design:** A quasi-experimental study design. **Setting:** This study was conducted in Anesthesia Intensive Care Unit at the Emergency University Hospital of Tanta University Hospitals affiliated to ministry of higher education and scientific research. **Subjects:** Purposive sampling of 100 patients divided into two groups 50 in each group in the above previously mentioned setting. **Tools:** Two tools will be used in this study: **Tool I:** Enteral Feeding Assessment Tool, **tool II:** Enteral Feeding Tolerance Assessment Tool. **Results:** The results showed more consistent improvement in residual volume across the treatment days compared to the control group, with lower residual volumes on days 1 through 7 days with statistically significance difference ($P < 0.001$ for all). **Conclusion:** Based on the results of the current study, it can be concluded that: Abdominal massage has an effective intervention on the gastrointestinal outcomes (reduce abdominal distention, abdominal rigidity and gastric residual volume) among enterally fed critically ill patients. **Recommendations:** It can be recommended that the same study could be replicated in more hospitals with a larger probability sample for further research and abdominal massage should be a regular part of nursing treatment for critically ill patients.

Keywords: Abdominal massage, Critically ill Patient, gastric residual volume & Intensive care unit.

Introduction

Critically ill patients are patients who have severe illnesses with life threatening conditions that have serious consequences and requiring intense and vigilant medical and nursing care. Critical illness is often associated with a catabolic stress state and systemic inflammatory response. Nutritional support (NS) in critically ill patients prevents further metabolic deterioration and loss of lean body mass. Decrease in length of hospital stay, morbidity rate and improvement in-patient outcomes have attracted and valued the use of nutrition support in the critically ill patients. Nutritional support is the delivery of formulated enteral or parenteral nutrients to appropriate patients for purpose of maintaining/restoring nutritional status (El-Feky & Ali, 2020).

Enteral feeding or enteral nutrition is the preferable route and utilized commonly for nutritional support in critically ill patients. It helps to maintain peristalsis, improve blood supply and strengthen the immune system. So, it may reduce disease severity, diminish complications, decrease intensive care unit length of stay, and favorably impact patients' outcomes. Proper administration of enteral feeding formulas ensures safe delivery of desired nutrients, enhanced patient tolerance and

optimal nutrition support (Misirlioglu et al., 2023). Considering the most appropriate method of administration, the clinician should consider numerous factors such as patient's age, preexisting and current medical condition, nutritional status and requirement, enteral route for feeding, gastrointestinal (GI) tolerance, formula type used, patient mobility, feeding pump availability, and cost (Gunst et al., 2023).

Abdominal massage is a gentle, non-invasive therapeutic technique that focuses on the stomach and pelvic area that have relaxing and healing effect, and used for prevention and treatment of wide variety of gastrointestinal complications. Abdominal massage was considered a nursing intervention for minimizing elevated gastric residual, vomiting frequency, constipation and abdominal distension as has been indicated in numerous studies. Abdominal massage shortens the time it takes for food to pass through the digestive tract, stimulates and preserves peristaltic activity, and decreases intraabdominal pressure. Furthermore, it was a non-pharmacological, noninvasive, and safe approach with no side effects (Shalaby Khalaf Mahran et al., 2023).

Significance of study

Based on statistical medical records and clinical practice of Tanta University hospital, critical ill patient is exposed to enteral feeding complication and increase gastro residual volume that cause malnutrition, delayed recovery and prolonged hospital stay length. As a result, abdominal massage is utilized to minimize these complications. Abdominal massage was used to optimize enteral feeding tolerance by decrease gastro residual volume and improve patient nutrition.

The aim of this study was to:

Evaluate the effect of abdominal massage on enteral feeding tolerance in critical ill patients.

Research hypothesis

Critically ill patients in the study group who are exposed to abdominal massage will expected to have an improvement of enteral feeding tolerance compared to who doesn't exposed.

Subjects & Method

Research design

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

Setting:

This study was conducted in Anesthesia care unit at Tanta Emergency hospital. This unit contains 4 rooms were occupied 5 beds with 5 monitors for every room

and all the unit had 5 ventilators & 20 beds.

Subjects:

Purposive sampling of 100 patients divided into two groups 50 in each group in the above previously mentioned setting. The sample size was estimated using the sample size estimated by Epi Info 7 statistical program, according to the following parameters: [Total patient is 300 per year in 2021, Confidence level =99.9%; Accepted error =5%; Confidence Coefficient=95%]

Control group, it was consist of (50) patients who was receive routine nursing care by hospital nursing staff such as monitoring Gastro-residual volume every 6 hrs .elevate head of bed(30-45), ensure the correct placement of nasogastric tube and irrigation of nasogastric tube.

Study group, it was consist of (50) patients who was receive abdominal massage technique by the researcher.

The both groups were selected according to the following criteria.

Inclusion criteria:

The subjects were selected according to the following criteria:

- Adult patients (21 to 60 years).
- Both sexes.
- NGT patients.
- Hemodynamic stability.
- Spent for more than 24hrs in ICU.

- Patient receive intermittent feeding

Exclusion criteria:

- The patients with abdominal wound, surgery gastrostomy and jejunostomy tubes, ileus, diarrhea or mal absorption.
- Contraindication for abdominal massage such as abdominal
- Tumors, peritonitis, abdominal aneurysm, and ascites.
- The patients received gastroprokinetic agents as metoclopramide

Tools of the study: -

Two tools were used to collect data for this study as follows:

Tool I: Enteral Feeding Assessment Tool

This tool was developed by the researcher after reviewing the relevant literature (El-Feky & Ali, 2020; Diab et al., 2021; Gunst et al., 2023) and was consisted of two parts as follows:

Part (a) Socio-demographic characteristics of the patients:

Socio-demographic data involves age, gender.

Part (b): Patients' clinical data:

It was formulated by the researcher after reviewing the literatures, it was including data such as, diagnosis, past medical history and medications regimen, current medication, vital signs, time of starting enteral feeding, size of the nutritional tube,

amount of formula prescribed per day and blood glucose level.

Tool II: Enteral Feeding Tolerance Assessment Tool:

This tool was developed by the researcher after reviewing the relevant literature to assess gastro-intestinal function (Mohamed et al., 2021; Kahraman et al., 2020) and was included two parts as follow:

Part (a): Gastro-intestinal function Assessment Sheet:

It was developed by the researcher after reviewing the literatures, it was including assessment data of the following:

1-Abdominal distention assessment: it was done before the abdominal massage and one hour after the second and third massage. This part was include assessing the presence of abdominal pain, abdominal discomfort, abdominal rigidity and passing of flatus, measuring patient's abdominal girth.

2-Bowel elimination assessment: it was including daily assessment of (amount, consistency and frequency of bowel elimination).

3-Vomiting assessment: it was including daily assessment of (frequency, amount of emesis before and after massage).

Part (b): Gastro-Residual Volume Assessment Sheet

It was used to assess the amount of gastric residual before the abdominal

massage and the second time one hour after the massage, the 3rd time one hour after the third massage. It was done three time daily for 7 consecutive days before and after massage.

Scoring system

- Abnormal findings were scored (0)
- Normal findings were scored (1)

Method

1) Official Permission to carry out the study was obtained from the responsible authorities at the study setting.

2) Ethical consideration:

- a. Ethical committee approval was obtained from the faculty of nursing.
- b. Nature of the study did not cause any harm to the entire subjects.
- c. Informed consent was taken from conscious patients or first relative class family members if patient is unconscious after explanation the aim of the study.
- d. Confidentiality and anonymity was maintained by use of code number instead of name and privacy of the patients will be taken in to consideration regarding data collection.

3) Tools I was developed by the researcher after reviewing of the relevant literatures considering part (b) developed by (El-Feky & Ali, 2020; Diab et al., 2021; Gunst et al., 2023) Considering tool II part

(a, b) developed by (Mohamed et al., 2021; Kahraman et al., 2020).

4) Validity of Tools:

All tools were presented to a jury of (7) experts in the area of critical care nursing to ensure their applicability, feasibility and validity of the tools and accordingly the needed modifications were done.

5) A pilot study

A pilot was conducted on 10% of patients to test the feasibility and applicability of the tools and to determine any obstacles that may encountered during the period of data collection, accordingly, needed modification will be done. Those patients will be excluded from the study subjects.

6) Patients who fulfill the inclusion criteria immediately on admission was assessed and divided into two equal groups, 50 patients in each group. The researcher will start by control group patients first to prevent data contamination.

7) Reliability of Tools:

- Cronbach's Alpha for tool I was 0.874 for 24 items applied on 10 patients.
- Cronbach's Alpha for tool II was 0.902 for 14 items applied on 10 patients.
- Cronbach's Alpha for the sheet in total was 0.911 for 38 items applied on 10 patients

8) Field work: -

Data collection were collected from (February 2025 to December 2025).

9) The present study was conducted through four phases: Assessment, planning, implementation and evaluation

1-Assessment Phase:

Assessment was done by the researcher for all patients of both groups using tool I. This phase was started before applying abdominal massage technique to assess the base line data.

2-Planning Phase:

Based on data of assessment and literature, abdominal massage technique was developed. **Expected outcome criteria was formulated as:**

- Improved tolerance to enteral feeding.
- Provide adequate nutritional requirement as evidenced by total amount of formula consumed daily as doctor order.

3-Implementation phase: -

Control group: The patients in the control group did not receive any intervention they received only routine hospital care as (aspirate gastric residual volume).

Study group: was received abdominal massage combined with hospital routine care that was implemented by the researcher, as following: **(Afitasari & Hudiyawati, 2021).**

Implementation phase:

All patients in the study group received abdominal massage. The massage was performed in the privacy of the patient.

The massage patient was lying in a supine position with his or her legs slightly bent through placing the patient's legs on a pillow. The bed's head was raised 30 to 45 degrees. The upper anterior iliac projection under the chest ribs was exposed, while the rest of the body was covered. The researcher took a position to the right of the patient's pelvis.

The abdominal massage was done to the abdominal wall in the direction of the bowel. It was performed twice daily for 20 minutes in a clockwise direction over the intestines on the abdominal wall. The massage was performed half an hour before enteral feeding to minimize the risk of aspiration, with a 6-hour period between massages. lubricant gel was used to make the massage easier. During the study, the head of the bed elevated to angle 30 to 45 degrees and was maintained 24 hours a day, with a 30-degree angle for performing the massage. Five stages of abdominal massage were used: the **first stage** started with a gentle relaxing stroke up the abdominal wall, followed by motions likes brushing the skin in the abdominal

region. The **second stage**, elastic deformation movement of the thoracic lumbar fascia, was performed by putting the dominant hand on the abdominal skin, the other hand on it, and applying pressure then squeezing the skin under pressure. **The third stage**; the abdominal skin is picked and kneaded by the fingers as if it was dough. **The fourth stage** includes shock motions from top to bottom and conversely around the armpit. The muscles in the intercostal spaces of false ribs moved during the final stage.

The gastric residual volume (GRV) and abdominal circumference was measured three times daily before the abdominal massage and 1 hour after second massage and 1 hour after third massage.

- Gastric residual volume was measured by aspirating slowly the total volume of gastric contents using a 60-ml syringe before each feeding.
- Extra syringes were used if the amount exceeds one syringe.
- The measurement was repeated, when stomach contents are no longer aspirated to verify whether the stomach is empty.
- The evaluation of gastric emptying of patients on continuous enteral feeding, the enteral nutrition was interrupted

30 min prior to the gastric residual volume and abdominal circumference measurements.

- The Measurements was done immediately before the abdominal massage to the patients in the intervention group. The measurements of control patients were completed concurrently.

Abdominal circumference

-Measurements was done using soft flexible, plastic measuring tape.

-The beginning points for the measurement the subject's umbilicus. The subject's waist was marked with a water-resistant pencil and measurement was taken at the same place each time during expiration.

Phase (4): -Evaluation phase: -

Patients of both groups was evaluated using tool II

Control group: was evaluated three time daily for 7 consecutive daily on admission & an one hour before and after enteral feeding.

Study group: was evaluated three times daily using tool (II) part (a.1, b), daily using tool (II) part (a.2,3). The evaluation was done before the massage, one hour after the second massage and one hour after the 3rd massage with 6-hour interval among massage for 7 consecutive days. The mean score was estimated during 2nd, 5th and 7th day of the study.

Comparison will be done among the studied groups to define the effect of abdominal massage on tolerance of enteral nutrition as indicated by absence of abdominal distension, vomiting normal habit and low gastric residuals; as a clinical Outcomes of enterally fed critically ill patients.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 29. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison was done using Chi-square test (χ^2). For comparison between means of variables for two groups, independent samples T-test was used. For comparison between means for variables pre and post intervention in a group, paired samples T-test was used. For comparison between means for variables during three periods of intervention in a group, or for more than two variables, the F-value of analysis of variance (ANOVA) was calculated **Gerstman B Burt ()2008**. Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A significance was adopted at $P < 0.05$ for interpretation of results of tests of significance (*). Also, a

highly significance was adopted at $P < 0.01$ for interpretation of results of tests of significance (**).

Results

Table (1) Illustrates distribution of the studied groups regarding their socio-demographic characteristics.

This table revealed that nearly two third (64%, 70%) of both control and study group respectively were in age group (50-60) years old with mean age of **49.78±9.692** for control group and **52.64±8.108** for study group. **As regard to gender**, it was noticed that half (50%) and more than half of patients in both control and study group were female.

Concerning to educational level and occupation, the result presented that two third (34%) and one four (24%) of the control and study groups respectively were read and write respectively. **Also**, half (50%) and more than half (56%) of the control and study groups respectively were housewife.

Additionally, no statistically significant differences were found between both groups regarding their age, gender, and occupation; however there were significant differences regarding education ($P = 0.013$).

Table (2): Shows distribution of the studied groups regarding their clinical data. It was observed that all studied patients had other diseases

(shock and pneumonia) as past medical history, followed by near half (34%, 46%) of control and study groups had hypertension respectively. Moreover, more than half (54%, 58%) of control and study groups had disturbed level of consciousness as current diagnosis respectively.

As regard to feeding regimen, time of starting enteral nutrition and size of feeding tube, it was noticed that all control group and the majority (90%) of study groups had intermittent feeding respectively. Also, more than half (72%, 66%) of control and study groups had started enteral nutrition on admission respectively with the majority (84%, 88%) of control and study groups had small diameter of feeding tube respectively.

Additionally, there was statistically significant differences between both groups in relation to food regimen. $P < 0.05$.

Table (3): Demonstrate distribution of the studied groups regarding their current medication, these findings revealed that the majority (86%, 90%) of control and study groups had antibiotic respectively followed by more than half (60%, 62%) of control and study groups had anticoagulant respectively.

Table (4): Illustrates distribution of the studied groups regarding assessment of formula prescribed day. It was indicated that the majority (80%) and more than half (60%) of control and study groups had blundered formula respectively with the majority (84%, 94%) of control and study groups received 250ml of prescribed formula per four hours.

Concerning blood glucose level, the result presented that the majority (86%, 72%) of patients in both control and study groups had blood glucose range (70-110 mg/dl) respectively.

Additionally, there was a statistically significant difference between type of formula and blood glucose level (0.049, 0.003) of control and study group respectively.

Table (5) Shows Mean scores of vital signs of the studied groups patients throughout the periods of the study. The results illustrated that the mean score of **temperature** in the study group showed improvement compared to the control group during 2nd, 5th and 7th day (36.98 ± 0.09 , 37.05 ± 0.23 , 37.02 ± 0.19 , 37.07 ± 0.24 , 37.02 ± 0.13 , 37.03 ± 0.23) respectively.

Concerning pulse, respiration and blood pressure it was observed that the mean value in the study group showed improvement compared to

control group during 2nd, 5th and 7th day) with no statistically significant differences within each group where $p = (0.000^*)$ respectively.

Regarding oxygen saturation, the result presented that improvement in the study with mean value (94.84 ± 1.56 , 94.38 ± 1.98 , 94.32 ± 2.14 , 94.36 ± 2.34) on the 5th and 7th day with slightly statistically significant differences in two groups where p value = (0.727 , 0.065) respectively.

Table (6): Distribution of the studied groups regarding gastrointestinal function as indicator of feeding tolerance throughout the periods of the study.

Regarding abdominal distention and abdominal rigidity the results revealed improvement from admission to 7th day of the study within study groups from 92% to 2% and from 94% to 0%, from 88% to 0% and from 94% to 0%, with statistically significant differences where p value = (0.000^*) respectively.

Concerning passing of flatus, the results showed that there was improvement of the study groups compared to control groups from admission to 7th day of the study (from 78% to 40% and from 78% to 64%) respectively.

Also, there was higher statistically significant differences between study and control group on 7th day of the study where p value = (0.000^* , 0.005^*) respectively.

Similarly abdominal girth, the results indicated improvement in studied groups with mean value (from 76.20 ± 5.78 to 72.20 ± 5.71 and from 68.68 ± 16.63 to 64.10 ± 16.17) on admission to 7th day of the study with statistically significant differences where p value = (0.000^*) respectively.

Table (7): Distribution of the studied groups regarding vomiting and bowel elimination throughout the periods of the study. Regarding vomiting assessment, the findings revealed a reduction in the percent of patient who had vomiting in the studied groups from 50% to 2% and from 62% to 14% from admission to the 7th day of the study with improvement in frequency in two groups from 30% to 0% in the control group compared to from 22% to 2% in study group.

In relation to bowel elimination frequency. The results illustrated improvement in the study group from 32% to 88% during admission, 2nd, 5th and 7th respectively.

Additionally, there was statistically significant differences concerning vomiting and bowel elimination in

the studied group where p value = **(0.000*)**.

Table (8): Mean scores of gastro-Residual volume of the studied groups throughout the periods of the study. The results showed that there was a significant reduction in gastro-residual volume in the study group compared to control group from admission to 7th day of the study

with statistically significant differences in both studied groups where p = **(0.000*)**

Table (1): Distribution of the studied groups regarding their socio-demographic characteristics

Characteristics	The studied patients (n=100)				χ^2 P
	Control group (n=50)		Study group (n=50)		
	N	%	N	%	
Age (in years)					1.493 0.684
(21-<30)	3	6.0	1	2.0	
(30-<40)	4	8.0	5	10.0	
(40-<50)	11	22.0	9	18.0	
(50-60)	32	64.0	35	70.0	
Range	(26-60)		(29-60)		t=2.561 P=0.113
Mean $\pm$ SD	49.78 $\pm$ 9.692		52.64 $\pm$ 8.108		
Gender					FE 0.689
Male	25	50.0	22	44.0	
Female	25	50.0	28	56.0	
Educational level					10.753 0.013*
Illiterate	7	14.0	21	42.0	
Read and write	17	34.0	12	24.0	
Basic education	14	28.0	7	14.0	
Higher education	12	24.0	10	20.0	
Occupation					3.240 0.356
Manual work	13	26.0	14	28.0	
Employee	5	10.0	6	12.0	
Technical work	7	14.0	2	4.0	
House wife	25	50.0	28	56.0	

FE: Fisher' Exact test

* Significant at level P<0.0

Table (2): Distribution of the studied groups regarding their clinical data

Clinical data	The studied patients (n=100)				χ^2 P
	Control group (n=50)		Study group (n=50)		
	N	%	N	%	
# Past medical history					1.042 0.307
▪ Respiratory disease	0	0.0	7	14.0	
▪ Heart disease	4	8.0	1	2.0	
▪ GIT disease	7	14.0	5	10.0	
▪ Hypertension	17	34.0	23	46.0	
▪ Diabetes mellitus	7	14.0	12	24.0	
▪ Other(traumatic head injury)	50	100.0	50	100.0	
Current diagnosis					FE 0.840
▪ Disturbed level of consciousness	27	54.0	29	58.0	
▪ Pneumonia	23	46.0	21	42.0	
# Feeding regimen					7.814 0.005*
▪ Continuous feeding	0	0.0	9	18.0	
▪ Intermittent feeding	50	100.0	45	90.0	
▪ Bolus feeding	0	0.0	2	4.0	
Time of starting enteral nutrition					3.455 0.178
▪ On admission	36	72.0	33	66.0	
▪ After 24h of admission	10	20.0	16	32.0	
▪ After 48h of admission	4	8.0	1	2.0	
Size of feeding tube					FE 0.774
▪ Small diameter (12-16)	42	84.0	44	88.0	
▪ Large diameter (18-.)	8	16.0	6	12.0	

More than one answer was chosen

FE: Fisher' Exact test

* Significant at level $P < 0.05$ **Table (3): Distribution of the studied groups regarding their current medication**

Current medication	The studied patients (n=100)				χ^2 P
	Control group (n=50)		Study group (n=50)		
	N	%	N	%	
▪ Asthmatic diuretic	0	0.0	2	4.0	2.351 0.258
▪ Amino acid (parental nutrition)	6	12.0	14	28.0	
▪ Analgesic	2	4.0	6	12.0	
▪ Antibiotic	43	86.0	45	90.0	
▪ Anticholinergic	10	20.0	9	18.0	
▪ Anticoagulant	30	60.0	31	62.0	
▪ Antidiuretic	11	22.0	21	42.0	
▪ Antiemetic	4	8.0	4	8.0	
▪ Antiepileptic	5	10.0	7	14.0	
▪ Ant hemorrhagic	2	4.0	3	6.0	

▪ Antihypertensive	6	12.0	8	16.0
▪ Anti-inflammatory	7	14.0	13	26.0
▪ Antipyretic	6	12.0	2	4.0
▪ Antiviral	4	8.0	5	10.0
▪ Cerebral circulatory enhancer	6	12.0	7	14.0
▪ Corticosteroid	5	10.0	6	12.0
▪ Laxative	4	8.0	4	8.0
▪ Proton pump inhibitor	40	80.0	14	28.0
▪ Supplements and vitamins	35	70.0	18	36.0

Table (4): Distribution of the studied groups regarding assessment of formula prescribed per day

Formula prescribed per day	The studied patients (n=100)				χ^2 P
	Control group (n=50)		Study group (n=50)		
	N	%	N	%	
Type					FE 0.049*
▪ Blended	40	80.0	30	60.0	
▪ Commercial	10	20.0	20	40.0	
Amount/per 4 hours					FE 0.200
▪ 200	8	16.0	3	6.0	
▪ 250	42	84.0	47	94.0	

FE: Fisher' Exact test

* Significant at level $P < 0.05$

Table (5): Mean scores of vital signs of the studied groups patients throughout the periods of the study

Vital signs	The studied patients (n=100)							
	Range							F P
	Mean ± SD							
	Control group (n=50)			F P	Study group (n=50)			
2nd day	5th day	7th day	2nd day		5th day	7th day		
1. Temperature (°c)	(36.5-38) 37.07±0.24	(36.5-37.5) 37.02±0.13	(36.5-38.5) 37.03±0.23	0.753 0.473	(36.5-37.2) 36.98±0.09	(36.7-38) 37.05±0.23	(36.4-37.8) 37.02±0.19	1.93 0.149
2. Pulse (b/m)	(100-125) 104.60±4.60	(66-100) 81.88±6.98	(66-100) 80.18±6.59	246.08 0.000*	(100-130) 107.78±3.98	(50-94) 73.02±9.59	(60-92) 71.94±8.66	341.03 0.000*
3. Respiration (c/m)	(26-30) 29.06±1.00	(14-30) 19.48±3.13	(12-28) 17.62±3.19	269.68 0.000*	(28-30) 29.30±0.91	(12-23) 18.10±2.49	(12-24) 16.72±2.60	516.72 0.000*
4. Blood pressure (mmhg)								
- Systolic	(80-100) 88.80±4.35	(100-160) 121.60±13.15	(90-150) 120.56±13.17	142.76 0.000*	(80-90) 87.20±4.54	(100-150) 121.20±11.36	(100-140) 112.84±10.54	180.57 0.000*
- Diastolic	(50-60) 54.60±5.04	(60-100) 76.54±9.43	(60-100) 78.34±10.39	117.85 0.000*	(40-60) 53.00±5.05	(60-90) 77.80±8.15	(60-90) 74.80±8.86	161.16 0.000*
5. Oxygen saturation (%)	(90-99) 94.64±2.05	(85-98) 94.32±2.14	(89-99) 94.36±2.34	0.320 0.727	(91-99) 95.14±1.25	(90-99) 94.84±1.56	(89-99) 94.38±1.98	2.79 0.065

* Significant at level $P > 0.05$

Table (6): Distribution of the Studied Groups regarding gastrointestinal function as indicator of feeding tolerance throughout the periods of the study

Gastro-intestinal Function	The studied patients (n=100)																	
	Control group (n=50)								χ^2 P	Study group (n=50)								χ^2 P
	On admission		2nd day		5th fay		7th fay			On Admission		2nd day		5th day		7th day		
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%	
A-Abdominal distention	4	8.0	4	8.0	9	18.0	49	98.0	140.97	3	6.0	3	6.0	22	44.0	50	100.0	153.51
▪ Not present	46	92.0	46	92.0	41	82.0	1	2.0	0.000*	47	94.0	47	94.0	28	56.0	0	0.0	0.000*
B- Abdominal rigidity	6	12.0	7	14.0	24	48.0	50	100.0	127.45	3	6.0	4	8.0	22	44.0	50	100.0	149.21
▪ Not present	44	88.0	43	86.0	26	52.0	0	0.0	0.000*	47	94.0	46	92.0	28	56.0	0	0.0	0.000*
C-Passing of flatus	11	22.0	5	10.0	6	12.0	18	36.0	12.93	11	22.0	9	18.0	19	38.0	30	60.0	24.18
▪ Not present	39	78.0	45	90.0	44	88.0	32	64.0	0.005*	39	78.0	41	82.0	31	62.0	20	40.0	0.000*
Abdominal girth (in cm)	(59-88)		(59-88)		(58-86)		(56-85)		F=5.43	(32-100)		(32-100)		(30-98)		(29-95)		F=6.79
Range	76.20±5.78		76.14±5.82		74.20±5.74		72.20±5.71		P=0.000*	58.68±16.63		68.28±16.82		66.76±16.54		64.10±16.17		P=0.000*
Mean ± SD																		

* Significant at level P<0.05

Table (7): Distribution of the studied groups regarding vomiting and bowel elimination throughout the periods of the study

Gastro-intestinal Function	The studied patients (n=100)																	
	Control group (n=50)								χ^2 P	Study group (n=50)								χ^2 P
	On admission		2nd day		5th day		7th day			On admission		2nd day		5th fay		7th day		
	N	%	N	%	N	%	N	%		N	%	N	%	N	%	N	%	
Vomiting assessment																		
▪ Not present	25	50.0	25	50.0	26	52.0	49	98.0	46.96	19	38.0	20	40.0	33	66.0	43	86.0	34.43
▪ Present	25	50.0	25	50.0	24	48.0	1	2.0	0.000*	31	62.0	30	60.0	17	34.0	7	14.0	0.000*
Frequency																		
▪ None	25	50.0	25	50.0	26	52.0	49	98.0	63.92 0.000*	19	38.0	20	40.0	32	64.0	43	86.0	44.90 0.000*
▪ Once/day	10	20.0	18	36.0	22	44.0	1	2.0		20	40.0	28	56.0	17	34.0	6	12.0	
▪ Twice/day	15	30.0	7	14.0	2	4.0	0	0.0		11	22.0	2	4.0	1	2.0	1	2.0	
Bowel elimination Frequency																		
▪ None	7	14.0	3	6.0	2	4.0	19	38.0	26.12	34	68.0	21	42.0	10	20.0	6	12.0	42.75
▪ Once/day	43	86.0	47	94.0	48	96.0	31	62.0	0.000*	16	32.0	29	58.0	40	80.0	44	88.0	0.000*

* Significant at level P<0.05

Table (8): Mean scores of gastro-Residual volume of the studied groups throughout the periods of the study

Residual Volume	The studied patients (n=100)									
	Range									
	Mean $\pm$ SD									
	Control group (n=50)					Study group (n=50)				
	On admission	2nd day	5th day	7th day	F P	On admission	2nd day	5th day	7th day	F P
1. First day	(15-25) 18.70 $\pm$ 3.37	(14-24) 18.12 $\pm$ 2.97	(13-23) 17.30 $\pm$ 2.70	(10-22) 16.24 $\pm$ 2.76	6.50 0.000*	(15-25) 17.30 $\pm$ 2.55	(13-23) 16.06 $\pm$ 2.46	(10-22) 15.18 $\pm$ 2.48	(8-19) 13.54 $\pm$ 2.61	19.60 0.000*
2. Second day	(12-22) 16.88 $\pm$ 2.40	(11-21) 16.10 $\pm$ 2.23	(10-20) 15.14 $\pm$ 2.22	(7-20) 14.12 $\pm$ 2.62	12.66 0.000*	(10-20) 14.64 $\pm$ 2.51	(7-19) 13.18 $\pm$ 2.59	(5-18) 12.04 $\pm$ 2.72	(5-16) 10.34 $\pm$ 2.58	24.45 0.000*
3. Third day	(10-19) 14.58 $\pm$ 2.35	(9-19) 13.80 $\pm$ 2.42	(8-18) 13.14 $\pm$ 2.37	(7-17) 12.30 $\pm$ 2.36	8.35 0.000*	(7-16) 11.98 $\pm$ 2.40	(6-15) 10.62 $\pm$ 2.28	(5-15) 9.66 $\pm$ 2.39	(4-14) 7.92 $\pm$ 2.47	25.63 0.000*
4. Fourth day	(8-17) 12.72 $\pm$ 2.45	(7-16) 12.22 $\pm$ 2.50	(6-15) 11.42 $\pm$ 2.50	(5-15) 10.18 $\pm$ 2.49	9.94 0.000*	(5-15) 9.40 $\pm$ 2.52	(4-13) 8.28 $\pm$ 2.14	(4-12) 7.34 $\pm$ 2.04	(3-10) 5.96 $\pm$ 1.83	23.06 0.000*
5. Fifth day	(5-15) 10.52 $\pm$ 2.59	(5-15) 9.96 $\pm$ 2.52	(4-14) 9.30 $\pm$ 2.53	(4-13) 8.36 $\pm$ 2.35	6.91 0.000*	(5-11) 6.80 $\pm$ 2.14	(4-10) 5.92 $\pm$ 1.89	(3-9) 5.30 $\pm$ 1.63	(2-7) 4.22 $\pm$ 1.52	17.94 0.000*
6. Six day	(5-12) 8.18 $\pm$ 1.99	(4-11) 7.54 $\pm$ 1.95	(4-10) 6.90 $\pm$ 1.81	(3-10) 5.98 $\pm$ 1.80	12.35 0.000*	(4-10) 5.54 $\pm$ 1.49	(3-9) 4.82 $\pm$ 1.41	(2-8) 4.28 $\pm$ 1.25	(2-5) 3.30 $\pm$ 1.07	25.79 0.000*
7. Seven day	(3-10) 5.54 $\pm$ 1.56	(3-9) 4.96 $\pm$ 1.20	(2-8) 4.26 $\pm$ 1.05	(1-5) 3.00 $\pm$ 1.34	35.51 0.000*	(3-5) 4.42 $\pm$ 0.70	(2-5) 3.66 $\pm$ 0.80	(1-4) 3.14 $\pm$ 0.81	(1-4) 2.34 $\pm$ 0.92	58.38 0.000*

* Significant at level P>0.05

Discussion

In the hospital setting depending on the disease condition, patients may need to maintain their nutritional intake through altered routes like enteral tube feeds and parenteral. Critically ill patient can have issues that can lead to restriction in oral feeding. In such cases, an option is nasogastric feeding (**Rajkumar, 2020**).

Nutrition is one of the essential components of life. Every individual requires nutrition for healthy living. However, for some individuals, nutritional intake becomes compromised while some benefit from oral supplements, others require active nutritional support (**Lynn, 2019**).

Abdominal massage is a gentle, noninvasive treatment that may have relaxing and healing effect for some people, and are used in the treatment of wide variety of health conditions especially those related to the stomach such as indigestion and bloating (**Daniel, 2018**).

Abdominal massage is low cost, has no side effects, and has been widely used for patients prone to gastrointestinal dysfunction. Abdominal massage improves blood circulation in the gastrointestinal tract and stimulates gastrointestinal peristalsis, which accelerates the passage of food through the gastrointestinal tract. Recent reports suggested that abdominal massage applied to critically ill patients

receiving enteral nutrition may reduce the incidence of related gastrointestinal outcomes (**Wang et al., 2022**).

Part (1) Socio-demographic characteristics and clinical data of both studied groups.

The result of the present study revealed that there was no statistically differences between both groups in relation to their Socio-demographic characteristics and this indicated that the studied groups are homogenous in their characteristics, the total number of patients sampled in the present study were (100) patients divided equally in control group and study group.

Regarding to age and gender of the studied patients, the current study reported that more two-third of studied patients were in age group (50-60) years. More patients over 50 years admitted to ICU due to age-related increases in chronic diseases (comorbidities like heart/lung issues, diabetes, weakened immune system making them prone to severe infections) and acute events like heart attack.

This finding were in agreement with **Dehghan et al., (2018)** found that more two-third of the studied patient's age ranged between (40 - 60) years old. Additionally, half of them were males. This result contradicts with **Ahmed et al., (2020)** stated that more than two third of studied patient in both group had age more than forty years old.

On observation of sex, it was noticed that half of control group and more than half in study group were female. This might be explained by the fact that aging affects the female gastrointestinal system by slowing gastric emptying, reducing digestive enzyme and acid production which can lead to food intolerance and weakening the pelvic floor muscles, which can lead to constipation and Malabsorption. This result is aligned with (Turan, & Atabek Aşti, 2016). Who reported that the majority of the population were female.

On the other hand, this finding was contradicted by Momenfar et al., (2018) found that among the patients, 60% were male.

Concerning level of education, this result presented that only one third of control groups and near one fourth of study groups were read and write. Also, the result was disagreement with Abd-Elraheem et al., (2020) statement that one third of study and control group can't read and write.

Regarding occupation, it is found that the majority of patients in the control and study groups were housewife. This result was disagreement with Momenfar et al., (2018), and stated that the majority of the study group and more than two thirds of the control group were unemployed. While this was disagreement with Diab et al., (2021), and stated that more than two thirds of the control and study group was working.

In Relation to past medical history, it was observed that only one third of control and more than one third of study group had hypertension. This might be explained by the fact that hypertension is the major risk factors for **Increasing Intestinal Permeability**, Hypertension increases the activity of the sympathetic nervous system (SNS), leading to increased gut wall permeability.

Also, it is lead to inflammation, The increased permeability allows inflammatory triggers and gut Microbiome Imbalance (Dysbiosis). Hypertension is associated with a disturbed gut microbiome, this microbial imbalance contributes to a compromised gut barrier and inflammation (Santisteban et al., 2017).

Regarding current diagnosis, it was observed that more than half of patients in the study and control groups were diagnosed with disturbed level of consciousness (DCL) respectively. It might be explained by the fact that DCL is the risk factors for brain-gut axis disruptions caused by underlying conditions like severe infections, metabolic disorders, or neurological diseases, which can lead to gastrointestinal symptoms such as impaired motility, nausea, or dysphagia. Conversely, severe digestive issues like bowel obstruction or inflammation can send signals to the brain, triggering

"sickness behavior," mood changes, and sometimes even affecting cognitive function (Holzer, 2022). This result was agreement with Camilleri M. (2021) statement that the majority of study group was diagnosed neurological diseases.

Concerning food regimen, the majority and more than half of patients in the control and study groups had intermittent feeding within the first 24 hours respectively. It might be explained early initiation of enteral feeding is considered very important science it preserves gut health and then modulates the stress response to critical illness. On the other side Song et al., (2018) stated in their study that there was given enteral feeding within 48 hours after admission is efficient and safe for critically ill patients.

Part (II) Adverse assessment of studied patients regarding formula prescribed per day.

As regard to formula prescribed, the majority of patients in control and study groups had blundered formula with 250ml per four hour and had (70-110) mg /dl respectively. This result was disagreement with (Diab et al., 2021) found that the majority of patient take 300ml/2hrs during study.

Part (III) Distribution among gastrointestinal outcomes, gastrointestinal function and gastro-residual volume signs of studied groups.

Concerning gastrointestinal outcomes of the studied patients after an hour of third routine care throughout periods of intervention, the result of presented study was clarified that there is a significant improvement in the abdominal distention and abdominal rigidity of control groups compared to disappeared of abdominal distention and abdominal rigidity in the study groups with there is no significant differences between two groups respectively.

This result is supported by Wang et al., (2019) and Dehghan et al., (2018) found that the abdominal massage helps to relieve abdominal distension and the amount of distention in the intervention group was less than the control group. While this result was in disagreement with (Ali et al., 2022). who mentioned that more than two third of study group after application of abdominal massage have occasional discomfort of short duration of abdominal distention, while less than half of the control group have frequent and prolonged episodes of abdominal distention.

In relation to passing of flatus, the present study showed that improvement of passing of flatus in the study groups compared to control groups respectively. This might be explained by the fact of gas and bloating make the stomach tight and uncomfortable. Abdominal Massage (AM) helps release trapped gas and

relax muscles, giving quick relief that stated by **Boangmanalu et al., (2025)**.

As regard to abdominal girth and bowel elimination throughout third routine care, the current study clarified that improvement of mean range of abdominal girth and bowel elimination in the study groups compared to control groups respectively. This attributed to the fact that a study conducted by **Onur et al., (2020)**, presented that improved bowel movements and reduced waist circumference among studied patients who managed by abdominal massage. While large abdominal circumference score was observed among control group on the first day and sixth day of study. Also, **Diab et al., (2021)** reported a significant improvement among study group only in the 7 day of study after applying of abdominal massage.

As for vomiting frequency, the current study illustrated that improvement of vomiting in the control groups and study groups respectively. This can be justified by the fact that, vomiting occurred in 2.0% of patients in the study group **Uysal, (2017)**

Also, this result was in disagreement with **(Fareed and El- Sayad, 2017)** mentioned that there was a significant reduction of vomiting occurrence among the study group than the control group after abdominal massage and **Diab et al.,**

(2021) who stated that there was a statistically significant difference among study group throughout the periods of follow up regarding frequency of vomiting episodes.

Gastric residual volume is the amount of liquid drained from a stomach following administration of enteral feed. Monitoring of GRV is very important and remarkable standard for nutrition status improvement **(Fritz, 2021)**. **In this regard**, the present study showed that GRV was high in control group in 5th and 7th day after intervention with abdominal massage with statistical significant difference between both groups. This might be attributed that abdominal massage stimulating the parasympathetic division of the autonomic nervous system and relaxing the sphincter in the gut and improving peristalsis that results in increasing the gastric emptying and decreasing the residual volume **(Kosasih et al., 2019)**.

This results were supported by **El-Feky and Ali, (2020)** and **Momenfar et al., (2018)** found high GRV in the control group who didn't receive abdominal massage. However, these findings were inconsistent with **Dehghan et al., (2018)** who showed that GRV didn't change significantly among control and experimental groups after abdominal massage.

Conclusion

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

Abdominal massage was an effective intervention on the gastrointestinal outcomes among intermittent enterally fed critically ill patients as it leads to reduction in gastric residual volume, abdominal distension and close observation of nasogastric fed side effect.

Recommendations

Based on results of the present study, the following recommendations could be suggested:

Regarding nursing education:

- On-going and regular in-service educational programs about assessment of gastrointestinal outcomes among enterally fed critically ill patients and how to measure gastric residual volume and intra-abdominal pressure.
- Developing a simplified and comprehensive manual booklet for nurses including basic information about abdominal massage technique as definition, purposes, types, indications, contraindications and procedure steps.
- Nursing curriculums must include the concept of complementary therapy including abdominal massage as an effective method to improve gastrointestinal outcomes for enterally fed critically ill patients.
- **Regarding clinical practice:**
- Incorporate abdominal massage as a routine nursing care for

critically ill patients receiving enteral feeding.

- Gastric residual volume should be checked before enteral feeding for all critically ill patients.

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Quality of Life among Hemodialysis Patients

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Abstract

Background: Hemodialysis patients often experience significant physical, psychological, and social challenges due to their chronic condition, while life-, can lead to fatigue, dietary restrictions, dependency, and emotional distress, all of which affect their overall quality of life. **The aim of study was** to assess quality of life among hemodialysis patients. **Research design:** A descriptive research design was used to utilize this study. **Setting** The study conducted at El Fayoum health insurance outpatient clinics affiliated to El Fayoum governorate. **Sample:** A purposive sample was taken of hemodialysis patient. The sample size was 220 from total population targeted 512 hemodialysis patients. **Tool:** Two tools were used in the study: **Tool I:** An interviewing Questionnaire: it was modified by the researcher and it consisted of **three parts. Part1:** Demographic characteristics of hemodialysis patients. **Part 2:** Present & past medical history of hemodialysis patients. **Part 3:** Patient's knowledge about hemodialysis patients. **Tool II:** Quality of life scale. **Results:** The data reveals that more than half of the patients had poor knowledge about kidney failure. A statistically significant positive correlation was found between knowledge scores and all quality of life (QOL) domains. The strongest correlations were with daily living activities, health and functional status, followed by total QOL, psychological status and socio-economic status. **Conclusion:** More than half of hemodialysis patients had poor knowledge about kidney failure. Overall, more than half of patients reported a poor total quality of life. The study revealed that patients with higher levels of good knowledge had a significantly better quality of life. Furthermore, a statistically significant positive correlation was found between knowledge scores and all quality-of-life domains, with the strongest correlations observed with daily living activities, health and functional status. **Recommendations:** Develop educational programs aimed at enhancing patient knowledge about kidney disease, its management and the impact on quality of life. Encourage active patient participation in managing their disease by providing clear information on dietary habits and the importance of adhering to medical advice.

Keywords: Quality of Life, Hemodialysis.

Introduction

Chronic Kidney Disease (CKD) and its terminal stage, End-Stage Renal Disease (ESRD), represent a major global health concern. Hemodialysis remains the most common life-sustaining treatment, yet it imposes significant physical, psychological and social challenges (**Francis et al., 2024**). In Egypt, the increasing prevalence of End-Stage Renal Disease (ESRD), driven by diabetes, hypertension and limited access to transplantation, heightens the burden on healthcare systems. Assessing the quality of life (QoL) of hemodialysis patients is, therefore, vital to ensure holistic, patient-centered care, with nurses playing a key role in improving QoL by providing technical expertise, education and emotional support (**Farag & El-Sayed, 2022**).

Hemodialysis is a life-saving procedure that replaces the kidney's filtration function in patients with End-Stage Renal Disease (ESRD). It works through diffusion and ultrafiltration, removing waste, excess fluids and electrolytes across a semi-permeable membrane (**Gaully et al., 2022**). Each session typically lasts four hours and is performed three times per week. This process maintains internal balance and prevents life-threatening complications such as uremia.

Despite its effectiveness, the repetitive and time-consuming nature of hemodialysis significantly affects patients' physical energy and lifestyle (**Abraham & Goldfarb, 2025**).

The global incidence of End-Stage Renal Disease (ESRD), continues to rise due to increasing rates of diabetes, hypertension and aging populations. Millions of patients depend on dialysis, creating an immense strain on healthcare systems worldwide (**Chesnaye et al., 2024**). Similarly, in Egypt, ESRD prevalence has grown due to both infectious and chronic causes. Economic constraints, late disease detection and limited transplant availability make long-term hemodialysis. This growing demand underscores the urgent need for preventive measures, public health education and improved renal care infrastructure (**Abou-Bakr et al., 2022**).

Studying hemodialysis patients offers valuable insights into chronic disease management and the effectiveness of healthcare systems, as these individuals often face multifaceted challenges that necessitate ongoing, multidisciplinary support (**El-Sayed & El-Masry, 2022**). Assessing their quality of life (QoL) shifts the focus of care from basic survival to

comprehensive well-being. By exploring their lived experiences, healthcare professionals and policymakers can develop tailored interventions that address physical symptoms, emotional distress and social limitations, making enhanced QoL a key indicator of successful patient-centered care **(Siregar & Siregar, 2022)**.

While hemodialysis prolongs life, it introduces numerous complications that impact daily functioning. Acute issues include hypotension, muscle cramps, nausea and fatigue during sessions. Chronic problems such as anemia, bone disorders and skin itching further reduce patients' comfort, while repeated vascular access increases risks of infection and thrombosis **(Habas et al., 2022)**.

Quality of Life (QoL) in hemodialysis extends beyond physical health to include psychological, social and environmental dimensions. It reflects how patients adapt to the limitations imposed by their condition while maintaining personal fulfillment **(Al-Rajhi & Al Salmi, 2022)**. A good QoL may involve emotional stability, strong family support and the ability to perform daily activities with minimal discomfort. Measuring QoL provides a holistic view of treatment outcomes, emphasizing that effective care should enhance

not only survival but also overall well-being and satisfaction **(Keita, 2025)**.

Several factors influence the QoL of hemodialysis patients. Medical aspects include dialysis adequacy, comorbidities and management of complications. Equally important are non-medical factors such as socioeconomic status, employment, education level and psychological resilience, where strong family and social support networks can buffer emotional stress and promote adherence to treatment **(Yonata et al., 2022)**.

Nurses play an essential role in maintaining and enhancing the QoL of hemodialysis patients. Their responsibilities extend beyond technical procedures to include patient education, emotional support and counseling **(Shu et al., 2025)**. By monitoring vital signs, managing complications and teaching about diet and medication, nurses ensure safety and adherence. They also act as advocates, helping patients cope with anxiety, depression and lifestyle adjustments, thereby significantly contributing to their overall well-being **(Qu & Shen, 2023)**.

Significance of the Study

Hemodialysis remains an intervention that can save the lives of people suffering from end-stage renal disease (ESRD), yet it poses

significant challenges to maintaining a high quality of life (QoL). The chronic nature of the treatment, its frequency and the presence of multiple comorbidities often diminish patients' physical and emotional well-being. QoL encompasses a broad spectrum of life domains, including physical health, psychological stability, social relationships and spiritual fulfillment dimensions frequently disrupted in hemodialysis patients (*Siregar & Siregar, 2022*).

Globally, the prevalence of hemodialysis has grown significantly due to the rising incidence of kidney disease and an aging population. According to recent estimates, millions of individuals depend on hemodialysis as a renal replacement therapy. Developed countries like the United States, Japan and Germany report a high utilization rate of this treatment, while developing nations are striving to expand access to meet increasing demands. The advancements in dialysis technology and improved healthcare systems have contributed to better patient outcomes, highlighting the importance of continued efforts to make this essential treatment accessible to all (*Lee & Son, 2021*).

According to recent data, the burden of kidney disease in Egypt is

substantial. A report from the Clinical and Environmental Toxicology Center at Kasr Al-Ainy Medicine highlighted a significant concentration of cases, with Cairo governorate accounting for a high percentage of the national burden. Environmental and industrial factors have been confirmed as major contributors to the prevalence of kidney diseases among citizens, underscoring the urgent need for improved renal care infrastructure and public health interventions (*Abdelrahman & El-Morsy, 2022*).

Aim of the study

The current study aimed to assess quality of life among hemodialysis patients.

Research Questions: -

- What is the effect of hemodialysis on patient's quality of life?
- What is the relation between hemodialysis patient's quality of life & their socio-demographic characteristic?

Subjects and Method

Study design:

Quasi experimental **Subjects and Method**

The subjects and method for this study were portrayed under the following four main items:

- I.** Technical design.
- II.** Operational design.
- III.** Administrative design.
- IV.** Statistical design.

I. Technical Design:**A. Research design:**

A descriptive research design was used to utilize this study.

B. Setting:

The study was conducted at El Fayoum health insurance outpatient clinics affiliated to El Fayoum governorate. The facility consists of five floors, including two dedicated nephrology examination rooms. The site was selected because it provides healthcare services to approximately 560 hemodialysis patients residing in the Keman Fares area. The sample size was 220 from total population targeted 512 hemodialysis patients.

Inclusive criteria

- Adult patients aged 20 years and older.
- Diagnosed with end-stage renal disease (ESRD) and undergoing regular hemodialysis for at least 6 months.
- Able to communicate effectively and willing to participate in the study.

Exclusive criteria

- Patients with severe cognitive impairment or psychiatric illness that would interfere with communication or understanding of the questionnaire.
- Patients with acute medical conditions or hospitalization during the time of data collection.
- Patients who refused to participate or withdrew consent during the study.

Subjects of the study:**Sample type:**

A purposive sample was taken of hemodialysis patient

Sample size:

The sample was composed of about 220 According to this power analysis equation.

$$n = \frac{N \times p(1-p)}{\left[\left[N - 1 \times (d^2 \div z^2) \right] + p(1-p) \right]}$$

N: population target = 512

n: sample = 220

z: The standard score corresponding to the significance level 0.95 is equal to 1.96

d: The error rate is equal to 0.05

p: Property availability and neutral ratio = 0.50

n=

$$\frac{512 \times 0.50(1-0.50)}{(512 - 1 \times (0.05)^2 \div (1.96)^2) + 0.50(1-0.50)} = 220$$

Sample type:

A purposive sample was obtained and including adults aged between 20 – 55 years old from both sexes.

Tools for data collection:

Two tools were used to conduct this study after extensive literature review.

Tool I: An interviewing Questionnaire: it was modified by the researcher and it consists of three parts.

Part 1: Demographic characteristics of hemodialysis patient's is adopted from *Khazaei Ghozhdi et al. (2023)*

& modified by the researcher and included Gender, Age, Marital Status, Residence, Education Level, Occupation, Income... etc.

Part 2: Present & past medical history of hemodialysis patient's is adopted from *Kim et al. (2022)* and included patient's Genetic diseases, Birth defects, chronic diseases. Infectious and parasitic diseases, previous operations, the current symptoms experienced by the patient etc.

Part 3: Patient's knowledge about hemodialysis patient's is adopted from *Nerbass et al. (2022)* and included (5 questions) as definition of kidney, kidney function, causes, signs and symptoms, the most important medical examinations.

Scoring system total points =5 points

The total knowledge scoring level was categorized as follows:

- Good level of knowledge >75% from total score (total score =5)
- Fair level of knowledge 50% - <75% from total score. (total score 3<4)
- Poor level of knowledge < 50% from total score (total score <3)

Tool II: Quality of life scale adopted from Rizio et al. (2023) and it translated in to Arabic Language by the researcher it contains, physical quality of life, psychological quality of life, social and economic quality of life.

Quality of life scale scoring system:

For Quality-of-life scale items, the scores of the items were summed up and the total divided by the number of items.

Quality of life of Haemodialysis Patients	Points			Items	Score
	2	1	0		
Physical quality of life	Yes	Somewhat	No	20	40
Psychological status	Yes	Somewhat	No	13	26
Social and economic status	Highly	Moderately	Weakly	12	24
Daily living activities	Needs full help	Needs help	Doesn't need help	10	20
Total				55	110

These scores were converted into a percentage score.

- Total Score 110 grades.

- The quality of life was considered good if the percent score was 60% or more from total score (score $\geq$ 66 point) poor if less than 60% from total score (score >66)

II. Operational Design:

The operational design included the following components: a preparatory phase, content validity and reliability, a pilot study, ethical considerations, and fieldwork.

a) The preparatory phase:

This phase began before tool development and involved reviewing current national and international

literature (books, journals, online resources) related to the study topic to gain a comprehensive understanding of the research problem and guide tool construction.

b) Pilot study:

A pilot study was conducted on 10% of the total sample (about 22 patient) of the study subjects to test applicability, feasibility, practicality of the tools and then the necessary modifications were done according to the results of pilot study. The pilot study was included in the results.

b) Content validity:

A panel of experts revised the tools. composed of three professors of community Health Nursing to measure the content validity of the tools and the necessary modifications were done accordingly.

c) Content reliability:

Reliability of the tools was tested to determine questionnaire items related to each other.

Alpha Cronbach Reliability Analysis of the Used Tool

Items	Cronbach's Alpha	N of Items
Knowledge	0.724	5
Quality of life	0.845	55

A general reliability score of 0.811 was achieved, indicating strong reliability. Reliability was interpreted as: <0.25 (weak), 0.25–0.75 (moderate), 0.75–<1 (strong), and 1 (optimum).

d) Fieldwork:

The investigator conducted interviews individually after introducing himself to each participant and clearly explaining the study's aim, obtaining formal consent beforehand. Participants completed the questionnaire themselves, while the structured interview form was filled in by the investigator, although some adults (20–40 years) preferred to complete it independently. Data collection took place over six months (July–December 2024), with each interview lasting 15–20 minutes, and the investigator meeting 4–5 participants per day, twice weekly (Sundays and Tuesdays, 9:00 am–1:00 pm). Confidentiality, anonymity, voluntary participation, and the right to withdraw at any time were assured, and participants were informed that all collected information would be used solely for research purposes.

III. Administrative Design:

A permission for conducting the study was assured from the dean of faculty of nursing of Fayoum University to the director of the health insurance clinics in Fayoum.

Ethical considerations:

An official permission to conduct the proposed study was obtained from Fayoum University Supreme Committee for Scientific Research

Ethics. Before completing the informed permission form, participants were fully told about the study and their role, and participation in the survey was entirely optional. The study's nature and aim were explained, participants were given the option to withdraw at any time, and the material was kept private so that no third party could access it without their consent. Respect for culture, values, ethics, and beliefs.

IV. Statistical Design:

The information was gathered, coded, and input onto a personal computer. The statistical package for social science (SPSS) version 20 application was used to analyze it. Descriptive statistics were used to provide the data in the form of frequencies and percentages; quantitative variables were described as mean and standard deviation; qualitative variables were described as numbers and percentages; and qualitative variables were compared using the Chi-square test. Two variables can be ranked using the Spearman correlation coefficient. The linear link between two sets of data was demonstrated using Monte Carlo simulation and Pearson product moment correlation (PPMC), whereas >0.05 Non significant $<0.05^*$ significant $<0.001^{**}$ High significant

Results

Table 1 Displays that 78.2% being males. Regarding age, 38.2% were 50 years or more, with a mean age of 57.46 ± 9.38 years. In terms of marital status, 80.0% were married. A total of 56.8% lived in rural areas. Concerning education, 47.3% had an intermediate level of education. With respect to occupation, 63.2% were unemployed. A sufficient income was reported by 58.2% of patients. Additionally, 65.0% were smokers. When asked about caregiving, 72.7% were cared for by their spouses.

Table (2): Regarding family medical history this table shows hereditary kidney diseases were the most frequently, reported condition, present in 88.2% of the patients. Regular use of antibiotics and painkillers for a long time was also common, reported by 80.5% and 76.8% respectively. A family history of hypertension was noted in 62.7%, and 60.0% reported chronic urinary tract infections. Additionally, 53.6% had a history of Hypertension. Only 6.4% of the patients reported that a family member also suffered from kidney failure.

Figure (1): The pie chart shows that more than full of patients had poor knowledge (50.9%) about kidney failure, followed by 30.0% with fair

knowledge and 19.1% with good knowledge.

Figure (2): The pie chart demonstrates that 64.5% of hemodialysis patients report a poor overall quality of life, while only 35.5% report a good quality of life. (71.2%), and those with insufficient income (71.7%). Poor knowledge was also notably higher among smokers (67.7%) compared to non-smokers. Conversely, higher levels of good knowledge were seen among **urban residents (35.8%)**, university-educated individuals (40.9%), employees (37.0%), and non-smokers (34.5%). The chi-square test indicated significant differences across age, marital status, residence, education, occupation, income, and smoking status ($P < 0.001$), while gender

differences were not statistically significant ($P = 0.324$).

Table (16): A statistically significant positive correlation was found between knowledge scores and all QOL domains ($P < 0.001$). The strongest correlations were with **daily living activities ($r = 0.801$)** and **health and functional status ($r = 0.782$)**, followed by total QOL ($r = 0.721$), psychological status ($r = 0.631$), and socio-economic status ($r = 0.482$).

Table (1): Distribution of the studied hemodialysis patients according to their demographic characteristics (N=220)

	N	%
Gender		
Male	172	78.2
Female	48	21.8
Age		
20- 30	31	14.1
30- 40	50	22.7
40- 50	55	25.0
50 or more	84	38.2
Mean± SD	57.46±9.38	
Marital Status		
Single	29	13.2
Married	176	80.0
Divorced	10	4.5
Widow	5	2.3

Residence	125	56.8
Rural		
Urban	95	43.2
Education Level		
Illiterate	15	6.8
Reads& writes	35	15.9
Intermediate	104	47.3
University	66	30.0
Occupation		
Unemployed	139	63.2
Employee	81	36.8
Income		
Sufficient	128	58.2
Insufficient	92	41.8
Smoker		
Yes	143	65.0
No	77	35.0
Person who takes care of you		
Spouse	160	72.7
Children	60	27.3

Table (2): Distribution of family medical history of hemodialysis patients (N=220)

Family Medical History	N	%
Hypertension	138	62.7
Hypotension	73	33.2
Hyperglycemia	118	53.6
Hypoglycemia	102	46.4
Chronic urinary tract infections	132	60.0
Hereditary kidney diseases	194	88.2
Urinary system surgeries	31	14.1
Taken painkillers regularly for a long time	169	76.8
Taken antibiotics regularly for a long time	177	80.5
Hospitalized for kidney failure	79	35.9
Family suffer from kidney failure	14	6.4

Total items not mutually exclusive

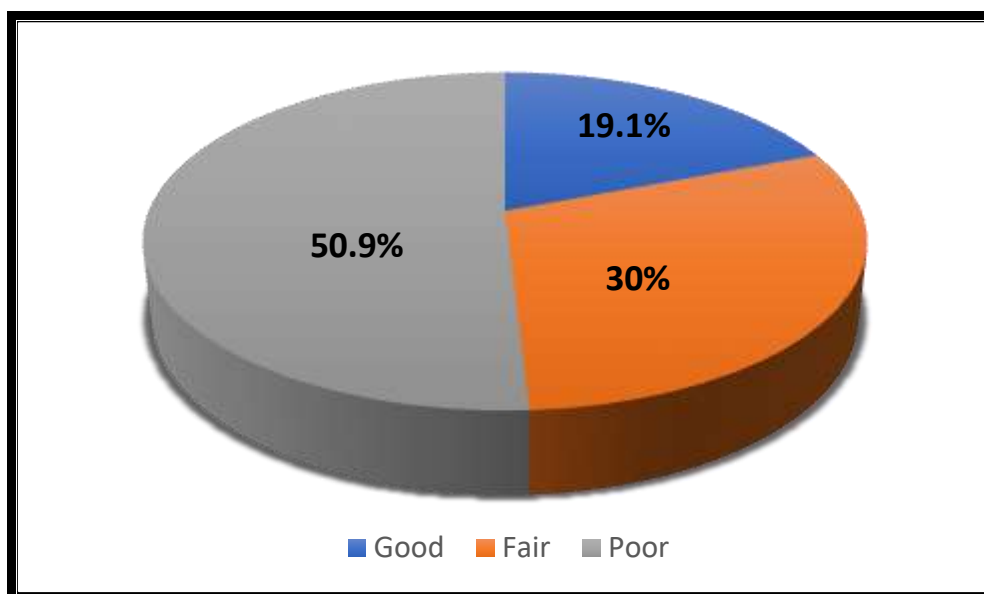


Figure (1): Distribution of the studied sample according to their level of knowledge about kidney failure (N =220)

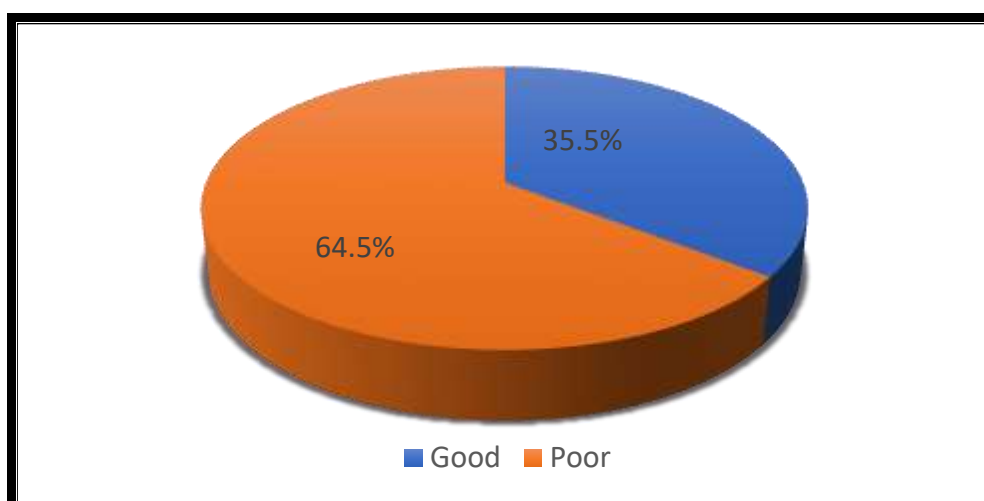


Figure (2) Distribution of the sample under study in accordance with quality of life of hemodialysis patients.

Table (3): Correlation between total score of knowledge and total score of quality of life dimensions among hemodialysis patients (n=220)

Items of QOL of Hemodialysis Patients	Knowledge score	
	r	P-value
Physical quality of life QOL	0.782	<0.001*
Psychological quality of life QOL	0.631	<0.001*
Socio-economic quality of life QOL	0.482	<0.001*
Daily living activities (ADL)	0.801	<0.001*
Total QOL	0.721	<0.001*

Discussion

Haemodialysis patients with end-stage renal disease (ESRD) may encounter a number of stresses that might negatively affect their quality of life, as well as their physical and emotional health. These patients experience stress, social isolation, limits in walking and mobility, reduced physical activity, dependence, and feelings of worry and uncertainty over their health and well-being due to treatment circumstances and the disease's chronic course (*Almutary et al., 2023*). So, this study aims to assess quality of life among hemodialysis Patients.

Part I: Demographic characteristics of hemodialysis patients

According to demographic characteristics among hemodialysis patients; the current study result showed that most of the studied patients being males (**Table 1**). From the researcher point of view, the high percentage of male hemodialysis patients may be attributed to gender-based lifestyle factors such as higher rates of hypertension, smoking, and occupational exposure among males. Additionally, men are more likely to seek treatment at later stages of kidney disease, leading to increased dialysis dependence. This result in the same line with *Yonata*

et al. (2022) who applied a study in Indonesia among 124 patients entitled “Factors Affecting Quality of Life in Hemodialysis Patients” and found that highly percentage of the studied patients were males.

Regarding age among studied patients the current study results reveals that less than two fifths of the studied patients were 70 years or more, with a mean age of 57.46 ± 9.38 years (**Table 1**). This may be explained by the fact that recognised risk factors such kidney infection, diabetes, and hypertension cause ESRD in older people. This result disagrees with a study done in Oman among 205 patients by *Al Salmi et al. (2021)* entitled “Kidney, Disease, Quality of Life among Hemodialysis Patients revealed that less than two-fifths of the patients were in the 40–49 age range.

Concerning to marital status among studied patients the current study result indicated that, most of the studied patients were married (**Table 1**). From the researcher point of view, this result may be due to the average age of patients being in adulthood, where marriage is common. Marriage also provides emotional and social support, which can positively impact treatment adherence and coping with chronic illness, this finding in accordance with a study in Iran among 227

patients done by *Ghafourifard et al. (2021)* entitled “Hemodialysis patients perceived exercise benefits and barriers: the association with health-related quality of life” and showed that more than three quarters of the studied patients were married. while, the current study result disagrees with *Shokrpour et al. (2021)* who applied a study in Iran among 70 patients to evaluate the effect of positive thinking training on stress, anxiety, depression, and quality of life among hemodialysis patients: A randomized controlled clinical trial and reported that highly percentage of the studied patients were single. The current study result showed that more than half of the studied patients lived in rural areas (**Table 1**). This result in the same line with *Nagy et al., (2021)* who conducted a study in Egypt among 84 entitled “Impact of malnutrition on health-related quality of life in patients on maintenance hemodialysis” and reported that more than half of the studied patients lived in rural areas. Concerning education, the present study result showed that less than half of the studied patients had an intermediate level (**Table 1**). These findings supported with *Yuliawati et al., (2023)* a study in Indonesia among 103 patients entitled “Quality of life in end-stage renal

disease patients undergoing hemodialysis and its affecting factors in a hemodialysis unit of general hospital denpasar” and reported that less than half of the studied patients had high school

As regard income, the current study result indicated that more than half of the studied patients had sufficient income (**Table 1**). This result in agreement with *Al-Rubaia et al. (2022)* entitled “Association between dialysis adequacy and quality of life among hemodialysis patients” and reported that highly percentage of the studied patients had sufficient monthly income.

Additionally, the current study result presented that less than two thirds of the studied patients were smokers (**Table 1**). From the researcher’s point of view, this may be due to stress, low health awareness, or as a coping mechanism for the psychological burden of chronic illness such as kidney failure. This finding contrasted with *Marthoenis et al. (2021)* who applied a study in Germany among 213 patients to assess Quality of life, depression, and anxiety of patients undergoing hemodialysis: Significant role of acceptance of the illness and found that more than half of the studied patients where never smoker, more than two fifths of them were

previously smoker, while minority of the were currently smoking

The current study showed that about caregiving, less than three quarters of the studied patients were cared for by their spouses (**Table 1**). From the researcher point of view this result may be attributed to the strong emotional bond and sense of responsibility within marital relationships. Spousal caregivers often provide consistent support with daily care needs, emotional encouragement, and treatment adherence, especially in chronic illnesses like kidney failure. This result in the same line with *Nagarathnam et al. (2021)* in a study in India among 150 patients entitled “Factors Influencing Scales of Burden, Coping Mechanisms, and Quality of Life in Caregivers of Hemodialysis Patients in Andhra Pradesh, India” and reported that highly percentage of the studied caregivers were spouses.

Part II: past and current medical history of hemodialysis patients

As regard medical history of hemodialysis patients, the current study result showed that hereditary kidney diseases were the most frequently reported condition, present in the majority of the studied patients (**Table 2**). This finding disagrees with *Jaberi et al. (2025)* a study in Iran among 226

patients to assess the relationship of death anxiety with quality of life and social support in hemodialysis patients and reported that the majority of the studied patients hadn't family history of kidney disease

The current study result showed that most of hemodialysis patients were regular use of antibiotics and more than three quarters of them use painkillers for a long time (**Table 2**). From the researcher's point of view, the frequent use of antibiotics and painkillers among hemodialysis patients may be attributed to their high susceptibility to infections and chronic pain conditions. This reflects the need for careful medication management to prevent complications due to impaired drug clearance.

In a study in Palestine among 277 patients entitled “Pain management evaluation in maintenance hemodialysis patients” and found that one third of the studied patients were not prescribed any pain medications, and two thirds of them were treated with analgesics during the year prior to the interview, *Dreither et al. (2021)*

The current study results revealed that less than two thirds of the studied patients had family history of high blood pressure and chronic urinary tract infections respectively

(Table 2). From the researcher's point of view, a family history of high blood pressure among hemodialysis patients may indicate a genetic predisposition to hypertension, which is a major contributing factor to kidney failure. This highlights the importance of early screening and lifestyle interventions in at-risk families

These results were supported with **Aloob, & Kafi (2024)** in a study among 103 patients in Sudan entitled “The Bacterial Causes Urinary Tract Infection among Hemodialysis Patients in Khartoum State, Sudan” and revealed that slightly higher rate of urinary tract infection among less than half of the studied females than less than two fifths of the studied males. While, **Crew et al. (2019)** who mentioned that, less than one third of the studied patients were hypertensive, and minority of them had urinary tract infection. The current study finding agree with **Ranadive et al. (2019)** who conducted study in New Delhi among 50 patients entitled "knowledge and expressed practices of dietary regulation among chronic renal failure patients undergoing hemodialysis" and reported that more than two thirds of the studied sample had hypertension

The present study result indicated that low percentage of the patients

reported that a family member also suffered from kidney failure **(Table 2)**. From the researcher's point of view, the low percentage of patients reporting a family history of kidney failure may indicate that environmental and lifestyle factors, such as poor diet, hypertension, or diabetes, play a more significant role than genetic predisposition in the development of kidney failure among the studied group. The present study results in the same line with **Deif et al. (2015)** who conducted study in Egypt among 60 patients entitled "effect of an educational program on adherence to therapeutic regimen among chronic kidney disease stage5 (CKD5) patients under maintenance hemodialysis" and reported that high percentage of the studied patients hadn't family members suffered from renal failure. And supported with **Ali et al. (2022)** in a study in Egypt among 70 patients entitled “Factors affecting coping mechanism among patients undergoing hemodialysis life long program” and reported that less than three quarters of the studied patients' family members hadn't hemodialysis.

Regarding overall knowledge level about kidney failure; the present study result showed that half of the patients demonstrated a poor level

of understanding. Meanwhile, less than one third of them had a fair level of knowledge, and less than one fifth of them showed good knowledge about kidney failure (**Table 6, Figure 1**). From the researcher investigator point view this result may be due to more than one tenth the studied sample were reads& writes and less than half of them had Intermediate level of education and this may affect their ability to learn so it is a must to attend an educational programs and courses to enhance their knowledge related to the kidney failure.

The present study finding in the same line with **Whdan et al. (2019)** who conducted a study in Egypt among 80 patients entitled "Home Self-Care for Client with Hemodialysis " and found that more than half of patients had poor level of knowledge. Also, **Kumela et al. (2019)** who mentioned that more than half of the studied patients had poor level of knowledge. Additionally, **Hamza et al. (2021)** who reported that high percentage of the studied patients had poor knowledge score also, **Ahmed et al. (2021)** who denote that the high percentage of patients had unsatisfactory level of knowledge about hemodialysis.

The present study disagrees with **Kumela et al. (2019)** who

mentioned that more than one third of the participants had average knowledge level while **Erandika et al. (2022)** who conducted study in Sri Lanka among 100 patients entitled "knowledge and patient satisfaction among hemodialysis patients attending to emergency dialysis unit" and mentioned that majority of the patients had knowledge about the HD treatments and had enough knowledge on dialysis. However, about one fifth of them had unsatisfactory level of knowledge.

As regard overall quality of life among hemodialysis patients, the current study result demonstrates that less than two thirds of hemodialysis patients reported a poor overall quality of life, while more than one third of them reported a good quality of life (**Figure 3**). From the researcher's point of view, this could be due to the restrictive nature of dialysis schedules, dietary limitations, chronic fatigue, and the psychological impact of living with a life-threatening condition.

These findings in the same line with **Asghar et al. (2022)** who conducted a study in Pakistan among 118 patients entitled "A cross-sectional research conducted during the ongoing COVID-19 pandemic to evaluate quality of life variables

among hemodialysis patients in a poor nation” and reported that total QoL of the study population was found quite low. And similar with *Hejazi et al. (2021)* in Iran among 311 participants entitled “Components of quality of life in hemodialysis patients from family caregivers’ perspective: a qualitative study” and found that the studied patients had poor level of QoL. And harmony with *Khanam et al. (2025)* reported that highly percentage of participants had low quality of life and rest of the participants had high quality of life. While, contrasted with *Yonata et al. (2022)* who Indonesia among 124 patients entitles “Factors affecting quality of life in hemodialysis patients” and discovered that most hemodialysis patients had a high standard of living.

Concerning correlation between knowledge score and quality of life dimensions among hemodialysis patients, the results of the current investigation demonstrated a statistically significant positive association between knowledge scores. and, all QOL domains ($P < 0.001$). The strongest correlations were with **daily living activities ($r = 0.801$)** and **health and functional status ($r = 0.782$)**, followed by total QOL ($r = 0.721$), psychological status ($r = 0.631$), and

socio-economic status ($r = 0.482$) (**Table 16**).

Conclusion

Over half (50.9%) of hemodialysis patients, had inadequate understanding, according to the research about kidney failure, followed by less than one-third (30.0%) with fair knowledge. Overall, more than half (64.5%) of patients reported a poor total quality of life, while less than half (35.5%) reported good quality of life. The study revealed that patients with, higher levels of good knowledge had been significantly better quality of life. Furthermore, a statistically significant, positive, correlation was found between knowledge scores and all quality of life domains, with the strongest correlations observed with daily living activities ($r = 0.801$) and health and functional status ($r = 0.782$).

Recommendations

The following recommendations are made in light of the results of the current study:

For out patients’ clinic Management:

1. Develop educational programs aimed at enhancing patient knowledge about kidney disease, its management and the impact on quality of life.
2. Implement regular assessments of patients’ quality of life,

especially focusing on daily living activities and psychological well-being, to provide timely interventions.

3. Provide psychosocial support through counseling services to address anxiety, depression and other psychological issues prevalent among hemodialysis patients.
4. Ensure that enough financial resources and support are available for patients with low income to improve their access to healthcare and daily living essentials.

For Healthcare Providers:

1. Encourage active patient participation in managing their disease by providing clear information on dietary habits and the importance of adhering to medical advice.
2. Train healthcare professionals to better recognize the psychological challenges faced by patients and offer targeted interventions to improve their emotional well-being.
3. Promote community outreach programs to raise awareness of hemodialysis patients' needs and improve social support systems, particularly for those living in rural areas.

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University Students' Awareness and Perception of Artificial Intelligence Application in Nursing Education

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Abstract

Background: Artificial intelligence (AI) is rapidly emerging across various sectors, particularly higher education. AI is instrumental in improving educational quality by strengthening communication skills, enhancing global connectivity, and supporting curriculum development. Ultimately, AI promotes personalized learning, which leads to better academic performance. **The aim of the study:** To assess university students' awareness and perception of artificial intelligence application in nursing education. **Study design:** The current study adopted a descriptive research design. **Subjects:** Random sample of a total of 500 students were enrolled in faculty of nursing, Menoufia National University. In different academic levels. **Setting:** The setting for the study was the Faculty of Nursing, Menoufia National University. **Tools:** Two tools were used for data collection. Data were collected using two instruments. **Tool I:** Students' awareness regarding Artificial Intelligence Questionnaire sheet. **Tool II:** Nursing students' attitude towards application of artificial Intelligence in Education. **Results:** Over half (51.2%) of the students surveyed attained a satisfactory total level of awareness concerning the impact of AI on their academic achievement, while 35.8% of them had semi satisfactory level and only 13% of them had unsatisfactory level. The result implies that Artificial Intelligence has a favorable influence on the academic performance of the students in the study. **Conclusion:** Findings of the current study concluded that, the students had significantly higher awareness regarding the impact of artificial intelligence applications on academic achievement. **Recommendations:** Artificial intelligence should be included practiced in academic courses to enhance interactive learning and critical thinking in studying.

Keywords: Awareness, perception, nursing students.

Introduction

In recent years, with the continuous progress of computer technology and algorithms, Artificial Intelligence (AI) has demonstrated significant breakthroughs in the domains of image recognition and natural language processing, intelligent interaction, etc., and can even surpass the level of human intelligence. The excessive development of Artificial Intelligence AI had a far-reaching effect on all domains of life (**Gao et al., 2020**).

Artificial Intelligence (AI) is revolutionizing many sectors, and its effectiveness on academic education achievement is profound and far-reaching. The deployment of AI applications within educational environments enables institutions to elevate individualized learning, boost student performance, and optimize institutional workflows (**Wang et al., 2021**).

Artificial Intelligence (AI) methodologies are currently utilized for generating pioneering instruments in academic education, that can enhance the way students learn, engage, and succeed in their education pursuits through the plan of the institutions of high education and scientific research (**August et al. 2021**). A key advantage of integrating AI tools into academic

instruction is their ability to minimize the time and labor necessary for both teaching and processing scientific data. These systems allow educators to dedicate their time to more critical professional duties by automating routine aspects of the workflow, such as the presentation and arrangement of text. (**Pabba et al. 2021**).

AI-enabled instruments furnish adaptive learning technologies that are specifically designed to address individual student needs , allows educators to effectively tailor both teaching methods and necessary interventions. (**Ahmadi, S 2023**). These tools can analyze extensive datasets to identify proficiencies, and areas of deficit., enabling educators to customize teaching strategies and interventions effectively (**Chen, et al., 2020**). Furthermore, AI streamlines administrative duties, including grading and record management, thereby liberating educators to concentrate on teaching and mentoring (**Zawacki et al 2019**).

There have been numerous studies indicates that using of AI in education can lead to improved student engagement, motivation, and academic performance. (**Akgun S et al (2021)**). Moreover, AI-powered analytics furnish educators with

crucial data on student development and deficit areas, enabling prompt and effective support for those struggling. This capability has fueled a significant increase in research interest aimed at examining AI's effect on student learning experiences. **(Ma, Y et al. 2018).**

In the 21st century, higher education and scientific research institutions are strategically transforming their programs to align with rapid global, technological, and revolutionary changes. Consequently, these institutions have integrated and invested in Artificial Intelligence (AI) techniques across their activities to fulfill their three core functions: teaching, scientific research, and community service. **(August et al. 2021).**

Universities are vital in enhancing the quality of both undergraduate and postgraduate educational services to maximize student satisfaction. Furthermore, adopting intelligence techniques is crucial for improving service quality and fostering future competitiveness **(Ahmadi,S 2023).** While AI offers many advantages, therefore mitigating these potential risks and harnessing AI's full academic potential necessitates the collaboration of educators, policymakers, and relevant stakeholders. **(Stanford University,**

2019). Additionally, by identifying barriers such as a lack of skills, knowledge, or time, educators can implement strategies to help students overcome these challenges, fostering greater engagement and adoption of AI tools in nursing education. **(Han S et al. 2025)**

Aim of the study

This study aimed to assess University Students' Awareness and Perception of Artificial Intelligence Application in Nursing Education

Research Questions: -

- What is level of knowledge related to AI application in nursing education among university students?
- Are university students aware of impact of artificial intelligence applications on their cognitive level?
- How do university students perceive the benefits, risks, and challenges associated with the use of AI tools in their academic achievement?

Subjects and Method

Study design:

A descriptive approach was used to carry out this study.

Setting:

This study was performed within at the Faculty of Nursing, Menoufia National University, which is governed by the Ministry of Higher Education and Scientific Research.

Subjects

Stratified Random Sampling a total of (553) students (179 students level 1, 374 students level 2). Total number of students enrolled in Faculty of Nursing, Menoufia National University was (1700). In different academic levels (level 1, 2). using Computer-generated random numbers as selection tool. The sample size represents (32.5%) of total number of students

Tools of the study:

To obtain the necessary data, two tools were specifically constructed.

Tool (1): Students' awareness regarding Artificial Intelligence Questionnaire sheet: it was formulated by researcher after reviewing the related literature review. It consisted of two parts:

Part 1: Data related to socio-demographic data of students as age, academic level.

Part 2: Data related to previous dealing with artificial intelligence technology, such as: previous courses regarding artificial intelligence and previous using of academic learning based on artificial intelligence

Tool (2): Nursing students' attitude towards application of artificial Intelligence in Education: It was formulated by the researcher after conducting a thorough literature review. This tool intended to assess the impact of artificial

intelligence on their cognitive; skill based learning outcome, perceived benefits and risks, challenges and difficulties in using AI in academic achievement

Scoring system:

The scoring system for the study instrument utilized a 3-point Likert scale.

- One mark was given for no answer.
- 2 marks for somewhat answer.
- 3 marks for yes answer.

The total score impact of AI on academic achievement. Calculated as following:

- Less than 60% considered low or no impact of AI on academic achievement.
- From 60- <80% considered moderate no impact of AI on academic achievement.
- From 80-100 % considered high impact of AI on academic achievement.

Statistical design

Data were analyzed using SPSS software version (26). Descriptive statistics, means, percentages, and paired t-tests were applied; significance level was set at $p \leq 0.05$.

Method

The study was accomplished through the following steps.

1) Prior to conducting the study, the necessary permissions were granted

by the responsible authorities before the study commenced.

2) Ethical and legal considerations:

1- Ethical approval code 726-8-2025 was obtained from the Faculty of Nursing Ethics Committee prior to conducting the study. Nursing Ethical Committee.

2- The methodology was designed to ensure that the participants experienced no harm or discomfort whatsoever.

3- Confidentiality and privacy were fully maintained throughout the data collection process.

4- Informed consent was obtained from all students to participate, and they were explicitly assured of their right to discontinue their involvement at any point.

5- The research instrument was subjected to review by a panel of five subject-matter experts to verify its content validity and overall clarity (Tool I, II).

6-A preliminary pilot study involving 50 students (10% of the sample) was conducted to evaluate the instrument's clarity, applicability, and feasibility, leading to necessary revisions. After which the necessary modifications were made. The pilot participants were excluded from the main study and replaced with a new, independent sample of nurses.

7) Development and subsequent modification of the study tools were

guided by an extensive examination of related literature.

8) Data collection carried out via online surveys or printed questionnaires, ensuring confidentiality and voluntary participation.

9) "Data collection was carried out over a period of three months, starting in October 2025 and ending in November 2025."

Results

Table (1) Frequency distribution of the studied students according to their demographic characteristics (n=553). The demographic analysis (N=553) revealed that the majority of participants (82.1%) fell within the 20 to 25-year age bracket, years. The sample exhibited a nearly equal gender distribution were female (n=265). Furthermore, more than half of the students (64.6%) were enrolled in the 2nd academic level.

Table (2) distribution of the studied students according to their previous experience with artificial intelligence applications (N=553). This table shows that 72.0%, 60.4%, & 57.7% of the studied students had previously participated in courses related to AI applications, previously used AI technology, and had been previously trained by the university on AI applications respectively.

Table (3): The distribution of student responses regarding the

cognitive effects of Artificial Intelligence (AI) (n=553). It reveals that artificial intelligence impact on cognitive levels among students as 83.2%, 74.0%, & 74.0% of the studied students had used AI technologies in the educational process. All P-values < 0.05 it indicates that AI technology had a positive impact on their understanding and academic achievement, and AI technology enhanced their ability to innovate and be creative in education and academic achievement, respectively.

Table (4): Attitudes of the students regarding the impact of artificial intelligence on their skills levels (n=553). It shows that regarding artificial intelligence impact on skills levels among students, 72.7%, 69.1%, & 68.9% of the studied students had used AI-driven learning platforms in their academic education, used AI-based virtual personal assistants in their academic achievement and education, and AI technology facilitated easier access to various educational resources, respectively. All items show very significant results ($p < 0.001$), confirming that AI has a strong, non-random impact on students' academic skills and experiences.

Table (5) distribution of the students regarding challenges and difficulties in using AI in academic achievement (n=553).this table shows that regarding Challenges and Difficulties in Using AI in Academic Achievement among students 87.3%, & 70.9% of the studied students would recommend using AI technology in academic achievement to their peers and faced challenges such as application crashes when using AI technology, respectively.

Figure (1): distribution of the sample students according to total levels of artificial intelligence impact on academic achievement (n=553). Shows that 51.2% of the studied students had high level of Artificial Intelligence impact on academic achievement, while 35.8% of them had moderate level and only 13% of them had low level. That indicates a positive impact of Artificial Intelligence impact on academic achievement.

Table (1): Frequency distribution of the studied students according to their demographic characteristics (n=553)

Items	NO.	%
Age (year)		
less than or equals 20 years old	86	15.5
more than 20 to 25 years old	454	82.1
more than 25 years old	13	2.4
Mean ± SD	22.12±1.76	
Gender		
Male	288	52.1
Female	265	47.9
Academic levels		
1	179	32.3
2	374	67.6
Mean ± SD	3.21±0.90	

Table (2): Distribution of the studied students according to their previous experience with artificial intelligence applications (N=553)

Items	Yes		No	
	No.	%	No.	%
Have you previously participated in courses related to AI applications?	398	72.0	155	28.0
Have you previously used AI technology?	334	60.4	219	39.6
Have you been previously trained by the university on AI applications?	319	57.7	234	42.3

Table (3): The distribution of student responses regarding the cognitive effects of Artificial Intelligence (AI) (n=553)

		No		Somewhat		Yes		Chi-square	
		No.	%	No.	%	No.	%	X ²	P-value
1-	Have you used AI technologies in the educational process?	72	13.0	21	3.8	460	83.2	625.44	<0.001*
2-	Does the use of AI technology improve the quality of your academic achievement?	68	12.3	145	26.2	340	61.5	213.27	<0.001*
3-	Does AI technology have a positive impact on your	88	15.9	56	10.1	409	74.0	413.52	<0.001*

	understanding and academic achievement?								
4-	Do you believe that the use of AI in education increases your participation and interest in lessons?	63	11.4	138	25.0	352	63.6	244.02	<0.001*
5-	Do AI techniques negatively affect the relationship between the student and the teacher?	110	19.9	111	20.1	332	60.0	177.44	<0.001*
6-	Has AI technology helped you save time and effort in education and academic achievement?	69	12.5	126	22.8	358	64.7	254.24	<0.001*
7-	AI technology enhanced your ability to innovate and be creative in education and academic achievement?	64	11.5	80	14.5	409	74.0	411.43	<0.001*

χ^2 (significant relationship) *P-value* (statistically significant)

Table (4): Attitudes of the students regarding the impact of artificial intelligence on their skills levels (n=553).

Items	No		Somewhat			Yes	Chi-square	
	No.	%	No.	%	No.	%	X ²	P-value
1- Have you used AI-based recommendation systems in your academic achievement and education?	86	15.6	154	27.8	313	56.6	147.26	<0.001*
2- Have you used AI-based virtual personal assistants in your academic achievement and education?	100	18.1	71	12.8	382	69.1	320.23	<0.001*
3- Have you used AI-based adaptive learning systems in your academic achievement and education?	82	14.8	117	21.2	354	64.0	237.57	<0.001*

4- Have you used AI-based automated evaluation systems in your academic achievement and education?	101	18.3	95	17.2	357	64.5	242.71	<0.001*
5- Have you used AI-based tools in academic writing?	112	20.3	119	21.5	322	58.2	154.35	<0.001*
6- Have you used AI-driven learning platforms in your academic education?	67	12.1	84	15.2	402	72.7	386.33	<0.001*
7- Is the use of productivity tools that operate with artificial intelligence technology in education and academic achievement?	92	16.6	134	24.2	327	59.2	170.41	<0.001*
8- Have you noticed an improvement in your grades since you started using AI technology?	87	15.7	100	18.1	366	66.2	269.02	<0.001*
9- Has AI technology helped you better understand academic material compared to previous educational methods?	60	10.8	127	23.0	366	66.2	280.73	<0.001*
10- Has AI technology facilitated easier access to various educational resources?	53	9.6	119	21.5	381	68.9	326.55	<0.001*
11- Has AI technology made it easier to understand complex academic topics compared to traditional learning methods?	87	15.7	112	20.3	354	64.0	235.95	<0.001*

χ^2 (significant relationship) *P*-value (statistically significant)

Table (5) Distribution of the studied students regarding challenges and difficulties in using AI in academic achievement (n=553)

Items	No		Somewhat		Yes		Chi-square	
	No.	%	No.	%	No.	%	X2	P-value
1- Have you faced challenges such as application crashes when using AI technology?	104	18.8	57	10.3	392	70.9	392.92	<0.001*
2- Have you encountered difficulties in using AI applications in academic	152	27.5	158	28.6	243	43.9	28.10	<0.001*

achievement?								
3- Do you suffer from the excessive cost of subscription fees for AI applications in education?	157	28.4	61	11.0	335	60.6	209.72	<0.001*
4- Is there an over-reliance on AI technology?	140	25.3	117	21.2	296	53.5	102.90	<0.001*
5- Do you have concerns about the privacy and security of your data when using AI technology?	110	19.9	110	19.9	333	60.2	179.85	<0.001*
6- Would you recommend using AI technology in academic achievement to your peers?	70	12.7	0	0.0	483	87.3	170.41	<0.001*

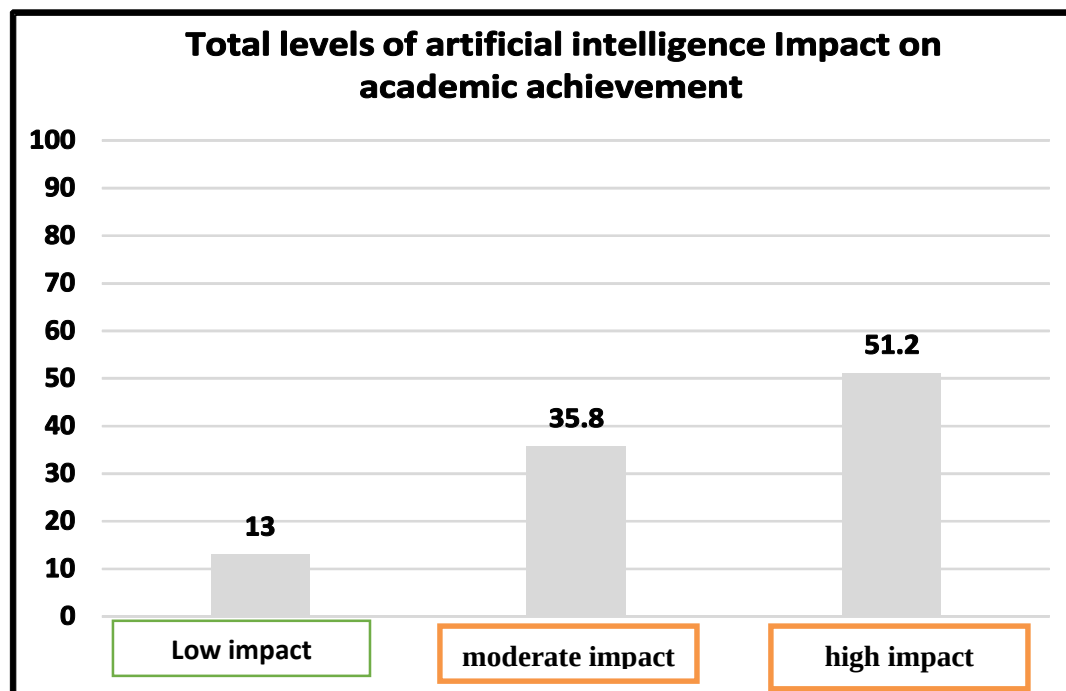
 X^2 (significant relationship) P -value (statistically significant)

Figure (1): Distribution of the sample students according to total levels of artificial intelligence impact on academic achievement (n=553)

Discussion

The current study aimed to assess university students' awareness and perception according to the usage of AI in education. Concerning the participants' demographic characteristics of the studied students this study clarified that mostly of involved students were male, this may be due to male students report higher levels of self-efficacy and a more positive attitude towards complex technology use and adoption compared to female student and more than half of them were at 2nd academic level may be due to there was more experience in usage of AI rather than 1st academic level students.

According to previous participation in studies or activities related to artificial intelligence, the study clarified that almost thirty-three of the participant engaged on previous activities regarding AI may be related to students use AI-driven learning platforms in their academic education as that assistants in their academic achievement and education, and AI technology facilitated easier access to various educational resources , Similarly the study results, **(Akinwalere et .al, 2022)**_also conducted a study entitled by “Artificial intelligence in higher education: Challenges and opportunities”

In relation to knowledgeable and cognitive skills level, the study reflects a positive impact of AI technology on understanding and academic achievement of students'' and AI technology enhanced their ability to innovate and be creative in education and academic achievement, respectively as AI helps students synthesize vast amounts of nursing literature and research data. Synchronizing with this results, **(Wei et al (2025)** conducted a study which showing a positive effect of applications AI in cognitive skills among high education student

Regarding to practical skills the study reveals that students use AI-driven learning platforms in their academic education, used AI-based virtual personal assistants in their academic achievement and education, and AI technology facilitated easier access to various educational resources, respectively may be related to AI-driven tools promote self-regulated learning, allowing nursing students to master complex clinical scenarios independently. Also **(González 2021)** Harmony with the study results regarding to practical skills regarding to artificial intelligence applications

Regarding Challenges and Difficulties in using AI in Academic Achievement among students revealed that more than thirty-three of the participants recommend using

AI technology in academic achievement to their peers and faced challenges such as application crashes when using AI technology related to engagement of AI in almost in all fields of life nowadays, respectively. This result agrees with (Pedró 2020), “Applications of artificial intelligence to higher education: Possibilities, evidence, and challenges”

Conclusion

In conclusion, answered the research question which confirmed awareness of the students about using artificial intelligence in education. Additionally, the results strongly indicate that implementing AI technologies and applications in education holds a transformative capacity to significantly improve the effectiveness and quality of instructional and learning activities.

Recommendations

The following recommendations are made in light of the results of the current study:

1. Enhance AI Literacy: using of AI must be widely used in education and promoting the ethical and optimal utilization of intelligent technologies to build a conscious generation.
2. Embed nursing-AI expertise into faculty training to align teaching methods with tech advancements and maximize AI's educational impact."

3. Develop data protection policies to secure student information and actively mitigate algorithmic biases within AI systems.

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