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Effect of Swaddling Technique Versus Massage Therapy on Clinical Outcomes for Neonates Undergoing Invasive procedures

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Abstract

Background: Neonates undergoing invasive procedures often experience significant pain and discomfort, which may negatively affect their physiological stability clinical outcomes. Non-pharmacological interventions such as swaddling and massage therapy are commonly used to reduce pain and improve neonatal comfort. **Aim of the present study was to** evaluate the effect of swaddling technique versus massage therapy on clinical outcomes for neonates undergoing invasive procedures. **Design:** Randomized controlled study design. **Subjects and method:** A purposive sampling of 195 neonates divided into three equal groups; control, swaddling and massage groups. **Setting:** Neonatal intensive care unit of Tanta Main University Hospital and Kafr El Sheikh University Hospital. Four tools were used in this study: **Tool (I):** Neonatal bio-sociodemographic data assessment sheet, **tool (II):** Neonatal infant pain scale, **tool (III):** Physiological parameters follow-up chart and **tool (IV):** COMFORT neo scale for neonates. **Results:** During the invasive procedure, the neonates in the swaddling and massage groups had lower mean total pain scores (1.25 ± 0.66 , 1.68 ± 0.50) respectively, compared to the control group (1.74 ± 0.48) with high statistically significant differences, Also, most of the control group had discomfort state compared to the other two groups during the invasive procedure. **Conclusion:** Both swaddling and massage are more effective than routine care in improving clinical outcomes of neonates in terms of minimizing pain and discomfort during and shortly after invasive procedures, with swaddling showing the greatest benefit. **Recommendation:** Incorporate swaddling and massage techniques into routine care protocols for neonates undergoing invasive procedures.

Key words: Clinical Outcomes, Invasive Procedures, Massage therapy, Neonates, Swaddling technique.

Introduction

Significant pain and discomfort are frequently experienced by neonates undergoing invasive procedures, which may have effects on their development and health. One of the most important aspects of neonatal care is managing invasive procedural pain and discomfort in this fragile population. Swaddling and massage therapy are two popular non-pharmacological interventions that have been investigated to reduce pain and encourage relaxation and comfort (**Barge et al., 2024**).

Exposure to repeated pain resulting from invasive procedures that can be defined as a procedure causing skin or mucosal damage by inserting or removing foreign bodies and disturbing the body integrity of a neonate. It can have serious short and long term consequences for neonates, particularly due to the immaturity of their central nervous systems. In the short term consequences, painful stimuli may lead to physiological instability, including fluctuations in heart rate, respiratory rate, oxygen saturation, and elevated levels of stress hormones such as cortisol (**Magor, et al., 2024**). Behaviorally, neonates often exhibit increased crying, irritability, and disrupted sleep patterns. On the other hand, the long term, inadequate procedural pain management has been

associated with altered pain sensitivity, impaired brain development, and adverse neurodevelopmental, cognitive, and behavioral outcomes. Repeated exposure to pain during this critical period of brain maturation may also negatively affect neuronal organization and stress regulation systems. Therefore, emphasizing the necessity of effective and timely pain management in neonatal care is very significant issue (**McPherson et al., 2020; Campbell-Yeo et al., 2022; WHO, 2022**).

Neonates are capable of perceiving pain due to the functional development of pain pathways, even though their nervous system is still immature. Studies have shown that premature and term infants may exhibit heightened sensitivity to painful stimuli because of incomplete descending inhibitory pathways. This can result in exaggerated physiological and behavioral responses to pain compared to older children (**Fitzgerald & McKelvey, 2020; Campbell-Yeo et al., 2022**).

Pharmacological pain management in neonates is often limited due to concerns about drug safety, immature hepatic and renal function, and potential adverse effects. Therefore, non-pharmacological interventions are considered essential components of neonatal invasive procedural pain

management. These methods are safe, cost-effective, and can be easily implemented in clinical settings without significant side effects. Also, it is often used as first-line or adjunctive approaches to reduce invasive procedural pain and improve neonatal comfort (**Johnston et al., 2021; Shah & Ohlsson, 2022**).

Non-pharmacological interventions such as swaddling and massage therapy are considered integral components of developmental care as both help to enhance physiological stability and support neurodevelopmental outcomes (**Altimier & Phillips, 2020; Coughlin, 2021**).

Swaddling technique involves wrapping the neonate snugly in a blanket or cloth, restricting limb movement while providing a sense of security and warmth. This technique mimics the intrauterine environment, which can be inherently soothing for neonates. The primary effect of swaddling is reducing physiological and behavioral signs of distress, such as crying, agitation, and increased heart rate. It also contributes to decreased cortisol levels, indicating a reduction in stress response. Swaddling can promote better sleep patterns, improve oxygen saturation, and foster a sense of safety, which collectively can lessen the pain

perception during invasive procedures (**Dixley and Ball, 2022**).

Massage therapy involves systematic tactile stimulation of the neonate's skin using gentle, patterned movements. This intervention has several beneficial effects on neonates, especially those undergoing stressful or painful invasive procedures. Massage can stimulate the release of endorphins and serotonin, which are natural pain-relieving and mood-enhancing chemicals, thereby reducing perceived pain and discomfort. Additionally, massage therapy can improve autonomic stability by lowering heart rate and respiratory rate, enhancing sleep quality, and promoting neonatal weight gain and growth (**Weerakul et al., 2025**).

Nurses play a vital role in caring of neonates undergoing invasive procedures through implementing appropriate developmental care, ensuring their safety, comfort, and developmental needs are met. Invasive procedures such as venipuncture, peripheral IV insertion and blood sampling can cause significant pain and discomfort. Nurses are responsible for preparing the neonates physically and emotionally. Also, nurses are employing non-pharmacological interventions such as swaddling and massage to promote relaxation,

comfort and stability. Overall, nursing care that incorporates swaddling and massage not only alleviates procedural distress but also supports the neonate's overall well-being, facilitating smoother procedures and faster recovery (**Neto et al., 2025**) (**Konukbay et al., 2024**).

Significance of the study

Swaddling and massage therapy are considered important non-pharmacological interventions that have gained renewed attention after being previously underutilized. The use rate for non-pharmacological interventions was 18%, whereas the use rate for pharmacological interventions was 2% indicating their advantages long term effects in comparison to analgesics (**khalil et al., 2020**).

Neonates admitted to NICU settings are frequently exposed to multiple painful invasive procedures, with an average ranging from 7.5 to 17.3 procedures per day. Given the potential adverse short- and long-term effects on neonatal physiological stability and neurodevelopment, hence, there is a critical need for safe and effective pain management strategies. Swaddling has been shown to be an effective technique in alleviating pain among both preterm and full-term neonates. In addition, it contributes

to enhancing physiological stability, supports the development of central regulatory systems, reduces crying, and promotes better sleep quality (**Ho et al., 2016**; **O'Brien et al., 2021**).

Studies have shown that massage can relieve the pain of neonates, improve their sleep, and have a positive impact on the growth and development of neonates by stimulating the release of endorphins and serotonin, (**Liu et al., 2022**). So, the aim of this study was to evaluate the effect of swaddling technique versus massage therapy on clinical outcomes for neonates undergoing invasive procedures.

Aim of the Study

Evaluate the effect of swaddling technique versus massage therapy on clinical outcomes for neonates undergoing invasive procedures.

Research hypotheses

-Implementation of swaddling technique for neonates undergoing invasive procedures is expected to improve their clinical outcomes than control group.

-Implementation of massage therapy for neonates undergoing invasive procedures is expected to improve their clinical outcomes than control group.

Operational definition:

Clinical outcomes: Refers to decrease adverse effects that may

occur during invasive procedures which include pain, discomfort level and instability of physiological parameters such as heart rate, respiratory rate and oxygen saturation.

Subjects and methods

Research design

Randomized controlled design was used in the study.

Setting

The study was conducted at neonatal intensive care unit of Tanta Main University Hospital and Kafr El Sheikh University Hospital which is affiliated to Ministry of Higher Education and Scientific Research.

Subjects

A sample of (195) neonates was collected from the above previously mentioned settings and fulfilling the inclusion criteria.

Inclusion criteria:

- Full term neonates whose gestational age between 38 and 42 weeks.
- Neonates who exposed to invasive procedure (intravenous cannula insertion and venous blood sample).

Exclusion criteria:

- Neonates who had congenital anomalies, intracranial hemorrhage, chromosomal abnormalities, seizures, and cardiac defects
- Neonates who received analgesic or muscle relaxant within four hours

before the intervention of cannula insertion or venous blood sample.

- Neonates on mechanical ventilators. The sample size calculation was done using Epi-Info software statistical package according to the total number of neonates admitted per year at the previously mentioned settings which was 496. The calculation is based on confidence level 95% with the margin of error 5%.

The studied neonates were selected and divided into three equal groups by simple random sampling (65) for each;

- **Group I (control group):** Who received routine care which refers to standard NICU nursing management such as vital signs assessment and pain assessment during invasive procedure invasive procedures (e.g., peripheral intravenous cannulation and venipuncture for blood sampling), without any additional non- pharmacological pain relief interventions.
- **Group II (swaddling group):** Who received swaddling technique.
- **Group III (massage group):** Who received massage therapy.

Tools of the study

Four tools were utilized as follows:

Tool I: Neonatal bio-socio-demographic data assessment sheet: It was developed by the researcher after extensive review of

related literatures (Taplak & Bayat, 2021) (Doaa & Amal, 2022): It include Bio- sociodemographic data of neonates such as gestational age, type of delivery, postnatal age, type of feeding, weight, length, medical diagnosis, type of invasive procedure, duration of invasive procedure and medications used for each neonate.

Tool II: Neonatal Infant Pain scale (NIPS)

It was developed by Lawrence et al., 1993. It aimed to assess six behavioral reactions to painful procedures in full-term neonates. It investigates crying, facial expressions, breathing pattern, arm movement, leg movement, and the state of arousal in neonates. For an example: Crying (0) point indicates no crying, (1) point indicates whimper, (3) indicates vigorous crying (Sarhangi et al., 2021)

Scoring system: The score range of NIPS was 0-7, with 0-2 points indicated no pain, 3-4 points indicated mild to moderate pain and 5-7 points indicated severe pain.

Tool III: Physiological Parameters Follow-Up Chart. It was developed by the researcher after reviewing recent literatures (Eliza & Dariusz, 2022) (Matteo Bruschetti et al., 2022). It contained three items including heart rate, respiratory rate and oxygen saturation.

Tool IV: COMFORT neo Scale for Neonates: It was an adopted form (Emanuel et al., 2018). It was used to determine comfort state in neonates admitted at (NICU) and composed of 6 dimensions: Alertness, calmness/agitation, facial tension, muscle tone, body movement and crying (only in spontaneously breathing neonates). In this study, the dimension of “crying” was evaluated because neonates had spontaneous breathing and 6 dimensions in total were rated.

Scoring system

As responses were on a (1) to (5) Likert scale, for an example, alertness was scored as (1) for quiet sleep with eyes closed and no facial movement, (2) for active sleep with eyes closed and facial movement, (3) for quietly awake with eyes open and no facial movement, (4) for actively awake with eyes open and facial movement, and (5) for awake and hyper alert.

Total scores ranged from 6 to 30. Scoring 13 points and below on the scale indicated that the neonate was in comfortable state and the scoring between 14-30 indicated that the neonate was in uncomfortable state (Van Dijk et al., 2009).

Method

The study was accomplished through the following steps:

Administrative process:

An official permission to conduct the study was obtained from the dean of the Faculty of Nursing to the manager of the neonatal intensive care unit at Kafr Elsheikh and Tanta University Hospital after explaining the aim of the study to obtain their approval and cooperation to conduct the study.

Ethical and legal considerations:

- a. Ethical approval was obtained from the Faculty of Nursing Scientific Research Ethical Committee, Tanta University, prior to conducting the study code number 400-3-2024.
- b. The nature of the study would not cause any harm or pain to the entire sample.
- c. Informed consent to participate in the study was obtained from parents of the neonates.
- d. Confidentiality of information about neonates was maintained, and parents had the right to withdraw their neonates from the study at any time.

Tools development:

Four tools were developed and modified based on reviewing the related literatures.

Content validity

The study tools were presented to a jury of five experts in the field of Pediatric Nursing to check validity, clarity, comprehensibility,

applicability and ease of tool implementation.

Testing reliability

Reliability of the used tools was supported by previous studies. The Neonatal Infant Pain Scale (NIPS) showed high internal consistency (Cronbach's $\alpha = 0.92$) as reported by (Lawrence et al., 1993). The COMFORT neo Scale demonstrated good internal consistency (Cronbach's $\alpha = 0.88$) as reported by (Van Dijk et al., 2009).

In the current study, Cronbach's α was 0.782 for "Tool I" and 0.726 for "Tool II", which indicate that the four tools were reliable to detect the aim of the study.

Pilot study

A pilot study was carried out on 10% of the sample (20 neonates) to test the clarity, applicability, and feasibility of the study tools and the necessary modifications were done. Pilot sample was excluded from the total sample of the study.

Phases of the study:

The study was conducted through four phases: assessment phase, planning phase, implementation phase, and evaluation phase.

1- Assessment phase:

- The researcher was present in the neonatal intensive care units at Kafr El Sheikh University Hospital and Tanta University Hospital from 8:00

am to 1:00 pm for four days per week (Saturday, Sunday, Monday, and Tuesday) to collect the data.

- The researcher collected the neonates' bio-sociodemographic characteristics using Tool (I).
- In addition, the researcher assessed and recorded physiological parameters using Tool II, and evaluated pain and comfort states using Tool III and Tool IV before, during and after two minute of the invasive procedure. This phase took approximately 15 minutes per neonate.

2- Planning Phase:

- Before conducting the study, the researcher met the NICU nurses and resident physicians to explain the study purpose and gain their cooperation (**Ernstmeyer & Christman, 2023**).
- The researcher reviewed recent literatures on neonatal pain management, swaddling technique, and massage therapy (**Ayyıldız et al., 2023; Ali et al., 2019; Weerakul et al., 2025**).
- The researcher also received training on massage therapy from a professor of Physical therapy, Faculty of Medicine, Kafr Elsheikh University to ensure correct application of the massage technique.
- All materials for the study were prepared, including blankets for swaddling, monitoring devices, and documentation sheets. The environment was maintained quiet and comfortable for neonates during procedures.

3- Implementation Phase:

- The 195 neonates who met the inclusion criteria were assigned into three groups: control group, swaddling technique group, and massage therapy group. Before starting the invasive procedure, neonates were connected to monitoring devices and baseline physiological parameters were recorded. The invasive procedures included peripheral intravenous cannula insertion and blood sample collection.
- Neonates in the **control group** received routine nursing care before, during, and after the invasive procedures (**Tanriverdi et al., 2025**). This care included maintaining thermal comfort, gentle handling to minimize distress, monitoring for complications, and providing emotional support (**Mishra et al., 2024**).
- Neonates in the **swaddling group**, the researcher applied the safe swaddling technique as the following:

i. Positioning:

- Neonates were placed in a supine position on a blanket as illustrated in Fig.(1).

- The legs were kept in flexion close to the torso, in accordance with the neonate's anatomical position.

ii. Wrapping:

- The blanket was wrapped around the neonate to provide gentle support and a feeling of security, closely resembling the confined space of the womb.
- Arms were positioned close to the torso, without restricting limb movements.
- The wrapping was neither too tight nor too loose and adjusted according to the site of the invasive procedure.

iii. Duration:

- Swaddling was applied before and continued during the invasive procedure (Dixley & Ball, 2022; Marlo, 2025).

vi. Safety Measures:

- The researcher continuously observed the neonate for any signs of distress, overheating, or impaired breathing.
- If the neonate showed distress or instability, swaddling was temporarily adjusted or discontinued.



Fig.1: Original picture for the researcher while applying swaddling technique

For neonates in the **massage therapy group**, moderate-pressure massage was applied 10-15 min before and continued during the invasive procedure, by the following steps:

i. Preparation:

- Hand hygiene and clinical stability confirmed.
- Neonate placed in comfortable supine position in incubator or on radiant warmer.
- Monitoring devices connected.

ii. Massage Technique

Head and Neck: Gentle stroking from head and face down to neck, then across shoulder as shown in fig. (2).

Upper Limbs: Each arm massaged from shoulder to hand and back using gentle palm strokes.

Lower Limbs: Each leg massaged from thigh to foot and back to promote circulation.

Back: Neonate gently turned to side-lying, strokes applied from upper back to waist.

iii. Safety Measures:

- Pressure was light to moderate, adjusted based on neonate cues.
- If neonate showed distress or instability, massage was stopped immediately. (Ali et al., 2019; Weerakul et al., 2025)



Fig.2: Original picture for the researcher while applying massage therapy

4- Evaluation Phase:

For all neonates in the three study groups, physiological parameters, pain levels, and comfort states were assessed and recorded before the invasive procedure, during and two minutes after the completion of the procedure. The findings of the two study groups were compared with the control group.

Statistical design

Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 27. Graphics were done using Excel program. Quantitative data were presented by mean (X) and standard deviation (SD). Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square (χ^2) test, Anova test (F)

and correlation (R). Level of significance was set as P value <0.05 for all significant tests.

Results

Table (1): Shows bio-sociodemographic characteristics of neonates, it revealed that majority of neonates in the three groups were in the age group of 38-<40 weeks. Regarding type of delivery, 67.7% of neonates in the control group was delivered by cesarean section compared to 60% and 76.9% in the swaddling and massage groups respectively. The mean postnatal age was 8.68 ± 6.52 days in the control group compared to 5.74 ± 4.99 & 8.40 ± 4.53 days in swaddling and massage groups respectively. Also, 64.6% of neonates in control group relied on bottle feeding compared to 55.4% & 63.1% in the swaddling and massage groups respectively. Moreover, neonates' mean weight and length were similar across the three groups, with slight variations.

Figure (3): Shows that 41.5% of neonates in the control group suffered from neonatal jaundice compared to 43.1% and 40% of neonates in the swaddling and massage groups respectively. Also, 20% of neonates in the control group had respiratory distress syndrome compared to 36.9% and 16.9% in the swaddling and massage groups respectively.

Table (2): Clears that, before the invasive procedure, majority of neonates in the three studied groups had no pain, with similar low total mean scores. During the invasive procedure, the control group had a much higher percentage 75.4% of severe pain and higher mean total pain scores 1.74 ± 0.48 than the other two groups with high statistically significant differences as $p\text{-value} < 0.001$. while, two minutes after the invasive procedure the severity level of pain reduced towards a mild to moderate pain level in swaddling and massage group 10.8% and 21.5% respectively with lower mean scores compared to 55.4% in the control group with high statistically significant differences as ($p\text{-value} < 0.001$).

Table (3): Illustrates that, before the invasive procedure, heart rate, respiratory rate, and O_2 saturation were similar across all groups. On the other hand, during invasive procedure, the control group exhibited higher heart and respiration rates and lower oxygen saturation 154.6, 62.4, 90% respectively compared to swaddling (151.9, 53.5, 91.1%) and massage groups (144.5, 53.6, 90.5%) respectively, with highly statistically significant difference in heart rate and respiratory rate as ($p\text{-value} < 0.001$).

Table (4): Portrays that, before the invasive procedure, less than half of the control group 44.6% had uncomfortable state with total mean score 1.45 ± 0.50 followed by massage group 1.34 ± 0.48 then swaddling group 1.25 ± 0.43 . During the invasive procedure, most of the control group 93.8% had uncomfortable and higher mean scores 1.94 ± 0.24 than the other two groups with highly statistically significant differences as $p\text{-value} < 0.001$. Two minutes after invasive procedure, uncomfortable levels remained lower in the swaddling and massage groups 12.3% and 35.4% respectively with lower mean scores compared to 56.9% in the control group with statistically significant differences as ($p\text{-value} < 0.001$).

Table (5): Clears that there was a negative significant correlation between studied neonates in the control and massage groups' total pain scores and total comfort scores before, during and 2min. after invasive procedure as ($p\text{-value} < 0.05$), there was a highly significant negative correlation between total pain scores and total comfort scores 2min. after invasive procedure as ($p\text{-value} < 0.001$) and a significant negative correlation before and during invasive procedure as ($p\text{-value} < 0.05$).

Table (1): Percentage Distribution of the Studied Neonates According to their Bio-Sociodemographic Characteristics (N=195).

Items	Control group (n=65)		Swaddling group (n=65)		Massage group (n=65)	
	No.	%	No.	%	No.	%
Gestational age						
38-<40 weeks	52	80	55	84.6	57	87.7
40-42 weeks	13	20	10	15.4	8	12.3
Mean ±SD	38.85±0.87		38.74±0.97		38.80±0.87	
Type of delivery						
Normal delivery	21	32.3	26	40	15	23.1
Caesarean section	44	67.7	39	60	50	76.9
Post-natal age						
0-6 days	23	35.4	37	56.9	21	32.3
7-<14 days	32	49.2	20	30.8	39	60
14-28 days	10	15.4	8	12.3	5	7.7
Mean ±SD	8.68±6.52		5.74±4.99		8.40±4.53	
Type of feeding						
Bottle feeding	42	64.6	36	55.4	41	63.1
Gavage feeding	6	9.2	8	12.3	6	9.2
Breast feeding	12	18.5	17	26.2	15	23.1
Parenteral feeding	5	7.7	4	6.1	3	4.6
Current weight						
<2 kg	6	9.2	7	10.8	5	7.7
2-3 kg	54	83.1	53	81.5	56	86.2
>3 kg	5	7.7	5	7.7	4	6.1
Mean ±SD	2.54±0.53		2.41±0.51		2.48±0.50	
Length						
<49 cm	40	61.5	31	47.7	30	46.2
49-50 cm	18	27.7	22	33.8	20	30.7
>50 cm	7	10.8	12	18.5	15	23.1
Mean ±SD	48.51±1.79		48.71±1.75		49.43±2.11	
Type of invasive procedures						
Cannula insertion	52	80	55	84.6	57	87.7
Venous blood sampling	13	20	10	15.4	8	12.3
Duration of invasive procedure						
<5 min.	56	86.2	54	83.1	55	84.6
5-10 min.	9	13.8	11	16.9	10	15.4
Specific medications used for each neonates						
Antibiotics	15	23.1	16	24.6	24	36.9
Antipyretics	12	18.5	41	63.1	32	49.2
Nebulizer therapy	5	7.7	6	9.2	2	3.1
Steroids	33	50.7	2	3.1	7	10.8

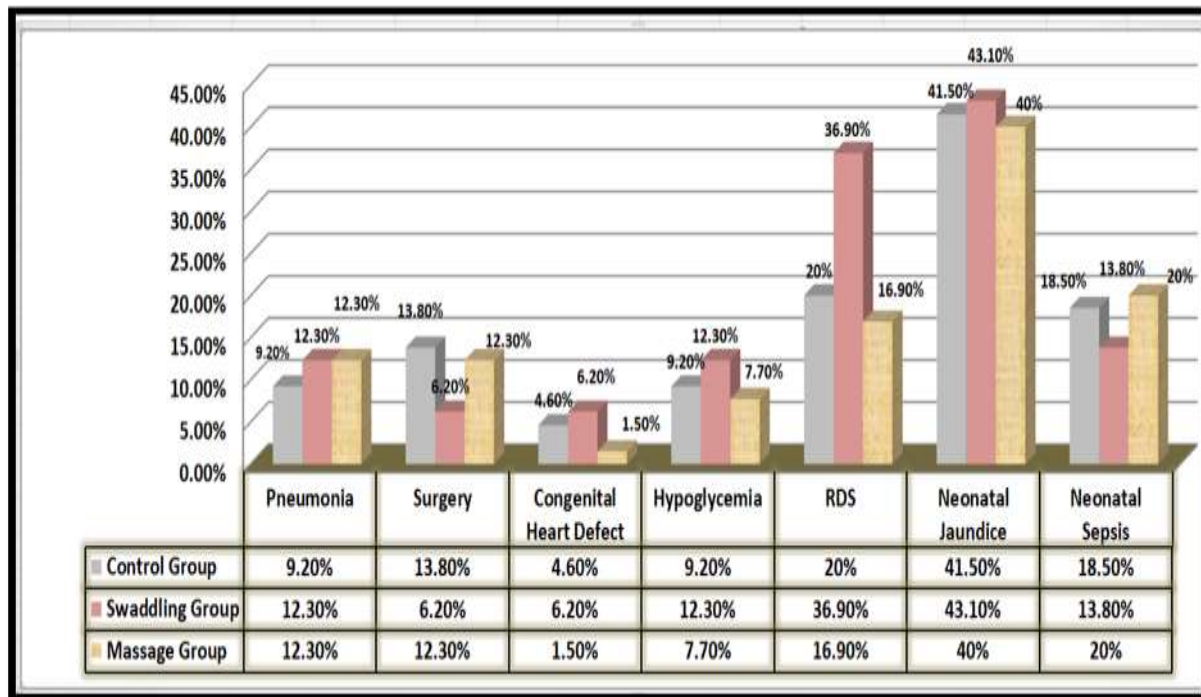


Figure (3): Percentage Distribution of the Studied Neonates According to their Medical Diagnosis (N=195).

Table (2): Comparison between the Studied Neonates' Total Pain Scores and Levels before, during and 2 minutes after Invasive Procedure (N=195).

Total pain level		Control group (n=65)		Swaddling group (n=65)		Massage group (n=65)		Anova test	
		No.	%	No.	%	No.	%	F	P-value
Before invasive procedure	No pain	51	78.5	54	83.1	56	86.2	0.791	0.455
	Mild to moderate pain	11	16.9	7	10.8	8	12.3		
	Severe pain	3	4.6	4	6.2	1	1.5		
Mean total score (Mean± SD)		0.26 ± 0.53		0.23 ± 0.55		0.15 ± 0.40			
During invasive procedure	No pain	1	1.5	8	12.3	0	0	15.26	<0.001**
	Mild to moderate pain	15	23.1	33	50.8	19	29.2		
	Severe pain	49	75.4	24	36.9	46	70.8		
Mean total score (Mean± SD)		1.74±0.48		1.25±0.66		1.68±0.50			
2 min. after invasive procedure	No pain	25	38.5	58	89.2	49	75.4	19.92	<0.001**
	Mild to moderate pain	36	55.4	7	10.8	14	21.5		
	Severe pain	4	6.1	0	0	2	3.1		
Mean total score (Mean± SD)		0.68±0.59		0.14±0.39		0.28±0.52			

Using: Anova test (F), p-value>0.05=no significant; p-value<0.05= significant; p-value<0.001= high significant

Table (3): Comparison between the Studied Neonates' Physiological Parameters Mean Scores before, during and 2 minutes after Invasive Procedures (N=195).

Physiological parameters		Control group (n=65)	Swaddling group (n=65)	Massage group (n=65)	F	P-value
		Mean/SD	Mean/SD	Mean/SD		
Before invasive procedure	Heart rate	139.6±16.3	139.5± 16.0	142.5±16.3	380.26	0.49
	Respiratory rate	49.5±11.8	49.0±12.0	53.1±11.4	648.90	0.09
	Oxygen saturation	93.0±6.4	93.6±6.3	92.4±6.2	51.76	0.52
During invasive procedure	Heart rate	154.6±22.2	151.9±13.5	144.5±4.8	3597.2	<0.001**
	Respiratory rate	62.4±11.0	53.5±7.7	53.6±6.6	3373.7	<0.001**
	Oxygen saturation	90.0±6.1	91.1±6.2	90.5±5.5	40.0	0.56
2min. after invasive procedure	Heart rate	144.2±16.1	138.7±14.9	139.5±14.1	1123.3	0.09
	Respiratory rate	53.4±12.1	48.1±11.1	51.5±9.1	932.9	0.02*
	Oxygen saturation	91.1±6.3	97.0±1.7	96.8±0.8	1471.1	<0.001**

Anova test (F) , p-value>0.05=no significant; p-value<0.05= significant;

p-value <0.001= high significant

Table (4): Comparison between the Studied Neonates' Comfort State before, during and 2minutes after Invasive Procedure in the Three Groups (N=195).

Comfort state		Control group (n=65)		Swaddling group (n=65)		Massage group (n=65)		Anova test	
		No.	%	No.	%	No.	%	F	P-value
Before invasive procedure	Comfortable	36	55.4	49	75.4	43	66.2	2.93	0.056
	Uncomfortable	29	44.6	16	24.6	22	33.8		
Mean total discomfort score (Mean± SD)		1.45±0.50		1.25±0.43		1.34±0.48			
During invasive procedure	Comfortable	4	6.2	38	58.5	16	24.6	29.74	<0.001**
	Uncomfortable	61	93.8	27	41.5	49	75.4		
Mean total discomfort score (Mean± SD)		1.94±0.24		1.40±0.49		1.75±0.43			
2 min. after invasive procedure	Comfortable	28	43.1	57	87.7	42	64.6	16.43	<0.001**
	Uncomfortable	37	56.9	8	12.3	23	35.4		
Mean total discomfort score (Mean± SD)		1.57±0.49		1.12±0.33		1.35±0.48			

Anova test (F), p-value>0.05=no significant; p-value<0.05= significant;

p-value<0.001= high significant

Table (5) Correlation between the Studied Neonates' Total Pain Scores and their Total Comfort Scores before, during and 2minutes after Invasive Procedure.

Total comfort score	Total pain level score					
	Before invasive procedure		During invasive procedure		Two minutes after invasive procedure	
	<i>r</i> ¹	<i>p</i> ¹	<i>r</i> ²	<i>p</i> ²	<i>r</i> ³	<i>p</i> ³
Control group	-0.314	0.011*	-0.264	0.033*	-0.263	0.034*
Swaddling group	-0.369	0.002*	-0.302	0.015*	-0.776	<0.001**
Massage group	-0.293	0.018*	-.339	0.006*	-.354	0.004*

Pearson's r (p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS)

Discussion

The hospitalized neonates are frequently exposed to repeated painful stimuli, which may negatively affect their physiological stability, neurodevelopment, and overall well-being. In this context, both swaddling and massage therapy have emerged as effective, low-risk strategies for pain management and comfort promotion methods (**Shen et al., 2022**). This study results revealed that the mean gestational age was (38.85 ± 0.87 , 38.74 ± 0.97 , 38.80 ± 0.87) in the control, swaddling and massage groups respectively, and more than half of neonates in the control and swaddling groups were delivered by cesarean section compared to more than three quarters in the massage groups.

The result was congruent with **Talebi et al. (2022)** who conducted a study titled " The effect of concurrent use of swaddle and sucrose on the

intensity of pain during venous blood sampling in neonate: a clinical trial study" and found that the mean gestational age was 38.65 ± 0.7 weeks and more than half of them were delivered by cesarean section. On the other hand, the findings were incongruent with **Akkoca et al., (2021)**, who conducted a study titled "The effect of the swaddling method on stress levels in newborns administered nasal CPAP" and revealed that the mean gestational age of the newborns was 36.93 ± 1.50 and 50% of them was delivered by cesarean section.

There was no difference between the three groups regarding feeding, weight, length, type and time of invasive procedure. Since, more than half of neonates in three groups relied on bottle feeding. Moreover, neonates' mean weight and length were similar across the groups, with slight variations with majority of

them in 2-3 kg category. Furthermore, majority of neonates in the three groups underwent cannulation for less than 5 minutes of the duration.

The findings were similar with **Talebi et al. (2022)** who stated that studied neonates did not significantly differ in terms of weight, length, and head circumference. While the current study findings contrasting with **Azez et al. (2023)** who stated that more than half of the neonates in control and intervention groups had mixed feeding and nearly half of them in 3-3.5 Kg category of weight. Regarding the studied neonates' medical diagnosis, this study revealed that less than half of neonates suffered from neonatal jaundice followed by respiratory distress syndrome then neonatal sepsis in the three groups. The current finding was consistent with **Ghobrial et al. (2025)** who reported that neonatal jaundice was one of the most prevalent conditions among neonates admitted to NICUs, accounting for 31% of all admissions. In contrary **Akkoca et al. (2021)** mentioned that all the participated neonates in their study suffer from transient tachypnea. Also, **Ayyıldız et al. (2023)**, mentioned that all neonates undergoing aspiration procedure, most of them was due to meconium

aspiration syndrome diagnosis. This contradiction may be attributed to the differences in inclusion criteria, clinical settings, and the primary purpose of each study.

In accordance to comparison between the studied neonates' total pain level before, during and 2 minutes after invasive procedure, this study revealed that before the invasive procedure, a small percentage of each group experienced severe pain, with similar low total mean scores. While, during the invasive procedure, the majority of neonates in control group had severe pain level compared to other two groups with statistically significant differences, while two minutes after invasive procedure, the intensity of pain levels reduced from severe to mild to moderate in slightly more than half in swaddling group and less than thirty percent in massage group compared with about one quarter of neonates in control group with significant differences.

From the researcher's perspective, the differences in pain levels among the studied neonates during and after the invasive procedure can be explained by the effect of the two non-pharmacological interventions that used in this study on neonatal pain modulation; both interventions not only reduce pain during the procedure but also facilitate faster recovery and self-regulation after the

painful stimulus **Mohammed et al. (2025)**.

The observed changes among the swaddling group can be attributed to the pain-relieving effect of swaddling. Swaddling provides containment and supports behavioral organization in neonates by limiting excessive limb movements and creating a secure environment similar to the intrauterine setting. This supportive positioning promotes a sense of comfort and security, enhances self-regulation, and reduces behavioral responses to painful stimuli. Consequently, neonates receiving swaddling may exhibit lower pain expression and better tolerance of invasive procedures compared to those receiving routine care **Talebi et al., (2022)**.

The findings were in same line with **Salimi et al. (2020)** who stated that massage therapy decreased the pain during painful procedures with significant difference for pain score during, and after the intervention of each of the two groups. The findings also similar with **Çiftci et al. (2022)** who studied the effect of three different methods (swaddling, kangaroo and control group) applied during peripheral vascular access in premature on pain and comfort levels on 148 premature neonates at NICU in Turkey and determined that the mean NIPS scores of the swaddling

group during and after peripheral vascular access was significantly lower than the control group, and their comfort was higher. It has been reported that swaddling method applied during blood collection of pre-mature newborns reduces pain scores and has a positive effect on pain.

In contrast to the findings of the present study, **Yilmaz & Yavuz. (2025)** who conducted a study with title "Comparison of different methods for reducing pain during a heel lance in newborns: a randomized trial" and reported different results, that found a statistically significant difference in mean NIPS scores after procedure, where the breastfeeding group and skin to skin care group exhibited significantly lower pain scores compared to the swaddling group (0.87 ± 1.83 , 2.10 ± 2.35 , 2.23 ± 2.01) respectively

In relation to the studied neonates' physiological parameters mean scores, the present study showed that, before the invasive procedure, heart rate, respiratory rate, and O₂ saturation were similar across all groups. On the other hand, during invasive procedure, the control group exhibited higher heart and respiration rates and lower oxygen saturation compared to swaddling and massage groups with highly statistically

significant difference. From the researchers' standing point, this may be attributed to neonates' autonomic and stress responses to pain, as well as the modulating effects of non-pharmacological interventions measured alongside the NIPS. Painful stimuli activate the sympathetic nervous system and trigger the release of stress hormones, resulting in increased heart rate and respiratory rate. Additionally, pain-related crying and physiological instability may transiently compromise oxygenation, leading to lower oxygen saturation levels. Therefore, alterations in these physiological parameters are considered objective indicators of pain in neonates (**Obeidat et al., 2021**).

These findings were in accordance with **Apaydin Cirik & Efe (2020)** who reported that neonates who received swaddling demonstrated more stable physiological parameters during the procedure, including lower heart rate fluctuations and better oxygen saturation levels compared with those receiving routine care. The authors concluded that non-pharmacological interventions were effective in maintaining physiological stability during painful procedures.

These findings not aligned with **Akkoca et al. (2021)** who found that

the mean scores of heart rate and respiratory rates in the swaddling method during Nasal Continuous Positive Airway Pressure applied to newborns were lower than those in control group before the intervention. Meanwhile, **Yilmaz & Yavuz. (2025)** stated that no difference was found between the groups' mean vital signs scores before the heel lance procedure however, there was a significant difference in physiological parameters were observed between the groups during and after the procedure which is consistent with our findings. Furthermore, the results not matched with a systematic review conducted by **Liu et al. (2022)** and revealed that massage was effective for blood oxygen saturation both during and after the procedure, but non-effective for the variation of respiratory rate after the procedure, and heart rate both during and after the procedure.

Moreover, after 2 minutes of invasive procedure, the mean heart and respiratory rate of the swaddling and massage group was lesser than that of control group and the mean O₂ saturation of control group was higher in the swaddling and massage groups compared with control group with highly statistically significant difference. Overall, swaddling and massage were more effective than routine care that provided to neonates

in control group in maintaining normal physiological parameters during and 2minutes after the invasive procedure. Also, swaddling was generally more effective than massage. From the researcher's opinion this indicating that the neonates in swaddling and massage groups demonstrated significantly more stable parameters, indicating that these interventions helped attenuate the pain level and stress response.

These findings aligned with the study of **Apaydin Cirik and Efe (2020)** which revealed that the mean heart rate during and after the orogastric tube insertion procedure was lower in the swaddling group compared to the routine care group and other groups. In contrast **Roshanray et al. (2020)** who stated that after 5 min, the heart rate in the mother's hug group decreased significantly compared to the massage and control groups. There were no significant changes in the respiratory rate and blood oxygen saturation level in any of the newborns during and after blood sampling.

Concerning the studied neonates' total mean score comfort state before, during, and 2min. after invasive procedure, the current study revealed that before the invasive procedure, the neonates in control group had uncomfortable states' total mean

score (1.45 ± 0.50) followed by massage group (1.34 ± 0.48) then swaddling group (1.25 ± 0.43). While during the invasive procedure, most of the neonates in control group had uncomfortable and higher mean total score followed by massage group, then swaddling group. Two minutes after invasive procedure, uncomfortable levels remained lower in the swaddling and massage groups compared to in the control group. This may be attributed to the calming and soothing effects of swaddling and massage techniques, which help reduce neonatal discomfort and stress during and after invasive procedures. This finding supports previous study about "Neonatal pain: A journey spanning three decades and found that invasive procedures, such as heel pricks or injections, induce stress and discomfort in neonates **Johnston, (2020)**. Also, the findings are on the same line with **Pichler et al., (2023)** in a study aimed to assess comfort during less invasive surfactant administration in very preterm infants in Germany and concluded that non-pharmacological analgesia (swaddling and massage) provided adequate comfort in 61% of the infants during less invasive surfactant administration. Regarding the correlation between the studied neonates' total pain level and their total comfort level before,

during and 2min. after invasive procedure. The current study cleared that there was a negative significant correlation between studied neonates in the control and massage groups total pain level score and total comfort level score before, during and 2min. after invasive procedure. On the other hand, there was a highly negative significant correlation between studied neonates in the swaddling group total pain level score and total comfort level score 2min. after invasive procedure and a negative significant correlation before and during invasive procedure. This may contribute to the understanding that increased pain is associated with decreased comfort, and that specific interventions such as massage or swaddling affect these relationships, by modifying pain perception and promoting comfort in newborns during invasive procedures.

Likewise, **(Kim, 2020)** in a study about “Prevention and management of pain in the neonatal intensive care unit” concluded that methods include breastfeeding, swaddling, and sensorial saturation through massage can efficiently decrease pain and discomfort due to routine care measures and minor procedures in preterm and term neonates and have a more immediate and robust impact on reducing pain and increasing

comfort, possibly by promoting relaxation and parasympathetic activity. Also, these findings are corresponding with **(Karadede, and Mutlu, 2024)** who concluded that there was a negative correlation between premature neonates in the swaddling group total pain level score and total comfort level score.

Conclusion

The current study concluded that swaddling and massage were more effective than routine care in improving clinical outcomes of neonates in terms of minimizing pain during and shortly after invasive procedures. Also, both interventions appear effective in reducing discomfort associated with invasive procedures compared to control group.

Recommendations

Related to nursing practice:

- Incorporate swaddling and massage techniques into routine care protocols for neonates undergoing invasive procedures to effectively reduce pain and stabilize physiological responses.
- Provide practical training for nurses and caregivers on proper swaddling and massage techniques to ensure consistency and efficacy in pain management strategies.

Related to nursing education:

- Establish clear clinical guidelines that recommend the use of swaddling and massage for neonatal pain relief, emphasizing their benefits over routine care and no intervention.

Related to further research:

- Encourage research to explore long-term effects, optimal timing, and frequency of swaddling and massage techniques, as well as their applicability across different neonatal populations and settings.
- Further research is recommended on larger and more diverse samples to confirm the current findings and to evaluate the long-term effects of swaddling and massage therapy on neonatal clinical outcomes during different invasive procedures.

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Effect of School Health Services on Academic Performance and Quality of Life of Primary School Students with Bronchial Asthma

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Abstract

Background: School health services play a unique role in managing bronchial asthma, directly impacting students' functioning, academic engagement, and overall well-being. **Aim of the study:** was to assess the effect of school health services on academic performance and quality of life of primary school students with bronchial asthma. **Design:** A descriptive cross-sectional design was used. **Setting:** The study was conducted across 11 primary schools in Hail, Saudi Arabia, and 14 primary schools in Tanta, Egypt. **Subjects:** A total sample of 220 asthmatic students (165 from Hail and 55 from Tanta) participated. **Tools:** Three tools were used. **Tool I:** The School Health Service Assessment Form consisted of two parts: Part (1) Socio-demographic characteristics of the studied students and Part (2) School Health Services Assessment. **Tool (II):** Pediatric Quality of Life Inventory (PedsQL 4.0) to measure health-related quality of life. **Tool (III):** The Academic Procrastination Behavior Scale to assess tendencies to delay school tasks. **Results:** More than half of the students rated health services as poor. Nearly half experienced poor quality of life, while over two-fifths had low academic procrastination. Grades negatively correlated with procrastination ($r = -0.379$), which positively correlated with absenteeism ($r = 0.227$) and quality of life ($r = 0.528$). **Conclusion:** There were significant relationships between structural levels of school health services and student nationality, family income, and parental occupation ($p < 0.01$). Inadequate school health services directly contributed to poorer quality of life, higher absenteeism, and increased academic procrastination, with a clear geographical disparity showing significantly better services in Saudi Arabia than in Egypt. **Recommendation:** Continuous improvement of school health services specifically for emergency interventions, routine follow-up, and chronic condition management.

Keywords: - Academic Performance, Bronchial Asthma of Primary School Students, Quality of Life, School Health Services.

Introduction

Bronchial asthma is a chronic respiratory condition characterized by recurrent episodes of wheezing, breathlessness, and coughing, which often interfere with daily activities. In children, these symptoms can significantly affect their quality of life and academic performance, within schools essential **(Grant & Wood., 2022)**.

Bronchial asthma is a leading cause of absenteeism, with many students missing school due to asthma attacks or hospitalizations. Triggers like allergens, exercise, and stress are common in school settings, leading to exacerbation of the condition. **(Murray, Low, Hollis, Cross & Davis, 2019)**.

Students with bronchial asthma often experience a reduced quality of life due to limitations on physical activities and constant monitoring of symptoms. School health services such as health counseling and psychological support are vital in helping students manage their symptoms effectively. Additionally, physical activity promotion tailored to students with asthma, along with emotional support, enables students to participate confidently in school life, leading to an enhanced overall quality of life **(Grant & Wood, 2022)**.

School health services provide preventive and curative services that enable students

with asthma to better manage their condition, engage fully in academic and social activities, and improve overall well-being **(Plaza-González., Zabala-Baños, Astasio-Picado & Jurado-Palomo., 2022)**.

School health services ensure that students receive timely interventions, reducing absenteeism and improving classroom performance. Health education programs adapted for students and staff further enhance understanding of asthma, enabling teachers to recognize symptoms early and offer appropriate accommodation, such as medication breaks or activity modifications **(Murray, Low, Hollis, Cross & Davis, 2019)**.

School health services are crucial for the effective management of bronchial asthma among students, significantly influencing their quality of life and academic performance. Through offering services such as routine medical screenings, chronic condition management, health education, and psychological support, schools provide an environment where students with asthma can thrive both academically and socially **(Plaza-González, Zabala-Baños, Astasio-Picado, & Jurado-Palomo, 2022)**.

Community health nurses play a crucial role in enhancing the academic performance and quality of life of primary

school students with bronchial asthma (**Kindi et al., 2022**). They provide health education to students, parents, and teachers about asthma management, ensuring proper medication adherence and symptom control. Additionally, they conduct regular health assessments, monitor asthma triggers within the school environment, and develop individualized action plans to prevent asthma attacks. By promoting a supportive and healthy school setting, community health nurses help reduce absenteeism, improve students' concentration in class, and enhance their overall well-being (**Beasley, Noble, & Weatherall, 2024**).

Significance of the study

Childhood bronchial asthma is a significant global health concern, affecting millions of children worldwide and presenting considerable challenges to both their well-being and academic performance. The prevalence of childhood asthma varies across countries, influenced by environmental, genetic, and socioeconomic factors. In Saudi Arabia, studies have indicated a notably high prevalence rate of childhood asthma, with approximately 16.6% of children affected (**Alharbi et al., 2020**). Factors such as air pollution, sandstorms, and genetic predisposition contribute to this high incidence (**Hijazi, Abalkhail, & Seaton, 2019**). In Egypt, the prevalence of

childhood asthma fluctuates across different regions. Research in Cairo has reported an 8.2% prevalence rate among children aged 3–15 years (**Ahmed, El-Sayed, & Mahmoud, 2021**).

Aim of the study

The study aimed to assess the effect of school health services on academic performance and quality of life of students with bronchial asthma.

Subjects and Method

Study design:

Descriptive cross-sectional study design was used.

Settings:

This study was conducted across two distinct international settings: 14 primary schools in Tanta (Gharbia Governorate, Egypt) and 11 primary schools in Hail (Kingdom of Saudi Arabia).

Study Subjects:

A purposive convenience sampling technique was used in this study. A total sample of 220 primary school students diagnosed with bronchial asthma who were willing to participate; 165 students from Hail and 55 students from Tanta. Selection criteria targeted schools with a recorded history of asthmatic students to ensure urban and suburban representation.

Tools of the study:

Three tools were utilized to collect data:

Tool (I): The School Health Service Assessment Form

Developed by the researcher based on literature, consisting of two parts:

Part (I): Bio-socio-demographic Characteristics of Studied Students:

It includes data about students' age / years, sex, family income, father education, mother education, father's occupation, mother's occupation, nationality, place of residence, presence of water source in the house, number of family members, number of houses rooms, crowding index, latest academic grade, number of days of absenteeism in the last semester, and academic performance.

Part (II): Assessment of school health services: 10 questions evaluating the availability and frequency of use of services like medication management, screenings, first aid, and chronic care.

The scoring system:

Rated as "Not Available" (0), "Moderate Available" (1), and "Fully Available and Effective" (2). Overall scores range from 0 to 20, converted into percentages:

-Good school health services: 50% or more of the total score (Score ≥ 20).

-Poor school health services: $< 50\%$ of the total score (Score < 20).

Tool (II): Pediatric Quality of Life Inventory (PedsQL 4.0)

Developed by Varni et al. (2001) and adapted by the researcher to measure

health-related quality of life (HRQoL) via 23 items across four domains: physical, emotional, social, and school functioning. Rated on a 5-points scale (0 = Never to 4 = Almost Always).

Scoring system:

Total score ranges from 0 to 92, converted into percentages:

-Poor quality of life: $\geq 50\%$ of the total score.

-Good quality of life: $< 50\%$ of the total score.

Tool (III): The Academic Procrastination Behavior Scale

Developed by Çakıcı (2003) and adapted to assess task delay tendencies using 19 items on a 5-point Likert scale (1 = Never to 5 = Always). Total score ranges from 19 to 95; higher scores indicate a greater tendency to procrastinate. Academic performance was tracked through grades and school absenteeism records.

Scoring System:

Categorized into percentages:

-High Academic Procrastination: $> 60\%$ of the total score.

-Moderate Academic Procrastination: 40% - 60% of the total score.

-Low Academic Procrastination: $< 40\%$ of the total score.

Method

1- Obtaining Approval: Official permissions were obtained from the Dean of Faculty of Nursing (Tanta University),

the Ministry of Education in Egypt and Saudi Arabia, and the Hail Health Cluster, followed by consents from school administrators and health staff.

2-Ethical Considerations: Ethical approval was issued by Faculty of nursing, Tanta University (Code: 629-4-2025). Informed consent was secured from parents and students. Participation was voluntary, non-harmful, confidential, and had no impact on educational or medical services.

3-Developing the Study Tool: Tools were compiled, translated into Arabic, and validated for face and content validity by a jury of five community health nursing professors.

4-A Pilot Study: Conducted 10% of the sample to test clarity and applicability; those pilot participants were excluded from the final study.

5-The reliability of the study tool: Computed using Cronbach's Alpha, yielding an overall score of 0.802 (0.789 for socio-demographic, 0.785 for health services, 0.857 for PedsQL, and 0.777 for procrastination).

6-The actual study: Data collection spanned over 6 months. The researcher met with the 220 asthmatic students during school hours, spending 30–45 minutes per student to complete the supervised questionnaires after taking oral

consent. Grades and absenteeism records were obtained from official school files.

7-Statistical analysis: Data was analyzed using SPSS version 23. Quantitative data were expressed as Mean $\pm$ SD and range; categorical data as frequencies and percentages. Statistical tests included Chi-square (X^2), Fisher Exact test (FE), Monto Carlo Exact test (MCET), and Pearson's correlation (r). Significance was set at $P < 0.05$ (*) and high significance at $P < 0.01$ ().

Results

Table (1): Represents the distribution of the studied primary school children with bronchial asthma according to their bio-socio-demographic characteristics, academic grade and absenteeism in last semester. This table illustrates that the children were distributed into two main age groups: More than half (59.5%) of the children were aged 6–8 years, and nearly two-thirds (60.5%) were male. The vast majority were Saudi nationals (75.0%) and lived in urban areas (88.2%). Family income was reported as adequate by the vast majority (91.4%). Regarding parental education, more than half of fathers (59.1%) and mothers (54.5%) hold university or postgraduate degrees. Nearly half (46.8%) of the houses had 2–3 rooms, and the majority (85.0%) had a crowding index of less than 2. Regarding

family size, nearly half (46.3%) of the houses consisted of 3–4 members.

Academically, nearly two-thirds (63.2%) of students scored in the 90% range, and ultimately almost all (99.1%) demonstrated good academic performance. This occurred despite absenteeism, with the vast majority (82.3%) of students being absent for 1–9 days.

Figure (1): Represent the distribution of the studied primary school students with bronchial asthma according to levels of school health services. This figure showed that more than half (54.5%) of the students rated the school health services as poor, while the remaining proportion (45.5%) of them reported having good school health services. The overall score for school health services ranged from 0 to 22, with a mean score of 10.41 ± 6.80 , indicating a generally low to moderate level of service provision within the schools.

Table (2): Represents the mean and standard deviation of health-related quality of life domains total scores of the studied primary school students with bronchial asthma. This table showed that the total scores for the health-related quality of life domains varied among the studied students. For the physical functioning domain, the mean score was 19.22 ± 6.84 with a range

of 0–32. The emotional functioning domain recorded a mean score of 9.80 ± 4.47 with values ranging from 0–20. Regarding social functioning, the mean score was 6.70 ± 5.56 within a range of 0–20. Finally, the school functioning domain showed a mean score of 9.90 ± 4.54 with the same score range of 0–20.

Table (3): Represent the distribution of the studied primary school students with bronchial asthma according to levels of quality of life. This table showed that more than half of the studied students (52.7%) had a good quality of life, while less than one half (47.3%) of them experienced a poor quality of life. The total quality-of-life scores ranged from 0 to 92, with a mean score of 45.64 ± 16.34 of the studied students.

Table (4): Represent the distribution of the studied primary school students with bronchial asthma according to levels of academic procrastination. This table showed that nearly half (42.3%) of the students showed low academic procrastination, which was the highest reported level, while about one-quarter (25.4%) of them demonstrate moderate procrastination, representing the lowest percentage. The total scores for procrastination ranged from 19 to 95 of the studied students, with a mean score of 51.31 ± 23.03 .

Table (5): Represents the relation between socio-demographic characteristics of the studied primary school students with bronchial asthma and levels of school health services. Regarding family income, parental occupation, and nationality, the statistically significant relations for students receiving good school health services were as follows: **0.007, 97.0%, 0.001, 72.0%, 51.0%, 0.001, 90.0%, and 10.0%** respectively.

Table (6): Represents the relation between socio-demographic characteristics of the studied primary school students with bronchial asthma and their levels of quality of life. This table showed that a statistically significant relation was also observed for **mother's occupation**, a statistically significant relation was ($p = 0.014$), where more than half (**52.6%**) of students with a good quality of life had mothers who were employees.

Additionally, absenteeism showed a statistically significant association ($p = 0.036$), as the vast majority (**87.9%**) of students with a good quality of life missed only **1–9** days.

Table (7): Represents the relation between socio-demographic characteristics of the studied primary school students with bronchial asthma and their levels of academic

procrastination. This table showed that it was found that regarding family income, there was a highly statistically significant relation ($p = 0.009$), where the vast majority (**97.8%**) of students with low procrastination had adequate income. Nationality ($p = 0.001$) and academic performance ($p = 0.005$) were also highly significant, with the vast majority of Saudi students (**89.2%**) and over three-quarters (**76.3%**) of those scoring in the **90%** range being low procrastinators.

Additionally, low procrastination was significantly associated with a mother's university education ($p = 0.036$, **66.6%**), a mother's employment ($p = 0.014$, more than half or **57.0%**), and urban residence ($p = 0.025$, nearly all or **94.6%**).

Table (8): Represents the correlation between age, academic grade, absenteeism in last semester, health services, quality of life and total procrastination score. This table shows that a highly statistically significant positive correlation ($r = 0.528$, $p = 0.000$) was found between the total quality of life score and the total procrastination score.

In contrast, the latest academic grade demonstrated a highly significant negative correlation with procrastination ($r = -0.379$, $p = 0.000$), representing the strongest negative relationship and indicating that academic performance

significantly decreases as procrastination increases.

Other significant correlations with procrastination included positive relationships with the crowding index ($r = 0.343$, $p = 0.000$) and absenteeism ($r = 0.227$, $p = 0.001$), alongside a weaker negative correlation with age ($r = -0.181$, $p = 0.007$).

Table (1): Distribution of the studied primary school children with bronchial asthma according to their bio-socio-demographic characteristics, academic grade and absenteeism in last semester

Socio-demographic characteristics of primary school children	The studied primary school children (n= 220)	
	No	%
Age / years		
- 6 -	131	59.5
- 9 -	89	40.5
- Range	6 – 11	
- Mean $\pm$ SD	8.17 $\pm$ 1.524	
Sex		
- Male	133	60.5
- Female	87	39.5
Family Income		
- Adequate and save	201	91.4
- In adequate	19	8.6
Father education		
- Illiterates /reads and writes	4	1.8
- Basic education (Primary & Preparatory)	12	5.5
- Secondary	74	33.6
- University / Post university	130	59.1
Mother education		
- Illiterates /reads and writes	10	4.6
- Basic education (Primary & Preparatory)	24	10.9
- Secondary	66	30.0
- University / Post university	120	54.5
Father's Occupation		
- Professional	14	6.3
- Handicraft	8	3.6
- Employee	146	66.4
- Freelance work	49	22.3

- Not working	3	1.4
Mother's Occupation		
- Professional	6	2.7
- Handicraft	1	0.5
- Employee	98	44.5
- Freelance work	18	8.2
- Not working / House wives	97	44.1
Nationality		
- Saudi Arabian	165	75.0
- Egyptian	55	25.0
Place of residence		
- Rural	26	11.8
- Urban	194	88.2
Presence of water source in the house		
- Yes	182	82.7
- No	38	17.3
Number of family members		
- 3 – 4	102	46.3
- 5 – 6	95	43.2
- > 6	23	10.5
- Range	3 -12	
- Mean ± SD	4.86 ± 1.430	
Number of houses rooms		
- 2 – 3	103	46.8
- 4 – 5	102	46.4
- 6 – 7	15	6.8
Crowding index		
- < 2	187	85.0
- ≥ 2	33	15.0
Latest academic grade		
- 60 % -	7	3.2
- 80 % -	74	33.6
- 90 % -	139	63.2
- Range	60 – 99	
- Mean ± SD	90.66 ± 6.686	
Number of days of absenteeism in the last semester		
- 1 -	181	82.3
- 10 -	35	15.9
- 20 -	4	1.8
- Range	1 – 40	
- Mean ± SD	6.43 ± 5.073	
Academic performance		
- Good academic performance	218	99.1
- Poor academic performance	2	0.9

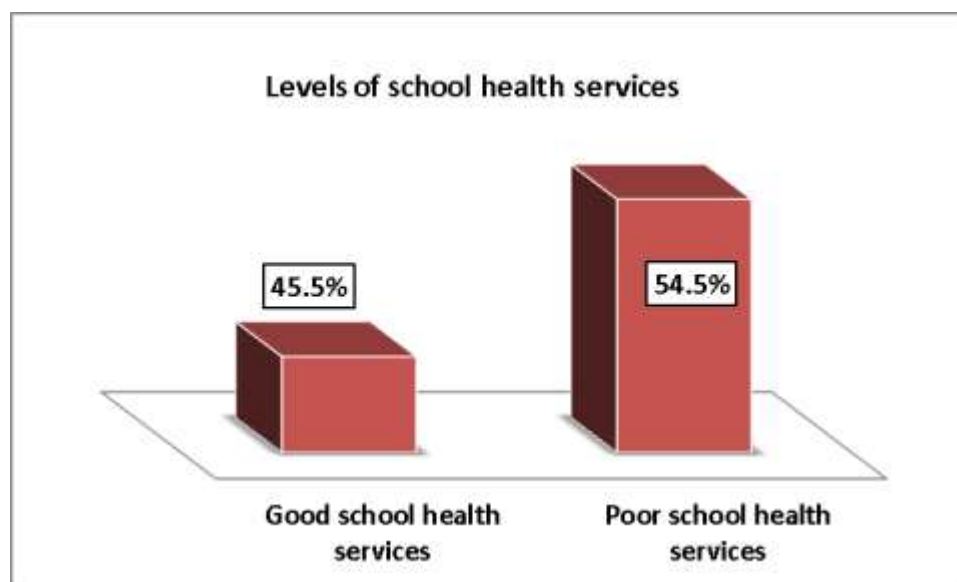


Figure (1): Distribution of the studied primary school students with bronchial asthma according to levels of school health services

Table (2): Mean and standard deviation of health-related quality of life domains total scores of the studied primary school students with bronchial asthma

Health related quality of life domains total scores	The studied primary school students (n=220)		
	Mean $\pm$ SD	Minimum	Maximum
- Physical functioning domain	19.222 $\pm$ 6.838	0	32
- Emotional functioning domain	9.804 $\pm$ 4.473	0	20
- Social functioning domain	6.704 $\pm$ 5.564	0	20
- School functioning domain	9.904 $\pm$ 4.537	0	20

Table (3): Distribution of the studied primary school students with bronchial asthma according to levels of quality of life

levels of health-related quality of life	The studied primary school students (n=220)	
	No	%
- Good quality of life	116	52.7
- Poor quality of life	104	47.3
- Range	0 – 92	
- Mean $\pm$ SD	45.636 $\pm$ 16.344	

Table (4): Distribution of the studied primary school students with bronchial asthma according to levels of academic procrastination

levels of academic procrastination	The studied primary school students (n=220)	
	No	%
- Low Academic Procrastination	93	42.3
- Moderate Academic Procrastination	56	25.4
- High Academic Procrastination	71	32.3
- Range	19 – 95	
- Mean $\pm$ SD	51.313 $\pm$ 23.030	

Table (5): Represents the relation between socio-demographic characteristics of the studied primary school students with bronchial asthma and levels of school health services

Socio-demographic characteristics of the studied primary school children	The studied primary school children (n= 220)				X ² p
	Poor school health services (n=120)		Good school health services (n=100)		
	No	%	No	%	
Age / years					0.161 0.688
- 6 -	70	58.3	61	61.0	
- 9 -	50	41.7	39	39.0	
Sex					0.915 0.339
- Male	76	63.3	57	57.0	
- Female	44	36.7	43	43.0	
Family Income					FE 0.007**
- Adequate and save	104	86.7	97	97.0	
- In adequate	16	13.3	3	3.0	
Father's Occupation					MCET 0.001**
- Professional	13	10.8	1	1.0	
- Handicraft	8	6.7	0	0.0	
- Employee	74	61.7	72	72.0	
- Freelance work	24	20.0	25	25.0	
- Not working	1	0.8	2	2.0	
Mother's Occupation					MCET 0.001**
- Professional	6	5.0	0	0.0	
- Handicraft	1	0.8	0	0.0	
- Employee	62	51.7	36	36.0	
- Freelance work	5	4.2	13	13.0	
- Not working / House wives	46	38.3	51	51.0	
Nationality					22.0 0.001**
- Saudi Arabian	75	62.5	90	90.0	
- Egyptian	45	37.5	10	10.0	
Crowding index					1.294 0.255
- < 2	99	82.5	88	88.0	
- ≥ 2	21	17.5	12	12.0	
Latest academic grade					MCET 0.086
- 60 % -	6	5.0	1	1.0	
- 80 % -	35	29.2	39	39.0	
- 90 % -	79	65.8	60	60.0	

** Highly significant

MCET (Monte Carlo Exact Test)

Table (6): Relation between socio-demographic characteristics of the studied primary school students with bronchial asthma and their levels of quality of life

Socio-demographic characteristics of the studied primary school children	The studied primary school children (n= 220)				X ² p
	Good quality of life (n=116)		Poor quality of life (n=104)		
	No	%	No	%	
Age / years					4.934 0.29
- 6 -	61	52.6	70	67.3	
- 9 -	55	47.4	34	32.7	
Sex					1.299 0.254
- Male	66	56.9	67	64.4	
- Female	50	43.1	37	35.6	
Mother's Occupation					MCET 0.014*
- Professional	4	3.4	2	1.9	
- Handicraft	0	0.0	1	1.0	
- Employee	61	52.6	37	35.6	
- Freelancing	6	5.2	12	11.5	
- Not working / House wives	45	38.8	52	50.0	
Crowding index					0.023 0.88
< 2	99	85.3	88	84.6	
≥ 2	17	14.7	16	15.4	
Latest academic grade					MCET 0.001**
60 % -	1	0.9	6	5.8	
80 % -	28	24.1	46	44.2	
90 % -	87	75.0	52	50.0	
Number of days of absenteeism in the last semester					MCET 0.036*
1 -	102	87.9	79	76.0	
10 -	13	11.2	22	21.2	
20 -	1	0.9	3	2.9	

** Highly significant

* Significant

MCET (Monte Carlo Exact Test)

Table (8): Relation between socio-demographic characteristics of the studied primary school students with bronchial asthma and their levels of academic procrastination

Socio-demographic characteristics of primary school children level of quality of life	The studied primary school children (n= 220)						X ² p
	Low Academic Procrastination		Moderate Academic Procrastination		High Academic Procrastination		
	(n=93)		(n= 56)		(n=71)		
	No	%	No	%	No	%	
Age / years							4.547 0.103
- 6 -	48	51.6	35	62.5	48	67.6	
- 9 -	45	48.4	21	37.5	23	32.4	
Sex							0.166 0.921
- Male	55	59.1	35	62.5	43	60.6	
- Female	38	40.9	21	37.5	28	39.4	
Family Income							MCET 0.009**
- Adequate and save	91	97.8	48	85.7	62	87.3	
- In adequate	2	2.2	8	14.3	9	12.7	
Mother education							MCET 0.036*
- Illiterates /reads and writes	4	4.3	1	1.8	5	7.0	
- Basic education (Primary & Preparatory)	10	10.8	7	12.5	7	9.9	
- Secondary	17	18.3	20	35.7	29	40.8	
- University / Post university	62	66.6	28	50.0	30	42.3	
Mother's Occupation							MCET 0.014*
- Professional	0	0.0	3	5.4	3	4.2	
- Handicraft	0	0.0	1	1.8	0	0.0	
- Employee	53	57.0	19	33.9	26	36.6	
- Freelancing	4	4.3	8	14.3	6	8.5	
- Not working / House wives	36	38.7	25	44.6	36	50.7	
Nationality							18.019 0.001**
- Saudi Arabian	83	89.2	38	67.9	44	62.0	
- Egyptian	10	10.8	18	32.1	27	38.0	
Place of residence							7.34 0.025*
- Rural	5	5.4	11	19.6	10	14.1	
- Urban	88	94.6	45	80.4	61	85.9	
Crowding index							2.284 0.319
- < 2	83	89.2	46	82.1	58	81.7	
- ≥ 2	10	10.8	10	17.9	13	18.3	
Latest academic grade							MCET 0.005**
- 60 % -	1	1.1	2	3.6	4	5.6	
- 80 % -	21	22.6	25	44.6	28	39.4	
- 90 % -	71	76.3	29	51.8	39	54.9	

** Highly significant

* Significant

MCET (Monte Carlo Exact Test)

Table (9): Correlation between age, academic grade, absenteeism in last semester, health services, quality of life and total procrastination score

Variables	Age	Crowding index	Latest academic grade	Number of days of absenteeism in the last semester	Total score of school health services	Total score of quality of life
	r	r	r	r	r	r
	p	p	p	p	p	p
Crowding index	-0.033-0.631	-	-	-	-	-
Latest academic grade	0.1160.085	-0.252-0.000**	-	-	-	-
Number of days of absenteeism in the last semester	-0.084-0.215	0.2410.000**	-0.332-0.000**	-	-	-
Total score of school health services	-0.062-0.362	-0.082-0.223	-0.051-0.447	-0.088-0.193	-	-
Total score of quality of life	-0.107-0.115	0.1280.058	-0.107-0.114	0.1260.062	0.0480.477	-
Total procrastination score	-0.181-0.007**	0.3430.000**	-0.379-0.000**	0.2270.001**	0.0440.512	0.5280.000**

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

Discussion:

Bronchial asthma significantly impacts school-age children's physical activity, emotional stability, and education. Comprehensive school health services including early assessment, medication, emergency care, and education—are vital to stabilizing symptoms and minimizing absenteeism (**Bajamal et al., 2025; Kindi et al., 2022; Lowe et al., 2023**). This study assessed how these services affect the academic performance and quality of life of primary school students with bronchial asthma.

Socio-demographically, over half of the children were aged six to eight years, nearly two-thirds were male, and the vast majority were Saudi nationals living in urban areas with adequate income. Over half of the parents held postgraduate degrees. Regarding living conditions, nearly half of the homes had two to three rooms, with a crowding index of **less than two** for most. Academically, nearly two-thirds scored in the highest range, yielding good overall academic performance despite minor absenteeism (**Table 1**).

These findings align closely with an intervention study by **Alhazmi et al. (2023)**, which evaluated a similar demographic profile where **59.8%** of the studied pediatric asthma patients were male, and reported that localized fragmentation in asthma care could be corrected through

structured regional programs to directly lower emergency room visits and hospitalizations. Conversely, these results contrast with the active clinical trials of **Chakravarthy et al. (2025)**. By allocating 50.0% of their study cohort (47 out of 94 participants) into a highly unified, structured educational teaching program, they achieved a statistically significant ($P < 0.001$) elimination of active symptoms and a complete optimization of the children's quality of life.

More than half of the students rated overall school health services as poor, with the average score reaching only about two-fifths of the maximum points (**Figure 1**). This highlights a systemic deficit, showing that current primary school health programs are fragmented and lack uniform execution for chronic illnesses like asthma.

These findings align closely with a scoping review by **Uchima et al. (2022)**, which reported a 56.0% institutional dissatisfaction rate due to fragmented global health services. Conversely, these results contrast with the positive outcomes of **Lowe et al. (2023)**, who found that unified clinical frameworks achieved an 84.5% satisfaction rate.

Regarding the overall health-related quality of life, more than half of the studied students reported a good quality of life, while less than half experienced a poor quality of life,

yielding a moderate collective mean score (**Table 2**). The researcher notes that because nearly half reported a poor quality of life despite stable socioeconomic backgrounds, financial security does not automatically guarantee optimal symptom control. Instead, these children face a constant physical struggle, "rationing" their activities to conserve breath.

These results align with a systematic review by **Gerriko et al. (2025)**, which found that pediatric quality of life remains highly vulnerable to triggers, with 46.8% scoring below acceptable thresholds. Conversely, these findings contrast with a cohort study by **Langenfeld et al. (2020)**, which reported that 45.0% of children routinely "masked" their symptoms, experiencing a poor quality of life unnoticed until severe, acute exacerbations occurred.

Regarding the specific domains of health-related quality of life, mean scores varied considerably across areas of vulnerability. Physical functioning yielded the highest collective mean score, while social functioning was the lowest rated domain among the sample. All four domains—physical, emotional, social, and school functioning—spanned from zero to their maximum limits (**Table 3**). The researcher notes that low social and emotional scores show the asthma burden extends beyond physical limits; children face

isolation and anxiety due to fear of triggering acute exacerbations.

These results align with a cross-sectional study by **Nitya et al. (2025)**, which supported these findings by demonstrating that 15.0% of their pediatric sample had completely uncontrolled asthma and 21.7% had partly controlled asthma, severely driving down multi-dimensional quality of life scores. Conversely, these findings contrast with a tertiary hospital study by **Akhiwu et al. (2022)**. Their data showed that 61.0% of children maintained a stable, moderately preserved level of functioning across key domains, retaining resilient physical and social activity behaviors despite 41.3% having uncontrolled asthma.

Regarding overall academic procrastination levels, nearly half of the students showed low academic procrastination, while about one-quarter demonstrated moderate procrastination, representing the lowest percentage (**Table 4**). The researcher highlights that the substantial proportion of students experiencing moderate-to-high procrastination points to behavioral barriers from managing a chronic condition. Physical and cognitive exhaustion from asthma forces children to split limited energy reserves between medical recovery and classroom tasks, causing delayed academic engagement.

These results align with a cross-sectional study by **Ahmed et al. (2023)**, which found that 55.4% of school-aged individuals experiencing persistent physical or environmental stress report problematic task postponement. Conversely, these findings differ from outcomes by **Alkhazaleh and Abojedi (2026)**, whose structural equation model showed that up to 48.3% of task postponement habits are driven by psychological and digital stressors.

A highly statistically significant relationship was found between received school health services, family income, parental occupation, and nationality (**Table 5**). The vast majority of students receiving good services belonged to families with adequate income, employed fathers, and housewife mothers, while Saudi Arabian students received significantly better services than Egyptian students. The researcher notes that resource distribution is driven by household financial stability and national status rather than uniform institutional access.

These results strongly agree with **Gassasse et al. (2025)**, who proved that socioeconomic factors and secure parental employment determine pediatric asthma care access. Conversely, the findings contrast with **Wu et al. (2023)**, who argued standardized infrastructure provides comprehensive care to

74.5% of asthmatic children regardless of income.

A statistically significant relationship was found between quality of life, maternal occupation, and school absenteeism (**Table 6**). Over half of the students with a good quality of life employed mothers, and the vast majority missed very few school days. The researcher noted that stable maternal employment enhances household security and healthcare access, minimizing severe exacerbations and reducing illness-related absences.

These results align with **Simoneau and Gaffin (2023)**, who found that stable parental employment helps **58.0%** of pediatric asthma patients achieve optimal health. Conversely, the findings contrast with **Pate et al. (2023)**, where socioeconomic disparities left **52.0%** of children with poor clinical outcomes.

Highly statistically significant relationships were found between academic procrastination, family income, nationality, and academic performance (**Table 7**). The vast majority of low procrastinators belonged to families with adequate income, held Saudi Arabian nationality, and scored in the highest academic range. Additionally, statistically significant relations were noted for maternal education, maternal employment, and urban residence. The researcher notes that a secure, resource-rich home

environment mitigates the fatigue of managing asthma, preserving energy for prompt academic engagement.

These results align with **Xu et al. (2024)**, who correlated high academic performance with low task delay in **75.4%** of top students. Conversely, the findings contrast with **Cutipa-Flores et al. (2025)**, who found **62.5%** of students struggled with high procrastination regardless of socioeconomic background.

A highly statistically significant positive correlation was found between total quality of life and total procrastination (**Table 8**), showing that academic delay is a direct symptom of compromised well-being. Significant positive correlations were also identified between procrastination, crowding index, and school absenteeism. Conversely, academic grade demonstrated a highly significant negative correlation with procrastination, while school health services showed the weakest, non-statistically significant correlation, suggesting that fragmented services do not translate into better outcomes. These results align with **Yang-Huang et al. (2024)**, who found that physical asthma limitations are deeply intertwined with behavioral environments, showing **64.2%** of asthmatic children develop secondary patterns like procrastination. Conversely, the findings contrast

with **Wu et al. (2023)**, who argued robust health infrastructure reduces procrastination for **72.0%** of asthmatic children.

Conclusion

Based on the findings of the present study, it can be concluded that more than half of the studied primary school students with bronchial asthma had poor school health services. Additionally, nearly half of them had poor health-related quality of life, and nearly one-third suffered from high academic procrastination. While students generally maintained good academic performance, asthma significantly impacted their physical activity and school attendance. The study highlights that poorer quality of life and higher absenteeism are directly associated with increased academic procrastination.

Recommendation

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

- Continuous improvement of school health services specifically for emergency interventions, routine follow-up, and chronic condition management.
- Ensure the availability of written asthma action plans and reliever medications in all schools.
- Organize regular health education programs for students, teachers, and parents regarding triggers and symptom monitoring.

-Provide psychological and academic support for students with repeated absenteeism or high procrastination to improve school engagement.

-Strengthen home-school coordination to promote healthy home environments and reduce the impact of social factors like crowding.

-Conduct future longitudinal studies to evaluate the long-term effect of structured school-based asthma interventions.

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Effect of Shaker Exercise and Masako Maneuver on Dysphagia, Swallowing Function and Quality of life among Patients with Hyperthyroidism

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Abstract

Background: Hyperthyroidism is a common endocrine disorder that may lead to dysphagia, impairing swallowing ability and quality of life. Shaker exercises and the Masako maneuver are effective techniques for improving swallowing function. **Aim:** This quasi-experimental study aimed to evaluate the effect of Shaker exercises and the Masako maneuver on dysphagia, swallowing function, and quality of life among patients with hyperthyroidism. **Setting:** The study conducts in Medical Hospital of Main Tanta University Hospital. **Subjects:** A purposive sample of 60 adult patients participated in the study. **Tools:** Structured Assessment Questionnaire, Swallowing Ability Observational Checklist, Dysphagia Disturbance Questionnaire, and Dysphagia Quality of Life Questionnaire. **Results:** revealed highly statistically significant improvements in swallowing ability. The proportion of patients with normal swallowing ability increased from 0.0% at baseline to 98.3% after two months, while aspiration pneumonia decreased from 73.3% before intervention to 0.0% after follow-up. **Conclusion:** Shaker exercises and the Masako maneuver were effective in reducing dysphagia severity, improving swallowing function, enhancing swallowing safety, and promoting better quality of life among patients with hyperthyroidism. **Recommendations:** The study recommends incorporating Shaker exercises and the Masako maneuver into routine nursing care plans for patients with hyperthyroidism experiencing dysphagia.

Keywords: Dysphagia, Hyperthyroidism, Masako Maneuver, Quality of Life, Shaker Exercise, Swallowing Function.

Introduction

Hyperthyroidism is a common endocrine disorder that is characterized by excessive thyroid hormone production, which often leads to neuromuscular weakness and impaired coordination of swallowing muscles. These alterations predispose patients to dysphagia, a complication that negatively affects daily functioning and overall health. Dysphagia in hyperthyroid patients contributes to nutritional deficiencies, aspiration risks, and increased psychological distress, ultimately reducing quality of life (**Lee & Pearce, 2023**).

Dysphagia is defined as difficulty in swallowing food, liquids, or saliva due to impairment in the oral, pharyngeal or esophageal phases of swallowing. It may result from neurological disorders, muscular weakness, structural abnormalities, or systemic diseases affecting the swallowing mechanism. Common causes of dysphagia include stroke, neurodegenerative diseases, head & neck disorders, and endocrine conditions as hyperthyroidism, which can impair neuromuscular coordination and muscle strength involved in swallowing (**Clavé & Shaker, 2015; Baijens et al., 2021**). Rehabilitation exercises such as the Shaker exercise and Masako maneuver are non-invasive, cost-

effective, and easily taught, making them highly suitable for long-term use. Furthermore, their role in maintaining functional independence is vital, as untreated dysphagia can lead to social withdrawal, psychological distress, and decreased health-related quality of life. Thus, integrating targeted swallowing exercises into care plans may provide both physiological and psychosocial benefits for hyperthyroid patients (**Chen et al., 2025; Cordier et al., 2021**).

The Shaker exercise, also known as the head-lift exercise, is designed to strengthen the suprahyoid muscles, which are crucial for opening the upper esophageal sphincter (UES) during swallowing. By repeatedly lifting the head while lying in a supine position, patients gradually increase muscle tone and improve the elevation of the larynx. This leads to better airway protection and reduced risk of aspiration in individuals with swallowing difficulties (**Park et al., 2021**).

The Masako maneuver, or tongue-hold technique, is another rehabilitative strategy that specifically targets the posterior pharyngeal wall movement during swallowing. By gently holding the tongue between the teeth while swallowing, patients activate the pharyngeal constrictor muscles more

effectively, leading to improved pharyngeal pressure and bolus clearance. This exercise is beneficial for individuals who experience reduced tongue base retraction, a common issue in dysphagia associated with hyperthyroidism (**Chen et al., 2025**). Nurses play a pivotal role in the early management of dysphagia among patients with hyperthyroidism. As frontline healthcare providers, they are often the first to observe symptoms as coughing during meals, changes in voice quality, or prolonged swallowing time. Moreover, nurses provide education and motivation for patients to adhere to rehabilitative exercises like the Shaker and Masako maneuvers. This continuous support is critical for achieving long-term improvements in swallowing function and overall patient outcomes (**Rowe et al., 2024; Mancin et al., 2024**).

The aim of the study: this study aimed to evaluate the effect of Shaker Exercises and Masako Maneuver on dysphagia, swallowing function and quality of life among patients with Hyperthyroidism

Research Hypotheses:

-Patients who will receive Shaker exercises and Masako maneuver are exhibited to have improved in dysphagia and swallowing function.

-Patients who will receive Shaker exercises and Masako maneuver are exhibited to have improved quality of life.

Subject and Method

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

Setting:

The study was conducted at General Medical Hospital of Main Tanta University Hospital and its affiliated outpatient clinics.

Subjects:

A purposive sample of 60 adult patients with enlarged hyperthyroidism and swallowing difficulties was recruited from the previously mentioned settings.

Inclusion criteria for subjects studied:

- Patients from both sexes.
- Age group between 21-60 years.
- Patients diagnosed with enlarged hyperthyroidism have difficulty swallowing either liquid or soft/hard food or both.

Tools of data collection:

Four tools were used to collect the study data:

Tool I: Structured Assessment Questionnaire. This questionnaire was developed by the researcher after an extensive review of the relevant literature (**Langmore & Pisegna, 2015; Wiersinga, 2023**), and consisted of two parts.

Part (A): Socio-demographic

Characteristics: This section collected data regarding patient code, age, sex, marital status, educational level, occupation, and place of residence.

Part B: Clinical Assessment

This section included information related to duration of disease, medical diagnosis, BMI, past and present medical and surgical history, previous history of esophageal cancer, smoking and comorbidities disease, complain and symptoms, mood changes, if the patients follow special diet, type of medication, history of hospitalization. **Tool II: Swallowing Ability Observational Checklist**

This tool was adapted from Northwestern Dysphagia Patient Checklist which was developed by **Logemann et al. (1999)**, updated by **Audag et al. (2019)** and modified by the researchers. It was used to assess the swallowing ability of different food types and their amount. This tool included six items which were; apraxia of swallow, oral residue, coughing/throat clearing, delayed pharyngeal swallow, reduced laryngeal elevation, and multiple swallows per bolus. Each item was scored using a five-point ordinal scale as follows: 0= (No difficulty), 1= (mild difficulty), 2= (moderate

difficulty), 3= (severe difficulty), 4= (Unable to perform the task).

The total score ranged from 0 to 100 and was interpreted as follows:

21–40 indicated normal swallowing function.

21–40 indicated mild swallowing difficulty.

41–60 indicated moderate swallowing difficulty.

61–80 indicated severe swallowing difficulty.

81–100 indicated inability to swallow safely without assistance.

Tool III : Dysphagia Disturbance Questionnaire (DSQ)

Dysphagia Disturbance Questionnaire was developed by **Manor et al. (2007)** and was used to quantify the severity of swallowing impairment. The questionnaire consisted of 15 items covering both oral and pharyngeal phases of swallowing. The first five questions assessed oral swallowing disturbances, whereas the remaining ten questions evaluate pharyngeal swallowing dysfunction.

Fourteen items were rated on a four-point scale ranging from 0 (no disturbance) to 3 (severe disturbance). One dichotomous question was scored as 2.5 for "Yes" and 0.5 for "No."

The total score was obtained by summing all responses, with higher scores reflecting greater dysphagia severity.

Tool IV: Dysphagia Quality of Life Questionnaire (DQOL-Q)

The Dysphagia Quality of Life Questionnaire was used to evaluate the impact of swallowing impairment on patients' daily activities and overall quality of life. The questionnaire consisted of four domains: Physical domain, Social and psychological domain, Dietary domain and general quality of life domain. Each domain contained ten items scored on a five-point Likert Scale ranging from 0 (Never) to 4 (Always).

Higher total scores indicated a greater negative impact of dysphagia on quality of life, whereas lower scores reflected better functional status and quality of life.

Method:

1 -Administrative process: An official permission letter was obtained from the Dean of the Faculty of Nursing and submitted to the responsible administrative authorities at Main Tanta University Hospital before initiation of the study.

2- Ethical and legal consideration:

-The Tanta University Faculty of Nursing's ethical committee gave its

approval prior to the study's execution with code 653-5-2025.

-written informed consent was obtained from all patients and their freedom to leave the study at any moment.

-Privacy and confidentiality were taken into account.

3- Tool development: The tools of the study were developed by the researcher after reviewing related literature except Tool (III): Dysphagia Screening Questionnaire was developed by (**Koyano, 1987**) and Tool (IV) Dysphagia Quality of Life questionnaire based on literature (**Bricker, McHorney & Wyrwich, 2004**).

4- Tool validity: The content validity of the developed tools was tested for clarity and applicability by seven experts in medical surgical nursing to ensure their validity and modifications were done.

5- Tool reliability: Cronbach's alpha reliability analysis was performed to assess the internal consistency of the study instruments. Cronbach's alpha for tool II is 0.868 for 29 items. Cronbach's alpha for tool III is 0.976 for 15 items. Cronbach's alpha for tool IV is 0.998 for 40 items.

6- A pilot study: A pilot study was conducted on approximately 10% of the total study sample (six patients), to evaluate the clarity and

applicability of the data collection tools, identify any practical difficulties that might arise during implementation. Accordingly, the necessary modifications were made. The subjects of the pilot study were excluded from the original sample.

7- Data collection was completed over a six-month period starting from July 2025 to January 2026.

8- The field work was carried out through four consecutive phases: assessment, planning, implementation, and evaluation.

Assessment phase: Assessment of the patients was done using Tool I part A and B, II, III and IV pre, one month and two months.

Planning phase:

a-Preparing the content of therapeutic exercise booklet: illustrative educational booklet written in simple Arabic language was designed to facilitate patient understanding. The educational materials included diagrams, photographs, PowerPoint presentations, instructional videos, demonstrations, and interactive discussions.

b-Preparing the environment:

Maintaining quietness, good ventilation, providing privacy and using audiovisual materials that were necessary as power point presentation and videos through using laptop. In addition to preparing

equipment and suitable chair and bed that are used during preparing every type of exercise.

Implementation phase: The intervention program was implemented individually in a quiet and private setting. Each participant attended 4 structured sessions.

-The first session: overview of hyperthyroidism and its potential impact on swallowing function and the importance of adherence to rehabilitation exercises.

-The second session: Participants were trained to perform tongue-strengthening exercises, tongue range-of-motion exercises, and tongue retraction exercises.

-The third session: (Shaker exercise training). The exercise protocol was performed three times daily for approximately 10 minutes, five days per week, for eight consecutive weeks.

-The fourth session: (Masako Maneuver), Training patients to perform the Masako maneuver correctly. The maneuver was performed in three sets of ten repetitions, three times daily, five days per week, for eight weeks.

All participants continued to receive their routine departmental care and medical treatment in addition to swallowing exercise.

Evaluation phase: Each patient in all study groups was assessed by

using Tool I part A and B, II, III and IV, Tool II, Tool III and Tool IV pre, one month and two months to determine the effectiveness of implementing Rehabilitative Exercise.

Methods of data analysis:

Data was collected and entered onto a computer, where it was analyzed using IBM Statistical Package for Social Sciences (SPSS) version 20. (Armonk, NY: IBM Corp). Number and percent were used to describe qualitative data. Range was used to describe quantitative data.

Results

Table (1): Distribution of patients according to socio-demographic data. It illustrated that the largest proportion (40.0%) belonging to the age group of >40–50 years. Females constituted a slightly higher percentage (51.7%) than males (48.3%). **Regarding occupation and educational level,** the majority of patients (88.3%) had a relatively high level of education. In addition, the majority of patients (88.3%) had a relatively high level of education. **Regarding residence,** nearly two-thirds of the participants (65.0%) resided in rural areas.

Table (2): Comparison between the three studied periods according to level of Overall Swallowing Ability Observational Checklist. It showed that remarkable

improvement in the overall level of swallowing ability among the studied patients throughout the intervention period. The observed improvement in swallowing ability levels was highly statistically significant ($F = 114.74$, $p < 0.001$), **Figure (1): Comparison between the three studied periods according to level of Overall Swallowing Ability Observational Checklist,** it showed that improvement in the overall level of swallowing ability among the studied patients throughout the intervention, with equal proportions classified as having mild (50.0%) and moderate (50.0%) swallowing impairment before intervention. Following one month of intervention, (81.7%) of patients achieved normal swallowing ability, while only (18.3%) remained mildly impaired. After two months, (98.3%) of patients achieved normal swallowing ability and only one patient (1.7%) remained mildly impaired.

Table (3): Comparison between the three studied periods according to total score for Dysphagia Disturbance (DSQ). It showed marked improvement in dysphagia severity among the studied patients throughout the intervention period. The overall dysphagia score showed a

substantial reduction from 22.25 ± 8.39 before the intervention to 9.32 ± 7.60 after one month and 1.37 ± 3.80 after two months ($F = 111.712$, $p < 0.001$).

Table (4): Comparison between the three studied periods according to level of overall Dysphagia Quality of Life (DQOL-Q). The table demonstrated a significant improvement in the overall Dysphagia Quality of Life (DQOL-Q) levels among the studied patients throughout the intervention period. With highly statistically significant ($F = 75.796$, $p < 0.001$).

Figure (3): Comparison between the three studied periods according to level of overall Dysphagia Quality of Life (DQOL-Q). It showed that, before intervention the majority of patients (70.0%) were classified as having a moderate-to-severe impairment in quality of life, while 10.0% experienced severe impairment and only 18.3% had minimal impairment. Following the intervention, the proportion of patients with minimal impairment increased progressively to 36.7% after one month and 90.0% after two months. Concurrently, the percentage of patients with moderate-to-severe impairment decreased markedly from 70.0% at

baseline to 10.0% at the final assessment, while severe impairment was completely eliminated after one month.

Table (5): Correlation between Observational Checklist, DSQ and DQOL-Q in each period. It showed significant positive correlations between the Swallowing Ability Observational showed significant (DQOL-Q) scores across the study periods. Strongest correlations were observed between DSQ and DQOL-Q scores, after one month ($r_s = 0.921$, $p < 0.001$). Significant positive correlations were also found between observational checklist scores and DSQ scores at all assessment periods ($r_s = 0.546-0.779$, $p < 0.001$). Furthermore, observational checklist scores were significantly correlated with DQOL-Q scores after two months ($r_s = 0.233$, $p = 0.074$).

Table1: Distribution of patients according to Socio-demographic data.

Part A: Socio-demographic Data	No.	%
Age (years)		
21– 40	21	35.0
>40 – 50	24	40.0
>50 – 60	15	25.0
Min. – Max.	28.0 – 58.0	
Mean $\pm$ SD.	43.97 $\pm$ 7.90	
Sex		
Male	29	48.3
Female	31	51.7
Occupation		
Manual work	21	35.0
Employee	19	31.7
Technical work	1	1.7
House wife	19	31.7
Educational level		
Illiterate	1	1.7
Read and write	1	1.7
Basic education	5	8.3
Diploma	27	45.0
Secondary education	9	15.0
University education	17	28.3
Low Education	7	11.7
High Education	53	88.3
Residence		
Urban	21	35.0
Rural	39	65.0

Table 2: Comparison between the three studied periods according to level of Overall Swallowing Ability Observational Checklist

Swallowing Ability Observational Checklist	Pre		After 1 month		After 2 months		Fr	P
	No.	%	No.	%	No.	%		
Level								
Normal (0 – 20%)	0	0.0	49	81.7	59	98.3	114.74*	<0.001*
Mild (21 – 40%)	30	50.0	11	18.3	1	1.7		
Moderate (41– 60%)	30	50.0	0	0.0	0	0.0		
Severe (61 – 80%)	0	0.0	0	0.0	0	0.0		
Unable to swallow safely without assistance (81– 100%)	0	0.0	0	0.0	0	0.0		

Fr: Friedman test

p: p value for comparing between the three studied periods

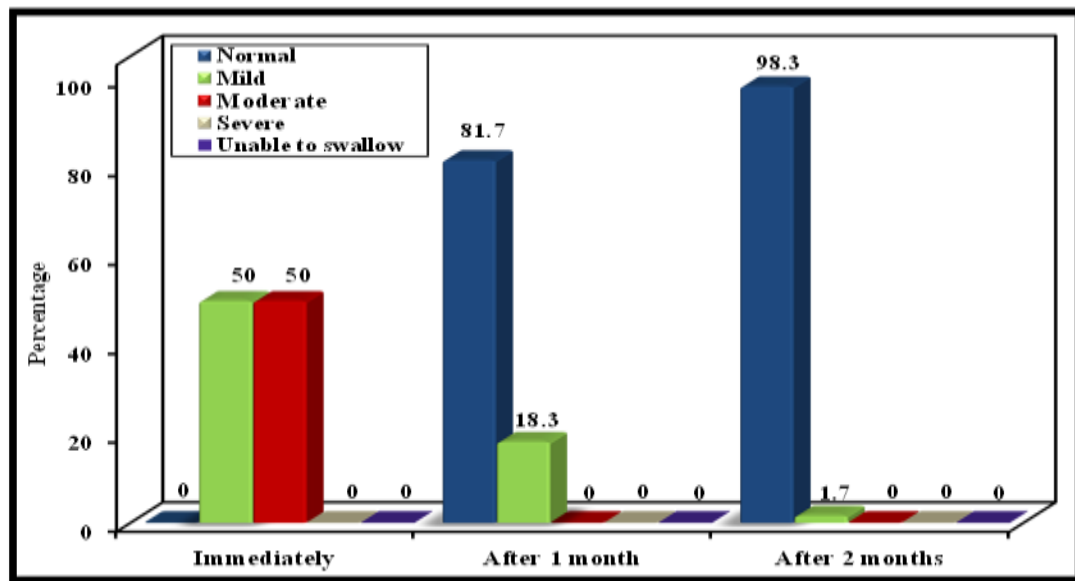
*: Statistically significant at $p \leq 0.05$ 

Figure 1: Comparison between the three studied periods according to level of overall Swallowing Ability Observational Checklist

Table 3: Comparison between the three studied periods according to total score for Dysphagia Disturbance (DSQ) (n = 60).

Dysphagia Disturbance (DSQ)	Pre	After 1 month	After 2 months	Fr	P
Oral Phase (0 – 15)					
Min. – Max.	5.0 – 15.0	0.0 – 10.0	0.0 – 5.0		
Mean ± SD.	9.12 ± 2.91	3.97 ± 3.03	0.53 ± 1.52	113.19*	<0.001*
Median (IQR)	10.0 (6.0 – 10.0)	5.0 (0.0 – 5.0)	0.0 (0.0 – 0.0)		
Sig. bet. periods	p ₁ =<0.001*, p ₂ =<0.001*, p ₃ =<0.001*				
Pharyngeal Phase (0 – 27)					
Min. – Max.	5.0 – 25.0	0.0 – 16.0	0.0 – 8.0		
Mean ± SD.	13.13 ± 5.57	5.35 ± 4.62	0.83 ± 2.32	111.712	<0.001*
Median (IQR)	13.0 (8.50 – 16.0)	5.0 (0.0 – 7.0)	0.0 (0.0 – 0.0)		
Sig. bet. periods	p ₁ =<0.001*, p ₂ =<0.001*, p ₃ =0.001*				
Overall (0 – 42)					
Min. – Max.	10.0 – 40.0	0.0 – 26.0	0.0 – 12.0		
Mean ± SD.	22.25 ± 8.39	9.32 ± 7.60	1.37 ± 3.80	111.712*	<0.001*
Median (IQR)	23.0 (14.0 – 26.0)	10.0 (0.0 – 12.0)	0.0 (0.0 – 0.0)		
Sig. bet. periods	p ₁ =<0.001*, p ₂ =<0.001*, p ₃ =0.001*				

IQR: Inter quartile range

SD: Standard deviation

Fr: Friedman test, Sig. bet. periods was done using Post Hoc Test (Dunn's test with Bonferroni adjustment for multiple comparisons)

Table 4: Comparison between the three studied periods according to level of overall Dysphagia Quality of Life (DQOL-Q) (n = 60).

Dysphagia Quality of Life (DQOL-Q)	Pre		After 1 month		After 2 months		Fr	P
	No.	%	No.	%	No.	%		
Level								
Minimal (0 – 39)	11	18.3	22	36.7	54	90.0		
Moderate (40–59)	1	1.7	1	1.7	0	0.0		
Moderate to severe (60 – 120)	42	70.0	37	61.7	6	10.0	75.796*	<0.001*
Severe (>120)	6	10.0	0	0.0	0	0.0		

Fr: Friedman test

*: Statistically significant at p ≤ 0.05

p: p value for comparing between the three studied periods

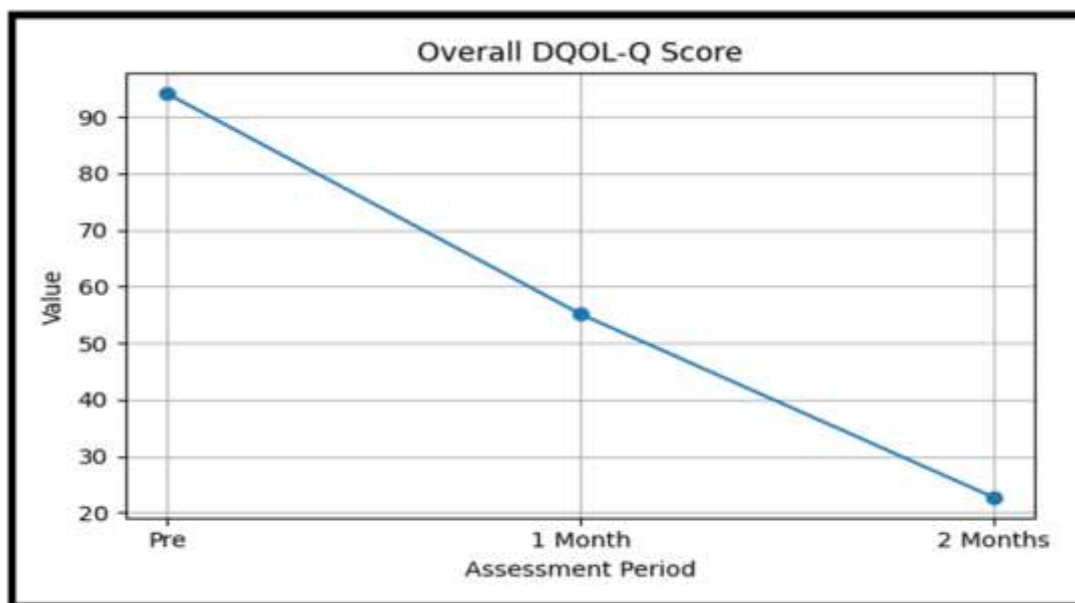


Figure2: Comparison between the three studied periods according to level of overall Dysphagia Quality of Life (DQOL-Q).

Table 5: Correlation between Observational Checklist, DSQ and DQOL-Q in each period

	Pre		After 1 month		After 2 months	
	r_s	p	r_s	p	r_s	P
Observational Checklist vs. DSQ	0.689*	<0.001*	0.779*	<0.001*	0.546*	<0.001*
Observational Checklist vs. DQOL-Q	0.637*	<0.001*	0.677*	<0.001*	0.233	0.074
DSQ vs. DQOL-Q	0.939*	<0.001*	0.921*	<0.001*	0.496*	<0.001*

r_s : Spearman coefficient

*: Statistically significant at $p \leq 0.05$

Discussion

Hyperthyroidism is a common endocrine disorder that may lead to thyroid enlargement and dysphagia due to compression of the pharynx and esophagus. Dysphagia can negatively affect swallowing function, nutritional status, and quality of life,

highlighting the importance of early assessment and appropriate management (Ortega, 2024; Thorsen et al., 2022).

The Shaker exercise and Masako maneuver are effective swallowing rehabilitation techniques that improve swallowing function by strengthening the muscles involved

in swallowing and enhancing airway protection. Nurses play a key role in implementing these evidence-based interventions, educating patients, and monitoring outcomes, thereby improving swallowing function, quality of life, and reducing dysphagia-related complications among patients with hyperthyroidism (Yilmaz et al., 2024; Mari et al., 2025).

This study aimed to evaluate the effect of Shaker exercises and the Masako maneuver on dysphagia, swallowing function, and quality of life among patients with hyperthyroidism. This section discusses the findings in relation to previous studies, highlighting the implications of these findings for evidence-based nursing practice and dysphagia rehabilitation.

Regarding the socio-demographic characteristics of the studied patients, the findings of the present study revealed that the highest proportion of patients belonging to the 40–50 years' age group. This finding reflects that hyperthyroidism commonly affects middle-aged adults. This finding was matched with Mohammed and Hassanein (2019) who reported that most patients with hyperthyroidism-associated dysphagia were middle-aged adults. On the other hand, these results were disagreed with Suzuki

et al. (2022) who found that younger patients with Graves' disease, particularly those younger than 40 years, were more likely to present with hyperthyroidism. **Concerning sex,** the present study revealed that females represented a slightly higher percentage than males, which may be attributed to the higher susceptibility of women to thyroid disorders, particularly autoimmune thyroid diseases. This finding is in agreement with Wémeau et al. (2018), who reported that females constituted the majority of the studied sample. It is also consistent with Hollowell et al. (2002), which demonstrated a higher prevalence of thyroid disorders among females compared to males. **Also, the current study** sociodemographic results revealed that manual workers represented the largest category, followed equally by employees and housewives. This finding is consistent with Leso et al. (2020), who reported that thyroid disorders may have a considerable impact on working populations, particularly individuals engaged in physically demanding occupations, emphasizing the relationship between thyroid disease and occupational status. On the other hand, these results differ from Taylor et al. (2018), who reported variations in the demographic

characteristics of patients with hyperthyroidism across different populations, with women and non-working individuals representing a substantial proportion of affected patients. **With regard to educational status**, the present study revealed that the majority of patients had a relatively high level of education, while only a small proportion had low educational attainment. This finding is in agreement with **Taylor et al. (2018)**, who reported that the epidemiology of thyroid disorders may vary according to sociodemographic factors, including educational level. This finding disagreed with the result of **Al Barzanji et al. (2019)**, who found that thyroid disorders were more common among individuals with lower educational attainment.

Regarding residence, most of the studied patients were from rural areas. This finding is in agreement with **Taylor et al. (2018)**, who reported that the distribution of thyroid disorders varies according to geographical and environmental factors, leading to differences between rural and urban populations. Likewise, **Laurberg et al. (2014)** emphasized that the epidemiological pattern of thyroid disorders varies across populations and is influenced by environmental and regional

factors such as iodine intake and genetic susceptibility.

Regarding the overall swallowing ability of the studied patients, the findings of the present study demonstrated clinically significant improvement following implementation of the intervention. The complete disappearance of moderate, severe, and unsafe swallowing categories reflects the effectiveness of the intervention in restoring functional swallowing performance and reducing dysphagia severity. These findings were consistent with **Sucipto and Ta'adi (2019)**, who reported marked improvements in swallowing ability among patients receiving Shaker exercises, with progression from moderate and severe dysphagia levels toward normal swallowing function. Similar findings were reported by **Abouelezz et al. (2020)**; **Mohammed and Hassanein (2019)**, who documented significant improvements in swallowing ability and safe oral feeding following implementation of swallowing exercise programs.

Regarding dysphagia severity, the findings of the present study revealed a marked reduction in Dysphagia Disturbance Questionnaire scores throughout the follow-up period. Significant improvements were observed in both

oral and pharyngeal swallowing domains, indicating substantial recovery of swallowing function and reduction in dysphagia severity. These findings demonstrate the effectiveness of the intervention in addressing multiple aspects of swallowing dysfunction. This finding agreed with **Mohammed and Hassanein (2019)**, who finding significant reductions in dysphagia severity among patients with hyperthyroidism following Shaker exercises. Similar findings were documented by **Barot et al. (2023)**; **Kamal Mohamed et al. (2025)**; **Abouelezz et al. (2020)**, all of whom reported improvements in swallowing function, feeding ability, swallowing safety, and overall dysphagia outcomes following structured swallowing rehabilitation programs.

Regarding the overall dysphagia-related quality of life, the findings of the present study demonstrated that, Improvements were observed across the physical, emotional, social, and functional domains, indicating that enhanced swallowing function positively influenced patients' overall wellbeing and daily functioning. These findings were in accordance with **Barot et al. (2023)**, who reported significant improvements in quality-of-life outcomes following swallowing

rehabilitation interventions. Likewise, **Kamal Mohamed et al. (2025)**; **Abouelezz et al. (2020)**; **Hashemian et al. (2019)** documented significant improvements in physical comfort, social participation, emotional wellbeing, functional independence, and overall life satisfaction among patients receiving swallowing rehabilitation programs.

Regarding the relationship between swallowing ability and dysphagia severity, the findings of the present study demonstrated a significant positive correlation between swallowing impairment and dysphagia-disturbance severity. Patients with greater swallowing impairment experienced more severe dysphagia symptoms, highlighting the close association between objective swallowing dysfunction and patients' subjective swallowing difficulties This finding agreed with **Mohammed and Hassanein (2019)**, who reported that improvements in swallowing ability following Shaker exercises were accompanied by significant reductions in dysphagia symptoms among patients with hyperthyroidism. Similarly, **Abouelezz et al. (2020)** found that improvements in clinical swallowing assessments corresponded with reductions in dysphagia-related complaints and feeding difficulties,

supporting the strong relationship between swallowing performance and dysphagia severity.

Regarding the relationship between swallowing ability and quality of life, the findings of the present study demonstrated a significant positive correlation, indicating that improvements in swallowing function were associated with higher quality-of-life scores. This finding agreed with **Barot et al. (2023)**, who reported that improvements in swallowing function following rehabilitation were strongly associated with enhanced quality-of-life outcomes. Likewise, **Kamal Mohamed et al. (2025)** found that reductions in dysphagia severity significantly improved patients' quality of life and daily functioning.

Regarding the relationship between dysphagia severity and quality of life, the findings of the present study revealed a significant negative correlation, indicating that patients with more severe dysphagia experienced poorer quality-of-life outcomes.

These findings were consistent with **Barot et al. (2023)**, who found that decreased dysphagia severity following swallowing rehabilitation was associated with significant improvements in quality-of-life measures. Similarly, **Hashemian et**

al. (2019) reported that improvements in swallowing dysfunction were accompanied by enhanced quality-of-life outcomes among patients with thyroid-related swallowing disorders. Comparable findings were reported by **Tuomi et al. (2022)**, who observed that persistent swallowing difficulties were associated with lower quality-of-life scores and greater psychosocial burden.

Regarding the influence of demographic and clinical characteristics on study outcomes, the findings of the present study demonstrated that improvements in swallowing ability, dysphagia disturbance, and quality of life occurred across different demographic and clinical subgroups. This suggests that the swallowing exercise program was broadly effective regardless of patient characteristics and supports its applicability as a valuable intervention for a wide range of patients experiencing dysphagia. This finding agreed with **Mohammed and Hassanein (2019)**, who reported significant benefits of Shaker exercises among patients with hyperthyroidism regardless of age and gender differences. Similarly, **Kamal Mohamed et al. (2025)** found that swallowing rehabilitation produced favorable

outcomes across diverse patient groups and clinical characteristics. However, **Tuomi et al. (2022)** suggested that disease-specific factors, particularly structural changes associated with head and neck cancer treatment, may influence the degree of improvement achieved through swallowing rehabilitation, which may explain variations in outcomes across different patient populations.

Conclusion

Based on the findings of the present study, it can be concluded that implementation of Shaker exercises and the Masako maneuver had a significant positive effect on patients with hyperthyroidism suffering from dysphagia. Improvements were observed in all domains of dysphagia-related quality of life, including physical, emotional, social, and functional wellbeing and complete elimination of aspiration pneumonia during the follow-up period.

Recommendations

It was recommended that Shaker exercises and the Masako maneuver should be incorporated into routine nursing care plans for patients with hyperthyroidism experiencing dysphagia. Further studied should be replicated using larger probability to evaluate the long-term effectiveness of different swallowing

rehabilitation techniques among patients with hyperthyroidism and other dysphagia-related conditions, samples and different healthcare settings.

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Head Nurses' Managerial Intelligence and Its Relation to Their Conflict Management as Perceived by Intensive Care Nurses

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Abstract

Background: Head nurses in intensive care units need strong managerial intelligence, cognitive, emotional, and social, to lead their teams and manage workplace conflict effectively. **Aim:** To identify head nurses' managerial intelligence and its relation to conflict management as perceived by intensive care nurses. **Design:** A descriptive-correlational design was used. **Setting:** Cardiology, Neurology, and Oncology ICUs at Tanta University Main Hospitals, which is affiliated with the Ministry of Higher Education and Scientific Research. **Subjects:** All 371 nurses working in these units were included. **Tools:** Two tools were used: tool (I) Head Nurses' Managerial Intelligence, and tool (II) Head Nurses' Conflict Management Questionnaires. **Results:** High percentage (72.0%) of nurses rated their head nurses' managerial intelligence as low, with emotional intelligence as the highest-rated dimension. Similarly, 72.0% of nurses rated their head nurses' conflict management as low. The accommodating strategy scored the highest dimension. **Conclusion:** Nurses perceived their head nurses as having low levels of both managerial intelligence and conflict management. A strong positive correlation was found between managerial intelligence and conflict management as perceived by nurses. **Recommendations:** Hospital administrators establish leadership training programs that focus on cognitive, emotional, and social skills need to be provided to IC head nurses, along with ongoing conflict management training and organizational support.

Keywords: Conflict Management, Head Nurses, Intensive Care Units, Managerial Intelligence, Nurses.

Introduction

Intensive Care Units (ICUs) are highly specialized clinical environments that operate within a multidisciplinary and interprofessional framework, devoted to the comprehensive and continuous management of critically ill patients. IC nurses are competent registered nurses who possess specialized skills and knowledge to provide comprehensive, high-quality care for acutely ill patients. They plan, coordinate, and implement care in collaboration with the healthcare team to meet the physical, psychological, and spiritual needs of both the patient and family **(Turner, 2021; Cynthia & Bearer, 2023)**. The effective functioning of ICU nursing teams depends heavily on the quality of nursing leadership, particularly head nurses, who bear direct responsibility for managing nursing staff, maintaining care standards, and coordinating unit operations under sustained clinical pressure **(West et al., 2022; WHO, 2022)**.

Head nurses in intensive care settings are required to demonstrate a distinctive combination of analytical, relational, and emotional leadership competencies. These competencies are collectively referred to as managerial intelligence, which is defined as the multidimensional capacity of head nurses to integrate cognitive reasoning, emotional regulation, and social awareness in the service of effective leadership and organizational performance **(Mosadeghrad & Abbasi, 2020; Dargahi & Vaysi, 2021)**. Managerial intelligence enables head

nurses to make sound clinical and administrative decisions, build constructive professional relationships with nursing staff, and navigate the complex interpersonal and organizational demands inherent to intensive care environments **(Gunawan & Aungsuroch, 2017; Ali et al., 2024)**.

Managerial intelligence is conceptualized as comprising three interrelated dimensions: cognitive, emotional, and social. Cognitive intelligence encompasses the analytical reasoning, critical thinking, and problem-solving capacities that enable head nurses to make informed, evidence-based decisions even under clinical pressure **(Otero et al., 2022; Dogham et al., 2025)**. Emotional intelligence refers to the ability to perceive, understand, regulate, and utilize emotions constructively, fostering trust, psychological safety, and resilience within nursing teams **(Garcia et al., 2023; Almadani & Alamri, 2024)**. Social intelligence represents the relational capacity to understand interpersonal dynamics, navigate professional relationships, and sustain effective cooperation within multidisciplinary healthcare organizations **(Lee et al., 2024; Bai et al., 2024)**. Together, these three dimensions provide the integrated leadership foundation that head nurses require to manage the multifaceted demands of intensive care settings **(Elsaeed et al., 2023)**.

Although critical care professionals form an integrated team to work together in harmony, those teams possess different

backgrounds, values, and goals, which makes the ICU a suitable environment for conflict to arise (**Rahim, 2023; Shao et al., 2024**). Conflict is a disagreement or variance of opinion related to the management of patients in an ICU that requires decision-making or action. It may emerge from a variety of sources, including interpersonal differences in values and opinions, scarcity of resources, lack of clarity about tasks, lack of guidance by superiors, lack of work justice, inadequate communication, and disparity of power between nurses and physicians (**Labrague et al., 2023; Zhang et al., 2024**). Conflict is an undeniable part of everyday work in ICUs; experiencing small amounts of conflict stimulates discussion and develops human capabilities to handle interpersonal differences. While unmanaged conflict establishes confusion in interpersonal relations, widens the chasm of misunderstanding, increases staff burnout, time-wasting, turnover, and hostility (**Bashir et al., 2022; Alsereidi et al., 2022**).

Conflict management is the practice of dealing with disputes in a rational, balanced, and effective approach to achieve constructive rather than destructive outcomes (**Rahim, 2023**). Five different conflict management strategies have been identified: avoiding, competing, accommodating, collaborating, and compromising (**Mostafa et al., 2019; Kilmann & Thomas, 2022**). Avoiding style is characterized by unassertiveness and

uncooperativeness, where the individual parties do not confront one another and avoid coming up with a resolution to the conflict. Competing style is known by assertiveness and uncooperativeness, reflecting a desire to satisfy one's concern regardless of the impact on the other party. The accommodating style is identified by unassertiveness and cooperativeness, representing the willingness of one party to place the opponent's interest above their own. The collaborating style is recognized by assertiveness and cooperativeness, where each individual respects the ideas and values of the other to find a solution that satisfies both parties. The compromising style is characterized by a moderate level of assertiveness and cooperativeness, where both parties have to give up a significant part of their concerns to reach a mutual agreement (**Kilmann & Thomas, 2022; Rahim, 2023**).

Head nurses play a central role in conflict management within IC nursing teams. The managerial intelligence of head nurses directly shapes their capacity to recognize conflict dynamics, regulate their own emotional responses, and select the most appropriate conflict management strategy for each situation (**Aseery et al., 2023; Assi & Eshah, 2023**). Head nurses with well-developed cognitive intelligence are better able to analyze the sources of conflict objectively; those with stronger emotional intelligence can remain calm and empathetic during tense situations; and those with higher social intelligence can leverage interpersonal

skills to facilitate constructive dialogue and resolution (**Kozlowski et al., 2023; Ali et al., 2024**). When head nurses have a lack of these managerial capabilities, unresolved conflicts accumulate over time, negatively affecting nursing team performance, staff satisfaction, and patient care quality in the ICU (**Labrague et al., 2023; Nguyen et al., 2024**).

Despite the recognized importance of managerial intelligence in nursing leadership, few studies have examined its relations with conflict management among IC head nurses, particularly in Egyptian intensive care settings. In addition, Previous studies have also reported inadequate conflict management support from head nurses in Egyptian hospitals, which has been associated with lower job satisfaction, increased turnover intention, and weakened team performance (**Abd-Elaziz et al., 2023; Elsaeed et al., 2023**). More studies are needed to better understand the relationship between managerial intelligence and conflict management among IC head nurses (**Aseery et al., 2023; Abou Hashish et al., 2023**). This may help improve leadership skills and conflict management practices among head nurses, leading to better nursing care in intensive care units (**Elbus et al., 2023**).

Significance of the Study:

The intensive care unit represents a highly demanding work environment where head nurses' leadership directly influences nurses' performance and patient outcomes. The stressful nature of ICU work

increases interpersonal conflicts and requires head nurses to manage these conflicts effectively (**Vallone & Zurlo, 2024; Fernández-Castillo et al., 2025**). Unresolved conflicts among nurses have been associated with lower job satisfaction, poor teamwork, increased turnover intention, and compromised patient safety (**Afanyedor, 2021; Kumar, 2021; Kumar, 2021 Alsereidi et al., 2022**). Understanding this relationship may support the development of leadership programs that enhance head nurses' managerial performance and improve the quality of nursing care (**Elsaheed et al., 2023**). Therefore, this study was conducted to assess head nurses' managerial intelligence and examine its relationship with conflict management as perceived by intensive care nurses at Tanta University Main Hospitals.

Aim of the Study

The aim of this study was to identify head nurses' managerial intelligence and its relation to conflict management as perceived by intensive care nurses.

Research Questions

1. What are the levels of head nurses' managerial intelligence as perceived by intensive care nurses?
2. What is the frequency of head nurses' conflict management strategies as perceived by intensive care nurses?
3. What is the relation between head nurses' managerial intelligence and their conflict management as perceived by intensive care nurses?

Subjects and Method

Study design:

A descriptive correlational research design was utilized to achieve the aim of the present study.

Setting:

The present study was conducted at Tanta Main University Hospital, affiliated with the Ministry of Higher Education and Scientific Research, specifically in the Cardiology, Neurology, and Oncology Intensive Care Units.

Subjects:

The study subjects consisted of a convenience sample of all ($n = 371$) nurses working in the mentioned ICUs, distributed as follows: 144 nurses in the Cardiology ICU, 208 in the Neurology ICU, and 19 in the Oncology ICU.

Tools of data collection: Two tools were used:

Tool I: Head Nurses' Managerial Intelligence Questionnaire. It developed by the researcher based on **Gunawan and Aungsuroch (2017); Mosadeghrad and Abbasi (2020); Dargahi and Vaysi (2021)**. It contained 2 parts:

Part I: It contained personal and work-related characteristics of nurses as sex, age, marital status, educational level, years of experience, and job position.

Part II: Head Nurses' Managerial Intelligence Questionnaire. It included 32 items across three dimensions: cognitive intelligence (14 items), emotional intelligence (11 items), and social intelligence (7 items).

Scoring system:

Nurses' responses were measured on a 5-point Likert Scale (1 = strongly disagree to 5 = strongly agree), It classified as: high ($\geq 75\%$), moderate ($60 - < 75\%$), or low ($< 60\%$).

Tool II – Conflict Management Strategies Questionnaire. It developed by the researcher based on **Mostafa et al. (2019); Rahim (2000)**. It contained 33 items assessing five strategies: Avoiding (7 items), Competing (7 items), Accommodating (6 items), Collaborating (6 items), and Compromising (7 items).

Scoring system:

Nurses' responses were measured on a 5-point Likert Scale (1 = never to 5 = always). The highest-scoring strategy was identified as the most frequently used.

Method

The following procedures were followed to conduct the current study:

Administrative process: An official permission was obtained from the Dean of the Faculty of Nursing, Tanta University, and submitted to the directors of Tanta University Hospitals to facilitate data collection after explaining the purpose of the study.

Ethical considerations: Approval was obtained from the Ethical Committee of the Faculty of Nursing, Tanta University (Code No. 469/5/2024). Informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

Developing the study tools: Tools (I) and (II) were developed by the researcher based on a review of the related literature.

Validity: Content and face validity was assessed by a jury of 5 experts in Nursing Administration. The Scale-level Content Validity Index (S-CVI) was 96% for Tool I and 98.7% for Tool II, indicating excellent content validity.

A pilot study was carried out after establishing the content validity of the study tools and before the actual data collection on 10% of the total study subjects (37 nurses). The pilot study aimed to assess the clarity, feasibility, and applicability of the study tools, identify any potential difficulties during data collection, and estimate the time required to complete the questionnaires. As no major modifications were required, the pilot study participants were included in the final study sample.

Reliability: Cronbach's Alpha was 0.952 for Tool I and 0.959 for Tool II, indicating high internal consistency.

Data collection procedure: Data were collected by the researcher from the selected intensive care units over a period of six months, from January 2025 to June 2025. The questionnaires were distributed individually to the study participants during different work shifts. The researcher explained the purpose of the study and provided the necessary instructions before questionnaire completion. Participants completed the questionnaires in the presence of the researcher to ensure completeness of responses and to provide clarification whenever needed. The average time required to complete the study tools ranged from 25 to 30 minutes.

Statistical analysis: Data were analyzed using IBM SPSS v20. Descriptive statistics (frequencies, percentages, mean $\pm$ SD) were used for all variables. Pearson's correlation coefficient was used to examine the relationship between managerial intelligence and conflict management. Chi-square test and Monte Carlo correction were applied for categorical comparisons. A p-value ≤ 0.05 was considered statistically significant.

Results

Table (1) :Demonstrates characteristics of nurses regarding their personal and work-related data. The table shows that more than half (58.5%) of the nurses were in the age group of 25–35 years, while 22.1% of them were aged less than 25 years. The age of the nurses ranged between 20.0 and 45.0 years, with a mean of 30.35 ± 6.50 . Females represented 81.1% of the total nurses. Unmarried nurses represented 51.2%, while 48.8% of them were married. According to the educational level, 45.3% of the nurses held a Bachelor of Nursing, and 44.7% held a Technical Nursing Institute Diploma. The Neurology Unit included 56.1% of the nurses. Nurses with 1–5 years of experience represented 84.9% of the total nurses. Also, the table showed that 12.4% of the nurses had participated in committees, and 10.0% of them had attended previous training courses.

Figure (1): Shows nurses' perception according to overall levels of head nurses' managerial intelligence. The figure illustrates that 72.0% of the nurses perceived their head nurses as having a

low level of overall managerial intelligence, while 25.3% of them perceived a high level of head nurses' managerial intelligence.

Table (2): Represents nurses' perception levels according to dimensions of head nurses' managerial intelligence. The table revealed that across all three dimensions of managerial intelligence, an identical 72.0% of nurses placed their head nurses in the low category. Regarding the high-level category, emotional intelligence attracted the greatest endorsement at 24.0%, followed by cognitive intelligence at 22.9%, while social intelligence recorded the lowest proportion of high ratings at 20.5% as perceived by nurses.

Table (3): Indicates nurses' perception levels regarding head nurses' conflict management strategies. The table noticed that, according to overall, 72.0% of nurses perceived their head nurses' conflict management as low, while 23.2% and 4.9% of them perceived it as moderate and high levels, respectively. Also, this table showed that, the accommodating strategy used by head nurses had the highest proportion of low-level perceptions by nurses at 80.9%, followed by the avoiding strategy at 75.5% and the competing strategy at 74.9. Regarding the high-level ratings, the collaborating strategy used by head nurses was the most frequently rated at this level by 25.3% of nurses, followed by the compromising strategy at 19.9%. The competing strategy used by head nurses came third at 10.5%, while the avoiding strategy was rated by 7.0% of them, and the accommodating

strategy came last by a mere 1.1%, as perceived by nurses.

Figure (2): Illustrates the mean percent of conflict management strategies used by head nurses as perceived by nurses. The figure revealed that the accommodating strategy ranked as the first strategy used by head nurses, with a mean score of 49.02, followed by the compromising strategy with a mean score of 46.8. The collaborating strategy used by head nurses ranked third (46.53). While the competing strategy used by head nurses ranked fourth with a mean score of 36.8. The avoiding strategy used by head nurses came in the last rank, with the lowest mean score of 33.99 as perceived by nurses.

Figure (3): Show the association between managerial intelligence and conflict management strategies among head nurses based on nurses' perception. The figure reveals a strong positive and significant correlation between head nurses' managerial intelligence and their conflict management strategies ($r = 0.956$, $p < 0.001$). Higher levels of managerial intelligence in head nurses are directly associated with more frequent use of conflict management strategies.

Table (4): Illustrates correlation between the total of head nurses' managerial intelligence and conflict management strategies used by head nurses as perceived by nurses. The table illustrates that head nurses' managerial intelligence was significantly correlated with all five conflict management strategies ($p < 0.001$). The strongest association

belonged to the avoiding strategy ($r = 0.924$), followed closely by the competing strategy ($r = 0.916$). The accommodating strategy, while also statistically significant, stood apart from the rest with a comparatively weaker correlation ($r = 0.598$, $p < 0.001$).

Table (5): Represents nurses' perception regarding levels of head nurses' managerial intelligence according to their personal and work-related characteristics. The table noticed that the clinical unit was the only variable to reach statistical significance ($\chi^2 = 15.016$, $p = 0.002$). Among Neurology Unit nurses, 58.8% perceived their head nurses' managerial intelligence as low, while 51.1% of Cardiology Unit nurses perceived their head nurses as having high managerial intelligence. Regarding the Oncology Unit, no nurses perceived their head nurse in the high category. while all other nurses' characteristics have not shown a statistically significant ($p > 0.05$).

Table (6): Demonstrates nurses' perception regarding levels of total head nurses' conflict management according to their personal and work-related characteristics. The table clears that a statistically significant was found between the nurses' work unit and their perception of head nurses' conflict management ($\chi^2 = 14.664$, $p = 0.004$). 58.8% of nurses in the Neurology Unit perceived that the head nurse's conflict management was low. Furthermore, 55.6% of those in the Cardiology Unit perceived it was high. Interestingly, no nurses in the Oncology Unit gave a high or moderate perception.

All other variables showed no statistically significant differences ($p > 0.05$).

Table (1): Characteristics of nurses regarding their personal and work-related data (n = 371)

Personal and work-related characteristics of the nurses	Nurses	
	No.	%
Age		
<25	82	22.1
25 – 35	217	58.5
>35	72	19.4
Min – Max.	20.0 – 45.0	
Mean $\pm$ SD.	30.35 $\pm$ 6.50	
Median (IQR)	30.0 (25.0 – 34.0)	
Sex		
Male	70	18.9
Female	301	81.1
Marital Status		
Married	181	48.8
Unmarried	190	51.2
Educational level		
Diploma	21	5.7
Technical Nursing Institute Diploma	166	44.7
Bachelor of Nursing	168	45.3
Post Graduate Studies	16	4.3
Unit		
Neurology Unit	208	56.1
Cardiology Unit	144	38.8
Oncology Unit	19	5.1
Years of experience		
<1 year	19	5.1
1 – 5 years	315	84.9
6 – 10 years	19	5.1
>10 years	18	4.9
Participation in Committees		
Yes	46	12.4
No	325	87.6
Previous Training Courses		
Yes	37	10.0
No	334	90.0

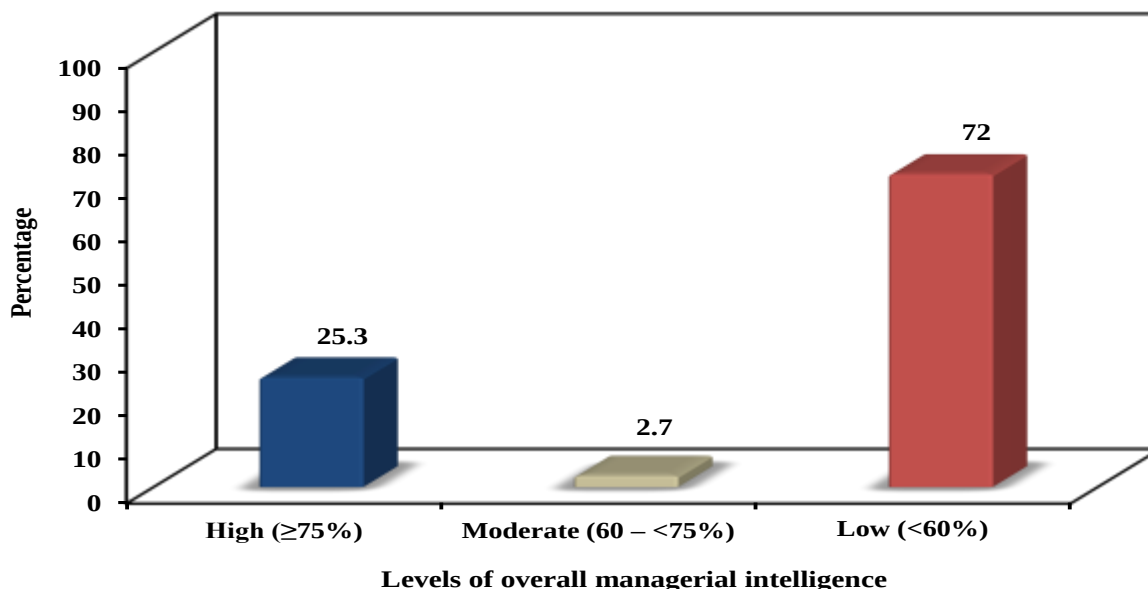


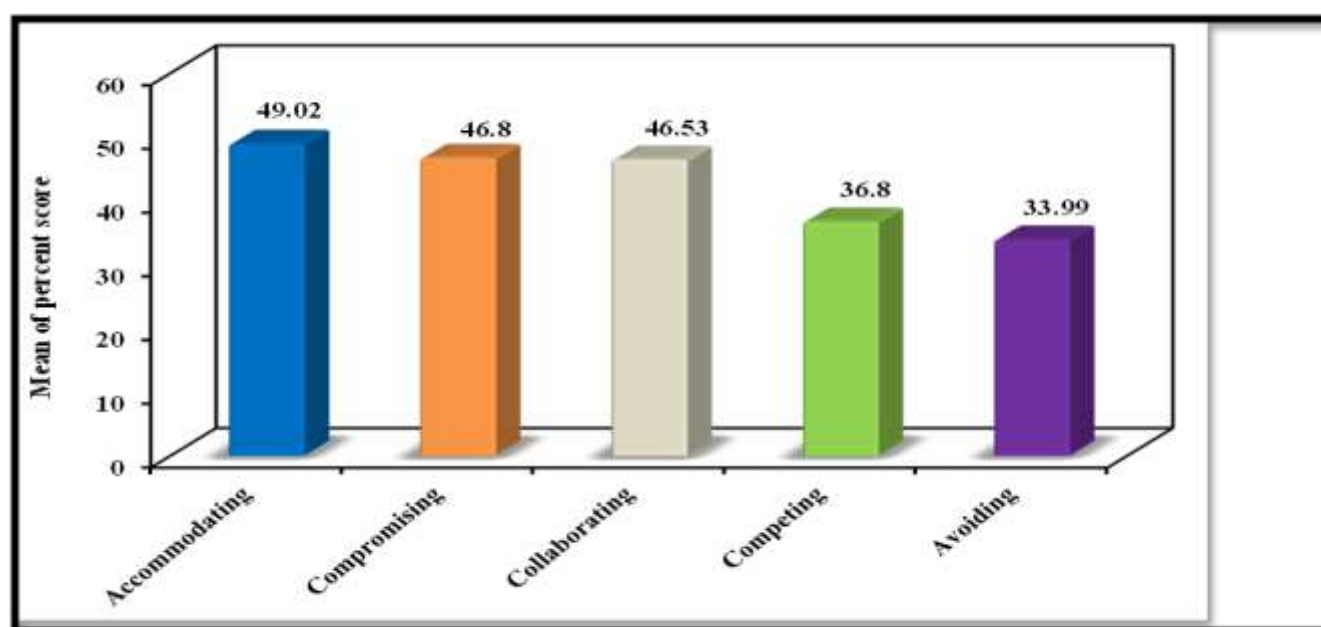
Figure (1): Nurses' perception according to overall levels of head nurses' managerial intelligence

Table (2): Nurses' perception levels according to dimensions of head nurses' managerial intelligence (n = 371)

Managerial intelligence dimensions	Nurses' perception					
	High		Moderate		Low	
	No.	%	No.	%	No.	%
Cognitive intelligence	85	22.9	19	5.1	267	72.0
Emotional intelligence	89	24.0	15	4.0	267	72.0
Social intelligence	76	20.5	28	7.5	267	72.0
Overall	94	25.3	10	2.7	267	72.0

Table (3): Nurses' perception levels regarding head nurses' conflict management strategies (n = 371)

Head nurses' conflict management strategies	Nurses' perception					
	High		Moderate		Low	
	No.	%	No.	%	No.	%
Avoiding	26	7.0	65	17.5	280	75.5
Competing	39	10.5	54	14.6	278	74.9
Accommodating	4	1.1	67	18.1	300	80.9
Collaborating	94	25.3	10	2.7	267	72.0
Compromising	74	19.9	31	8.4	266	71.7
Overall	18	4.9	86	23.2	267	72.0

**Figure (2): Mean percent of conflict management strategies used by head nurses as perceived by nurses**

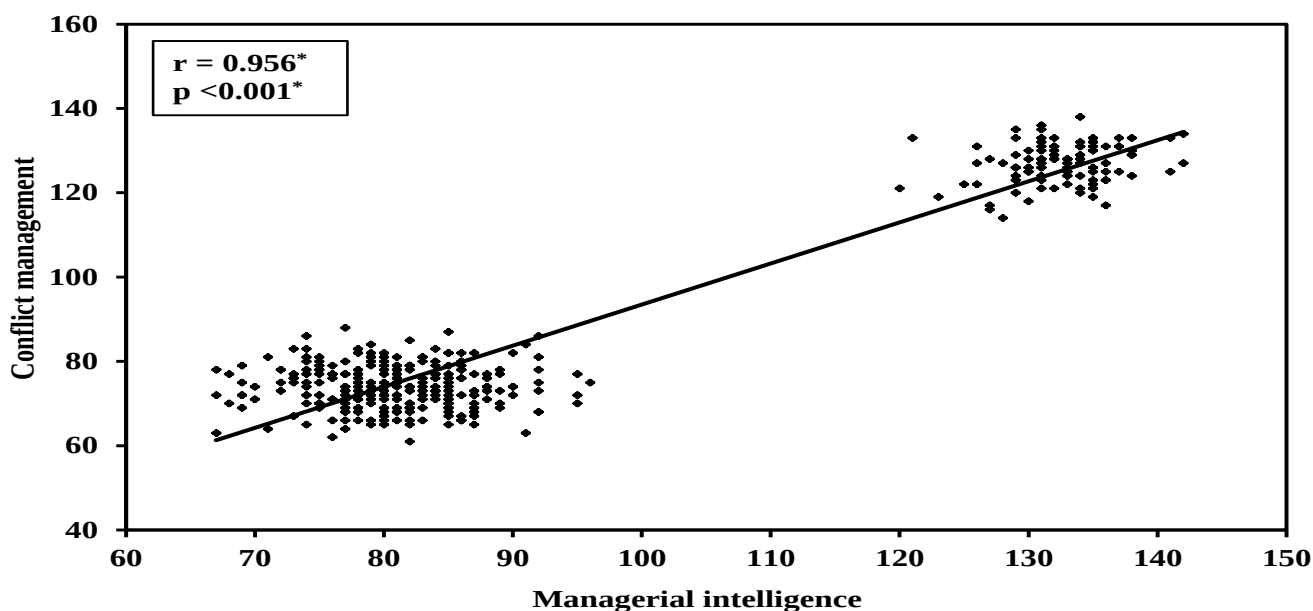


Figure (3): Correlation between head nurses' managerial intelligence and conflict management strategies as perceived by the nurses (n = 371)

Table (4): Correlation between the total of head nurses' managerial intelligence and conflict management strategies used by head nurses as perceived by nurses (n = 371)

Conflict management strategies	Head nurses' managerial intelligence	
	r	p
Avoiding	0.924*	<0.001*
Competing	0.916*	<0.001*
Accommodating	0.598*	<0.001*
Collaborating	0.903*	<0.001*
Compromising	0.890*	<0.001*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Table (5): Nurses' perception regarding levels of head nurses' managerial intelligence according to their personal and work-related characteristics (n = 371)

Personal and work-related characteristics of nurses	Levels of Head Nurses' Managerial Intelligence						χ^2	^{MC} p
	High		Moderate		Low			
	(n = 94)		(n = 10)		(n = 267)			
	No.	%	No.	%	No.	%		
Age								
<25	28	29.8	3	30.0	51	19.1	5.257	0.240
25 – 35	49	52.1	5	50.0	163	61.0		
>35	17	18.1	2	20.0	53	19.9		
Sex								
Male	21	22.3	1	10.0	48	18.0	1.176	0.581
Female	73	77.7	9	90.0	219	82.0		
Marital Status								
Married	42	44.7	4	40.0	135	50.6	1.292	0.547
Unmarried	52	55.3	6	60.0	132	49.4		
Education Level								
Diploma	5	5.3	1	10.0	15	5.6	6.413	0.321
Technical Nursing Institute	51	54.3	5	50.0	110	41.2		
Diploma	36	38.3	4	40.0	128	47.9		
Bachelor of Nursing	2	2.1	0	0.0	14	5.2		
Post Graduate Studies								
Unit								
Neurology Unit	46	48.9	5	50.0	157	58.8	15.016*	0.002*
Cardiology Unit	48	51.1	5	50.0	91	34.1		
Oncology Unit	0	0.0	0	0.0	19	7.1		
Years of experience								
<1 year	6	6.4	1	10.0	12	4.5	3.892	0.591
1 – 5 years	82	87.2	9	90.0	224	83.9		
6 – 10 years	4	4.3	0	0.0	15	5.6		
>10 years	2	2.1	0	0.0	16	6.0		
Participation in Committees								
Yes	7	7.4	2	20.0	37	13.9	3.536	0.148
No	87	92.6	8	80.0	230	86.1		
Previous Training Courses								
Yes	6	6.4	1	10.0	30	11.2	1.878	0.351
No	88	93.6	9	90.0	237	88.8		

Table (6): Nurses' perception regarding levels of total head nurses' conflict management according to their personal and work-related characteristics (n = 371)

Personal and work-related characteristics of nurses	Levels of Total Head Nurses' Conflict Management						χ^2	P
	High		Moderate		Low			
	(n = 18)		(n = 86)		(n = 267)			
	No.	%	No.	%	No.	%		
Age								
<25	3	16.7	28	32.6	51	19.1	7.456	^{MC} p=0.105
25 – 35	10	55.6	44	51.2	163	61.0		
>35	5	27.8	14	16.3	53	19.9		
Sex								
Male	4	22.2	18	20.9	48	18.0	0.717	^{MC} p=0.717
Female	14	77.8	68	79.1	219	82.0		
Marital Status								
Married	8	44.4	38	44.2	135	50.6	1.201	0.549
Unmarried	10	55.6	48	55.8	132	49.4		
Education Level								
Diploma	0	0.0	6	7.0	15	5.6	8.879	^{MC} p=0.150
Technical Nursing Institute	12	66.7	44	51.2	110	41.2		
Diploma	5	27.8	35	40.7	128	47.9		
Bachelor of Nursing	1	5.6	1	1.2	14	5.2		
Post Graduate Studies								
Unit ID								
Neurology Unit	8	44.4	43	50.0	157	58.8	14.664*	0.004*
Cardiology Unit	10	55.6	43	50.0	91	34.1		
Oncology Unit	0	0.0	0	0.0	19	7.1		
Years of experience								
<1 year	0	0.0	7	8.1	12	4.5	4.617	^{MC} p=0.523
1 – 5 years	17	94.4	74	86.0	224	83.9		
6 – 10 years	1	5.6	3	3.5	15	5.6		
>10 years	0	0.0	2	2.3	16	6.0		
Participation in Committees								
Yes	1	5.6	8	9.3	37	13.9	1.579	^{MC} p=0.474
No	17	94.4	78	90.7	230	86.1		
Previous Training Courses								
Yes	3	16.7	4	4.7	30	11.2	4.474	^{MC} p=0.092
No	15	83.3	82	95.3	237	88.8		

Discussion

Intensive care units represent one of the most challenging healthcare environments, where head nurses are required to demonstrate strong managerial intelligences to ensure effective team performance and high-quality patient care. Conflicts frequently arise in intensive care settings due to the complexity of clinical work and multidisciplinary interactions, understanding the relationship between head nurses' managerial intelligence and conflict management has become increasingly important.

Head nurses' managerial intelligence

The current study findings showed that most intensive care nurses perceived their head nurses as demonstrating a low level of overall managerial intelligence, while around one quarter perceived a high level. This pattern may be interpreted by the nature of the ICU work environment itself, which imposes continuous cognitive, emotional, and relational demands on head nurses that exceed their currently demonstrated managerial capacities. This finding is consistent with **Abd-Elaziz et al. (2023)**; **Al-Hamdan et al. (2023)**, who reported that inadequate managerial preparation and excessive workload contribute to weak communication climates and diminished staff trust. While it contrasts with **Elsaeed et al. (2023)** who found that most head nurses in Egyptian ICUs demonstrate high or moderate managerial intelligence, a difference possibly attributable to variations in work culture

and available leadership training resources between the different study settings.

Regarding head nurses' cognitive intelligence, it ranked last among the three dimensions. About one-fifth of nurses perceived a high level. The highest levels of uncertainty were related to head nurses' use of management styles to resolve work conflicts, their ability to identify department needs, and their capacity to adapt to change, suggesting weaknesses in head nurses' strategic and operational leadership skills. This finding is supported by **Dogham et al. (2025)**, who emphasized the importance of strategic thinking and adaptability in effective ICU leadership. Emotional intelligence was the highest-ranked dimension, with about one-quarter of nurses perceiving a high level of emotional intelligence among their head nurses. The most positively rated aspect was head nurses' ability to control their thoughts and actions, though understanding and appreciating others' feelings received the highest level of disagreement, reflecting inconsistency in this behavior. This is consistent with **Almadani and Alamri (2024)**, who showed that emotionally intelligent head nurses contribute to higher nurses' morale and greater psychological safety, while **Wei et al. (2023)** reported that such inconsistency in head nurses' emotional behaviors can weaken trust and teamwork. Social intelligence ranked second dimension; about one-fifth of nurses perceived a high level of social

intelligence among their head nurses. Head nurses' ability to promote teamwork and communicate effectively received the most positive ratings, whereas maintaining cooperation and encouraging change received the highest levels of disagreement. This is consistent with **Lee et al. (2024)**, who identified relational credibility as a key characteristic of socially intelligent leadership among head nurses.

Head nurses' conflict management strategies

Most nurses perceived head nurses' overall conflict management as low, while only a small percentage perceived a high level. This may be related to the challenging work environment in the ICUs of Tanta University Hospitals, where head nurses face heavy workloads, limited organizational support, and strict hierarchical communication systems that reduce their ability to apply conflict management strategies effectively. This finding is consistent with **Rahim et al. (2023)**; **Shao et al. (2024)**, who reported that poor conflict management by head nurses negatively affects nurses' morale and teamwork.

The avoiding strategy ranked last in mean percent score, yet a high frequency of specific avoidance behaviors by head nurses was reported, including avoiding open discussions with nurses and withdrawing from disagreements. Under continuous work pressure, avoiding conflict may appear to head nurses as the easiest option, allowing unresolved issues to accumulate over time. This is

consistent with **Laisney et al. (2022)**, who described avoidance as a common coping mechanism used by head nurses under stressful working conditions.

The competing strategy ranked fourth, with head nurses reported as insisting on their personal opinions, confronting nurses even at the expense of relationships, and using a harsh tone during disagreements. These behaviors may result from the stressful nature of ICU work, where authoritarian approaches may become more common under pressure. This interpretation is supported by **Maity et al. (2023)**, who found that dominant conflict behaviors are common among head nurses in hierarchical workplaces.

The accommodating strategy achieved the highest mean percent score, suggesting that head nurses generally prefer maintaining harmony, though it also showed the highest percentage of low-level perception among nurses' ratings, indicating inconsistent application. These findings agree with **Bashir et al. (2022)**, who found that head nurses often use an accommodating strategy to preserve professional relationships with nurses, while **Rahim (2023)** suggested that accommodation in hierarchical organizations may sometimes become an automatic reaction rather than a deliberate management strategy.

The collaborating strategy recorded the most frequent high-level ratings, with approximately one-quarter of nurses perceiving a high level of collaboration,

although nearly half of the nurses reported that listening by head nurses to their opinions was rarely or never practiced. **Shao et al. (2024)** noted that organizational culture, time pressure, and hierarchical structures often prevent head nurses from applying collaborative practices consistently with nurses. The compromising strategy ranked second in mean percent score. This may indicate that although head nurses attempted to involve nurses in resolving conflicts, opportunities for nurses to participate in decision-making remained limited. This is supported by **Labrague et al. (2023)**, who reported that in high-acuity settings, time pressure often pushes head nurses toward decisions that appear collaborative but are essentially unilateral.

Correlation Between Managerial Intelligence and Conflict Management

The current study found a strong positive, statistically significant correlation between head nurses' managerial intelligence and their use of conflict management strategies as perceived by nurses, suggesting that head nurses with higher managerial intelligence are more capable of recognizing conflicts, selecting appropriate responses, and maintaining effective communication with nurses during conflict situations. This finding is consistent with **Elsaeed et al., (2023)**, who reported a positive relation between managerial intelligence and conflict management effectiveness among ICU head nurses.

The strongest correlations were found between managerial intelligence and the avoiding and competing strategies, followed by the collaborating and compromising strategies, while the weakest correlation was observed with the accommodating strategy, suggesting that accommodation may depend more on head nurses' personality tendencies or workplace culture than on their level of managerial intelligence. **Greve and Kappes (2023)** suggested that accommodating behavior is often driven by head nurses' desire to maintain relationships with nurses rather than by analytical decision-making. Among all personal and work-related characteristics, the clinical unit was the only factor significantly associated with both nurses' perceptions of head nurses' managerial intelligence and conflict management. The Cardiology Unit nurses reported the highest levels of perceptions of both constructs, while no nurse in the Oncology Unit reported high or moderate levels for either, which may be related to the continuous emotional burden associated with caring for critically ill oncology patients. This explanation is supported by **Labrague et al. (2023)**, who found that conflict management effectiveness among head nurses' declines in units characterized by high emotional demands and limited leadership support.

Conclusion

Based on the findings of the present study, it was concluded that most nurses perceived their head nurses as having

low levels of both managerial intelligence and conflict management. Emotional intelligence was rated highest among the three managerial intelligence dimensions, while cognitive intelligence was rated lowest. The accommodating strategy had the highest frequency of used, while avoiding had the lowest. A strong positive correlation was found between managerial intelligence and conflict management. Among nurses' characteristics, only the clinical unit showed a significant association with both variables, with Cardiology unit nurses reporting the highest perceptions of both head nurses' managerial intelligence and conflict management.

Recommendations

For hospital administrator:

- Establish clear policies and guidelines to manage conflict in ICUs in a planned and proactive way.
- Develop leadership programs combining theory, practical skills for IC head nurses focusing on managerial intelligence through mentoring and coaching and conflict management methods.
- Add managerial intelligence competencies to the job description and performance evaluation criteria for IC head nurses.

For nursing education:

Include managerial intelligence concepts in undergraduate nursing curricula and add conflict management training to nursing programs through simulation-based exercises.

For further research:

Conduct longitudinal studies to measure the effect of leadership training programs on IC head nurses' managerial intelligence and conflict management over time and replicate this study in other clinical settings.

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Effect of Educational Program on Head Nurses' Knowledge and Perception about Huddles

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Abstract

Background: Huddles are short, structured, and regular routine meetings between team members aimed at bringing frontline healthcare providers together to discuss current challenges, share important information, identify potential risks, and develop immediate solutions. **The study Aim:** To determine effect of educational program on head nurses' knowledge and perceptions about huddles. **Design:** Quasi – experimental design was used. **Setting:** The study was carried out at Tanta Fever Hospital, which is connected to the Ministry of Health and Population. **Subjects:** included all staff nurses (n=220) and head nurses (n=40) working in the settings described above. **Tools:** Head Nurses' Huddle Knowledge Questionnaire and Nurses' Perception about Huddles. **Results:** Pre-program, totally head nurses (100.0%) had a low knowledge level about huddles, which improved to 90.0% post-program. Preprogram, over half (55.0%) of head nurses had high perceptions about huddles, which post-program improved to 90.0%. Preprogram, over three quarters (70.9%) of the staff nurses had high perceptions about the huddle, which post-program improved to 95.0%. **Conclusion:** A positive correlation existed between the knowledge and perception of head nurses regarding huddles post-program. **Recommendation:** Hospital administration needs to enhance huddles through conducting periodical in-service training programs and workshops about huddles and patient safety.

Keywords: Head nurse, Huddles, Knowledge, perception, and educational program.

Introduction

Head nurses occupy a pivotal position within healthcare organizations, serving as the first level of nursing management and acting as the essential link between organizational leadership and frontline nursing staff. Their responsibilities extend beyond supervising daily clinical activities to include coordinating patient care delivery, managing workforce challenges, supporting staff performance, and ensuring the provision of high-quality and safe healthcare services. Because of their close interaction with staff nurses, effective communication between head nurses and nursing personnel is fundamental for promoting a positive work environment **(AlThawabiya, Singh, AlLenjawi, & Alomari, 2023)**

Huddles are brief, structured, and regular team meetings designed to bring frontline healthcare providers together to discuss current challenges, share important information, identify potential risks, and develop immediate solutions. Through these short daily interactions, healthcare teams remain informed about ongoing events, coordinate patient care activities, anticipate emerging issues, and strengthen team alignment. Additionally, huddles provide valuable opportunities for nurses' staff to express concerns, exchange

feedback, and contribute to continuous improvement efforts **(Lin et al, 2022)**.

Huddles effectiveness is reflected through several interconnected dimensions that support team functioning and organizational performance. These dimensions include engaging, updating, planning, recognizing, identifying, providing, and accountability. Through engagement, teams' members actively participate in discussions about their work environment and increase communication, cooperation, and coordination. The updating dimension ensures that nurses' staff remain informed about current safety and quality issues, previous concerns, and evidence-based practices, thereby enhancing nurses' confidence and self-efficacy in providing safe care to the patients **(Pimentel, et al, 2021)**.

Equally important, planning dimension facilitates the organization of daily activities, preparation for high-risk patients, and coordination of care for individuals requiring additional attention or resources. Huddles also serve as a mechanism for recognizing staff achievements and identifying challenges within the workplace that can be handled via training, coaching and improvement of the clinical process. Moreover, these meetings allow for the identification of problems that need immediate action and should be escalated to higher management,

ensuring timely problem resolution and alignment with both short-term and long-term objectives. By providing a concise overview of daily operations, huddles support situational awareness, strengthen information sharing, enhance accountability, promote staff empowerment, and clarify individual responsibilities, thus ensuring better patient care delivery (**Pimentel, et al, 2021**).

Significance of study

The implementation of huddles within healthcare teams has been recognized as an effective strategy for strengthening accountability, enhancing communication, and promoting a culture of collaboration among healthcare professionals. By providing a dedicated time and structured forum for discussion, huddles encourage active participation, foster a greater sense of community, and empower team members to voice concerns and contribute to problem-solving initiatives. Consequently, huddles have emerged as an important leadership and patient safety tool that supports both workforce engagement and quality improvement efforts (**Pimentel, et al, 2021**).

Educational programs focused on huddle implementation can enhance head nurses' understanding of huddle principles, improve their leadership and communication competencies, and strengthen their ability to foster

teamwork, patient safety, and continuous quality improvement. Therefore, the purpose of the current study is to assess the impact of an educational program on head nurses' knowledge and perception of huddles.

Aim of the Study:

Determines the effect of the educational program on head nurses' knowledge and perception about huddles.

Research hypotheses:

Knowledge and perception of head nurses about huddle will be improved after implementation of the educational program.

Research design:

This study was used a quasi-experimental study design.

Setting:

The current study was conducted at Tanta Fever Hospital, which belongs to the Ministry of Health and Population. It was established in 2007 in the city of Tanta, Gharbia Governorate, with a 100-bed capacity. It includes; Emergency department, Inpatient departments, Hemodialysis, Liver & endoscopy and ICU.

Subjects:

The subjects involved totally (n=220) nursing staff and (n=40) head nurses who were working in the settings described above, divided into the following: emergency department included 37 nursing staff, inpatient departments 83 nursing staff,

hemodialysis department 47 nursing staff, liver & endoscopy department 44 nursing staff, and intensive care units 49 nursing staff.

Data Collection Tools

Two data collection tools were utilized to collect data:

Tool (I): Head Nurses' Huddle Knowledge Questionnaire

This tool is developed by the researcher based on **Franklin, (2020), Pimentel, (2021) , Rowan, (2022)**, and other related literature (**Rowles, 2022 and Sung, & Hsu, 2025**). It was utilized to assess head nurses' huddles knowledge. This questionnaire comprised of the following two components:

Part (1): personal characteristics of head nurses including such as age, sex, marital status, educational level, years of experience, departments, and previous training.

Part (2): The huddle knowledge questionnaire of head nurses comprised of 34 questions in the format of true or false (16 questions), multiple choices (14 questions), and matching (4 questions) that cover 3 sessions as follows:

- Basic concepts, importance, principle of huddle include 12 questions (No, 1, 2, 3, 17, 18, 19, 20, 21, 31, 32, 33, and 34).
- Types of huddle and influence on patient safety include 10 questions (No, 4, 5, 6, 7, 8, 9, 10, 22, 23, and 24).

- Barriers, role of head nurses and role of nursing staff include 12 questions (No, 11, 12, 13, 14, 15, 16, 25, 26, 27, 28, 29, and 30).

Scoring system:

Every question was scored (1) if the answer was correct; otherwise it was scored (0). Head nurses' knowledge levels based on the following cut-off points:

- High level of knowledge > 75 %.
- Moderate level of knowledge 60 - % 75%.
- Low level of knowledge < 60%.

Tool (II): Nurses' Perception about Huddle

The tool was prepared by the researchers following the guidelines provided by **Van der Heijde & Deichmann (2018), Pimentel (2021)**, and other related literature (**Rowan, 2022; Lin et al, 2022; Chau, 2024**). It was used to evaluate the perception of head nurses and staff nurses about the huddle. It included 36 items divided into seven dimensions:

- Engaging includes 10 items from (1-10).
- Updating includes 5 items from (11-15).
- Planning includes 7 items from (16-22).
- Recognizing includes 3 items from (23-25).
- Identifying includes 3 items from (26-28).
- Providing includes 5 items from (29-33).

- Accountabilities includes 3 items from (34- 36).

Scoring system:

Responses of the subjects were rated using a 5-point Likert scale that ratings from (1 - 5) as follows: (1) is strongly disagree, (2) is disagree, (3) is neutral, (4) is agree, and (5) is strongly agree. The results were calculated and classified based on the following cut-off points:

- High perception of huddle level > 75 %.
- Moderate perception of huddle level 60%- 75%.
- Low perception of huddle level <60%.

Method

1. Permission for the research was obtained from the Dean of the Faculty of Nursing, Tanta University, to responsible authorities in Tanta Fever Hospital.

2. Ethical considerations:

- Consent was obtained from the Scientific Research Ethical Committee at the Faculty of Nursing, Tanta University, was acquired; code no. (407-3-2024).
- Consent of the nursing staff to participate in the study was taken after clarifying the nature and objectives of the research.
- Participation in the study was voluntary, and subjects could have left the research at any stage of it.
- Participants' rights were protected through securing their informed

verbal consent through informing them about the nature and objective of the study, benefits of the research, methods of data collection, outcomes of the research, and rights of the respondents to leave the research at any point in time.

- The subjects were assured that the data collected was going to be held strictly confidential. Moreover, the autonomy of the subjects was maintained since they were not allowed to use their names.

- The nature of the study did not harm the participating nurses.

3. Data collection tools were developed by the researcher through a literature review.

4. The researcher translated data collection tools into Arabic

5. A jury of five experts in the nursing administration specialty evaluated the tools to ensure their content validity of the study.

- The experts included three professors and two assistant professors specializing in nursing administration at the Faculty of Nursing of Tanta University.

- Responses of the experts were gathered through a four-point Likert scale ranging from (4-1); 4= strongly relevant, 3= relevant, 2= little relevant, and 1= not relevant.

- Modifications were done, which included clarifications, omission of certain items, adding others,

and simplifying work-related words.

6. The face validity content index of tool (I) was 97.71%, while that of tool (II) was 94.03%.
7. The reliability of the tools was measured using Cronbach's Alpha. For Tool (I) was 70.7%, and tool (II) was 96.2%.
8. A pilot study was carried out on 10% of the sample size (including 4 head nurses and 22 staff nurses) in order to evaluate the tool's clarity, applicability, and viability, and necessary modifications were done based on the result. They were not excluded due to minor modifications. It took about thirty minutes to finish the questionnaire.
9. **Phase of data collection:** Data were collected in Tanta Fever Hospital. The researcher held a meeting with the head nurses and nurses in a group manner in the morning and afternoon shift in the waiting area in the department to explain the purpose of the study and to hand out the questionnaires. The head nurses and nurses responded to the questionnaires in front of the researcher to clarify any questions they had.
10. The data were collected on six months from the first of August 2024 until the end of January 2025.

The educational program

Four stages were used in the process of implementing the education program: assessment stage, developmental stage of the education program, implementation stage, and lastly the evaluation stage.

Stage I: Assessment stage

- Assess head nurses' knowledge and subjects' perception about huddles through filling part (II) of tool (I) and tool (II).

Stage II: Development of the educational program

The aim of the educational program is to investigate how the huddle-based educational program affects the knowledge and perceptions of head nurses.

Educational program objectives

- Define basic concepts of huddles.
- Discuss types of huddles.
- Identify influences of huddle on patient safety.

Selection and organizing the content

The second step was the design of content, the methods of teaching methods

The instructional program Content

The instructional program included three sessions which presented in the following sequence:

First session: definition, importance, principles of huddles.

Second session: types of huddles and influence of huddle on patient safety.

Third session: Role of head nurses in huddles.

Learning strategies

- Instructional strategies have been chosen on the basis of the needs of the participants as well as the objectives and the contents of the educational program through interactive lectures, discussion, brainstorming, demonstration, and role play.

- A PowerPoint presentation (PPT), handouts, and videos were used.

Stage III: Implementing the educational program

- The researcher makes the participants aware of the objectives of the learning program.

- The researcher constructed a good connection with participants to increase their participation and contribution.

- Head nurses were separated into groups. The educational program was delivered in (3) sessions for (3) groups, where each session took place every day for 30 minutes.

Stage IV: Evaluation of the educational program

Evaluation of the educational program was conducted in order to measure the extent of improvement terms of knowledge of head nurses, as well as their compliance with safety practice huddles.

- Post-test (Tool I) was conducted immediately after implementation of the educational program to measure knowledge of huddles among head nurses.

- The huddle questionnaire was used to assess the perception of the head nurse and staff nurse about the huddle pre and post program implementation.

Statistical analysis

The analysis of data was done using IBM SPSS Statistics 20.0 software (IBM Corp., Armonk, NY, 2011). Qualitative data was expressed in terms of numbers and percentages. In order to ensure the distribution was normal, the Kolmogorov-Smirnov test was used.

Quantitative variables were presented by minimal and maximal values, mean and standard deviation. The findings were considered statistically significant at the 5% level.

The used tests were

1. Chi-square test: Used for comparison of categorical variables among different groups.
2. T-test Used: for comparing normally distributed quantitative variables among two studied groups
3. Pearson coefficient: Used for measuring the association between two normally distributed quantitative variables

Results

Table (1): Shows the distribution of study subjects according to their personal and work- related data. This table reveals that the highest group (45 %) of head nurses were age >40 years old with mean scores 41.03 ± 4.38 , while the highest group of staff

nurses (71.4%) were age 25-35 years old. Most (90% and 97.3%) of head nurses and staff nurses were female and most (97.5% and 97.7%) were married respectively. About educational level, most of head nurses (90%) had attained a bachelor's degree, however more than two-thirds of staff nurses (66.8%) had a baccalaureate degree in nursing.

The highest percentage (67.5%) of head nurses had ≥ 15 years of experience, with a mean of 16.68 ± 4.32 , while the majority (85.9%) of staff nurses had < 15 years of experience, with a mean of 7.97 ± 6.87 . The highest percentages (27.5%, 27.5%, and 22.5%) of head nurses worked in hemodialysis, liver and endoscopy, and inpatient departments, respectively, while 33.6% and 20.5% of staff nurses worked in the inpatient department and intensive care unit. A majority of both groups of the study subjects had never been trained on huddling: 77.5% of the head nurses and 82.3% of the staff nurses.

Figure (1): represents the total knowledge of head nurses towards huddles pre- and post-implementation of the program. Pre-program, totally the head nurses

(100.0%) had a low knowledge level about huddles, which improved to 90% of them having a high level and 10% having a moderate level post-program implementation.

Figure (2): represents the total perceptions of huddles amongst the nursing staff pre- and post- program implementation. For head nurses, pre-program, more than half (55.0%) of head nurses had high perceptions about huddles, which post-program improved to 90.0%, while for staff nurses, pre-program, more than three quarters (70.9%) had high perceptions about huddles, which post-program improved to 95.0%.

Table (2) and Figure (3): show the correlation between huddle knowledge vs. huddle perception. The table and figure showed that there was a statistically significant positive relationship between the knowledge and the perception of the huddle by head nurses post-program, where p-value (≤ 0.05).

**Table (1): Distribution of study subjects according to their personal data
(n = 260)**

	Total (n = 260)		Head Nurse (n = 40)		Staff Nurse (n = 220)	
	No.	%	No.	%	No.	%
Age						
<25	24	9.2	0	0.0	24	10.9
25 – 35	162	62.3	5	12.5	157	71.4
36 – 40	33	12.7	17	42.5	16	7.3
>40	41	15.8	18	45.0	23	10.5
Min. – Max.	20.0 – 53.0		31.0- 50.0		20.0 – 53.0	
Mean ± SD.	3 2.16 ± 7.66		41.03±4.38		30.55 ± 7.0	
Sex						
Male	10	3.8	4	10.0	6	2.7
Female	250	96.2	36	90.0	214	97.3
Marital						
Married	254	97.7	39	97.5	254	97.7
Un married	6	2.3	1	2.5	6	2.3
Level of education						
Nursing diploma	24	9.2	0	0.0	24	10.9
Technical nursing diploma	49	18.8	0	0.0	49	22.3
Baccalaureate degree	183	70.4	36	90.0	147	66.8
Post graduate	4	1.5	4	10.0	0	0.0
Years of experience						
<15	202	77.7	13	32.5	189	85.9
≥15	58	22.3	27	67.5	31	14.1
Min. – Max.	1.0 – 32.0		10.0–26.0		1.0 – 32.0	
Mean ± SD.	9.31 ± 7.25		16.68±4.32		7.97 ± 6.87	
Department						
Emergency	37	14.2	5	12.5	32	14.5
Inpatient	83	31.9	9	22.5	74	33.6
Hemodialysis	47	18.1	11	27.5	36	16.4
Liver & endoscopy	44	16.9	11	27.5	33	15.0
Intensive care unit	49	18.8	4	10.0	45	20.5
Previous training on huddle						
Yes	48	18.5	9	22.5	39	17.7
No	212	81.5	31	77.5	181	82.3

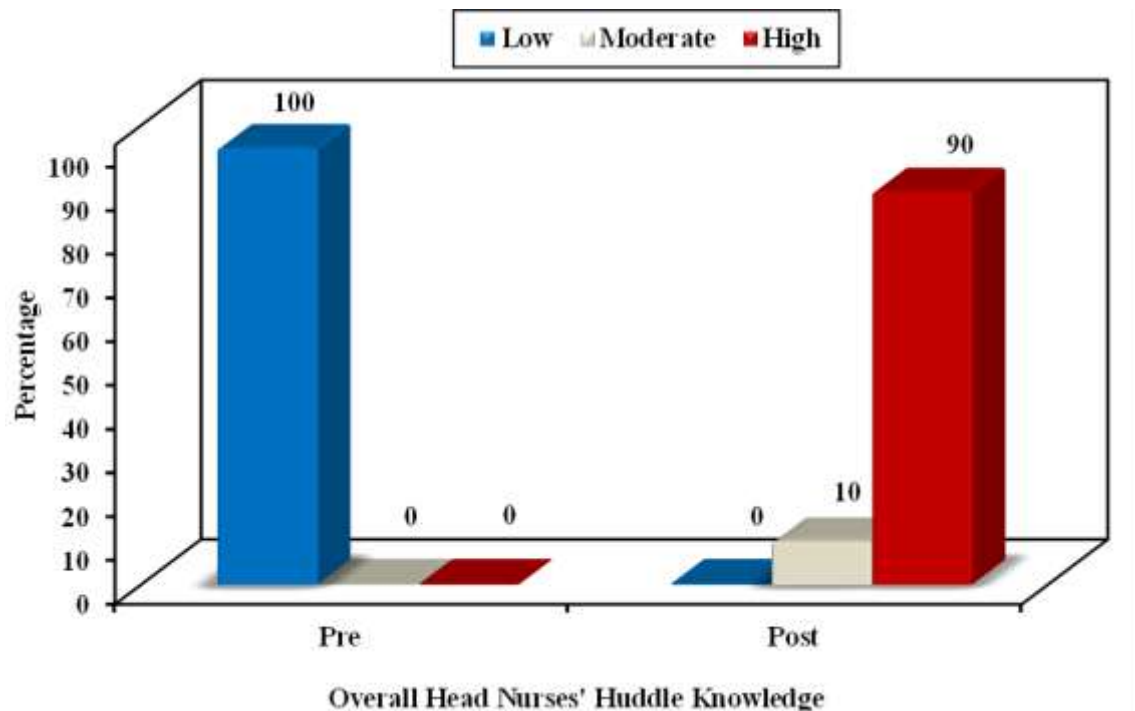


Figure (1): Overall level of head nurses' knowledge about huddle pre and post program implementation (n = 40)

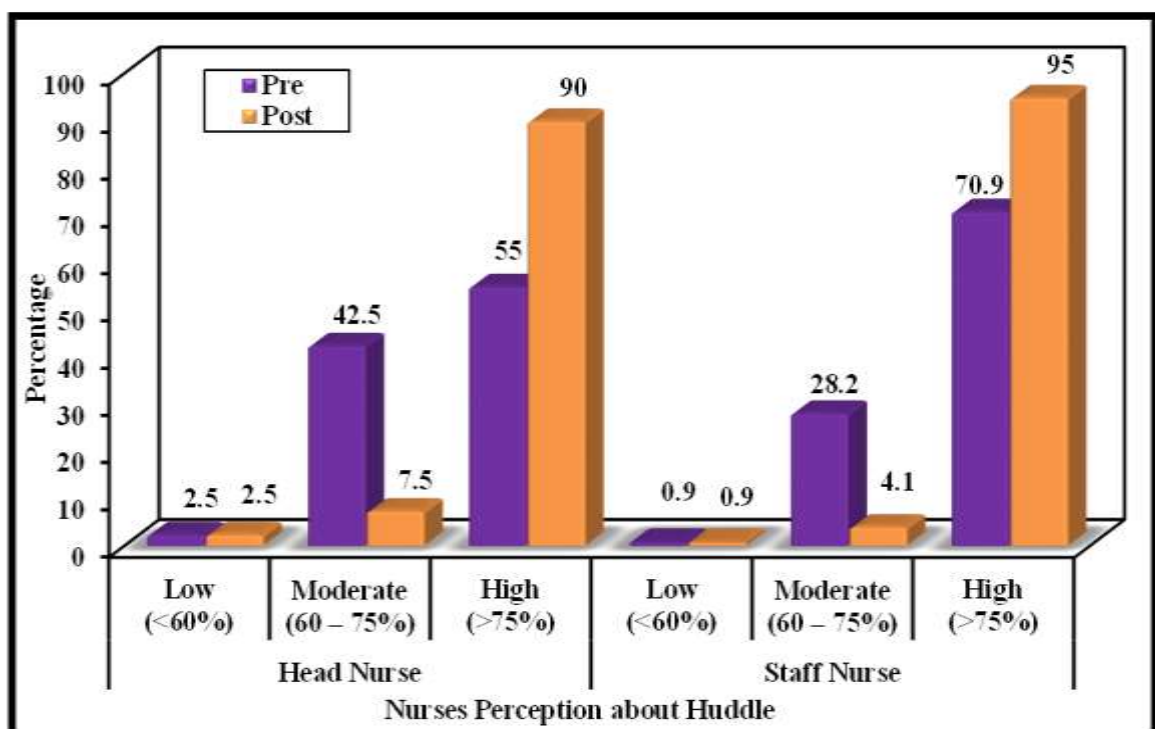
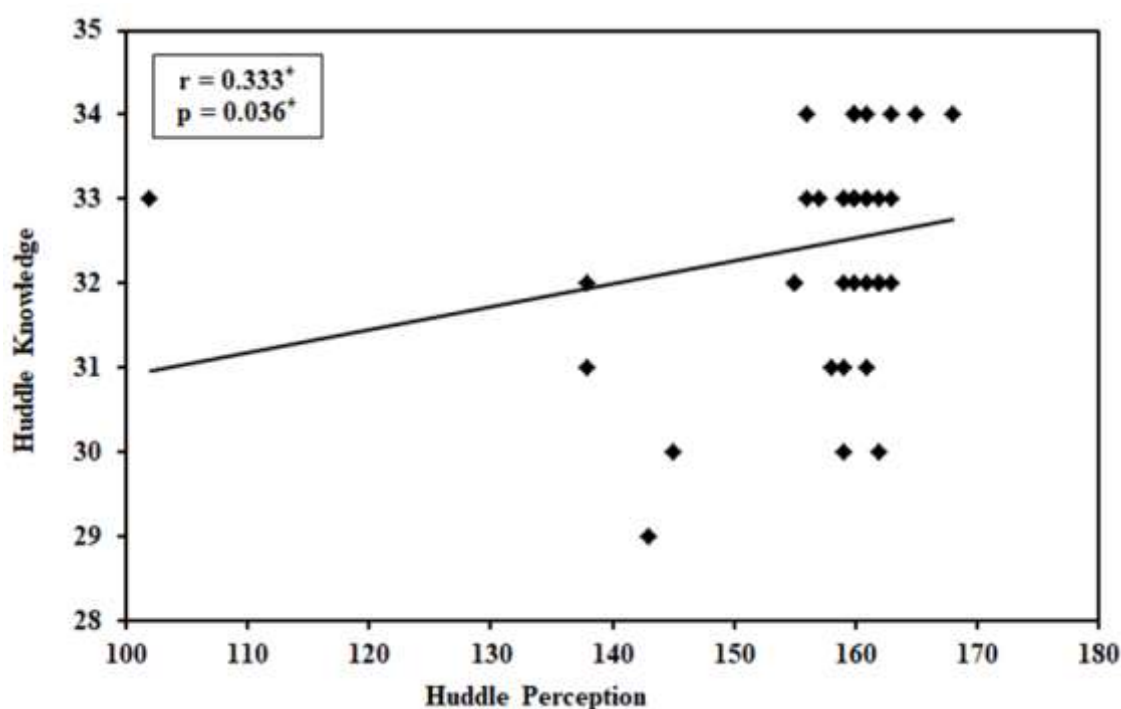


Figure (2): Total levels of nursing staff perception about huddle pre and post program implementation (n = 260)

Table (2): Correlation between head nurse Huddle Knowledge vs. Huddle Perception (n = 40)

Item		Huddle Knowledge	
		Pre	Post
Huddle Perception	R	0.145	0.333*
	P	0.374	0.036*

**Figure (3): Correlation between Huddle Knowledge vs. Huddle Perception (n = 40)**

Discussion

Nursing huddles enhance nurses' responsibility for ensuring patient safety, set a fixed time during the day or shift for care coordination, ensure personal communication of issues, minimize the chances of interruptions for the rest of the workday, and create an empowering culture in the healthcare team (Rafferty, 2025).

Therefore, the current study is aimed at assessing the impact of the education program on the knowledge and perceptions of head nurses about huddles.

Head nurses' knowledge about huddles

Preprogram, the study findings demonstrated that totally the head nurses had low knowledge levels

about huddles. This result may be due to inadequate training and lack of education about huddles, as nursing staff do not know about the importance, principle and role of huddles that are critical for safety, communication, and teamwork.

The results are consistent with **Schmelzer et al. (2025)**, emphasized that many head nurses lack sufficient knowledge about huddles. While contradicted by **Viernes (2016)**, who found that knowledge of head nurses about huddles high. Also **Bloxsom, (2025)** who found that increase head nurse' knowledge about huddles.

Post program, significant increases in knowledge levels among head nurses were noted. The result could be attributed to the positive influence of the educational program on the knowledge levels of head nurses concerning huddles. The participants learned new information using illustrative materials like PowerPoint presentations, handouts, and videos that helped them understand huddles. The result aligns with **Cranley, et al (2025)** who found that head nurses' knowledge levels about huddles increased after using illustrative media such as videos. Also **Bragg (2021)**, who found that head nurses' knowledge about huddles increased after using handouts that support the learning resource. This result is contradicted by **Rossacci (2024)**, which revealed that head nurses have

low levels of knowledge about huddles.

Nurses Perception about Huddle

Preprogram, this study showed that over half of the head nurses had high perceptions of huddles, and over three-quarters of staff nurses had high perceptions of huddles. This result may be due to prior exposure of nursing staff to formal or informal communication practices similar to huddles within clinical settings. Even without structured training, nurses often rely on shift reports and team discussions that make perceptions high about huddles.

This is consistent with the research carried out by **Girnius et al. (2024)**, reported that positive staff perceptions toward huddles and highlighted their contribution to successful huddle implementation. However, it contradicts **Watson (2025)**, who found low perception levels regarding the original huddles. Post program, findings showed a marked improvement in the perception of huddles by head nurses and staff nurses. This is caused by an applied program about huddles that provides staff with a better understanding of the present clinical setting and possible, upcoming difficulties. This is consistent with findings by **Rowan, et al. (2022)**, found an increase in staff perceptions about huddle after program implementation While, **Rotteau, et**

al. (2024) noted relatively lower perceptions of huddles among nurses.

Correlation between Huddle Knowledge vs. Huddle Perception

Based on the results obtained from the current study, there is a statistically significant positive correlation between the level of knowledge of head nurses and their perception of huddles post program. This result due to enhanced competency, increased confidence, and direct experience of improved patient safety outcomes following training. **Stapley et al., (2018)** stated that staff awareness of the huddle, its benefits, and rationale often relied on education of staff, suggesting a link between staff knowledge and staff perceptions. While disagreed with **Loesche, (2020)** found no significant difference between nurses' responses to huddles regarding knowledge and perception

Conclusion and Recommendations

According to the research conducted in the present study, it was established that Preprogram, the level of knowledge among all head nurses (100.0%) was low, which improved to be most of the head nurses (90.0%) had high knowledge post program implementation. Preprogram, over half (55.0%) of head nurses had high perception about huddle, which post program improved to be 90.0%. For staff nurses, Preprogram, more than three quarters (70.9%) had high perception about huddle, which post

program improved to be 95.0%. A significant positive correlation was established between knowledge level of head nurses and their perception regarding huddle.

Recommendations:

For the hospital administration

- Conduct periodic in-service training programs and workshops regarding huddles and patient safety goals to maintain and update the knowledge of all head nurses.
- Ensure the availability of sufficient staff and necessary resources (such as digital boards or specific meeting areas) to facilitate the successful implementation of daily huddles.
- Encourage a supportive work environment where administration actively promotes huddles as a tool for reducing medical errors and improving collaborative behavior.
- Provide motivation and recognition for head nurses who demonstrate high performance and commitment to huddle practices to ensure long-term sustainability.

For head nurses

- Ensure huddles are conducted daily and at the scheduled time to establish them as a reliable communication ritual that supports clinical planning and updates.

- Use a standardized huddle format (such as a specific checklist) to ensure all dimensions, identifying problems, providing solutions, and recognizing achievements are covered efficiently.
- Mentoring and nurturing new nurses in competency and communication skills
- Fostering a supportive environment for everyday professional practice and promoting their nurses' contributions for organizational work.

For staff nurses

- Actively participate in training program about huddle.
- Engage and speak up during huddles to identify potential risks, provide status updates on patients, and share critical information that ensures patient safety.

For further research

- Identify factors affecting head nurses' knowledge and perception about huddles.

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Association between Emotional Dysregulations and Maladaptive Behaviors among Technical Nursing Students

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Abstract

Background: Emotional dysregulation is considered a significant psychological instability among nursing students that may negatively affect their academic performance, clinical training experiences, and overall psychosocial functioning. It is associated with maladaptive behavioral patterns that emerge as ineffective coping responses to emotional distress and stressful academic and clinical demands. **Aim of the study** was to explore the association between emotional dysregulations and maladaptive behaviors among technical nursing students. **Study design:** A descriptive correlational research design was utilized. **Subjects:** The study subjects were 110 students. A convenient sample of 55 students from the first grade and 55 students from the second grade **Settings:** The study was conducted at the Technical Health Institute in Tanta City, affiliated with the Ministry of Health and Population. **Study tools:** two tools were used: **Tool I:** Difficulties in Emotion Regulation Scale (DERS). **Tool II:** Maladaptive Behavior Questionnaire. **Results:** The study revealed that the majority of the studied nursing students experienced greater difficulties in emotion regulation and exhibited higher levels of maladaptive behaviors. Furthermore, a statistically significant positive correlation was found between emotional dysregulation and maladaptive behaviors among technical nursing students. **Conclusion:** The results of the present study indicate that difficulties in emotion regulation were highly prevalent, and a higher prevalence of maladaptive behaviors was observed among the studied nursing students. **Recommendations:** Strengthening emotional regulation and behavioral management skills among nursing students through curriculum integration and structured clinical support.

Keywords: Emotional dysregulation, Maladaptive behavior, Nursing students.

Introduction

Nursing students must demonstrate patterns of professional behavior that adhere to the legal and ethical codes of nursing, promote the actual or potential well-being of clients, healthcare workers, and themselves, demonstrate accountability in preparation, documentation, and continuity of care, and respect the human rights of individuals **(Dafny et al., 2023)**. Students who fail to meet the academic requirements of the theoretical component of the course may be considered unsafe and may consequently be excluded from clinical practice **(Stephens et al., 2022)**. Recent evidence has consistently shown that maladaptive coping behaviors are common among pre-licensure nursing students and may negatively affect their academic performance, psychological well-being, and overall success, highlighting the magnitude of this problem in nursing education **(Charlton & Wofford, 2022)**. Students enrolled in nursing programs pass through a developmental stage characterized by increased psychological vulnerability, making them more susceptible to internalizing and externalizing

mental health problems **(Bendezú et al., 2022)**, as well as maladaptive behavioral patterns that may continue throughout adult life **(Supke et al., 2021)**. Problematic behaviors are not uncommon during adolescence and may reflect normal developmental changes. However, when these behaviors occur repeatedly, they can become an important predictor of mental health problems later in life **(Søvold et al., 2021)**. Nursing education integrates both academic instruction and clinical practice, enabling students to learn in classroom and healthcare environments simultaneously. Exposure to these complementary learning experiences enhances their adaptability, strengthens professional competence, and prepares them to deliver effective, evidence-based nursing care **(Dhakal et al., 2022)**. Moreover, as key members of the healthcare workforce, nurses are responsible for promoting and maintaining the health of individuals, families, and communities. Their professional responsibilities extend beyond addressing physical health needs to include psychological well-being, reflecting the principles of

holistic healthcare. For nursing students, developing the ability to regulate their own emotions, respond appropriately to patients' emotional needs, and cope with the challenges of unpredictable clinical environments is fundamental to effective clinical decision-making (**Safira et al., 2022**).

As future healthcare professionals, nursing students will provide care for individuals with diverse backgrounds, personalities, and healthcare needs. Therefore, strengthening emotion regulation skills during nursing education is essential to support professional practice and reduce the likelihood of maladaptive behaviors. Preparing psychologically healthy nursing students who can effectively manage their emotions is an important step toward developing competent and professional nurses (**Shin et al., 2021**). Accordingly, emotion regulation is an attempt to influence one's emotions and modify emotional responses to everyday situations. A lack of effective emotion regulation may result in persistent negative emotions, self-criticism, and feelings of guilt, which may eventually contribute to maladaptive

behaviors (**Shehata & Ramadan, 2017**).

In this regard, emotion dysregulation (ED) is a multidimensional construct characterized by difficulties in recognizing, understanding, and accepting emotions, impaired behavioral control during emotional distress, limited access to effective emotion regulation strategies, and reduced willingness to tolerate emotional discomfort.

Individuals with emotion dysregulation often rely on maladaptive coping strategies to manage negative emotions, which may contribute to emotional imbalance and behavioral problems (**Mekawi et al., 2021; Lin et al., 2021**). Additionally, higher levels of emotion dysregulation are associated with an increased tendency to engage in maladaptive behaviors, such as aggression and substance use. Theoretical and empirical evidence suggests that these behaviors often serve as attempts to escape, avoid, or regulate aversive emotional states (**Young et al., 2019; Miller & Racine, 2022**).

Based on the biosocial model, vulnerability to emotion

dysregulation is considered a central factor underlying both internalizing and externalizing problems, thereby increasing the risk of more severe psychopathological outcomes among students and young individuals. Therefore, there is extensive support for the association between emotion dysregulation and engagement in maladaptive behaviors. When examined individually, a wide range of maladaptive behaviors has been linked to difficulties in emotion regulation **(Miller & Racine, 2022)**.

Maladaptive behavior is considered unacceptable when it interferes with an individual's ability to function effectively in society, meet personal needs, or maintain the well-being of others **(Lanfredi et al., 2021)**. Educational institutions, including schools and colleges, play a significant role in shaping students' behaviors through their social and learning environments. However, exposure to negative peer influences may contribute to the development of maladaptive behaviors, whereas supportive peer relationships can promote positive behavioral adjustment **(Mafumbate & Mkhatjwa, 2020)**.

Maladaptive behavior refers to actions that are considered inconsistent with socially accepted norms and are generally viewed by society and authority figures as inappropriate or problematic. Such behaviors often prompt intervention or other forms of social regulation **(Oostdam et al., 2019)**. Within educational settings, maladaptive behavior is recognized as an important issue because of its negative influence on students' academic achievement, particularly among those in secondary and tertiary education **(Nnadozie et al., 2022)**. Once maladaptive behaviors become established, they are unlikely to decrease without appropriate intervention and may persist or worsen over time **(Zwilling et al., 2022)**. If left untreated, these behaviors can significantly reduce students' social and educational opportunities by limiting their access to learning activities, social interactions, community experiences, and successful participation in educational programs **(Barlattani et al., 2023)**.

Significance of the study:

Emotion dysregulation appears to be an important transdiagnostic factor that

increases risk for a wide range of behavior outcomes in students. So maladaptive behaviors result from a person learning to handle challenging situations and experiences in problematic ways. Although all maladaptive behaviors have this in common, the situations and experiences can vary considerably. Maladaptive behaviors occur in some or all the environments that make up a student's life—at home, at work, in social relationships, or in the community (**Sorcher et al., 2023**). To understand maladaptive behaviors, it is important to note that every behavior has a purpose. Among nursing students, difficulties in emotion regulation may contribute to maladaptive behaviors, which can subsequently increase the risk of developing psychopathological conditions over time. So, this study is interested in exploring the association between Emotion dysregulation and maladaptive behavior among nursing students.

Aim of the study

Explore the association between emotional dysregulations and maladaptive behaviors among technical nursing students.

Research questions:

- What is the level of emotional dysregulation among technical nursing students?
- What is the level of maladaptive behaviors among technical nursing students?
- What is the relation between emotional dysregulation and maladaptive behaviors among technical nursing students?

Subjects & Method

Design:

A descriptive correlational research design was utilized in the present study.

Setting:

This study was conducted at Technical Health Institute in Tanta City which is affiliated to the Ministry of Health and Population. It consists of four floors, which have many departments, including health laboratory, radiology, dental, emergency and critical care, medical registration, medical equipment maintenance, and health aide technician and finally the nursing technician. The nursing department at the Technical Health Institute provides services to two governorates, namely El-Gharbia, and Kafr- El-Sheikh. It works 6 days/ week, 6hrs/ day. It is prepared and equipped with 6

teaching rooms, each room equipped with 60 chairs and one lecture hall equipped with 40 fixed seats.

Subjects:

In the time of 2023 / 2024, the total number of students is 550. In the first grade the number of students is 270 and in the second grade the number of students is 280. The sample size and power analysis were calculated using Epi-Info software statistical package created by World Health organization and center for Disease Control and Prevention, Atlanta, Georgia, USA version 2002.

The criteria used for sample size calculation were as follows:

- 95% confidence limit, the expected significant correlation between maladaptive behaviors and emotion dysregulation was found between 60% of the studied population with a margin of error of 10%.

- The sample size based on the previously mentioned criteria was found at N=92. The sample size was increased to 110 to compensate for missing information and improve the quality of data of the study.

- A convenient sample of 55 students from the first grade and 55 students from the second

grade from the previously mentioned setting.

Tools of the study:

The data was collected by using the following two tools:

Tool I: Difficulties in Emotion Regulation Scale (DERS). It was developed by **Gratz and Roemer (2004)** and was adopted by the researcher. It is an instrument measuring emotion regulation problem. Used to assess clinically relevant difficulties in emotion regulation (with a particular emphasis on negative emotions). The scale consisted of 36 items rated on a five-point Likert scale ranging from 1 (almost never), 2 (sometimes) 3 (about half of time) 4 (most of time) to 5 (almost always). The scale contains 11 reverse-coded items (Items: 1, 2, 6, 7, 8, 10, 17, 20, 24, 30, and 34) which were reversed during data analysis before computing the subscales and total scores. It consisted of six subscales which include:

1-Nonacceptance of emotional responses: 6 items: 11, 12, 21, 23, 25, 29; for example, tendency to have a negative secondary or non-accepting reaction to one's own distress.

2-Difficulty engaging in goal-directed behavior: 5 items: 13, 18, 20, 26, 33; for example, Difficulty in concentrating and/or accomplishing tasks when experiencing negative emotions.

3-Impulse control difficulties: 6 items: 3, 14, 19, 24, 27, 32; for example, difficulty remaining in control of one's behavior when experiencing negative emotions.

4-Lack of emotional awareness: 6 items: 2, 6, 8, 10, 17, 34; for example, reflects a lack of awareness or inattention to emotional responses.

5-Limited access to emotion regulation strategies: 8 items: 15, 16, 22, 28, 30, 31, 35, 36; for example, reflects the belief that there is little one can do to regulate oneself once upset.

6-Lack of emotional clarity: 5 items: 1, 4, 5, 7, 9; for example, reflects the extent to which an individual knows and is clear about his or her emotions.

Scoring system:

Scores were presented as a total score as well as a score for each of the 6 subscales. Total scores ranged from 36 to 180, which the higher score indicates more difficulty in emotion regulation and lower score indicates no problem with emotion regulation.

•0< 50 Very low scores mean no problem with emotion regulation.

•50<90 Low scores mean lower problems with emotion regulation.

•90-180 Higher scores mean greater problems with emotion regulation.

Tool II : Maladaptive Behavior Questionnaire.

It consisted of two parts as follows:

Part 1: Nursing Student

Personal Data: It was developed by the researcher to elicit socio-demographic data about nursing students such as (age, sex, residence, grade level, marital status, income of the family and co-habitation).

Part 2: Maladaptive Behavior Questionnaire.

It was developed by **Aboh et al. (2014)** and was adapted by the researcher to measure maladaptive behavior. The scale consisted of a 29-item questionnaire with a dichotomous response format of Yes/No. The items were positively worded with:

- Items 1-10 measuring the influence of broken homes.

-Items 11-20 measuring the influence of negative attitudes of teachers.

-Items 21-29 measuring the delinquent behavior in students.

Scoring system:

In scoring the questionnaire, a response of Yes = 1 point while a response of No = 0 point.

Maladaptive behavior scale had a overall score ranging from 0 to 29 with maximum score was 29 and minimum was 0.

•Maladaptive behavior: (>14-29).

•Adaptive behavior: (0-14).

Method

The study was accomplished according to the following steps:

1.An official letter was addressed from the Dean of the Faculty of Nursing to the Manager of the Health Technical Institute to request their permission and cooperation for data collection.

2.Ethical considerations:

-The approval was obtained from the Nursing Faculty Scientific Research Ethical Committee, Tanta University. Code (320-11-2023).

-The nature of the study did not cause any harm or pain to the participants.

-Informed consent was obtained from the participants after explanation of the purpose of the study.

-The participants were reassured about the confidentiality and

privacy of their obtained information, and a code of number was used instead of names.

-Respecting the right of the participants to withdraw at any time during the data collection period.

3.Study tools (I, II) were translated into Arabic language by the researcher and were tested for content validity by a jury composed of five experts in psychiatric nursing field and the necessary modification was done. As the researcher made minor modification of tool II to suit our culture.

4.Content Reliability: All tools of study were tested for reliability using Cronbach's Alpha. Cronbach's Alpha for tool I was 0.881 and 0.951 for tool II.

5.A pilot study was carried out on 10% of the sample (11 student) from the previously mentioned settings to ensure the clarity and applicability of the study tools. Those subjects were selected randomly from actual study sample no modifications were done, so these subjects were included in the study sample.

6.Data Collection -Students were invited to participate in the study after being informed about its nature and purpose.

-Data were collected through self-administered questionnaires, distributed to students in groups (each group included 10 nursing students) in the presence of the researcher. Each student completed the questionnaire individually to assess the emotional dysregulation and maladaptive behaviors. The researcher met the students on all days of the week. Participants completed the questionnaire within approximately 30–45 minutes. The duration of data collection was six months, from April to the end of September 2024.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 30. 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 two independent groups, the independent samples t-test was used. For comparison between means among more than two groups, the F-value of one-way analysis of variance (ANOVA) was calculated. Correlation

between variables was evaluated using Pearson and Spearman's correlation coefficient r . Statistical significance was adopted at $P < 0.05$ for interpretation of results of tests of significance (*). Also, highly statistically significant was adopted at $P < 0.01$ for interpretation of results of tests of significance (**).

Results

Table (1): Refers to socio-demographic characteristics of the studied students. It was found that nearly half of the students were aged 20 years (49.1%), while 44.5% were 19 years old and 6.4% were 21 years old. Regarding sex, (51.8%) were females and (48.2%) were males. Concerning grade level, there was an almost equal distribution 50% for both first- and second-grade students. More than half of the students lived in rural areas (52.7%), while 47.3% of them lived in urban areas. As for marital status, the majority were single (92.7%), while only 7.3% were married. Considering income, most of the students' report that their income was enough (81.8%), whereas 18.2% report their income not enough. Finally, the majority lived with

their families (95.5%), while only 4.5% lived alone.

Figure (1): Illustrate distribution of the levels of difficulties in emotion regulation of the studied students. It reveals that the majority of students (92.7%) experienced greater problems with emotion regulation, while only a minority (7.3%) of them showed lower problems. This indicates that difficulties in emotion regulation were highly prevalent among the studied nursing students.

Figure (2): Shows the distribution of maladaptive behavior levels of the studied students. It demonstrates that nearly two-thirds of the students (64.5%) (>14-29) had maladaptive behaviors, while only (35.5%) (0-14) of them had adaptive behaviors. Which indicate high prevalence of maladaptive behavior among students.

Table (2): Demonstrates percentage comparison and correlation between maladaptive behavior level and difficulties in emotion regulation level of the studied students. It reveals a statistically significant relation between level of maladaptive behavior and difficulties in emotion regulation domain

among the studied students ($\chi^2 = 5.391$, $p = 0.023$). The majority of students with greater difficulties in emotion regulation exhibited maladaptive behavior (62.7%), whereas only (1.8%) of those with lower difficulties demonstrated maladaptive behavior. Conversely, adaptive behavior was reported among 30.0% of students with greater difficulties and (5.5%) of those with lower difficulties. Furthermore, a statistically significant positive correlation was found between the total maladaptive behavior score and the total difficulties in emotion regulation score ($r = 0.518$, $p < 0.000$), indicating that higher emotion regulation difficulties were associated with higher maladaptive behavior scores among the studied students.

Table (3): Shows the correlation between students' difficulties in emotion regulation domains and their maladaptive behaviors domains. The highest correlation was found between the total score of difficulties in emotion regulation and the total maladaptive behavior score ($r = 0.518$, $p = 0.000$), while correlation was observed between impulse control difficulties and delinquent

behavior in students ($r=0.209$, $p=0.028$). Overall, all correlations were statistically significant, indicating difficulties in emotion regulation are associated with maladaptive behavior in all domains of difficulties in emotion regulation and maladaptive behavior domains.

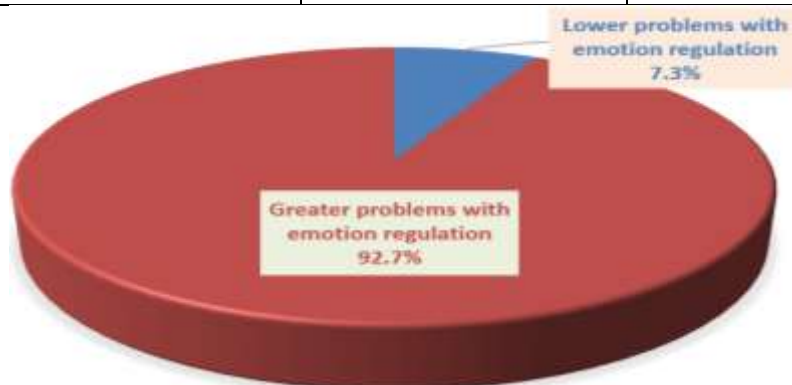
Table (4): Present relation between difficulties in emotion regulation and socio-demographic characteristics of students. It reveals that there is a statistically significant relation between socio-demographic characteristics and difficulties of emotion regulation in age ($F=20.78$, $p<0.000$), sex ($t=7.52$, $p<0.007$), grade level ($t=36.72$, $p<0.000$) and Residence at ($t=14.53$, $p<0.000$).and there is no significant relationship between difficulty of emotion regulation and the rest of sociodemographic characteristics, marital status, income and co-habitation.

Table (5): Shows the relation between maladaptive behavior and socio demographic characteristics of students. As it illustrates that there is a statistically significant relation between the socio-demographic characteristics and maladaptive

behavior of the students in age as ($t=16.92$, $p<0.000$), sex ($t=42.44$, $p<0.000$), grade level ($t=17.07$, $p<0.000$) and residence at ($t=10.84$, $p<0.001$) and there is no significant relation between maladaptive behavior of students and socio-demographic characteristics of marital status income and co habitation.

Table (1): Socio–demographic characteristics of the studied student

Characteristics	The studied nursing students (n=110)	
	No	%
Age (in years)		
19	49	44.5
20	54	49.1
21	7	6.4
Sex		
Male	53	48.2
Female	57	51.8
Grade level		
1 st grade	55	50.0
2 nd grade	55	50.0
Residence		
Rural	58	52.7
Urban	52	47.3
Marital status		
Married	8	7.3
Single	102	92.7
Income		
Enough	90	81.8
Not Enough	20	18.2
Co-habitation		
Alone	5	4.5
With Family	105	95.5



■ (50<90) Lower problems with emotion regulation ■ (90-180) Greater problems with emotion regulation

Figure (1): Distribution of levels of difficulties in emotion regulation of the studied technical nursing students

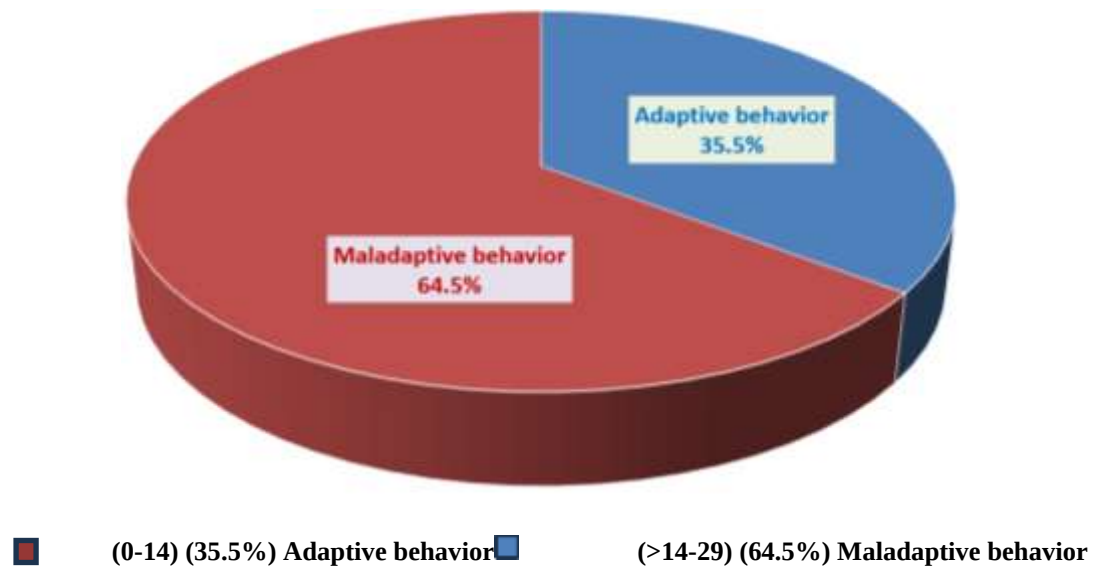


Figure (2): Distribution of maladaptive behavior level of the studied students

Table (2): Percentage comparison and correlation between maladaptive behavior level and difficulties in emotional regulation level the studied students

Maladaptive behavior domain	Total difficulties in emotion regulation domain (n=110)				
	Lower problems (n=8)		Greater problems (n=102)		
	N	%	N	%	
▪ Adaptive behavior	6	5.5	33	30.0	χ^2 5.391
▪ Maladaptive behavior	2	1.8	69	62.7	P =0.023*
r, P	0.518, 0.000**				

r: Pearson correlation coefficient

* Significant at level $P < 0.05$.

** Highly significant at level $P < 0.01$.

Table (3): Correlation between maladaptive behavior domains and difficulties of emotion regulation domains of the studied students

Difficulties of emotion regulation Domains	Maladaptive behavior domains (n=110)							
	1. Influence of broken homes		2. Influence of negative attitudes of teachers		3. Delinquent behavior in students		Total maladaptive behavior score	
	R	p	r	p	r	p	r	P
1. Non-acceptance of emotional responses	0.429	0.000**	0.346	0.000**	0.410	0.000**	0.506	0.000**
2. Difficulty engaging in goal-directed behavior	0.291	0.002**	0.280	0.003**	0.239	0.012*	0.341	0.000**
3. Impulse control difficulties	0.387	0.000**	0.294	0.002**	0.209	0.028*	0.367	0.000**
4. Lack of emotional awareness	0.266	0.005*	0.301	0.001*	0.318	0.001*	0.380	0.000**
5. Limited access to emotion regulation strategies	0.451	0.000**	0.372	0.000**	0.317	0.001*	0.477	0.000**
6. Lack of emotional clarity	0.254	0.007**	0.217	0.023*	0.241	0.011*	0.304	0.001**
Total difficulties of emotion regulation Domains score	0.460	0.000**	0.393	0.000**	0.374	0.000**	0.518	0.000**

r: Pearson correlation coefficient

* Significant at level $P < 0.05$.** Highly significant at level $P < 0.01$

Table (4): Relation between difficulties in emotion regulation and socio–demographic characteristics of the students

Characteristics	(n=110)	
	Total difficulties in emotion regulation Score	F/t P
Age (in years)		
▪ 19	116.59±23.361	20.78 0.000*
▪ 20	140.65±17.297	
▪ 21	144.86±7.777	
Sex		
▪ Male	136.32±22.482	7.52 0.007*
▪ Female	124.51±22.667	
Grade level		
▪ 1 st grade	118.55±23.184	36.72 0.000*
▪ 2 nd grade	141.85±16.623	
Residence		
▪ Rural	122.66±22.730	14.53 0.000*
▪ Urban	138.62±20.983	
Marital status		
▪ Married	128.25±29.080	0.06 0.807
▪ Single	130.35±22.893	
Income		
▪ Enough	130.39±23.818	0.03 0.857
▪ Not Enough	129.35±21.002	
Co-habitation		
▪ Alone	131.80±16.069	0.03 0.876
▪ With Family	130.12±23.583	

* Significant at level P<0.05

Table (5): Relation between maladaptive behavior and socio-demographic characteristics of the studied students

Characteristics	(n=110)	
	Maladaptive Behavior score	F/t P
Age (in years)		
▪ 19	13.71±5.128	16.92 0.000*
▪ 20	18.67±4.243	
▪ 21	19.86±2.478	
Sex		
▪ Male	19.40±3.743	42.44 0.000*
▪ Female	13.88±5.00	
Grade level		
▪ 1 st grade	14.62±5.626	17.07 0.000*
▪ 2 nd grade	18.45±3.971	
Residence		
▪ Rural	15.05±5.957	10.84 0.001*
▪ Urban	18.19±3.630	
Marital status		
▪ Married	17.13±4.704	0.11 0.742
▪ Single	16.49±5.272	
Income		
▪ Enough	16.70±5.187	0.49 0.488
▪ Not Enough	15.80±5.415	
Co-habitation		
▪ Alone	20.00±3.674	2.34 0.129
▪ With Family	16.37±5.234	

* Significant at level $P < 0.05$

Discussion

Emotion dysregulation is considered a significant factor affecting the psychological well-being and academic performance of technical nursing students. The demanding nature of nursing education, including intensive academic workload and emotionally challenging clinical exposure, may

increase students' vulnerability to emotional difficulties. When these difficulties are not effectively managed, they may manifest as maladaptive behaviors that negatively influence both personal and professional development (Merino-Soto et al., 2024; Abbasszade et al., 2025; Weires et al., 2025). Therefore, the current study explores the relation between

emotional dysregulation and maladaptive behaviors among technical nursing students.

The present findings revealed that the majority of students experienced greater problems with emotion regulation. This is likely attributable to the intensive academic workload and emotionally demanding clinical responsibilities, which significantly hinder students' ability to manage and regulate their emotions effectively. This may also be related to the developmental characteristics of late adolescence, a stage often marked by emotional intensity and fluctuating regulatory capacity. In addition, the transition from a dependent secondary school environment to a more independent academic and clinical setting may further challenge students' emotional regulation capacities.

These results are consistent with **Elsayes and Abo-Elyzeed (2021)**, who observed that newcomer nursing students in Egypt have higher difficulties in emotion regulation. Furthermore, **Ciydem (2024)** reported that nursing students commonly experience difficulties in regulating their emotions, particularly affecting their solution-focused thinking under academic stress. Concerning difficulties in emotion regulation domains, the current findings revealed that the

highest mean score was related to a lack of emotional awareness, while the lowest mean score was related to a lack of emotional clarity. This may be attributed to the high-stress nature of both academic and clinical environments, where students are constantly required to prioritize patient care, clinical skills, and task completion over their own emotional needs. Continuous exposure to emotionally demanding situations, combined with heavy workloads and tight schedules, may overwhelm students' capacity for self-reflection, which in turn reduce their ability to accurately perceive and label their emotional states.

These findings are consistent with **Wang et al. (2023)**, who emphasized that insufficient emotional awareness training is a key factor contributing to emotional dysregulation among students. Similarly, **Hamaideh et al. (2024)** reported that nursing students with low self-awareness experienced greater difficulties in emotion regulation, coping abilities, and adaptation to academic and clinical demands. Moreover, **Raghubir (2018)** highlighted that emotional awareness, as a fundamental aspect of emotional intelligence, is essential for effective emotional regulation and adaptive functioning in nursing practice.

Concerning the distribution of maladaptive behaviors among nursing students, the majority of students exhibited maladaptive behaviors. This is likely a consequence of the gap between academic and clinical demands and students' coping abilities. Limited emotional regulation skills and the influence of digital and social environments may further predispose students to avoidant or reactive behaviors. These findings are congruent with **Ayaz-Alkaya and Simones (2022)**, who reported that nursing students often rely on avoidance behaviors when facing academic stressors.

Concerning maladaptive behaviors domains among nursing students, the current study revealed that the most prominent domain was the negative attitudes of teachers, whereas delinquent behaviors were the least reported. This may reflect students' perceptions of faculty–student interactions within a highly structured and demanding educational environment, where close supervision, continuous evaluation, and strict feedback are essential components for ensuring patient safety and developing professional competence.

In this context, instructors play a crucial role in structuring the learning environment, providing

continuous feedback, and guiding students' professional development in nursing education. However, under conditions of perceived strict or evaluative communication, such interactions may occasionally be perceived as critical or less supportive, which can influence students' emotional responses and behavioral adjustment. In addition, the structured and highly regulated nature of nursing education, including adherence to professional ethical standards and exposure to healthcare accountability systems, may contribute to fostering discipline and professional conduct among students.

This finding is supported by **Clark (2017)**, who stated that uncivil or non-supportive faculty–student interactions can negatively affect students' learning environment, emotional well-being, and academic engagement. Similarly, **Dorgham et al. (2024)** reported that higher levels of perceived faculty support are associated with lower stress and more effective coping strategies among nursing students, whereas insufficient support is linked to increased psychological distress and maladaptive responses. Moreover, **Donough (2025)** emphasized that clinical supervision plays a key role in nursing education by supporting the development of professional

behavior and ethical awareness through continuous guidance, which helps reduce the likelihood of unprofessional conduct during clinical training. Regarding the correlation between maladaptive behaviors and difficulties in emotion regulation among nursing students, the present study revealed highly significant positive correlation, indicating that nursing students with greater difficulties in emotion regulation were more likely to exhibit maladaptive behaviors. This may suggest that limited ability to regulate emotional states such as anxiety and frustration is reflected in students' behavioral responses under stress. This impact may be intensified due to continuous exposure to high-pressure clinical environments that require simultaneous emotional regulation, rapid clinical judgment, and task prioritization. Furthermore, persistent emotional overload may deplete cognitive and emotional resources, thereby reduce self-regulatory capacity and increasing reliance on maladaptive coping strategies such as avoidance, withdrawal, or emotional suppression. Over time, repeated exposure to such stressors without sufficient emotional processing may contribute to the consolidation of these behaviors as habitual response

patterns rather than transient reactions to stress.

This finding is supported by **Trentini and Dan-Glauser (2025)**, who found that deficits in emotion regulation are associated with increased use of maladaptive coping strategies and higher levels of psychological distress. Similarly, **Compas et al. (2017)** reported that emotion regulation difficulties in young adults are linked to avoidance behaviors, impulsivity, and ineffective coping under stress. **Gross (2015)** further emphasized that impairments in emotion regulation processes reduce individuals' ability to modulate emotional experiences effectively, thereby increasing the likelihood of maladaptive emotional and behavioral outcomes. Consistent with these findings, **Miller and Racine (2022)** demonstrated that difficulties in emotion regulation are associated with behavioral and academic challenges, including impulsivity, social withdrawal, and difficulty engaging in goal-directed activities. Concerning the relation between difficulties in emotion regulation and socio-demographic characteristics of the students, the current study revealed that older students, male students, second-grade students, and those living in urban areas exhibited higher levels

of emotional dysregulation. Older students demonstrated greater difficulties, which may be due to cumulative academic demands, transitional stress associated with advancing through the nursing program, and increased life responsibilities, including part-time work and family obligations. These factors may overwhelm students' regulatory resources, reducing their ability to recognize, process, and modulate emotions effectively.

These findings are consistent with **Mikkelsen et al. (2024)**, who indicated that age is associated with changes in emotion regulation patterns in daily life, including reduced variability in regulation strategies among older adults. Conversely, these findings differ from **Whitmoyer et al. (2024)**, who demonstrated that older adults use adaptive strategies such as acceptance and positive reappraisal more frequently, suggesting that age does not necessarily increase emotional dysregulation.

Regarding academic grades, this finding may be related to their increased exposure to clinical placements during the final stage of the nursing program, where students are required to engage more actively in patient care and clinical decision-making. Such exposure may place greater emotional demands on

students and require continuous adaptation to complex and unpredictable clinical situations, which may challenge their ability to regulate emotions effectively. This finding is supported by **Lubbe et al. (2026)**, who reported that nursing students experience significant emotional challenges during clinical placements, including emotional strain, burnout, insecurity, and exposure to stressful clinical situations, which may affect their emotional functioning and psychological adjustment. Regarding sex differences, male students demonstrated significantly higher difficulties in emotion regulation than female students. This finding may reflect sex-related differences in emotional processing and help-seeking behaviors. Female students are often encouraged to express emotions and seek social support, whereas male students may be more likely to suppress emotional experiences. These findings are inconsistent with **Aviv et al. (2025)**, who reported that higher domestic and cognitive responsibilities among women contribute to elevated stress and challenges in emotion regulation. Additionally, **Di Benedetto (2025)** demonstrated that females generally exhibit stronger emotional reactivity and higher susceptibility to negative affect.

Furthermore, **Zhang et al. (2024); Sojer et al. (2024)** indicated that males and females employ distinct emotion regulation strategies under stress, highlighting that sex differences are context-dependent rather than uniformly disadvantageous for females.

As for urban residence, this finding may be attributed to the complex environmental context of urban settings, including high population density, rapid lifestyle demands, and increased social expectations, which may contribute to greater emotional demands and reduced opportunities for effective emotional recovery and regulation. These conditions may challenge students' ability to manage and modulate their emotional responses effectively. This result agrees with **Frey et al. (2024)**, who found that individuals in highly urbanized areas are more likely to experience poorer emotional adjustment compared with those in less urbanized or rural settings.

Concerning the relation between maladaptive behaviors and socio-demographic characteristics of nursing students, the current study revealed that older students, second-grade students, males, and those living in urban areas had higher maladaptive behavior scores. One possible explanation is that second-grade students that older students are

in a transitional stage of emerging adulthood, where pressures related to graduation and future career planning increase. Such pressures may be reflected in behavioral maladjustment, including poor academic engagement, social isolation, and impulsive behaviors. In this regard, students in this stage are still developing their ability to respond effectively to academic and social challenges. These findings are supported by **Bernardino et al. (2025)**, who noted that emerging adults often exhibit maladaptive coping in response to developmental and environmental demands, highlighting their vulnerability during this developmental stage.

Regarding academic grades, this finding may be explained by the fact that second-grade students are in their final academic year, during which academic and clinical responsibilities increase alongside concerns related to graduation and future career planning. These accumulated demands may contribute to the adoption of maladaptive coping patterns, such as avoidance, procrastination, or withdrawal. This explanation is consistent with **Solak et al. (2024)**, who reported that nursing students in the final academic year experienced significantly higher challenges than students in earlier academic years,

which increased academic and clinical demands encountered during the final stage of nursing education. In relation to sex, male students exhibited higher maladaptive behavior scores than females. This may be attributed to sex-related differences in behavioral patterns, socialization, and responses to academic and personal challenges, which may influence the tendency to engage in maladaptive behaviors. This result is in partial agreement with the results of **Rojas-Ruiz et al. (2024)**, who found that behavioral responses vary according to sex and contextual factors, suggesting that gender may influence the way students respond to challenging situations. However, these findings are inconsistent with **del Pino and Matud (2024)**, who found that although some gender differences were observed among students, educational level had a greater influence than gender on stress, coping styles, mental symptoms, and well-being, suggesting that gender alone may not be the primary determinant of students' behavioral outcomes. They are also partially consistent with **Tasket and Neal (2024)**, who reported gender differences in coping strategies, indicating that males and females may differ in their responses to challenging situation.

Regarding residence, this finding is likely related to the fast-paced lifestyle, increased social demands, and reduced opportunities for supportive social interactions often associated with urban settings. These conditions may increase the likelihood of engaging in maladaptive behaviors as students attempt to deal with academic and daily life challenges. These findings are supported by **Kamaruddin (2024)**, who reported that students exposed to challenging environmental conditions demonstrated maladaptive behavioral responses, particularly avoidance, highlighting the importance of promoting more adaptive behavioral responses.

Conclusion

According to the results of the present study, the majority of the studied students experienced high levels of difficulties in emotion regulation which indicate that difficulties in emotion regulation were highly prevalent among the studied nursing students. while nearly two-thirds of them exhibited maladaptive behaviors which refer to higher level of maladaptive behaviors among the studied nursing students. In addition, a statistically significant positive relationship was observed between difficulties in emotion regulation and maladaptive

behavior among the studied nursing students.

Recommendations

Based on the findings of the present study, the following recommendations are proposed and suggested:

Recommendations for psychiatric nursing environment:

- Integrate emotional regulation and behavioral management competencies as core intended learning outcomes (ILOs) to enhance nursing students' adaptive functioning in academic and clinical contexts.
- Incorporate behavioral modification techniques and anger management training to improve control of impulsive, avoidance, and other maladaptive behavioral responses under stress.
- Implement structured post-clinical debriefing sessions to evaluate and improve students' emotional and behavioral responses to critical clinical experiences, thereby promoting reflective learning and professional growth.
- Train clinical instructors to identify early behavioral warning signs of student distress, including absenteeism, sudden academic decline, withdrawal, or acting-out behaviors, to ensure timely support and referral.

Recommendations for curriculum development

- Integrate simulation-based learning scenarios that replicate high-stress clinical situations, focusing on both emotional regulation and behavioral control during critical events.
- Incorporate structured behavioral adjustment and professional conduct training to prepare students for clinical demands and reduce maladaptive behavioral patterns.
- Strengthening emotional regulation and behavioral management skills among nursing students through curriculum integration and structured clinical support.

Recommendations for further research

- Implement comprehensive student well-being and anti-bullying policies that ensure clear behavioral standards, protection mechanisms, and safe reporting channels.
- Developing program for educating about the importance of emotional regulation, emotional intelligence, and behavioral competence for nursing students.

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Exploring the Relationships of Emotional Dissonance, Compassion Satisfaction, Burnout, and Secondary Traumatic Stress among Psychiatric Nurses: A Mediation Analysis

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Abstract

Background: Psychiatric nursing is an emotionally demanding specialty in which continuous suppression of genuine emotions may contribute to emotional dissonance, increasing the risk of burnout and secondary traumatic stress. Meanwhile, compassion satisfaction may help buffer the negative effects of occupational stress. **Aim:** the present study aimed to investigate the relationships of emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress among psychiatric nurses and to examine the mediating role of burnout in the relationships among emotional dissonance, compassion satisfaction, and secondary traumatic stress. **Setting:** The study was conducted at Helwan Hospital for Mental Health and Addiction Treatment. **Subjects:** A purposive sample of 115 psychiatric nurses. **Tools:** Three instruments were used: (1) Socio-demographic Data Sheet, (2) the Professional Quality of Life Scale, and (3) the Emotional Dissonance Scale. **Results:** The findings revealed that emotional dissonance was significantly negatively correlated with compassion satisfaction ($r = -0.70$, $p \leq 0.001$) and positively correlated with secondary traumatic stress ($r = 0.75$, $p \leq 0.001$) and burnout ($r = 0.46$, $p \leq 0.001$). Secondary traumatic stress showed a significant negative correlation with compassion satisfaction ($r = -0.56$, $p \leq 0.001$) and a positive correlation with burnout ($r = 0.76$, $p \leq 0.001$), while burnout was negatively associated with compassion satisfaction ($r = -0.33$, $p \leq 0.001$). Additionally, Burnout mediated the relationship between emotional dissonance and secondary traumatic stress. **Conclusion:** Emotional dissonance represents a significant occupational burden that contributes to increasing burnout and secondary traumatic stress among psychiatric nurses, while reducing compassion satisfaction. Meanwhile, compassion satisfaction serves as a protective factor within challenging psychiatric clinical settings. **Recommendation:** targeted mental health interventions should be implemented to enhance compassion satisfaction and reduce emotional dissonance, secondary traumatic stress, and burnout among psychiatric nurses.

Keywords: Emotional Dissonance, Compassion Satisfaction, Burnout, and Secondary Traumatic Stress, Psychiatric Nurses.

Introduction

Nursing is widely recognized as one of the most physically and emotionally demanding healthcare professions. Among its various specialties, especially psychiatric nursing is considered a challenging task frequently involving exposure to individuals experiencing severe mental illness, emotional instability, behavioral disturbances, and psychiatric crises (Atta et al., 2025). Providing therapeutic care in such complex environments may place nurses at considerable risk for adverse psychological outcomes, thereby influencing their overall professional well-being (Al Harbi, 2026).

The concept of Professional Quality of Life (ProQOL) has emerged as an important framework for understanding the psychological consequences of caregiving professions. ProQOL encompasses three interrelated dimensions: compassion satisfaction, burnout, and secondary traumatic stress (Duffy, O'Connor, & Healy, 2024).

Compassion satisfaction is the positive aspect of caregiving, the sense of fulfillment, pleasure, and achievement derived from helping others and making a meaningful difference in their lives. This, in turn, reflects the rewarding experiences associated with providing effective care and contributing to patients' recovery and well-being (Kim, Ha,

& Jue, 2020). In contrast, burnout and secondary traumatic stress represent the negative dimensions of professional quality of life (Lobo, Kumar, & TM, 2024).

Burnout is a multifaceted psychological syndrome that develops in response to prolonged exposure to occupational stress. It is characterized by three core dimensions: **emotional exhaustion**, which reflects feelings of being emotionally overextended and depleted of energy and emotional resources; **depersonalization**, manifested as detached, cynical, or negative attitudes toward patients, colleagues, and the organization; and **reduced personal accomplishment**, characterized by diminished feelings of competence, achievement, and professional effectiveness (Woo et al., 2020).

Due to the inherently demanding nature of nursing practice, nurses are particularly vulnerable to burnout. Continuous exposure to high workloads, emotional demands, and workplace stressors can adversely affect their mental and physical well-being, reduce job performance and productivity, and ultimately compromise the quality of patient care (Tatala et al., 2025).

Secondary traumatic stress refers to the emotional distress and behavioral responses experienced by individuals who are indirectly exposed to the traumatic experiences of others. In

healthcare settings, particularly among psychiatric nurses, repeated exposure to patients' trauma narratives, emotional suffering, and crisis situations can lead to symptoms resembling those associated with direct trauma exposure. These symptoms may include intrusive thoughts, emotional exhaustion, avoidance behaviors, and heightened psychological distress **(Park, Kim, & Kim, 2025)**.

Evidence suggests that the adverse effects of secondary exposure to traumatic events can be comparable in severity to those experienced by individuals who directly encounter the trauma itself, highlighting the significant psychological burden associated with caregiving roles **(Kumar et al., 2024)**.

Furthermore, nursing practice involves substantial emotional demands that extend beyond the provision of physical care. Nurses are routinely required to respond to patient's' needs, alleviate suffering, and manage emotionally challenging situations while maintaining a professional and compassionate demeanor. As part of their professional role, nurses are expected to regulate and appropriately express emotions regardless of their genuine feelings. This requirement may create a discrepancy between internally experienced emotions and those outwardly displayed in accordance with organizational expectations,

professional standards, and societal norms. Such a mismatch is referred to as **emotional dissonance**, a psychological state that can contribute to emotional strain and negatively affect nurses' well-being and professional functioning **(Johannessen et al., 2025)**.

Emotional dissonance refers to the psychological conflict that arises when there is a discrepancy between an individual's genuinely felt emotions and the emotions, they are expected to express in accordance with organizational expectations and professional display rules. This internal tension occurs when employees suppress their authentic feelings and portray emotions that align with workplace norms, even when such expressions do not reflect their true emotional state **(Huang et al., 2026)**.

Consequently, emotional dissonance represents a clash between experienced and displayed emotions, which may lead to emotional strain, reduced well-being, and adverse occupational outcomes, particularly in professions that require extensive emotional labor, such as nursing **(Abdallah et al., 2025)**.

Psychiatric nurses provide patient-centered care for individuals with mental health conditions. They build therapeutic relationships, offer emotional support, manage medications, monitor progress, maintain a safe healing environment,

advocate for patients, provide education, and collaborate with healthcare teams to promote holistic recovery **(Wangel et al., 2024)**.

Significance of the study:

Nursing is consistently ranked among the most psychologically demanding professions, occupying the 27th position out of 130 occupations with significant mental health burden **(Bahari et al., 2022)**. Within this domain, psychiatric nursing is recognized as one of the most stressful specialties due to persistent stigma, heavy workload, and frequent exposure to patient aggression **(Al Harbi, 2026)**.

Compared with other nursing specialties, psychiatric nurses are more frequently exposed to emotionally charge clinical environments, including aggressive behaviors, self-harm incidents, and complex trauma histories. These conditions place them at heightened risk of adverse occupational outcomes, particularly burnout and secondary traumatic stress **(Duffy, O'Connor, & Healy, 2024)**.

Empirical evidence underscores the magnitude of this issue, with reported prevalence rates reaching 77.9% for burnout and 39.0% for secondary traumatic stress among psychiatric nurses **(Wang et al., 2024)**. While these findings highlight substantial psychological vulnerability, compassion satisfaction has been identified as a critical protective

factor that buffers against compassion fatigue and mitigates the negative effects of occupational stress **(Kim, Ha, & Jue, 2020)**. Conversely, emotional dissonance has emerged as a significant occupational stressor linked to a range of adverse outcomes, including emotional exhaustion, reduced job satisfaction, depressive symptoms, diminished work motivation, and overall deterioration in psychological well-being **(Vignoli et al., 2021)**.

Despite numerous advancements, critical gaps in research still remain. In Egypt, for instance, very few studies have specifically targeted psychiatric nurses, making this investigation one of the first to focus on this group. This highlights a significant gap in the existing literature, which the study aims to address while encouraging further research in this neglected area. Furthermore, it helps broaden nurses' understanding of the concepts examined in this study. As a result, the findings could serve as a basis for creating evidence-informed strategies aimed at improving compassion satisfaction and reducing emotional dissonance, burnout, and secondary traumatic stress among psychiatric nurses.

Aim of the study

This study aims to:

- Investigate the relationships of emotional dissonance, compassion satisfaction, burnout, and

secondary traumatic stress among psychiatric nurses.

- Examine the mediating roles of burnout in the relationships among emotional dissonance, compassion satisfaction, and secondary traumatic stress among psychiatric nurses.

Research questions:

- What is the level of emotional dissonance among psychiatric nurses?
- What are the levels of compassion satisfaction, burnout, and secondary traumatic stress among psychiatric nurses?
- What are the relationships among emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress among psychiatric nurses?
- Does burnout mediate the relationships among emotional dissonance, compassion satisfaction, and secondary traumatic stress among psychiatric nurses?

Subjects and Method

Study design:

A descriptive correlational research design was utilized to conduct the current study.

Setting:

The study was conducted at Helwan Hospital for mental health and addiction Treatment.

Subjects:

A purposive sample of 115

psychiatric nurses were recruited for this study.

Sample size: Using the formula for sample size calculation:

$$n = \frac{z^2 * p * (1-p) / e^2}{1 + \frac{z^2 * p * (1-p)}{e^2 * N}}$$

Where p is the estimated proportion in the population=0.5, N population size=150, e margin of error =5%=0.05. And z is the standard normal value with confidence level 95%=1.96. The sample size was found to be 115.

Inclusion criteria include:

- Nurses of both genders who were employed in psychiatric settings during the time of data collection.
- Have at least one year of clinical experience in psychiatric nursing to ensure adequate exposure to the study variables.
- Willingness to participate voluntarily in the study.

Exclusion criteria:

- Psychiatric nurses had mental illness or physical disabilities.

Tools for data collection:

Three tools were utilized to collect the required data for the present study:

I. Socio-demographic Data sheet

The researcher developed this questionnaire to obtain demographic and occupational characteristics of psychiatric nurses. The questionnaire collects data on gender, age, marital status, residence, monthly income, education level, and years of

experience working in psychiatric settings.

II- Professional Quality of Life Scale (ProQOL-5):

The Professional Quality of Life Scale (ProQOL-5), developed by **Stamm (2009)**, was used to assess level of compassion satisfaction, burnout, and secondary traumatic stress among psychiatric nurses. The scale consists of 30 items divided equally into three subscales (10 items in each). The first subscale is compassion satisfaction, including items (3,6,12,16,18,20,22,24,27,30). The second scale is secondary traumatic stress, including items (2, 7, 5, 9,11,13,14, 23, 25, 28). The third subscale is burnout, including items (1,4,8,10,15,17,19,21,26,29). Items are rated on a five-point Likert scale ranging from 1 = never to 5 = very often. Items 1, 4, 15, 17, and 29 are reverse- scored. Subscale scores are interpreted as low (≤ 22), average (23–41), and high (≥ 42) levels for each dimension.

III- Emotional Dissonance Scale:

The Emotional Dissonance Scale, developed by **Zapf et al. (1999)**, was used to assess the level of emotional dissonance among psychiatric nurses. The scale consists of four items rated on a seven-point Likert scale ranging from 1 = never to 7 = always. Higher scores indicate greater levels of emotional dissonance. The total score of the emotional dissonance scale ranges from 1 to 28. Scores are

categorized as follows: 4 to 12 indicating a low level of emotional dissonance, scores from 13 to 20 indicating a moderate level of emotional dissonance and scores from 21 to 28 indicating a higher level of emotional dissonance.

Method:

Validity and reliability of the study tools:

To guarantee semantic and conceptual equivalency, a forward-backward translation process was used to translate the questionnaires from English to Arabic. To verify content authenticity and cultural appropriateness, a panel of specialists in the fields of psychiatric nursing and mental health reviewed the Arabic translations. In the early development investigations, every tool demonstrated acceptable psychometric qualities, such as test-retest reliability, established internal consistency, and concept validity supported by factor analysis. The instruments employed in this investigation have well to high internal consistency reliability, as indicated by Cronbach's alpha coefficients.

The Professional Quality of Life Scale (ProQOL-5) yielded an overall reliability coefficient of 0.93 with subscale reliabilities of 0.88 for compassion satisfaction, 0.76 for burnout, and 0.85 for secondary traumatic stress. In addition, the Emotional Dissonance Scale

demonstrated satisfactory reliability with a Cronbach's alpha of 0.78. These results indicate adequate internal consistency of the study measures and confirm their suitability for application within the psychiatric nursing context. The results confirmed the appropriateness of the adapted instruments for measuring emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress in psychiatric nurses. Following this, a pilot study was conducted with 12 psychiatric nurses to assess the questionnaires' clarity, practicality, and average completion time. To avoid bias and duplication of data, those who took part in the pilot were excluded from the final data analysis.

Ethical considerations:

Ethical approval for the present study was obtained from the Research Ethics Committee of the Faculty of Nursing, Helwan University (Capital University) prior to the initiation of data collection (Research Ethics Approval No. HUNURSERC 2026 /01/ 58/28. In addition, official permission was secured from the administration of Helwan Hospital for mental health and addiction Treatment to conduct the study within the selected setting. Written informed consent was obtained from all participating psychiatric nurses after providing a comprehensive explanation of the study's purpose, procedures, and estimated time

required for participation. Participation was entirely voluntary, and participants were informed of their right to withdraw from the study at any time without penalty or negative consequences.

To ensure confidentiality and anonymity, unique identification codes were assigned to participants instead of using any personal identifiers. All collected data were securely stored and accessed only by the research team and were used strictly for academic and research purposes. The study adhered to the fundamental ethical principles of research involving human participants, including respect for autonomy, informed consent, confidentiality, and voluntary participation, which were rigorously maintained throughout all stages of the research process.

Data collection procedure:

Data were collected from psychiatric nurses working at Helwan Hospital for mental health and addiction Treatment. Prior to data collection, eligible participants were identified in accordance with the predefined inclusion criteria and were interviewed by the researcher. Participants completed the study questionnaires independently via a Google Forms link distributed by the researcher. Responses were automatically recorded through the online platform, while the researcher monitored the process to ensure

completeness and accuracy of the collected data. The average time required for questionnaire completion was approximately 15–20 minutes. Data collection was scheduled during nurses' rest periods to minimize disruption to clinical duties and to enhance convenience and participation. The data collection process extended over a four-month period, from February 2026 to June 2026.

Statistical Analysis:

All statistical analyses were performed using IBM SPSS Statistics version 30 and JASP program version 0.96.0. A two-tailed alpha level of $p \leq 0.05$ was considered statistically significant, with $p \leq 0.001$ regarded as highly significant. Descriptive statistics, including means, standard deviations, minimum, maximum, and percentages, were computed to summarize socio demographic characteristics, and all primary study variables. Participants were further categorized into low, moderate, and high levels for each primary variable based on appropriate cutoffs, and the proportions were reported. Normality tests were done and the data was normally distributed. Pearson's correlation coefficients were calculated to examine bivariate relationships between the main study variables. Correlation strength was interpreted according to Cohen's guidelines.

To test the relationships between emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress, a path analysis using maximum likelihood estimation was conducted. Statistical significance of the indirect effect was determined using bootstrapping with 5,000 resamples to generate bias-corrected 95% confidence intervals. Path coefficients are reported as standardized estimates (β) with standard errors, z-values, and p-values. Model fit indices were tested and the model was fit. Four separate multiple linear regression models (enter method) were estimated to identify significant predictors of compassion satisfaction, burnout, emotional dissonance, and traumatic stress, respectively. Regression results are reported as unstandardized coefficients (B), standard errors, standardized coefficients (β), t-values, and p-values, along with the coefficient of determination (R^2) for each model. No missing data were present in the final analytic sample ($N=540$), as incomplete cases were excluded list wise.

Results

Table 1: Reveals that more than two thirds (68.7%) of the participants are male, while nearly one third (31.3%) of them are female. more than half of participants (57.4%) aged from 20 to 30 years. The mean age is 30.47 ± 6.19 years. Regarding marital status most of the participants are married

(66.9%), followed by single (15.7%), widow (11.3%) then divorced (6.1%). In terms of residence, slightly more than half of the participants (52.2%) reside in urban areas, and nearly half (47.8%) in rural areas. Concerning monthly income, more than half of the participants (58.3%) have insufficient income, compared to more than two fifth (41.7%) with sufficient income. Regarding educational level, nearly half of the participants (45.2%) held a technical institute degree, followed by bachelor's degree (23.5%), diploma (22.6%), and postgraduate studies (8.7%). Concerning of years of experiences of the participants, more than half of the participants (52.2%) having 4–7 years of experience, with a mean duration of 5.02 ± 2.42 years.

Table 2: Reveals that the mean scores for compassion satisfaction (35.15), burnout (34.58), and secondary traumatic stress (35.35) all indicate average levels. Regarding emotional dissonance, mean score (16.61) which also indicate average emotional dissonance level.

Figure 1: Illustrates that more than half of the studied psychiatric nurses (55.7%) have moderate level of compassion satisfaction, about two third of them (64.3%) have moderate level of burnout. Nearly half (47%, 47.8%) of them have both moderate levels of secondary traumatic stress, and emotional dissonance, respectively.

Table 3 clarifies that emotional dissonance showed a strong, highly statistically significant negative correlation with compassion satisfaction ($r = -0.70$, $p \leq 0.001$), and strong positive correlations with both secondary traumatic stress ($r = 0.75$, $p \leq 0.001$) and burnout ($r = 0.46$, $p \leq 0.001$). Secondary traumatic stress is strongly negatively correlated with compassion satisfaction ($r = -0.56$, $p \leq 0.001$) and strongly positively correlated with burnout ($r = 0.76$, $p \leq 0.001$). Burnout shows highly statistically negative correlation with compassion satisfaction ($r = -0.33$, $p \leq 0.001$).

Table 4: Demonstrates that emotional dissonance has a significant positive indirect effect on Secondary traumatic stress through burnout ($\beta = 0.246$, $p = .002$), with a 95% CI [0.118, 0.430] excluding zero, indicating partial mediation. The direct effect of emotional dissonance on secondary traumatic stress is also significant ($\beta = 0.451$, $p < .001$), as is the total effect ($\beta = 0.698$, $p < .001$). In contrast, compassion satisfaction shows no significant indirect effect through burnout on secondary traumatic stress ($\beta = -0.001$, $p = .985$), with a confidence interval crossing zero [-0.117, 0.095]. The direct ($\beta = -0.067$, $p = .155$) and total effects ($\beta = -0.068$, $p = .138$) of compassion satisfaction on secondary traumatic stress are also non-significant.

Figure 2: Illustrates the direct path coefficients between the study variables. Emotional dissonance shows a direct positive effect on secondary traumatic stress (0.37) and on burnout (0.30). Compassion satisfaction demonstrates a direct negative effect on burnout (-0.06). Burnout, in turn, has a direct positive effect on secondary traumatic stress (0.02). These path coefficients suggest that emotional dissonance exerts a stronger direct influence on both burnout and secondary traumatic stress compared to compassion satisfaction. The model supports the mediating role of burnout in the relationship between emotional dissonance and secondary traumatic stress.

Table 5: Displays that gender ($b = 9.950$, $p < .001$) and residence ($b = 8.518$, $p < .001$) are statistically significant predictors of compassion satisfaction.

Table 6: Shows that that gender ($b = -5.564$, $p = .006$), residence ($b = -3.663$, $p = .049$), income ($b = -5.686$, $p = .001$), and experience ($b = 1.943$, $p = .029$) are statistically significant predictors of burnout.

Table 7: Shows that gender ($b = -11.448$, $p < .001$), residence ($b = -6.895$, $p = .001$), income ($b = -4.458$, $p = .021$), and education ($b = 3.197$, $p = .004$) are statistically significant predictors of secondary traumatic stress.

Table 8: Shows that gender ($b = -7.886$, $p < .001$) and residence ($b = -4.251$, $p = .004$) are statistically significant predictors of emotional dissonance.

Table 1: Socio-demographic characteristics of the studied psychiatric nurses (n=115).

Personal data	No.	%
Gender		
Male	79	68.7
Female	36	31.3
Age (years)		
20-30	66	57.4
31-40	39	33.9
41-50	10	8.7
Mean ± SD	30.47 ± 6.19	
Marital status		
Single	18	15.7
Married	77	66.9
Divorced	7	6.1
Widow	13	11.3
Residence place		
Urban	60	52.2
Rural	55	47.8
Income		
Sufficient	48	41.7
Insufficient	67	58.3
Educational level		
Diploma	26	22.6
Technical institute	52	45.2
BSc	27	23.5
Postgraduate studies	10	8.7
Experience (Years)		
1-3	36	31.3
4-7	60	52.2
8-10	19	16.5
Mean ± SD	5.02 ± 2.42	

Table 2: Mean percentage scores of compassion satisfaction, burnout, secondary traumatic stress, and emotional dissonance among the studied psychiatric nurses (n=115).

Study variables	Min	Max	Mean	SD
Compassion satisfaction	10	50	35.15	10.79
Burnout	10	50	34.58	9.81
Secondary traumatic stress	10	50	35.35	11.68
Emotional dissonance	4	28	16.61	7.80

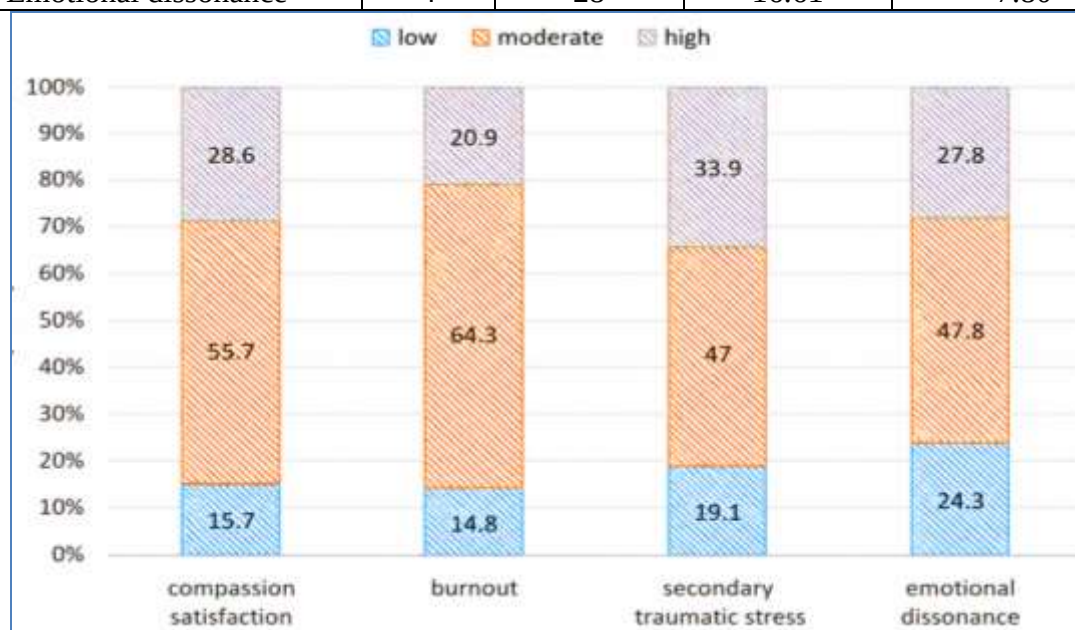


Figure 1: Distribution of compassion satisfaction, burnout, secondary traumatic stress, and emotional dissonance levels among the studied psychiatric nurses (n=115).

Table 3: Pearson's correlation matrix among compassion satisfaction, burnout, Secondary traumatic stress, and emotional dissonance (n=115).

Pearson's correlation		Compassion satisfaction	Burnout	Secondary traumatic stress
Burnout	r	-0.33		
	p	0.00		
Secondary traumatic stress	r	-0.56	0.76	
	p	0.00	0.00	
Emotional dissonance	r	-0.70	0.46	0.75
	p	0.00	0.00	0.00

P value is significant at ≤ 0.05 , highly significant at ≤ 0.001 .

Table 4: Mediation analysis of emotional dissonance and compassion satisfaction on Secondary traumatic stress through burnout (n=115).

Predictor → Mediator → Outcome	Effect	β	SE	z	p	95% CI
Emotional dissonance → Burnout → Secondary traumatic stress	Indirect	0.246	0.078	3.141	.002	[0.118, 0.430]
Emotional dissonance → Secondary traumatic stress	Direct	0.451	0.103	4.387	< .001	[0.246, 0.645]
Emotional dissonance → Secondary traumatic stress	Total	0.698	0.076	9.162	< .001	[0.530, 0.829]
Compassion satisfaction → Burnout → Secondary traumatic stress	Indirect	-0.001	0.054	-0.018	.985	[-0.117, 0.095]
Compassion satisfaction → Secondary traumatic stress	Direct	-0.067	0.047	-1.423	.155	[-0.142, 0.044]
Compassion satisfaction → Secondary traumatic stress	Total	-0.068	0.046	-1.485	.138	[-0.153, 0.031]

P value is significant at ≤ 0.05 , highly significant at ≤ 0.001 .

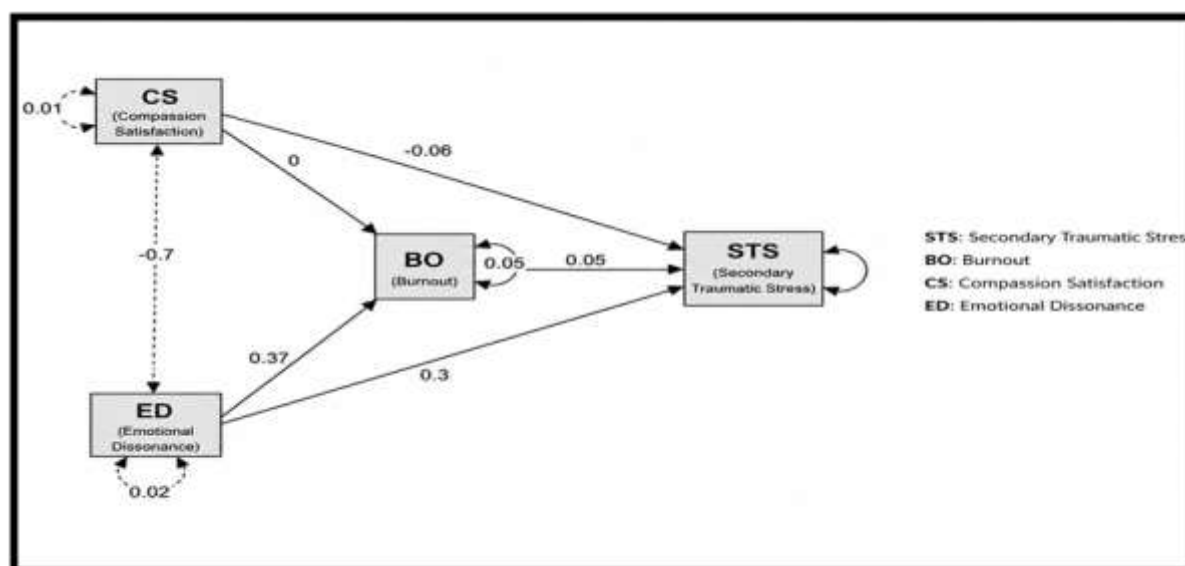


Figure 2: Path diagram of the relationships between emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress (n=115).

Table 5: Multiple regression analysis of demographic and compassion satisfaction (n=115).

Multiple regression Model	Unstandardized Coefficients		Standardized Coefficients	T	P
	B	Std. Error	Beta		
(Constant)	8.599	6.339		1.357	.178
Gender	9.950	2.146	.430	4.637	.000
Age	-.364	1.338	-.022	-.272	.786
Residence	8.518	1.975	.396	4.312	.000
Income	-2.207	1.793	-.101	-1.231	.221
Education	1.434	1.033	.118	1.388	.168
Experience	-.463	.943	-.104	-.491	.624
Marital status	-.917	1.418	-.069	-.647	.519

Dependent Variable: Compassion SatisfactionP value is significant at ≤ 0.05 , highly significant at ≤ 0.05 . $R^2 = 0.36$.**Table 6: Multiple regression analysis of demographic and burnout (n=115).**

Multiple regression Model	Unstandardized Coefficients		Standardized Coefficients	T	P
	B	Std. Error	Beta		
(Constant)	42.994	5.900		7.287	.000
Gender	-5.564	1.997	-.264	-2.786	.006
Age	-1.123	1.245	-.075	-.902	.369
Residence	-3.663	1.838	-.187	-1.993	.049
Income	-5.686	1.669	-.287	-3.407	.001
Education	.789	.962	.071	.820	.414
Experience	1.943	.877	.480	2.214	.029
Marital status	1.938	1.320	.160	1.469	.145

Dependent Variable: BurnoutP value is significant at ≤ 0.05 , highly significant at ≤ 0.05 . $R^2 = 0.33$.**Table 7: Multiple regression analysis of demographic and traumatic Stress (n=115).**

Multiple regression Model	Unstandardized Coefficients		Standardized Coefficients	T	P
	B	Std. Error	Beta		
(Constant)	56.110	6.703		8.371	.000
Gender	-11.448	2.269	-.457	-5.045	.000
Age	-1.583	1.415	-.089	-1.118	.266
Residence	-6.895	2.089	-.296	-3.301	.001
Income	-4.458	1.896	-.189	-2.351	.021
Education	3.197	1.093	.242	2.927	.004
Experience	1.037	.997	.215	1.040	.301
Marital status	2.020	1.499	.140	1.347	.181

Dependent Variable: secondary Traumatic StressP value is significant at ≤ 0.05 , highly significant at ≤ 0.05 . $R^2 = 0.39$.

Table 8: Multiple regression analysis of demographic and emotional dissonance (n=115).

Multiple regression Model	Unstandardized Coefficients		Standardized Coefficients	T	P
	B	Std. Error	Beta		
(Constant)	34.240	4.628		7.398	.000
Gender	-7.886	1.567	-.471	-5.034	.000
Age	-.036	.977	-.003	-.037	.970
Residence	-4.251	1.442	-.273	-2.948	.004
Income	-1.672	1.309	-.106	-1.278	.204
Education	1.372	.754	.156	1.819	.072
Experience	-.326	.688	-.101	-.473	.637
Marital status	.501	1.035	.052	.484	.629

Dependent Variable: Emotional Dissonance

P value is significant at ≤ 0.05 , highly significant at ≤ 0.05 . $R^2 = 0.35$.

Discussion

Psychiatric nurses are frequently exposed to highly stressful situations due to the nature of their work. Consequently, they are at increased risk of experiencing burnout and secondary traumatic stress, which may contribute to higher levels of emotional dissonance and lower levels of compassion satisfaction (Duffy, O'Connor & Healy, 2024). Consequently, this study sought to explore the relationships of emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress among psychiatric nurses.

Regarding burnout level, the findings of the present study indicated that about two third of psychiatric nurses experienced a moderate level of burnout. This may be attributed to the sustained emotional demands inherent in psychiatric care, including continuous exposure to patients'

suffering, aggressive behaviors, suicidal ideation, long-term psychiatric conditions, and persistent occupational stressors, in addition to the stigma associated with mental health services. These cumulative pressures contribute significantly to emotional exhaustion and reduced professional effectiveness.

In line with these findings, Wang et al. (2024) reported that burnout represents a major occupational concern among nurses, particularly within psychiatric settings, where exposure to workplace violence, heavy workload, and inadequate staffing further intensify psychological strain.

Regarding secondary traumatic stress level, the results also revealed that nearly half of psychiatric nurses experienced a moderate level of secondary traumatic stress, which may be explained by their frequent

and sustained exposure to patients' traumatic experiences and emotionally distressing narratives. Through continuous empathic engagement and therapeutic interaction, nurses may internalize or absorb the emotional burden of patients' trauma. Over time, such indirect exposure can lead to symptoms consistent with secondary traumatic stress.

These findings are consistent with those of **Duffy, O'Connor, and Healy (2024)**, who reported that mental health nurses are particularly vulnerable to secondary traumatic stress due to ongoing exposure to patient trauma, suicidal behaviors, emotional distress, and crisis situations.

Regarding emotional dissonance level, the findings of the present study indicated that nearly half of psychiatric nurses experienced a moderate level of emotional dissonance. This may be attributed to the high emotional expectations inherent in psychiatric nursing roles, where nurses are required to regulate and display emotions that align with professional norms, often exceeding their internal emotional comfort. This ongoing discrepancy between genuinely felt emotions and those expressed in the workplace reflects the core nature of emotional dissonance and highlights the psychological effort required to

maintain professional emotional displays in clinical settings.

These findings are consistent with **Abdallah et al. (2025)**, who reported moderate levels of emotional dissonance among psychiatric nurses. This similarity may be explained by the constant need for nurses to balance their authentic emotional responses with the emotionally regulated behavior expected within psychiatric care environments.

Regarding compassion satisfaction level, the results of the present study revealed more than half of psychiatric nurses experience moderate level of compassion satisfaction. This finding may be interpreted in light of the meaningful and rewarding nature of psychiatric nursing practice, where nurses often derive a sense of purpose, accomplishment, and professional fulfillment from supporting vulnerable patients and witnessing their improvement. The ability to provide effective care and establish therapeutic relationships may contribute to sustaining positive professional experiences despite occupational stressors.

This result is consistent with **Abdallah et al. (2025)**, who found that moderate levels of compassion satisfaction among psychiatric nurses reflect a strong sense of professional purpose and intrinsic motivation in caring for individuals with mental health conditions. In addition,

Öztürk and Alagöz (2024) suggested that moderate compassion satisfaction may be associated with enhanced psychological resources, such as mindfulness, which contribute to improved emotional regulation and overall well-being in psychiatric nursing practice.

Conversely, **Alreshidi (2023)** reported lower levels of compassion satisfaction among psychiatric nurses. This discrepancy may be explained by several contextual and occupational factors, including repeated exposure to verbal and physical aggression from patients with severe mental illness, which can significantly diminish positive work experiences. Additionally, limited access to continuing education and training programs related to the management of workplace violence may further reduce nurses' sense of efficacy and professional fulfillment. Variations in geographical context, cultural influences, staffing patterns, and workload distribution may also contribute to differences in compassion satisfaction across studies.

In the present study, compassion satisfaction was found to be negatively correlated with burnout, indicating that higher levels of compassion satisfaction may function as a protective psychological resource. This suggests that deriving meaning, fulfillment, and a sense of achievement from caregiving may

enhance nurses' resilience and strengthen their ability to cope with occupational stressors, thereby reducing the risk of burnout.

This finding is consistent with **Baçoğul et al. (2021)**, who also identified a strong negative relationship between compassion satisfaction and burnout. Their results further support the interpretation that compassion satisfaction serves as an important source of psychological strength, enabling nurses to sustain their work effectively in high-stress psychiatric environments.

The findings of the present study demonstrated a strong positive correlation between emotional dissonance and burnout among psychiatric nurses. This relationship may be explained by the persistent requirement for nurses to suppress their authentic emotions while displaying professionally expected emotional expressions. Such continuous emotional regulation imposes sustained psychological strain and depletes emotional resources, ultimately increasing vulnerability to burnout. Accordingly, higher levels of emotional dissonance are associated with greater levels of burnout. This finding is consistent with **Jin et al. (2025)**, who identified emotional dissonance as a key predictor of emotional exhaustion, a central component of burnout among psychiatric nurses.

In addition, the results revealed a strong negative correlation between secondary traumatic stress and compassion satisfaction. This may be attributed to repeated exposure to patients' traumatic experiences, which can contribute to emotional exhaustion and reduce nurses' psychological resilience. Consequently, elevated secondary traumatic stress may hinder nurses' ability to maintain positive emotional engagement in their work and diminish the sense of fulfillment derived from helping others, thereby lowering compassion satisfaction.

Similarly, **Öztürk and Alagöz (2024)** reported that high levels of secondary traumatic stress may lead psychiatric nurses to emotionally distance themselves from patients as a protective coping strategy, ultimately reducing empathy and the intrinsic satisfaction associated with caregiving.

The study also found a strong positive correlation between secondary traumatic stress and burnout. This association may be explained by continuous exposure to patients' trauma and emotional suffering, which places psychiatric nurses under sustained emotional pressure and contributes to progressive emotional exhaustion. Over time, this may significantly increase the risk of burnout.

In line with this finding, **Abdallah et al. (2025)** reported that the positive

relationship between burnout and secondary traumatic stress highlights how prolonged emotional strain increases vulnerability to trauma-related psychological symptoms.

Furthermore, emotional dissonance showed a strong and highly significant negative correlation with compassion satisfaction. This may be due to the ongoing emotional effort required to suppress genuine feelings and display organizationally expected emotions, which gradually reduces nurses' sense of achievement and fulfillment in patient care. As a result, higher emotional dissonance is associated with lower compassion satisfaction. Consistently, **Kim, Ha, and Jue (2020)** found that emotional dissonance contributes to emotional fatigue, which negatively affects job performance and reduces compassion satisfaction.

The results also indicated a strong positive correlation between emotional dissonance and secondary traumatic stress. This relationship may be explained by the fact that emotional dissonance increases psychological burden and emotional exhaustion, thereby reducing nurses' ability to effectively cope with patients' traumatic experiences and increasing susceptibility to secondary traumatic stress.

Similarly, **Singh and Hassard (2021)** emphasized that mental health professionals are required to engage in significant emotional labor to

support therapeutic relationships; however, depletion of empathic resources over time may result in vicarious traumatization and secondary traumatic stress, which are considered common occupational risks in psychiatric settings.

Finally, the present study revealed that burnout plays a mediating role in the relationship between emotional dissonance and secondary traumatic stress, indicating that emotional dissonance contributes to secondary traumatic stress indirectly through increased burnout levels. This suggests that burnout serves as a key psychological mechanism through which emotional dissonance influences trauma-related stress outcomes among psychiatric nurses.

In contrast, **Lee et al. (2021)** reported that compassion satisfaction may mediate the relationship between stress and burnout among nurses, acting as a protective factor that can buffer the negative effects of workplace stress. However, this buffering effect may diminish when nurses are exposed to sustained high levels of occupational stress, thereby increasing the likelihood of burnout.

Strengths and Limitations of the Study:

This study has several strengths that enhance the credibility and relevance of its findings. First, it focuses on an important yet underexplored population (psychiatric nurses in the Egyptian healthcare context) thereby

addressing a notable gap in the literature. Second, the study employed standardized and psychometrically validated instruments, which strengthens the reliability and comparability of the results. Third, the use of a descriptive correlational design allowed for a comprehensive examination of the relationships between emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress. Additionally, data were collected using a structured and anonymous online format, which may have reduced response bias and encouraged more honest reporting. Nevertheless, a limitation of this study was the use of a single mental health facility as the study setting, so the study's results may not be broadly applicable to other contexts or demographic groups.

Conclusion

The study concluded that about two third of the participants experienced a moderate level of burnout, nearly half of the participants experienced a moderate level of secondary traumatic stress and emotional dissonance, and more than half of the participants experienced a moderate level of compassion satisfaction. Additionally, the present study highlights the significant interrelationships between emotional dissonance, compassion satisfaction, burnout, and secondary traumatic stress among psychiatric nurses. The

findings demonstrate that emotional dissonance is a key occupational stressor that increasing burnout and secondary traumatic stress while reducing compassion satisfaction. Additionally, the results emphasize the protective role of compassion satisfaction in buffering against negative psychological outcomes and sustaining nurses' well-being in demanding psychiatric environments. Additionally, burnout plays a mediating role in the relationship between emotional dissonance and secondary traumatic stress.

Recommendations

Based on the findings of the present study, several evidence-informed recommendations are proposed.

At the clinical level, healthcare organizations should prioritize the development and implementation of structured psychological support programs aimed at reducing emotional dissonance among psychiatric nurses. This may include emotional regulation training, communication skills workshops, and reflective practice sessions designed to strengthen adaptive coping mechanisms and improve emotional awareness in clinical settings.

Furthermore, nursing administrators should establish supportive work environments that promote open communication, effective supervision, and access to regular debriefing sessions, particularly following exposure to traumatic or

high-risk patient encounters. Workload management strategies and adequate staffing ratios are also essential to reduce chronic occupational stress and prevent burnout.

At the educational level, psychiatric nursing curricula should integrate targeted content on emotional labor, secondary traumatic stress, and resilience-building strategies to better prepare nurses for the psychological demands of clinical practice. Continuous professional development programs should also be offered to enhance nurses' coping skills and reinforce compassion satisfaction.

From a policy perspective, institutional and national healthcare policies should recognize the psychological risks associated with psychiatric nursing and implement formal occupational mental health frameworks to support staff well-being and retention.

Finally, **future research** is recommended to employ longitudinal and multi-center designs to better understand causal pathways and to evaluate the effectiveness of targeted interventions aimed at reducing emotional dissonance and improving professional quality of life among psychiatric nurses.

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Assessment of Physiological Parameters and Distress among Children with Beta Thalassemia Major Undergoing Blood Transfusion

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Abstract

Background: Children with beta thalassemia require frequent invasive procedures such as frequent blood transfusions that can contribute to distress and physiological responses change. **Aim:** The present study was aimed to assess physiological parameters and distress among children with beta thalassemia major undergoing blood transfusion. **Research design:** Descriptive research design was used. **Subjects & Setting:** Purposive sampling of 75 children with beta thalassemia major was conducted at Pediatric Hematology and oncology department and blood transfusion unit of Tanta Main University Hospital was recruited. **Tools:** Three tools were used, assessment of children with beta thalassemia major structured interview schedule, physiological parameters, observational behavioral distress. **Results:** Most of the studied children exhibited altered physiological parameters, particularly increased respiratory rate and more than half of the studied children experienced moderate to severe distress levels before blood transfusion. **Conclusion:** A large proportion of studied children exhibited altered physiological parameters such as increasing heart and respiratory rate, decreasing oxygen saturations and distress before blood transfusion. **Recommendations:** Implementing educational programs for children with beta thalassemia major undergoing blood transfusion to enhance their physiological parameters and distress and promoting better health outcomes.

Keywords: Beta Thalassemia Major, Blood Transfusion, Children, Distress Physiological Parameters.

Introduction

Beta thalassemia major is a genetic disorder occurred by lower or lacking the synthesis of the beta-globin chain, which causes an excessive hemolysis and serious anemia symptoms, requiring regular blood transfusions and iron chelation therapy, it is the most common hematological disorder in worldwide, it is affect many children in the Mediterranean and Middle East regions and it is the most common inherited hemoglobin disorder in Egypt **(El-said, Darwish, & Wahba, 2021)**.

The manifestation of beta thalassemia major includes symptoms of anemia such as hypoxia, pallor, dyspnea, palpitation, tachycardia, dyspnea, dizziness, anorexia, activity indolence, intermittent confusion and syncope. Moreover, following hemolysis of the red blood cells, the main sign are jaundice that led to yellowing of the skin, sclera and mucus membrane, dark color urine and stool, and hepatosplenomegaly. **(Ch, Khashboqova, & Abdukhakimova, 2023; Salama, Abd El Dayem, Shaltout, & Nassim, 2024)**.

Management of children with beta thalassemia major includes supportive, curative and long-term therapy. Supportive therapy includes iron chelation therapy and regular transfusions of red blood cells. Meanwhile, curative treatment is in form of hematopoietic stem cell and

long-term therapy as gene therapy **(Forni, Grazzini, Boudreaux, Agostini, & Omert, 2023; El Aziz, El-Sheikh, El Nabawy Ahmed, & Attia, 2022)**.

Children with this disease experience considerable distress and alterations in their physiological parameters throughout the course of their illness. Several factors, including severe anemia, frequent blood sampling, repeated hospitalizations, regular blood transfusions, and the emotional disturbance associated with the disease, may trigger physiological responses manifested by changes in oxygen saturation, respiratory rate, and heart rate **(Toussaint et al., 2021)**.

Pediatric nurses play a pivotal role in caring for children with beta thalassemia major undergoing blood transfusion. Their responsibilities include assessing physiological parameters and distress levels, providing emotional support, educating children and their parents about the disease and blood transfusion, monitoring adherence to treatment, and implementing appropriate non-pharmacological interventions to minimize distress. Assessment of physiological parameters and distress is essential for identifying children's needs and planning individualized nursing care to ensure safe and effective blood

transfusion (Mahamud, Thabet, Ayed, & Sayed, 2022).

Significance of the study:

Beta thalassemia is the most common genetic disease. Globally, about 240 million people with disease, in Egypt, beta thalassemia is considered a significant public health issue, and it is estimated that one child is born with the disease annually for every 1.5 million live births. Children with beta thalassemia major require blood transfusions once or twice every month, which might disrupt their lives as they may need to stay in hospital for the full transfusion day as a result, their life are interfered, experience feelings of distress due to chronic anemia and frequent blood transfusions that leads to unstable vital signs and oxygen saturation. This study aimed to assess the physiological parameters and distress among children with beta thalassemia major undergoing blood transfusion (Amanullah, et al., 2023; Arumsari, et al., 2024).

Aim of the study

The current study was aimed to assess physiological parameters and distress among children with beta thalassemia major undergoing blood transfusion.

Research Questions:

1-What is the change of physiological parameters among children with beta thalassemia major undergoing blood transfusion?

2-What is the level of distress among children beta thalassemia major undergoing blood transfusion?

Subjects and Method

Design:

A descriptive research design was adopted for the current study.

Setting:

The study was conducted at Pediatric Hematology and oncology department and blood transfusion unit of Tanta Main University Hospital which is affiliated with the Ministry of Higher Education and Scientific Research.

Subjects:

Purposive sampling of 75 children with beta thalassemia major who were admitted to the previously mentioned setting, children with beta thalassemia major in the age between 10-18 years, who are undergoing blood transfusion for 3 hours or more.

Tools of data collection:

Three tools were utilized in the current study as follow:

Tool (I): Assessment of children with beta thalassemia major undergoing blood transfusion structured interview schedule:

This tool was developed by the researcher to obtain the required information and consisted of the following three parts:

Part (1): Socio demographic characteristics of studied children: including age, gender, birth order, and residence.

Part (2): Medical history of the child related to beta thalassemia major: such as information about the present history, onset of the disease, past history, treatment and complications.

Part (3): Assessment of children related to blood transfusion: such as time, duration, amount and reactions.

Tool II: Physiological parameters:

It was measured for beta thalassemia major children immediately before blood transfusion procedure it includes: monitoring vital signs including heart and respiratory rate and oxygen saturation.

Tool III: Observational Behavioral Distress check list

In the present study, this tool was adapted from **Elliott et al. (1987)** to assess children's behavioral reactions to acute distress immediately before blood transfusion. It consisted of: (information seeking, cry, scream, physical restraint, verbal resistance, seeks emotional support, verbal pain, and flail)

Children's perceived distress levels were scaled as follows:

Each item was scaled into (4) points based on the level of distress severity as:

- No distress (1).
- Mild distress (2).
- Moderate distress (3).
- Severe distress (4).

The total behavioral distress score was categorized according to the established cutoff points as follows:

- No distress: < 50%.
- Mild distress: 50% to < 60%.
- Moderate distress: 60 % to < 70 %.
- Severe distress: 70 % and more.

Method

The study was accomplished through the following steps:

1-Administrative process:

An official permission to collect the study data was obtained from the Dean of the Faculty of Nursing as well as the directors of pediatric hematology and oncology department and blood transfusion unit of Tanta Main University Hospital in order to obtain their approval and cooperation for carrying out this study.

2-Ethical and legal considerations:

- a) Ethical approval for conducting the study was obtained from Scientific Research Ethical Committee at the Faculty of Nursing Tanta University with Code no. (Code 434 /4/2024).
- b) Confidentiality and privacy of data were considered.
- c) Informed consent from children and their parents were taken.

3- Tools Development: study tools (I, II, III) were developed based on a review of the most recent relevant literature.

4-Content validity:

The tools were reviewed by a jury of five experts in pediatric nursing to check its content validity and clarity.

The Content Validity Index was 98.6%.

5- Pilot study:

A pilot study was conducted on (10%) of the studied children.

6- Reliability of tools:

The reliability of the study tools was assessed using Cronbach's Alpha. It was 0.790 for tool (I) & 0.979 for tool (II) & 0.805 for tool (III) that indicates high reliability of the tools.

7- Procedure of the study

Eligible children who met the inclusion criteria were recruited from the Pediatric Hematology and Oncology Department and Blood Transfusion Unit after obtaining informed consent from their mothers. Each child was interviewed individually before the scheduled blood transfusion to collect socio-demographic and clinical data using tool I.

Before the initiation of blood transfusion, the researcher assessed the child's physiological parameters, including heart rate, respiratory rate, and oxygen saturation, using Tool II. The child's level of distress was then assessed using Tool III before the blood transfusion procedure. All measurements were performed by the researcher under the same clinical conditions and recorded immediately on the data collection sheets for analysis.

Statistical analysis:

Collected data were organized, coded, tabulated, and analyzed

statistically using SPSS software. For qualitative data were presented using frequencies and percentages. The following test was done: Cronbach's Alpha: Reliability Statistics was assessed using Cronbach's Alpha test.

Results

Figure (1): Shows percentage distribution of the studied children according to their age, it was clear that, 46.7%, 36.0% & 17.3% of the studied children were among 10-<12 years, 12-<15 years and 15-<18 years respectively.

In relation to gender, **Figure (2)**, presents that male constituted more than half of the studied children (54.7%).

In relation to residence, **Figure (3)**, presents that 68% of studied children were from rural areas.

Table (1): Clarifies percentage distribution of the studied children according to their blood transfusion. The table shows that three quarter of studied children (76.0%) received blood transfusions every 2-4 weeks, with 69.3% completing transfusions within 3 hours, while 38.7% reported current transfusion reactions, most commonly occurring in a delayed pattern 48.3%, and manifested mainly as hyperthermia 48.3%, followed by allergy 24.2%, dyspnea 20.7%, and pain 6.9%; additionally, 66.7% had a previous history of transfusion reactions, predominantly hyperthermia 48.0%.

Table (2): Illustrates percentage distribution of the studied children regarding to physiological parameters. It was clear that the majority of the studied children exhibited altered physiological parameters before blood transfusion. Nearly three quarters of them 74.7% and 78.7% had above-normal heart rate and sub-normal oxygen saturation respectively. In addition, the majority of the studied children 92.0% had an above-normal respiratory rate.

Table (3): Clarifies percentage distribution of the studied children regarding children regarding their perceived distress levels. It was evident that about one third of them (34.7%) had mild distress. Additionally, more than one third of

the studied children (36.0%) experienced a moderate level of distress during blood transfusion. while less than one fifth (18.7%) suffered from severe distress.

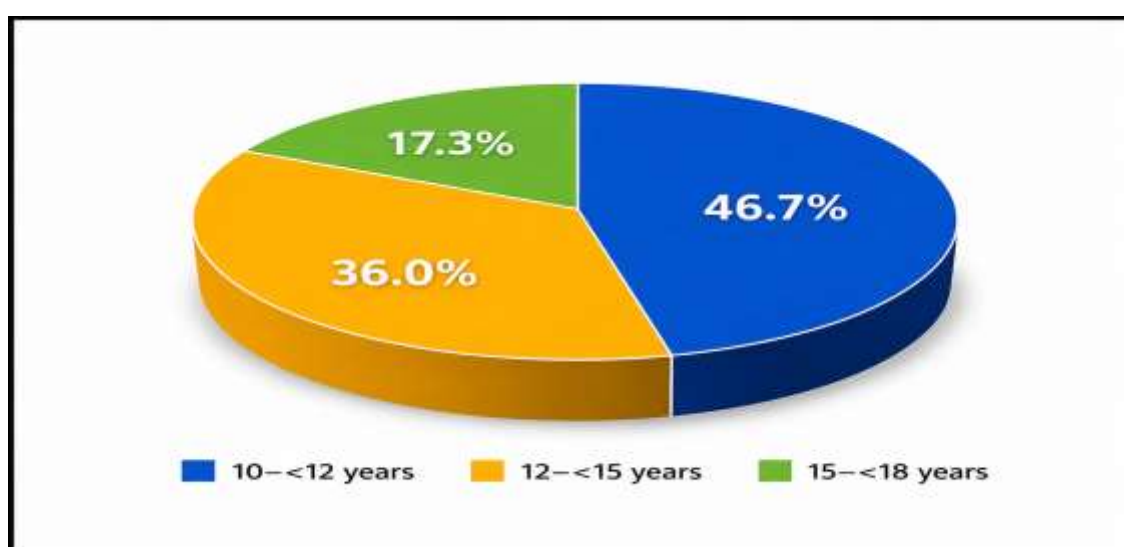


Figure (1): Age of the Studied Children in Years

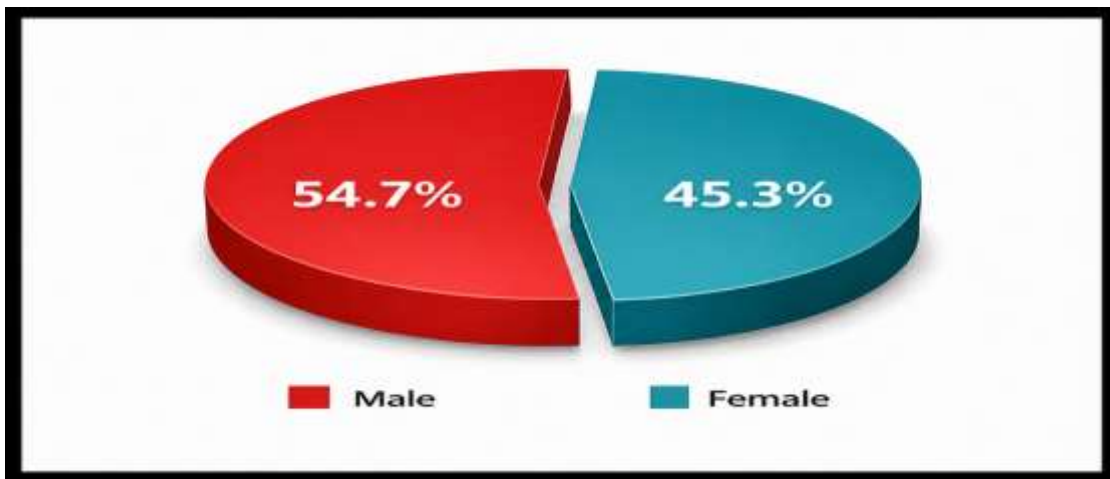


Figure (2): Children Gender

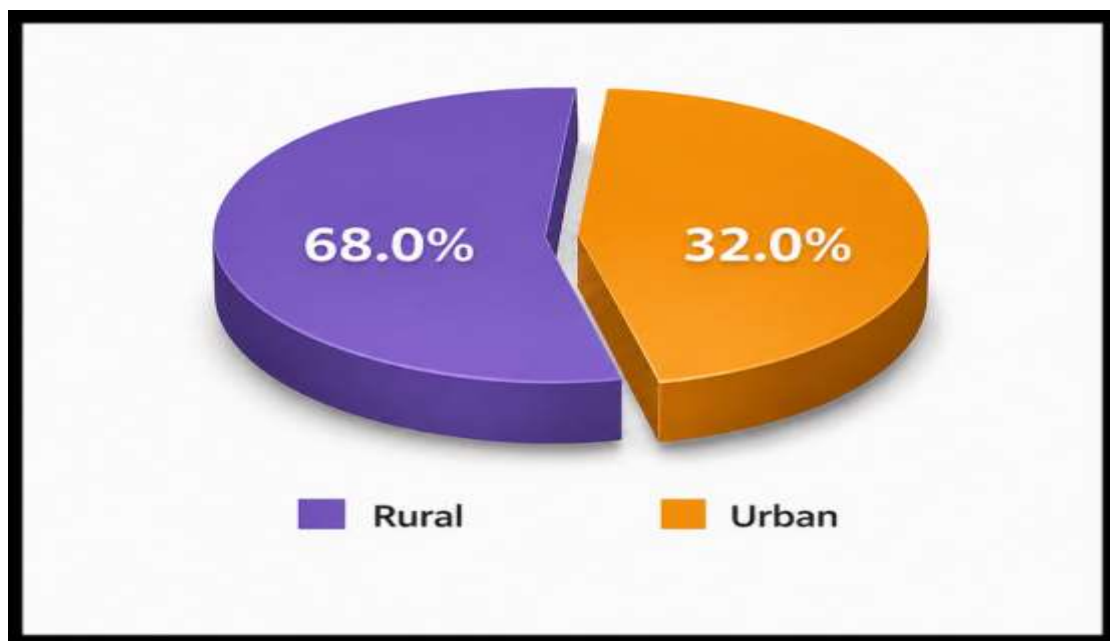


Figure (3): Children Residence

Table (1): Percentage distribution of the studied children regarding their blood transfusion

Blood transfusion	Studied children's (n=75)	
	No	%
Frequency of blood transfusion		
< 2 weeks	15	20.0
2 - 4 weeks	57	76.0
> 4 weeks	3	4.0
Duration of blood transfusion		
3 hours	52	69.3
4 hours	23	30.7
Complain of any reaction with current blood transfusions		
Yes	29	38.7
No	46	61.7
If yes, the reaction start		
During blood transfusion	8	27.6
After blood transfusion	7	24.1
Delayed reactions	14	48.3
Manifestations of current reactions		
Hyperthermia	14	48.3
Allergy (rash and itching)	7	24.2
Rapid breathing or dyspnea	6	20.7
Pain	2	6.9

Table (2): Percentage distribution of the studied children's regarding to physiological parameters

Physiological parameters	Studied children's (n=75)			
	Normal		Abnormal	
	No.	%	No.	%
Heart rate	19	25.3	56	74.7
Respiratory rate	6	8.0	69	92.0
Oxygen saturation	16	21.3	59	78.7

Table (3): Percentage distribution of the studied children regarding to their perceived distress levels

Table (3): Percentage distribution of the studied children regarding to their perceived distress levels	Studied children's (n=75)	
	No.	%
Distress Level		
No distress	8	10.6
Mild distress	26	34.7
Moderate distress	27	36.0
Severe distress	14	18.7

Discussion

Beta thalassemia major is severe anemia occurred by one of the most frequent recessive genetic diseases. As a result, children suffering from this disease require regular blood transfusions to survive that cause a lot of distress during their lives. In addition, beta thalassemia major may influence children's physiological parameters such as heart rate, respiratory rate, blood pressure, and oxygen saturation, as a result of chronic anemia and reduced oxygen-carrying capacity of the blood (**Mahamud et al., 2022**).

The finding of the present study revealed that more than half of studied children were males. **Mardhiyah et al. (2024)** whose results were consistent with the findings of the current study, reporting

that the largest proportion of studied children with beta thalassemia were males. On the other hand, **Abdel Aziz et al. (2022)** who's found that the majority of the studied children with beta thalassemia major were females.

The current study showed that the majority of the studied children were living in rural area. This result may be interpreted on the basis that at rural area there were high rate of consanguinity marriage and limited access to premarital and genetic counseling in this region that increase occurrence of beta thalassemia major.

This finding was in agreement with **Akram, and Khan (2022)** who observed in their study that the majority of the children suffering from beta thalassemia

major were living in rural residents. Besides **Mahfoz, Mahmoud, and Zaki (2024)** who supported the current findings and reported that more than half of children suffering from beta thalassemia were living in rural areas during the study period.

Regarding frequency of blood transfusion, it was clear that the approximately three-quarters of studied children receive blood transfusion every two to four weeks, this result may be interpreted on the basis that beta thalassemia major causes severe anemia and hemolysis of red blood cells that must be replaced by regular blood transfusion to support body growth and development.

These results were in a similar direction with **Abdelmotalieb et al. (2025)** who reported that nearly half of studied children needed a blood transfusion every four weeks, nearly third of pediatric participants need blood transfusion every three weeks and the others of patients need blood transfusion every two weeks.

Regarding manifestations of current blood transfusion reactions, the present study revealed that hyperthermia was the most reaction occurred. This may be described on the basis that children with beta thalassemia major receive regular blood transfusion from many donor, which increase their exposure to different

antigen that increase the immune system sensitivity, leading to reaction especially hyperthermia

This finding was supported by **Zarrabian, and Hanna (2023)** who mentioned that the majority were minor allergic reactions followed by febrile reaction for all the studied children. Besides **Iqbal, Aroob, and Saqlain (2025)**, who supported the current findings reported that the most studied children developed fever within one hour of blood transfusion while nearly third developed a fever after the completion of transfusion.

Children with beta thalassemia major suffer from a lot of distress and change in physiological parameters during their lives due to many factors such as several blood tests, repeated hospital stays and regular transfusions) Othman, **Abdul Ghani, Taib, & Mohamad, 2022**).

According to the results obtained in the present study, a high proportion of the studied children exhibited altered physiological parameters blood transfusion, which included increase in heart rate, respiratory rate, and decreasing oxygen saturation.

The high prevalence of altered physiological parameters before transfusion may be attributed to the pathophysiological consequences of beta-thalassemia major, chronic anemia reduces the oxygen-carrying capacity of

the blood, leading to tissue hypoxia and activation of compensatory mechanisms such as increased heart rate and respiratory rate, while oxygen saturation levels tend to decrease.

This finding was supported by **Ibreesam, and Shawq (2025)** who mentioned that before blood transfusion, the majority of studied children with thalassemia exhibited tachypnea and hypoxia. These findings may be attributed to the underlying chronic anemia, reduced oxygen-carrying capacity of blood.

In contrast, **Jadhav, et al. (2024)** who revealed that the pulse rate showed only minimal variation before and after blood transfusion of beta thalassemia children, indicating that heart rate was relatively stable during the transfusion period.

Regarding distress level of studied children, the existing study found that there were observed reduction in distress level before blood transfusion. This may be due to the chronic nature of beta thalassemia, which requires lifelong regular blood transfusions and is often accompanied by disease-related complications. These factors may adversely affect children's physical and psychological well-being, leading to increased distress, emotional tension, and a reduced quality of life.

The present findings are consistent with the results reported by **Badr et al. (2023)**, who reported that a high level of

distress was observed among children before blood transfusion, suggesting that pediatric patients commonly exhibit considerable distress prior to the transfusion procedure.

In addition, **Mediani, and Fuadah (2025)** was in harmony with the finding of the current study and revealed that, the distress occurs due to thalassemia major and its management as regular transfusions causing negative impact on an adolescent thalassemia survivor's physical and psychological health, independence, social relationships, personal beliefs, and overall quality of life, including interactions with their environment causing negative emotions, as distress.

Conclusion

It can be concluded that a large proportion of studied children exhibited altered physiological parameters such as increasing heart and respiratory rate, decreasing oxygen saturations and distress before blood transfusion.

Recommendations

Based on the findings of the current study, the following recommendations are suggested: Implementing of educational programs for children with beta thalassemia major undergoing blood transfusion to enhance their physiological parameters and distress and promoting better health outcomes.

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Empathy and Therapeutic Engagement among Psychiatric Mental Health Nurses

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Abstract

Background: Therapeutic engagement and competent humanistic care rely fundamentally on, and are facilitated by, clinical empathy. **Aim:** This study aimed to examine the association between empathy and therapeutic engagement among psychiatric mental health nurses. **Design:** A descriptive correlational research design was utilized. **Subjects:** A convenience sample of 111 psychiatric mental health nurses participated in the study. **Setting:** the study was conducted at Abbassia Hospital for Mental Health and Addiction Treatment. **Tools of data collection:** Socio-demographic data sheet, Empathy Assessment Scale, and Therapeutic Engagement questionnaire were used to collect data from nurses. **Results:** The findings revealed a high level of empathy among psychiatric nurses; however, their levels of therapeutic engagement highlighted a clear need for targeted attention. Empathy demonstrated a positive association with therapeutic engagement within the sample. Statistically significant positive correlations were observed between higher empathy scores, female gender, and greater professional experience. Therapeutic engagement was significantly correlated with both the age and experience of the nursing staff. **Conclusion:** Higher empathy was correlated with therapeutic engagement among psychiatric mental health nurses. **Recommendations:** Investigating the specific predictors of the empathetic therapeutic alliance will be critical to optimizing the quality of inpatient psychiatric care.

Keywords: Empathy, Therapeutic Engagement, Psychiatric Nurses

Introduction

In mental healthcare, the therapeutic relationship is a foundation of psychiatric nursing, initially defined by **Peplau (1988)** as a purposeful process directed at enhancing patients' mental wellbeing. This relationship centers on effective communication to understand patients' needs, support coping, and help problem-solving. Empathy is a vital competency in this process that is proven by theory and clinical evidences (**Moreno-Poyato, Rodríguez-Nogueira, Mirtcime, 2021**).

Empathy assists psychiatric nurses to comprehend and react to patients' feelings, playing a precarious role through all stages of the therapeutic relationship. It promotes trust in the orientation phase, helps engagement and shared decision-making in the working phase, and benefits evaluation in the termination phase (**Peplau, 1988; 1997; Forchuk et al., 1998; Reynolds & Scott, 1999**). It is also related to better patient outcomes, improved communication, and more family involvement in care (**Hsiao & Tsai, 2015**). Previous Researches has displayed that empathy impacts nurses' attitudes to mental illness, lessens burnout, and improves professional well-being and performance (**McAllister et al., 2019; Economou et al., 2019**).

In such specialty, clinicians' empathy is allied with better opportunities to

start positive therapeutic relationships with patients (**Priebe et al. 2019**). Empathy is defined as the capacity to be influenced by and share the emotional state of another, evaluate the reasons for the other's state, and identify with the other, accepting his or her perspective. It permits people to quickly and automatically relate to the emotional state of others (**De Waal, 2008**). Empathy develops through early childhood and is shaped by a series of factors, comprising genetics, temperament, environment (**Decety and Holvoet, 2021**).

Research shows that higher empathy levels amongst healthcare professionals are related to factors as higher education, female gender, older age, and more work experience (**Free, Swildens, Hoogendoorn, Beekman & van Meijel, 2025; Bogiatzaki et al., 2019; Moudatsou et al., 2020; Stanley, Mettilda Buvaneswari & Meenakshi, 2020**). However, in psychiatric health care settings, empathy may decline when nurses face challenging actions like violence or self-harm (**Salazar et al., 2023; Lindgren et al., 2021**). Also, difficulties in emotional regulation during empathic engagement can increase the possibility of compassion fatigue and burnout in mental health nurses (**Hunt, Denieffe & Gooney, 2017**).

Furthermore, empathy or the talent to understand and share the feelings of

another person, is also an important component of therapeutic engagement " TE" (**Atta, 2024**). The concept of therapeutic engagement encompasses several aspects, including building rapport, effective listening, and collaboration. TE, represents the process of building a collaborative and helpful relationship, it is a crucial aspect of psychiatric nursing (**Hartley, Raphael, Lovell& Berry, 2020**). TE in mental health nursing is characterized by active involvement of nurses, patients, and families in care, with emphasis on trust, respect, with a focus on recovery, enhancing coping abilities. Emphasizing a shared decision-making, and a partnership approach to achieve treatment and improve health outcomes (**Krist, Tong, Aycock & Longo, 2017; Hartley, Raphael, Lovell& Berry, 2020**).

Although there is no single definition of TE, it is frequently linked with concepts such as healing, empowerment. Robust therapeutic relationships are essential to patient-centered care and form an important role in refining clinical outcomes of patient experiences (**Chambers, et al. 2021**). In psychiatric nursing, effective engagement contains patient activation, which mirrors patients' knowledge, skills, and confidence in handling their health along a continuum from disengagement to self-advocacy. It depends on

communication, trust, and personalized interventions based on patient readiness, improved safety even with challenges as low participation and difficult behaviors (**Pelletier, 2015**). As well, engagement is focused on inspiring hope thru the interpersonal relationship with assessing the person's need for emotional and physical security, engagement is regarded from the patient's perspective (**Jiménez, Guillén-Guzmán, Oliva, Ballesteros-Urpi& Pardo-Hernandez, 2022**).

Moreover, nurses who engage therapeutically with patients are expected to understand their needs, fears, and goals, prepare more actual care planning and implementation. In Other words, therapeutic engagement is a dynamic process, requires nurses to be flexible, empathetic. By doing so, psychiatric nurses can be receptive to the changing needs of their patients, and can deliver care that is personalized to the unique patients' needs (**Khalil et al., 2026**). It is also influenced by the nurse's level of burnout and job satisfaction. Nurses who have high levels of burnout are less possible to engage therapeutically with patients, leading to diminished patient satisfaction and reduced health outcomes (**Behilak et al., 2024**).

Significance of the Study

Recent studies in mental health nursing indicate that when patients

perceive nurses as empathetic and passionately attuned, they tend to show higher levels of satisfaction, trust, and participation in their care. Additionally, nurses with effective communication skills are capable of identifying early signs of emotional distress and possible relapse (**Mesić, Vaûnost, njege, radu, sestara, 2020**). Conversely, poor communication is accompanied with patient isolation, deteriorating symptoms, lower treatment adherence, and greater coercive measures use, such as seclusion and restraint (**Moldawsky RJ et al, 2020; Khalil, Esawi, Abdelshakor & Abu Samra, 2026**). Alongside, therapeutic engagement assists nurses to detect primary signs of patient deterioration, leading to timely interventions, greater patient safety, reduced medical mistakes, and better clinical outcomes (**Curran et al., 2024**).

In Egypt, cultural and societal factors highlight the importance of these skills, as they influence the quality of the nurse patient relationship (**El-Ashry et al., 2023**). Additionally, numerous workplace challenges as persistent exposure to stress, time restraints, and healthcare system burdens can negatively influence empathy and lead to burnout, with 30–40% of nurses worldwide experiencing symptoms as emotional fatigue and depersonalization (**Román-Sánchez et al., 2022**).

Evidence also shows that absence of empathy may contribute to unmet patient needs and worse care practices (**Johansson & Wiklund-Gustin, 2016; Anandan, Cross & Olasoji, 2024**).

Empathy in mental health care, has been known as a protective factor against burnout, while therapeutic engagement is related to improved job satisfaction (**El-Ashry et al., 2023**). Accordingly, enhancing empathy through education and practical training is a key for improving the quality of care (**Hamed et al., 2025; Şen Olgay & Uğur, 2025**). As well as, considering organizational support promotes a culture of compassion (**Curran et al., 2024**). Finally, this study aims to examine the relationship between empathy and therapeutic engagement among psychiatric nurses, contributing to improved relational competence and overall quality of psychiatric healthcare.

Research Purpose

This study aims to examine the association between empathy and therapeutic engagement among psychiatric mental health nurses.

Research Question/s

What are the levels of empathy and therapeutic engagement among psychiatric mental health nurses?

Is there a correlation between empathy and therapeutic engagement among psychiatric mental health nurses?

Subjects

A convenience sample of (111) psychiatric mental health nurses was selected for participation in the current study. Nurses were recruited according to the following criteria: Psychiatric mental health nurses aged 18-60 years old, male and female nurses, have at least 2 years of experience in psychiatric nursing field, nurses working in inpatient psychiatric units, and who accept to participate in the study. The sample size was calculated using G power 3.1.9.4, the sample size was found to be 100. This sample size is associated with power 0.95 with effect size=0.33 and margin of error 0.05 (Figure 1).

Note: the researchers increase the number of recruited nurses to 111 nurses to overcome any missed responses.

Research Design

The descriptive correlational research design was employed in this study.

Setting

This study was conducted at Al-Abbasia Mental Health and Addiction Treatment Hospital

Tools of Data Collection

Data of the current study was collected using three tools which are;

Tool (1): Socio-demographic Data Sheet [Appendix I] [developed by the researchers].

This tool includes data about nurses' age, gender, educational

qualifications, and years of experience.

Tool (2): Empathy Assessment Scale (EAS) [Appendix II] [Malakcioglu, 2022].

This scale was Developed by Mac Malakcioglu (2022), the Empathy Assessment Scale (EAS) is a 13-item instrument designed to evaluate an individual's empathy levels across three distinct dimensions: Social Interaction, Cognitive Behavior, and Emotional Identification. The scale contains no reverse-scored items. Responses are rated on a 5-point Likert scale, ranging from 1 (Never) to 5 (Always). Subscale scores are determined by grouping specific items: Social Interaction (Items 1, 4, 10, and 12), Cognitive Behavior (Items 2, 5, 6, 8, and 11), and Emotional Identification (Items 3, 7, 9, and 13). A total empathy score is calculated by summing all 13 items, with higher scores reflecting greater levels of empathy.

The scale demonstrated strong psychometric properties. Test-retest reliability (r) evaluated over a four-week interval exceeded 0.60 across all subscales, remaining statistically significant at the $p < 0.01$ level. Internal consistency was robust, with a Cronbach's alpha of 0.845 for the total 13-item Empathy Assessment Scale (EAS). For the subscales, alpha coefficients were 0.696 for Social Interaction (4 items), 0.802 for Cognitive Behavior (5 items), and

0.964 for Emotional Identification (4 items). Additionally, concurrent validity was supported by a significant positive Pearson correlation ($r = 0.467$, $p < 0.001$).

The EAS was translated into Arabic and back-translated into English to verify linguistic accuracy. A panel of three psychiatric and mental health nursing experts evaluated the Arabic version for content validity. The resulting scale demonstrated strong internal consistency, with a Cronbach's alpha of 0.86.

Tool (3): Therapeutic Engagement Questionnaire (TEQ) (Registered Mental Health Nurse Version) [Appendix III] [Chambers et al., 2019].

The Therapeutic Engagement Questionnaire (TEQ) is available in two versions: The Service User (SU) version and the Registered Mental Health Nurse (RMHN) version. The current study utilized the RMHN version to evaluate the therapeutic engagement of psychiatric mental health nurses within inpatient psychiatric units, emphasizing their critical role in supporting patient recovery. The TEQ evaluates engagement across two distinct contexts. The instrument comprises 20 items and utilizes a 4-point response format (Strongly Disagree, Disagree, Agree, and Strongly Agree).

Higher cumulative scores indicate greater therapeutic engagement. To

ensure data integrity, any item with missing or multiple responses must be excluded from analysis.

Scoring is calculated by assigning weighted values to responses: Strongly Agree (multiplied by 4), Agree (multiplied by 3), Disagree (multiplied by 2), and Strongly Disagree (multiplied by 1). Individual scores are aggregated to derive an overall total score, which can be averaged across valid completed questionnaires. Total scores are categorized using a tricolor threshold system to determine clinical action: scores between 20 and 35 indicate critical performance requiring immediate action (Red); scores from 36 to 63 signify areas requiring targeted attention (Amber); and scores from 64 to 80 represent optimal, positive engagement (Green). Additionally, items receiving a high frequency of "Strongly Disagree" responses are isolated to identify specific systemic areas requiring quality improvement.

Psychometric evaluation of the TEQ-RMHN version shows high inter-scale correlations (0.57–0.90 RMHN), sound sub-scale internal consistency (> 0.95), concurrent validity (> 0.60) and adequate score variability. In summary, the TEQ behaves well as a measurement tool. The Arabic version of TEQ was translated by the investigators from English language to Arabic and vice versa to ensure accuracy. The Arabic

version was revised by a panel of (three) experts in psychiatric and mental health nursing to ensure content validity. Cronbach's alpha of the Arabic version was at acceptable level (0.84).

Ethical Considerations

Institutional approval was sought from the Research Ethics Committee of the Faculty of Nursing at Cairo University following a feasibility assessment of the study and its measurement instruments. Additionally, administrative permission was secured from the directors of Abbassia Hospital for Mental Health and Addiction Treatment. Prior to enrollment, written informed consent was obtained from all participants. They were received a comprehensive briefing regarding the purpose, nature, and scope of the study. Participants were explicitly assured of their confidentiality and anonymity, which was maintained through the use of unique numerical codes rather than identifying information. Finally, they were informed that participation is entirely voluntary, carries no inherent risks or harm, and that they retain the right to withdraw from the study at any point without penalty or consequence.

Procedure

A comprehensive literature review was conducted using textbooks, peer-reviewed journals, and electronic databases to establish a theoretical

foundation and identify appropriate data collection tools. To ensure cross-cultural accuracy, the selected instruments were translated into Arabic by the investigators and reviewed by subject-matter experts. Following ethical approval from the Research Ethics Committee at the Faculty of Nursing, Cairo University, official permission letters was sent to the hospital administrators to secure approval for the study. The study's aims, protocols, and procedures were thoroughly discussed with the directors of the selected setting.

Upon receiving administrative approval, the investigators had identified eligible participants based on the inclusion criteria. Prior to data collection, the research aim and nature of the study were explained to all prospective participants. Data collection took place in the hospital during dedicated sessions lasting 20 to 30 minutes. The nurses were self-administered the questionnaire packet comprising the socio-demographic data sheet, Empathy Assessment Scale, and Therapeutic Engagement Questionnaire, while the investigators remain present to answer any questions or provide clarification.

Statistical Design

Data were statistically analyzed using the Statistical Package for the Social Sciences (SPSS), version 22.0. Descriptive statistics were computed to summarize the sample characteristics, with categorical

variables expressed as frequencies and percentages, and continuous variables presented as means and standard deviations ($M \pm SD$). To evaluate the relationships between continuous variables, Pearson correlation coefficient (r) tests were performed. For all statistical tests, the threshold for statistical significance was set at $p < 0.05$, with $p < 0.01$ considered highly significant.

Results

Table (1) describes the sample in relation to their socio-demographic characteristics. Slightly more than half (58.6%) of studied nurses were females. And also more than one third of them (43.2%) of them aged from 23 to 40 years old, with mean age (33.78 ± 11.75). Concerning their educational level, more than half of studied nurses (58.6%) had graduated from the technical institute of nursing. Regarding their experience in the psychiatric nursing field, about one quadrant (25.2%) of them had more than 20 years of experience as psychiatric mental health nurses with the mean of experience years = (11.6 ± 8.8).

Table (2) reports that the overall empathy score among nurses was high (mean percent score=78.76%). Moreover, the scores of empathy domains, as the “cognitive behavior” component of empathy among nurses occupied a high level with mean percent score (82.97%), while “social interaction” and “emotional

identification” were at moderate levels with mean percent scores (73.48) and (68.92), respectively.

Table (3) clarifies levels of empathy among nurses, more than one half (54.1%) of nurses had high empathy level compared to (45.9%) of them had a moderate level of empathy.

Table (4.a) clarifies the therapeutic engagement strategies used by studied nurses, “preserving dignity of the patient” was the most selected strategy used by nurses (mean= 3.55 ± 0.52). High response rates were given to “supporting patient all the time” (mean= 3.45 ± 0.55), “show the patient respect all the time (3.42 ± 0.64), “encourage patients to express themselves” (mean= 3.38 ± 0.54), and “communicate with the patient in honest and clear manner” (mean= 3.24 ± 0.62). While minimal nurses’ agreement scored in items as “supporting the patient to take care risks out of their comfort zone” (mean= 2.28 ± 0.88), “accept that patients should have control over their care plans” (mean= 2.34 ± 0.88), and “use appropriate verbal and non-verbal communication” (mean= 2.82 ± 0.85).

Table (4.b) reveals that among the most frequently used strategies by psychiatric nurses were “behave in a professional manner” (mean= 3.38 ± 0.60), “respect the time and personal space of the patient” (mean= 3.38 ± 0.51), “ensure that the

care plan of the patient is coordinated” (mean= 3.30 ± 0.53), “working in partnership with patients to achieve their goals” (mean= 3.22 ± 0.61), “work with patients to plan their care in advance of being unwell” (mean= 3.23 ± 0.49), and “supporting choices that the patient make” (mean= 3.07 ± 0.67).

Table (5) demonstrates that the total mean score of therapeutic engagement among studied psychiatric nurses was (63.07) which indicate that their therapeutic engagement is in need for attention for further improvement interventions.

Table (6) clarifies that therapeutic engagement strategies that least used by psychiatric nurses are “accept that patients should have control over their care plans” (19.2%) followed by, “supporting the patient to take deliberate risks and step out of their care comfort zone” (18.9%), and “use appropriate verbal and non-verbal communication with the patient” (9%).

Table (7) demonstrates positive high statistical correlations between total scores of empathy and therapeutic engagement among nurse at (p-value) = (0.001). Additionally, there were positive statistical correlations between subscales of empathy (cognitive behavior & emotional identification) at (p-value) = (0.03) and (0.02), respectively. Moreover,

a high statistical correlation was found between “social interaction” domain of empathy and therapeutic engagement among nurses at (p-value) = (0.005).

Table (8) reveals that there are positive high statistical correlations between therapeutic engagement among studied nurses and their age at (p-value) = (0.004). Also there is a significant statistical correlation between therapeutic engagement and years of experience of nurses at (p-value) = (0.01). Concerning to empathy, the same table reveals that there were high significant statistical correlations between empathy among nurses and their experience and female gender at (p-value) = (0.00), for both.

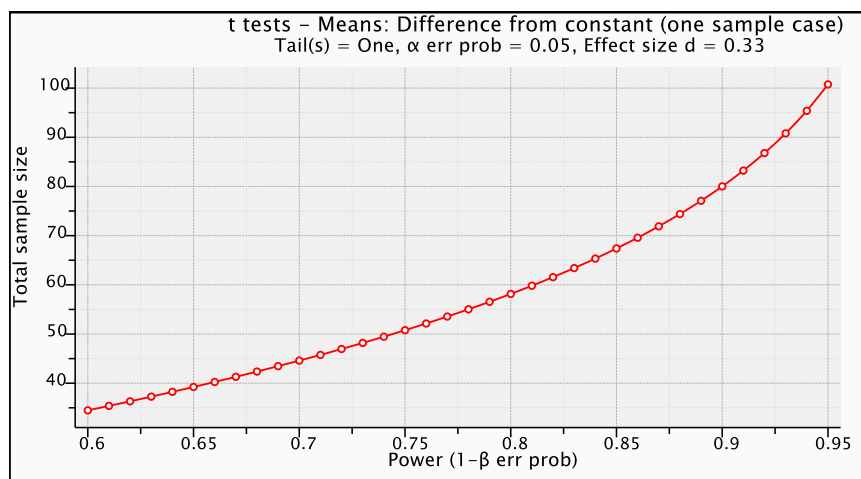


Figure (1): Sample Size Calculation Using G-power

Table (1): Socio-demographic Data of Studied Nurses (n=111).

Demographic data	No.	%
Gender		
Male	46	41.4
Female	65	58.6
Age		
18-<23	28	25.2
23-<40	48	43.2
40-60	35	31.5
Mean= 33.78±11.75		
Educational Level		
Diploma	34	30.6
Institute	65	58.6
Bachelor	10	9.0
Post graduate	2	1.8
Clinical Experience		
2-<5	46	41.4
5-<10	16	14.4
10-<20	21	18.9
	Mean=11.6 ±8.8	

Table (2): Empathy Domains among Studied Nurses (n=111).

Domains	Minimum	Maximum	Mean± sd	Mean percent	Scoring
Social interaction	5	16	11.76± 2.08	73.48	Moderate
Cognitive behavior	12	20	16.59± 2.05	82.97	High
Emotional identification	4	16	11.03± 2.90	68.92	Moderate
Total	27	50	39.38± 5.12	78.76	High

Table (3): Levels of Empathy among Studied Nurses (n=111).

Level of empathy	No.	%
Low	0	0.0
Moderate	51	45.9
High	60	54.1

>75% High (50-75) % Moderate <50% low

Table (4.a): Therapeutic Engagement Items among Studied Nurses (n=111).

Items	Strongly disagree %	Disagree %	Agree %	Strongly agree %	Mean± Sd
1. I show the service user (SU) respect at all times	1.8	2.7	46.8	48.6	3.42±0.64
2. I give the SU support at all times	0.0	2.7	49.5	47.7	3.45±0.55
3. I preserve the dignity of the SU in my care	0.0	0.9	43.2	55.9	3.55±0.52
4. accept the SU for who they are	0.9	13.5	49.5	36.0	3.21±0.70
5. I accept that the SU should have control over their care plan.	16.2	44.1	28.8	10.8	2.34±0.88
6. I encourage the SU to express themselves	0.0	2.7	56.8	40.5	3.38±0.54
7. I communicate with the SU in an open, honest and clear manner	1.8	4.5	61.3	32.4	3.24±0.62
8. I use appropriate verbal as well as non-verbal communication with the SU	9.0	19.8	51.4	19.8	2.82±0.85
9. I encourage the SU to be optimistic about their future	2.7	3.6	60.4	33.3	3.24±0.65
10. I support the SU when they take deliberate and planned care risks and step out of their care comfort zone	18.9	43.2	28.8	9.0	2.28±0.88

Table (4.b): Therapeutic Engagement Items among Studied Nurses (n=111).

Items	Strongly disagree %	Disagree %	Agree %	Strongly agree %	Mean±sd
11. I give the SU the confidence to create practical and realistic care plans	3.6	3.6	66.7	26.1	3.15±0.65
12. I work in partnership with the SU to achieve their goals	1.8	4.5	64.0	29.7	3.22±0.61
13. I ensure that the care plan of the SU is coordinated	0.9	0.9	65.8	32.4	3.30±0.53
14. I behave in a professional manner	1.8	0.9	55.0	42.3	3.38±0.60
15. I respect the time and personal space of the SU and make them feel at ease	0.0	0.9	60.4	38.7	3.38±0.51
16. I care about the feelings, issues and fears of the SU and respond appropriately	0.9	6.3	64.0	28.8	3.21±0.59
17. I have caring relationships with the SU	1.8	9.0	69.4	19.8	3.07±0.60
18. I support the choices that the SU makes	0.9	16.2	57.7	25.2	3.07±0.67
19. I work with the SU to plan their care in advance of them being unwell	0.0	2.7	71.2	26.1	3.23±0.49
20. I respect the life plans of the SU	3.6	4.5	67.6	24.3	3.13±0.65

Table (5): Total Score of Therapeutic Engagement among Studied Nurses (n=111).

Therapeutic engagement score					
Minimum	Maximum	Mean score	Standard deviation	Mean percent score	Scoring
42.00	80.00	63.07	7.34	78.7	Need for attention

Table (6): Therapeutic Engagement Items with Least Agreement among Studied Nurses (n=111).

Items	Frequency of strongly disagree	%
I accept that the SU should have control over their care plan	18	16.2
I use appropriate verbal as well as non-verbal communication with the SU	10	9
I support the SU when they take deliberate and planned care risks and step out of their care comfort zone	21	18.9

Table (7): Correlation between Empathy and Therapeutic Engagement among Studied Nurses (n=111).

Empathy	Therapeutic engagement	
	R	P
Social interaction	0.26	0.005**
Cognitive behavior	0.20	0.03*
Emotional identification	0.20	0.02*
Total	0.30	0.001**

*significant at p-value<0.05 **highly significant at p-value<0.01

Table (8): Correlation between Socio-demographic Data & Studied Variables (Empathy and Therapeutic Engagement) among Studied Nurses (n=111).

Demographic data	Therapeutic engagement		Empathy	
	R	P	R	P
Age	0.27	0.004**	0.11	0.24
Education	0.03	0.74	0.03	0.7
Experience	0.23	0.01*	0.25	0.00**
Gender(female)	T=1.7	0.08	T=3.7	0.00**

*significant at p-value<0.05

**highly significant at p-value<0.01

Discussion

This study aimed to evaluate the association between empathy and therapeutic engagement among psychiatric mental health nurses. The

finding of this study reveals a high level of empathy among psychiatric mental health nurses with varied levels of its domains (high level of cognitive behavior and moderate

levels for social interaction and emotional identification domains). **Dou et al (2026)** presented similar results as they found that providing competent and humanistic care for psychiatric patients is based mainly on the nurses' capabilities to recognize patient's feelings and understand his concerns and needs in addition to his/her ability to be patient. In the same vein, **Kirhmajer & Grah (2026)** studied empathy and psychological capital among nurses in psychiatric care units and found moderate level of empathy among nurses and high level of psychological capital. Current study finding is also matched with the analysis of **Free, Swildens, Hoogendoorn, Beek man, and Meijel (2025)** which showed that mental health nurses had higher levels of empathy and mentallizing. Additionally, these results are supported by the lived experiences of psychiatric nurses who expressed the main themes for providing compassionate care for psychiatric patients as; being sensitive to patients' feelings of psychological pain and suffering, listening attentively to the patient to understand his feelings and needs, being available and offering the self and responding to patient's needs in a timely manner, employing a non-judgmental attitude, avoid aggressive behaviors, provide support and encourage that patient to express his

feelings, and keeping trust all the time (**Saribudak, Usta, and Kalyoncu, 2026**).

Present results demonstrated that the total mean score of therapeutic engagement among studied psychiatric nurses indicated that their therapeutic engagement is in need for attention and require further improvement interventions. Therapeutic engagement strategies most frequently used by nurses were "preserving dignity of the patient", "supporting patient all the time", "show the patient respect all the time", "encourage patients to express themselves", and "communicate with the patient in honest and clear manner". Nurses also scored highly in items as; "behave in a professional manner", "respect the time and personal space of the patient", "ensure that the care plan of the patient is coordinated", "working in partnership with patients to achieve their goals", "work with patients to plan their care in advance of being unwell", and "supporting choices that the patient make".

These results are aligned with research of **Curran, Gannon, Rivera, Li, and Fitzpatrick (2025)** which ranked participatory goal formulation with patient as the highest scored facilitator of therapeutic relationship choosed by psychiatric nurses. Additionally, how mutual trust underpins effective therapeutic alliances, patient-focused

therapeutic approaches, and participatory choice making was rated highly by nurses as the most important facilitators of therapeutic engagement with patients. In the same line, **Askoia et al. (2024)** explored the Finnish nurses' experience of therapeutic engagement in acute mental health services and revealed that studied nurses had high scores in their ability to respect patients' dignity, encourage them to be optimistic, treat them in a professional manner, and paying attention and caring behavior regarding their feelings and concerns. Within this domain, **Missouridou et al. (2021)** analyzed experiences of nurses working in psychiatric care units as nurses refers to supporting independency in patients as a main core of the collaborative relationship . According to nurses' experiences, recovery process is based on collaboration with patients to teach them how to take responsibility about themselves, listening effectively to them to identify their concerns and needs, and teaching them adaptive skills. The role of socialization and contacting others is important in recovery process. Nurses emphasized importance of trusting therapeutic relationship which empowers the patient and helps in protecting their dignity. Limit sitting was a main theme expressed by nurses as it can be pursued by nurses without being aggressive, it helps patients to

understands and follow the ethical instructions of the society after discharge. This main theme is matched with analysis of **Moreno-poyato & Rodrigues-Nogueira (2021)**, where nurses emphasized that "While forming a strong bond with patients is essential, clinicians must not overlook collaborative decision-making. Agreeing mutually on goals and tasks is vital for fostering therapeutic commitment in mental health units."

These findings also are supported by **Mc Allister, Robert, tsianakas, and McCrae (2019)** who conducted a systematic review research of (37 article) study to identify the main principles of the nurse-patient therapeutic engagement and found that understanding the real experience of the patient is a main core of the relationship which achieved through acknowledging the patient's lived experience and his own perceived reality as the nurse should seek clarification from the patient to validate her understanding of the patient's speech, feelings, and actions. Nurses also use active listening approach to identify the patient's needs and feelings.

Moreover, **Mc Allister et al. (2019)** explored collaborative care as one of the corner stones of therapeutic relationship; nurses must work to facilitate patient's growth through promoting independency in all of interactions with their patients,

nurses also must protect patients decisions about their care or life situations, teach patients new skills and give feed-back to help them modify their maladaptive behaviors to facilitate their discharge process and further for easy successful engagement with community. Nurses' verbal and non-verbal communication techniques act as a model to be imitated by patients as nurses must maintain a calm voice, non-threatening relaxed body language, good eye contact, responding to patients' concerns in a timely manner and providing caring acts even through just physical presence with the patient.

Additionally, the art of using the self was reported by **Mc Allister et al. (2019)** as the nurse should activate the human being part in her personality in combination with the professional part. Nurse should be with the patient rather than looking for him. Nurses' awareness of their vulnerabilities make her more competent in caring for their patients. Engagement in therapeutic relationship require nurses to adapt their caring approach for the patient as each patient has specific problems and needs that differ from the other so each patient should have an individualized management plan tailored by the nurse.

Current study findings clarify therapeutic engagement strategies that least used by psychiatric nurses

were “supporting the patient to take deliberate risks”, and “accept that patients should have control over their care plans”. **Askoia et al (2024)** found similar results as nurses had lowest estimations on accepting that patients should have control over their care, help the patient to go out their comfort zone and take care risks. This finding also matched with results of **Mc Allister et al. (2019)** who discussed the importance of using control and limit sitting as an essential tool in psychiatric nursing practice as making control on the patient's behaviors may be done by emotional containment or sometimes by force. Nurses may use restraints to protect patients' physical safety and make control on their aggressive acts especially in emergency situations.

Current findings demonstrated positive strong statistical correlations between total scores of empathy and its domains (cognitive, emotional, social) with therapeutic engagement among nurses. These findings are matched with **Mc Allister et al. (2019)** who referred to empathy and connectedness with patients as a factor that determines the strength and effectiveness of therapeutic engagement. This result is similar to study of **Mukaihata, Fujimoto, & Greiner (2020)** which indicated that higher work engagement is positively correlated with nurses' empathy with patients. Moreover, empathy is recognized as a cornerstone for

cultivating profound interpersonal relationships between psychiatric nurses and those in their care **(Delany, Shattell, & Johnson, 2017)**. This is matched with study of **Perez-Fuentes, Molero Jurado, Gazquez Linares, & Oropesa Ruiz (2018)** which demonstrated that higher emotional intelligence in nurses strongly correlates with increased work engagement, which driven primarily by empathy and interpersonal skills."

This result accords with a similar study of the association between different aspects of empathy and therapeutic relationship with its components. Results revealed strong association between both constructs; as the cognitive component of empathy in which the psychiatric nurse able to understand patient's perspectives and see the situations from his point of view showed strong positive association with therapeutic relationship; when the nurse was able to understand the patient's concerns and understand his feeling and point of view, she became able to establish a strong bond with the patient. Also, results showed strong association between therapeutic relationship and other components of empathy as fantasy and compassion response except for the dimension of personal distress, there is a negative correlation. Regarding the components of therapeutic relationship, significant association

was explored between empathy and agreement on therapeutic goals between the nurse and patient, level of agreement on tasks, and bonding **(Moreno-poyato & Rodrigues-Nogueira, 2021)**. Utilizing a participatory action research (PAR) framework, **Moreno-Poyato et al. (2021)** successfully enhanced therapeutic relationship practices, yielding highly favorable outcomes. Most notably, their intervention correlated with a significant fostering in nursing empathy alongside a corresponding reduction in occupational distress. Overall, the main theme expressing this relationship is that "Therapeutic engagement and competent humanistic care relies fundamentally on and facilitated by empathy." **(Morera, Lima, Ferreira, and Fernandes, 2026; Dou et al, 2026)**.

Evidence from the present study suggests that there were positive statistical correlations between therapeutic engagement among studied nurses and their age and years of experience. This result is consistent with **Curran et al (2025)** who indicated that nurses who are older in age ranked highly than younger nurses in domains of therapeutic relationship as "participatory goal setting, and importance of being clinically supervised". Moreover, higher years of experience in psychiatric nursing field were associated strongly with

the main facilitators of therapeutic relationship ; understanding of the therapeutic relationship serves as the foundational cornerstone for all nursing interventions, emphasizing the importance of patient individualized designed interventions, supporting nurses' skills in identifying and reacting to patient's feelings and concerns in an empathetic way, in addition to nurses' capacity to be self-aware and ability for intrapersonal development. In the same line, **Dou et al (2026)** indicated that senior nurses are more competent in delivery of humanistic care to their patients. This finding is also consistent with other researches where age was positively associated with high levels of clinical experience, professionalism, and nurses' perceived competence (**Leal-Costa et al, 2020; Chen et al, 2023; & Miao et al, 2025**).

Concerning to empathy, there were high significant statistical correlations between empathy among nurses and their years of experience, and female gender at (p-value) = (0.00) for both. Similar results revealed a strong association between higher levels of empathy in female nurses compared to males at (p 0.0001), and also females had significant statistical correlations with subscales of empathy; cognitive empathy (p=0.03), emotional empathy (p .001), and social skills (p=0.02). Similarly, **Dou et al (2026)**

classified female nurses in the higher humanistic care group which strongly associated with female nurses' ability to practice emotionally than males as expected from their social roles.

Findings of **Moreno-poyato & Rodrigues-Nogueira (2021)** indicated that a nurse's experience and specialized mental health training are factors that significantly shape empathy and the therapeutic relationship. Findings are mixed on how work experience affects empathy in nursing. Some data suggests empathy increases over time, specifically noting this upward trend in oncology nurses as well as mental health nurses with general or specialized backgrounds (**Roman-Sanchez et al, 2022; Talenghani, ashouri, Saburi, 2017**). In contrast, some researchers found no significant link as **Kirhmajer & Grah (2026)** argued that "Rather than being a linear function of tenure, empathy is a dynamic trait heavily influenced by workload, organizational climate, interpersonal stressors, and emotional demands. Taken together, these systemic variables explain why their findings failed to support the hypothesis that more psychiatric experience would yield higher empathy scores." This rationalization was supported by **Ghadi, Ashouri, Soheila, sahragred (2020)** research shows that high stress and heavy workloads erode empathy across clinical environments. Notably,

however, psychiatric nurses still tend to exhibit greater empathy than intensive care or emergency department nurses."

Conclusion

This study examined the association between empathy and therapeutic engagement among psychiatric mental health nurses. Nurses' level of empathy was high and their therapeutic engagement indicated a need for attention. Empathy was strongly associated with therapeutic engagement among psychiatric nurses. Statistical positive correlations were found between empathy and female gender and years of nurses' experience. Also, therapeutic engagement was correlated with nurses' age and experience. Moving forward, examining the predictors of a strong therapeutic alliance will be critical to optimizing the quality of inpatient psychiatric care.

Recommendations

- It is essential for nursing education programs to equip mental health nurses with enhanced empathy skills, especially when navigating complex patient dynamics.
- Professional development for mental health nurses must place greater emphasis on the intersection of gender and work environments.
- Continuous training and personal growth programs are essential for helping psychiatric nurses develop stronger empathetic skills."

-Improvement intervention programs should be designed to improve the deficit areas in psychiatric nurses' therapeutic engagement.

- Future research on Predictors of the therapeutic relationship to enhance quality of care in psychiatric inpatient units.

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Relation between Workplace Bullying Behaviors and Intensive Care Nurses' Well-Being

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Abstract

Background: Workplace bullying is a significant occupational concern in healthcare organizations and has serious consequences for nurses' wellbeing. Nurses frequently encounter negative behaviors such as verbal abuse, intimidation, social exclusion, and work-related harassment, which may adversely affect their life, workplace, and psychological wellbeing. **Aim:** Assess the relation between workplace bullying behaviors and intensive care nurses wellbeing. **Research design:** A descriptive correlation design was utilized to conduct this study. **Setting:** The study was conducted at Tanta International Teaching Hospital in Intensive Care Units. **Subjects:** The study subjects consisted of all intensive care nurses (N= 489). **Tools:** Tool (I) Workplace bullying behaviors questionnaire and tool (II): Intensive care nurses' perception regarding wellbeing structured questionnaire. **Results:** Less than half (48.1%) of the nurses exposed to moderate level of bullying behaviors at workplace and above half (51.1 %) of the nurses had a moderate perception level of wellbeing. **Conclusion:** There was a negative statistically significant correlation found between overall workplace bullying behaviors and nurses' wellbeing. **Recommendation:** Hospital management implements and enforces zero-tolerance policies toward workplace bullying, supported by strict monitoring and accountability systems. Develop confidential and accessible reporting mechanisms to ensure nurses feel safe reporting bullying incidents without fear of retaliation.

Keywords: Intensive care nurses' wellbeing, Workplace bullying behaviors.

Introduction

Nursing constitutes a fundamental profession within the healthcare sector, providing comprehensive care to individuals, families, and communities with the overarching aim of sustaining or restoring optimal health outcomes. The nursing role extends beyond direct patient care to encompass health promotion, illness prevention, and the management of individuals experiencing acute or chronic conditions or functional limitations. Moreover, contemporary nursing practice involves patient advocacy, the maintenance of safe clinical environments, engagement in research, and active involvement in shaping health policy and organizational decision-making **(Maymoun & Sohail, 2020)**. Intensive care nurses play a pivotal role in delivering complex, life-sustaining care to critically ill patients, requiring advanced clinical expertise, constant vigilance, and rapid decision-making. While the intensive care units (ICUs) environment is designed to support critically ill patients, it often places substantial psychological, physical, and emotional demands on nurses. These demands may significantly affect nurses' wellbeing, job performance, and long-term professional sustainability **(Azemian, Ebadi & Afshar, 2021)**.

Intensive care nurses are particularly vulnerable to workplace bullying due

to continuous exposure to high-pressure situations and frequent ethical dilemmas. In addition to exposure to workplace bullying exerts profound and multifaceted adverse effects on intensive care nurses, extending across psychological, physical, social, professional, and organizational levels **(Einarsen, Hoel, & Cooper, 2020)**.

Workplace bullying is a multifaceted occupational problem characterized by repeated exposure to negative acts, such as harassment, intimidation, and social exclusion, over a prolonged period. It is widely recognized as a form of psychosocial hazard that arises from power imbalances and ineffective workplace dynamics. Moreover, workplace bullying has been increasingly recognized as a pervasive stressor in intensive care units, where high patient acuity, complex clinical demands, and hierarchical organizational structures create conditions conducive to negative interpersonal behaviors **(Tye-Williams, Carbo, D'Cruz, Hollis, Keashly, & Mattice, 2020)**.

Workplace bullying encompasses repeated behaviors that harass, offend, socially isolate, or undermine nurse's professional performance **(Nielsen et al., 2020)**. The consequences extend beyond personal distress, resulting in increased absenteeism, decreased productivity, lower job satisfaction, and diminished morale, thereby

affecting overall organizational functioning (**Mikkelsen, Hansen, Persson, Byrgesen & Høgh, 2020**). Also, workplace bullying is multidimensional and categorized into personal bullying, work-related bullying, and physically intimidating bullying. Personal bullying involves repetitive, intentional actions aimed at causing psychological or emotional harm affect nurses and may occur through physical, verbal, or psychological means, either directly or via digital platforms (**Tye-Williams et al., 2020**).

Furthermore, work-related bullying targets nurses' professional responsibilities and may include excessive monitoring, unjustified criticism, or obstruction of work tasks and physically intimidating bullying comprises behaviors physical acts or verbal threats that induce fear or a sense of physical danger in the targeted nurses (**Cregan & Kelloway, 2021**). Collectively, these forms of bullying disrupt nurses' professional relationships, compromise psychological safety, and negatively affect both the quality of patient care and the overall performance of healthcare organizations. Workplace bullying poses a serious threat to nurses' health and wellbeing, which has significant implications for healthcare organizations (**Farley, Mokhtar, & Niven, 2023**).

Furthermore, supporting nurses' wellbeing is essential for developing a resilient and capable nursing workforce that can meet future healthcare demands. Workplace safety and health are integral to overall wellbeing, and fostering a supportive work environment enhances staff satisfaction, engagement, and organizational success. Also, nurses' wellbeing is broadly conceptualized across three dimensions: life wellbeing, workplace wellbeing, and psychological wellbeing. Life wellbeing refers to nurses overall satisfaction with life, reflecting a fulfilling and desirable state of personal existence (**Jarden, Sandham, Siegert & Koziol-McLain, 2023**).

Moreover, workplace wellbeing focuses on creating conditions that promote higher performance, organizational effectiveness, and a safe, satisfying, and healthy professional environment. Psychological wellbeing is critical for affective commitment and job performance, as nurses with higher psychological wellbeing exhibit stronger dedication to their work and organization, leading to improved professional performance (**Delgado, Roche, Fethney & Foster, 2021**).

Nurses' wellbeing is a multidimensional construct encompassing physical health, psychological stability, job satisfaction, and overall quality of life.

Wellbeing influenced by social, organizational, and environmental factors, poor wellbeing among nurses can lead to reduced efficiency, lower quality of care, and diminished organizational outcomes. While promoting nurses' wellbeing enhances their professional performance, fosters job satisfaction, and strengthens the operational effectiveness of healthcare organizations (Almeida, Figueiredo & Lucas, 2024).

Significance of the study

Workplace bullying is a pervasive issue in nursing environments, particularly in high-stress settings such as intensive care units, and it has been consistently linked to adverse psychological outcomes, including anxiety, depression, emotional exhaustion, and burnout. Recognizing this relationship helps to highlight how negative workplace behaviors directly compromise nurses' life, workplace, and psychological wellbeing (Galanis, Moisoglou, Katsiroumpa, & Mastrogianni, 2024). Furthermore, nurses' wellbeing is closely associated with the quality and safety of patient care. Poor wellbeing resulting from bullying can lead to decreased concentration, increased risk of errors, reduced job satisfaction, and higher absenteeism and turnover rates. Therefore, exploring this relationship provides critical evidence for healthcare administrators to implement effective interventions aimed at

promoting a safe and supportive work environment (Farley, Mokhtar & Niven, 2023).

Aim of the study

Assess relation between workplace bullying behaviors and intensive care nurses wellbeing.

Research Questions

- What are the levels of workplace bullying behaviors among intensive care nurses?
- What are the levels of nurse's wellbeing in intensive care?
- What is relationship between workplace bullying behaviors and intensive care nurses wellbeing?

Subjects and Method

Research design:

A descriptive-correlational research design was used in the present study

Study setting:

The study will be done at all intensive care units in Tanta Main University Hospital, which is affiliated to Ministry of higher education and scientific research, including Neurology, Cardiology, Pediatric, Medical, and Oncology Intensive care units.

The subjects:

The study subjects consisted of all intensive care nurses (N= 489), who are working in the previously mentioned settings and available at the time of data collection.

Tools of data collection:

The data of the study was collected using the following two tools:

Tool (I): The Workplace Bullying Behaviors Questionnaire.

It consisted of two parts:

Part (1): Personal and work-related characteristics of nurses:

It included age, sex, marital status, educational qualifications, position, department and years of experiences.

Part (2): Intensive care nurses' perception regarding workplace bullying behaviors.

This part included 22 items divided into the following three dimensions:

-**Personal bullying** included 11 items.

-**Workplace bullying** included 8 items.

-**Physical intimidating bullying** included 3 items.

Scoring system:

Intensive care nurses' responses were measured on five- points of Likert Scale ranging from (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree. The total score categorized according to cut-off point and summing score of all categories.

-High level of workplace bullying $\geq 70\%$.

-Moderate level workplace bullying 50 % -< 70%.

-Low level of workplace bullying < 50%.

Tool (II): Intensive Care Nurses Perception Regarding Wellbeing Structured Questionnaire:

This part included 18 items divided into the following three dimensions:

-**Life wellbeing** included 6 items.

- **Workplace wellbeing** included 6 items.

- **Psychological wellbeing** included 6 itmes.

Scoring system:

Intensive care nurses' responses were measured on a 5-points Likert Scale ranging from (1) = strongly disagree, (2) = disagree, (3) = neutral, (4) =agree, (5) = strongly agree. The total score will be categorized according to cut-off point and summing score of all categories.

-High level of nurses' wellbeing $\geq 75\%$.

-Moderate level of nurses' wellbeing 60 %- 75%.

-Low level of nurses' wellbeing < 60%.

Methods:

1. Official permission was obtained from the Dean of Nursing Faculty at Tanta University and the authoritative personnel that submitted to the previously mentioned setting to obtain their permission to conduct the study.

2. Ethical considerations:

-Approval from Scientific Research and Ethical Committee at Faculty of Nursing was obtained with code number 462-5-2024.

-The researcher introduced herself to the participant, a full explanation of the aim and method of the study was done to obtain acceptance and cooperation as well as their informed consent.

-The right to terminate participation at any time was accepted.

-The nature of the study didn't cause any harm for the entire sample.

-Assuring nurses about the privacy and confidentiality of the collected data and explain that it was used for the study purpose only.

3. Tool I and tool II were translated into Arabic and presented to a jury of five experts in the area of specialty to check their content validity.

-The face validity value of workplace bullying was 71.4%, and intensive care nurses wellbeing was 97.8%

4. A pilot study was carried out on a sample (10%) of the subject (n=50). A pilot study was carried out after the experts' opinions and before starting the actual data collection. The pilot study was done to test clarity, sequence of items, applicability, and relevance of the questions to determine the time needed to complete the questionnaire. According to feedback from a jury and pilot study, the tool was modified by the researcher.

5. Reliability of tools was tested using Cronbach's Alpha Coefficient test. Reliability of workplace bullying was 0.954 and reliability of intensive care nurses wellbeing was 0.933.

6. Data collection phase: the researcher met with nurses who participated in the waiting area of their departments, explain the purpose of the study, distribute the questionnaire to them individually and ask them to

fill the questionnaires after obtaining agreement. Each nurse took about 25 - 30 minutes to fill in the questionnaires. The data were collected over period of three months during the year 2025, from the beginning of April 2025 until the end of June 2025.

Statistical analysis of data

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 of the obtained results was judged at the 5% level.

Results

Table (1): Illustrates distribution of the nurses according to their personal and work-related characteristics. As noticed in this table, the high percent 96.1% of the nurses were females. Also, high percent (83.6 %) of nurses were married. Moreover, the educational qualifications of nurses were 66.7% of them had Bachelor of Nursing Sciences. In relation to years of experience, 53.2% of nurses had 5 – 10 years of experience and one third 31.1% of them had <5 years with a mean of (6.66 ±3.74). Additionally, 42.5% and 29.5% of nurses work in neurology intensive care unit and cardiology care unit respectively.

Figure (1): Levels of nurses' agreement according to total workplace bullying behaviors. This figure revealed that less than half (48.1%) of the nurses exposed to moderate level of bullying behaviors at workplace. Also, above quarter (28.4%) of them are exposed to low level of workplace bullying. While 23.5% of nurses are exposed to high level of workplace bullying behaviors.

Table (2): Represents levels of nurses' agreement according to workplace bullying behaviors dimensions. The table shows that above half (51.2%) of nurses exposed to moderate level of workplace bullying behaviors dimension, while less than half (49.1%) of them exposed to moderate level of personal bullying behaviors. Also, above one third (35.0%) of nurses are exposed to low level of physically intimidating bullying.

Figure (2): Represents levels of nurse's perception regarding their wellbeing. This figure revealed that above half (51.1%) of nurses had moderate perception of their wellbeing. While, above quarter (26.6%) of nurses had high perception of their wellbeing and (22.3%) of them had low perception of their wellbeing.

Table (3): Represents levels of nurses' perception according to their wellbeing dimensions. This table shows that more than half (51.3%) of nurses had moderate perception

regarding psychological wellbeing. Also, about half (50.3%) of them had moderate perception regarding workplace wellbeing. While above one quarter (27.6%) of nurses had low perception regarding to life wellbeing.

Table (4): Illustrate relation between levels of nurses' workplace bullying behaviors and their wellbeing. This table shows a significant relationship between workplace bullying and nurses' wellbeing at ($p \leq 0.05$). Nurses who were exposed to high levels of bullying behaviors had low wellbeing (40.0%). While high wellbeing was more common among nurses who are exposed to low bullying behaviors.

Figure (3): Illustrate correlation coefficient between nurses' workplace bullying behaviors and their wellbeing. This figure revealed a negative statistically significant correlation was found between workplace bullying behaviors and nurses' wellbeing as overall ($r = -0.576$).

Table (1): Distribution of nurses according to their personal and work-related characteristics (n=489)

Personal and work-related characteristics	Nurses	
	No	%
Age (years):		
20 -29	391	80.0
30 – 39	65	13.3
40 -49	31	6.3
≥ 50	2	0.4
Mean ± SD = 25.55±5.96		
Sex:		
Female	470	96.1
Male	19	3.9
Marital Status:		
Single	80	16.4
Married	409	83.6
Educational qualifications:		
Secondary Nursing Diploma	15	3.1
Technical Nursing Institute	123	25.1
Bachelor of Nursing Sciences	326	66.7
Post Graduate Studies	25	5.1
Department:		
Cardiology care unit	144	29.5
Pediatric intensive care unit	96	19.6
Neurology intensive care unit	208	42.5
Medical intensive care unit	22	4.5
Oncology intensive care unit	19	3.9
Years of experience:		
<5	152	31.1
5 – 10	260	53.2
>10	77	15.7
Mean ± SD = 6.66 ±3.74		

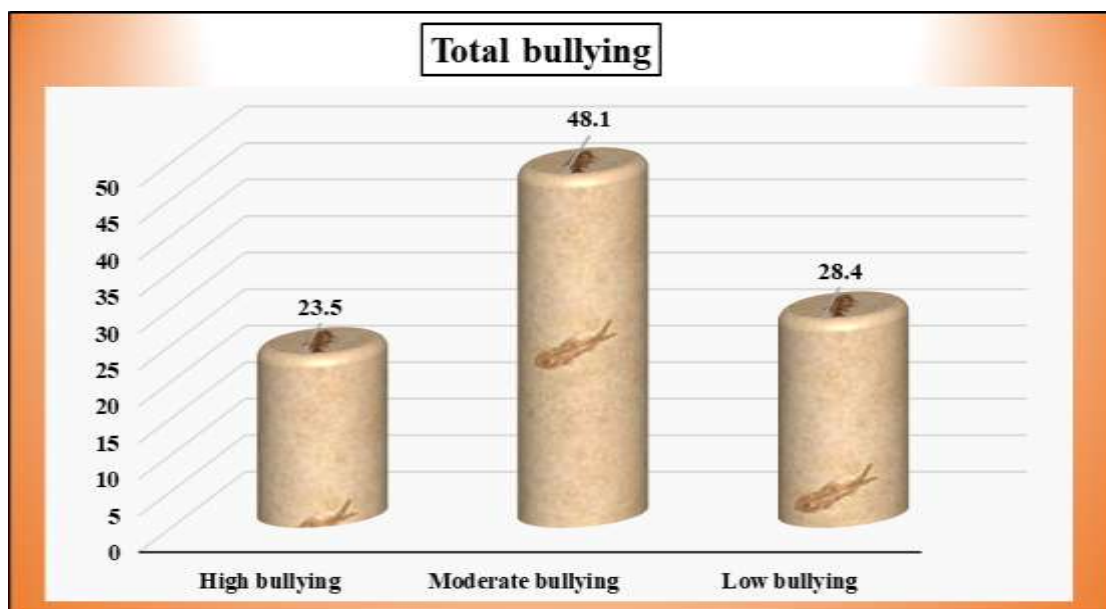


Figure (1): Levels of nurses' agreement according to total workplace bullying behaviors

Table (2): Levels of nurses' agreement according to workplace bullying behaviors dimensions (n=489)

Workplace bullying behaviors dimensions	Nurses' agreement					
	High bullying		Moderate bullying		Low bullying	
	No.	%	No.	%	No.	%
Personal bullying	114	23.3	240	49.1	135	27.6
Workplace bullying	117	23.9	250	51.2	122	24.9
Physically intimidating bullying	100	20.4	218	44.6	171	35.0
Total	115	23.5	235	48.1	139	28.4

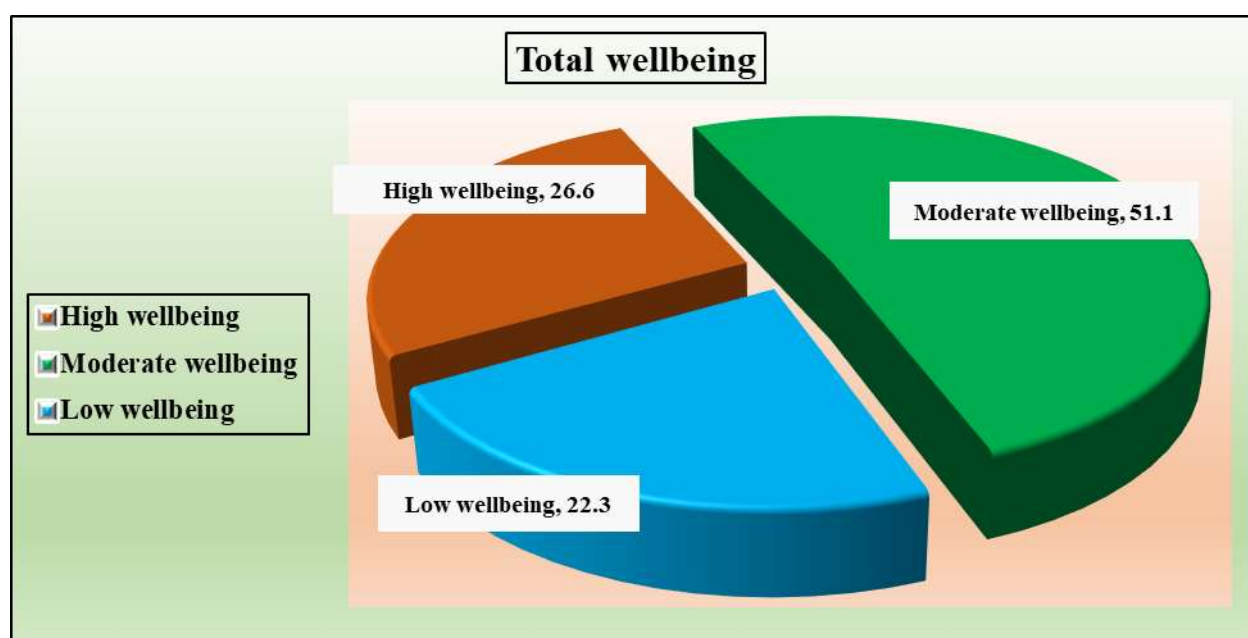


Figure (2): Levels of nurse's perception regarding their wellbeing

Table (3): Levels of nurses' perception according to their wellbeing dimensions (n= 489)

Wellbeing dimensions	Nurses' agreement					
	High wellbeing		Moderate wellbeing		Low wellbeing	
	No.	%	No.	%	No.	%
Life wellbeing	105	21.5	249	50.9	135	27.6
Workplace wellbeing	123	25.2	246	50.3	120	24.5
Psychological wellbeing	114	23.3	251	51.3	124	25.4
Total	130	26.6	250	51.1	109	22.3

Table (4): Relation between levels of nurses' workplace bullying behaviors and their wellbeing (n=489)

Levels of nurses wellbeing	Levels of nurses workplace bullying behaviors							
	High bullying (n=115)		Moderate bullying (n=235)		Low bullying (n= 139)		Chi - square test	P-value
	No	%	No	%	No	%		
High wellbeing (n=130)	28	24.3	50	21.3	52	37.4	44.68	0.000**
Moderate wellbeing (n=250)	41	35.7	149	63.4	60	43.2		
Low wellbeing (n=109)	46	40.0	36	15.3	27	19.4		

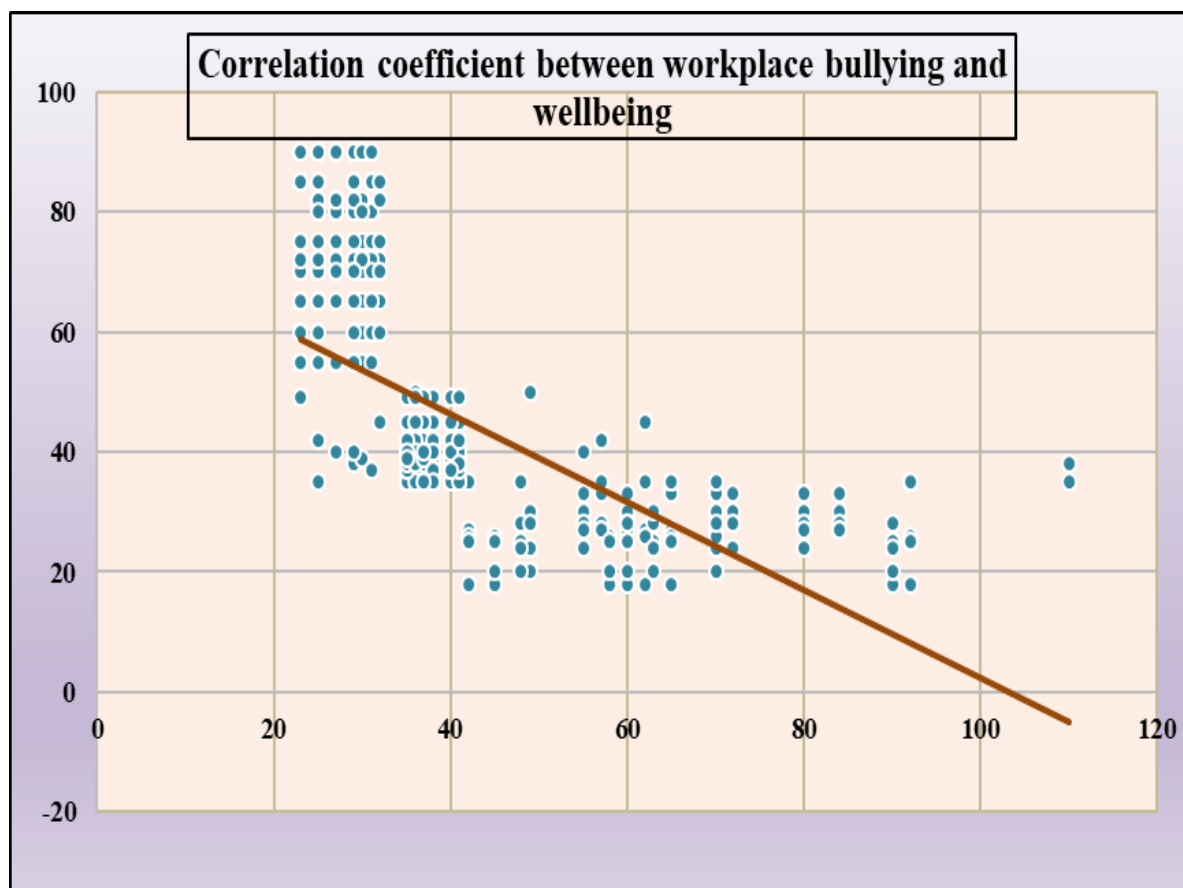


Figure (3): Correlation coefficient between workplace bullying behaviors and nurses wellbeing

Discussion

Intensive Care Units nurses play a significant role in monitoring unstable patients, administering intensive treatments, and responding promptly to sudden changes in patient condition (**Amini, Miyanaji, & Din Mohamadi, 2023**). Furthermore, workplace bullying is a critical psychosocial risk factor in nursing. It has a significant negative effect on nurses' wellbeing (**Begjani, Nayeri, Salami, Tavasoli, & Rajabi, 2025**).

Workplace bullying behaviors

Nurses' agreement with overall workplace bullying behaviors, where nearly half reporting moderate bullying and almost one-quarter being exposed to high levels indicates that bullying is not an isolated problem but rather a normalized and persistent issue in the work environment.

Along with the present findings, **Al Muharraq, Baker, and Alallah (2022)** who confirmed that workplace bullying remains highly prevalent in nursing settings, and it is a widespread occupational hazard among ICU nurses and high-acuity units have been identified as environments with elevated risk due to workload pressure, hierarchical structures, and emotional strain.

On the other hand, **Havaei, Staempfli, and MacPhee (2022)**

highlight substantial variability in reported prevalence rates, ranging from low to high depending on definitions and assessment methods used. Additionally, workplace bullying is not uniformly distributed and is strongly influenced by organizational culture, staffing levels, and leadership practices.

The present study results showed that the prevalence of moderate levels of workplace bullying behaviors among nurses may indicate that bullying has become a recurrent and normalized issue in the work environment. Nurses may frequently experience negative acts such as criticism, excessive workload, exclusion, or disrespectful communication that affect their psychological wellbeing and work performance over time.

Along with the present findings **Acar and Duygulu (2024)** who confirmed that workplace bullying in healthcare organizations is frequently moderate in intensity but widespread in prevalence, reflecting systemic rather than nurses-level dysfunction. Also, found that nurses commonly report exposure to persistent but non-extreme bullying behaviors.

On the other hand, **Nielsen and Einarsen (2023)** argued that in certain high-stress clinical environments, bullying may escalate into severe and

repeated hostile behaviors, particularly where leadership and governance are weak.

Intensive care nurses' well-being

The present study results indicated that most nurses had moderate wellbeing and indicate that nurses can cope with workplace demands but they are not achieving an optimal level of wellbeing. This could be related to continuous work pressure, staffing shortages, workload, and exposure to stressful clinical situations. Also, less than quarter of nurses had low wellbeing that emphasized the nurses are vulnerable to emotional exhaustion and decreased professional motivation. These results were consistent with the findings of **Galanis et al. (2024); Suhonen, Stolt, Katajisto, and Charalambous (2024)** who noted that nurses' wellbeing often remains at a moderate level due to the coexistence of supportive factors such as teamwork and professional commitment and persistent occupational stressors such as workload, emotional demands, and workplace conflict.

In contrast, **Yosep, Mediani, and Linda (2024)** who clarified the presence of a considerable percent of nurses reporting low wellbeing is concerning and significant segment of the nursing workforce suffering from

psychological strain, burnout, and reduced wellbeing, particularly in demanding clinical environments.

The present study results demonstrated a remarkably consistent pattern across wellbeing dimensions clustering around moderate levels. This uniformity identifies that nurses' wellbeing is not fragmented but interconnected, nurses do not experience workplace, psychological, and life wellbeing in isolation but they function through a holistic system of wellbeing shaped by both professional and personal factors.

Along with the present findings, **Alharbi et al. (2024); García-Sierra et al. (2024)** who demonstrated that nurses' wellbeing tends to remain at moderate levels due to sustained exposure to workplace stressors, including high workload, emotional demands, and staffing constraints. The lower proportion of nurses reporting high wellbeing, particularly in the life domain may reflect the spillover effect of occupational stress into personal life, where demanding work environments negatively influence life satisfaction and overall wellbeing.

At the same line, **Shah et al. (2025)** who clarified that the presence of a notable proportion of nurses experiencing low wellbeing across all dimensions represents a critical

concern. This subgroup reflects a consistently vulnerable segment of the workforce exposed to elevated levels of stress, emotional exhaustion, and early manifestations of burnout. On the other hand, **Alharbi, Almutairi, Alshammari, and Alharbi (2024)** who noted that nurses in high-pressure or resource-constrained environments may experience greater levels of psychological distress and lower overall wellbeing.

The present study results reveal that workplace bullying is a key organizational stressor that significantly influences nurses' wellbeing. The clear inverse pattern suggests that increased exposure to bullying is associated with a gradual decline in psychological wellbeing, confirming the strong role of the work environment in shaping outcomes.

Along with the present findings, **Zhang, Rehman, Addas, and Ahmad (2024)** who concluded that workplace bullying is significantly associated with increased burnout and reduced professional quality of life among nurses. Also, found that workplace bullying exerts a direct negative effect on psychological wellbeing. This result disagrees with **Wang, Liu, Chen, and Zhang (2024)** who showed that personal resources such as emotional intelligence and

psychological capital can buffer the negative effects of bullying, allowing nurses to maintain moderate levels of wellbeing despite exposure.

The present study results reveal a moderate to strong negative statistically significant correlation between workplace bullying behaviors and nurses' wellbeing. This indicates that as workplace bullying increases, nurses' wellbeing decreases, confirming an inverse relationship between the two variables. The strength of the correlation confirmed that higher exposure to workplace bullying behaviors such as harassment, exclusion, or verbal abuse is associated with poorer psychological and emotional wellbeing among nurses.

This finding is consistent with **Galanis et al. (2024)** who reported that workplace bullying is significantly associated with higher burnout and lower job satisfaction, reflecting reduced overall wellbeing. On the other scene, **Al Mansoor (2024)** who indicated that self-efficacy could buffer the negative impact of bullying on nurses' wellbeing, resulting in variability in outcomes among exposed nurses.

Conclusion

Based on the findings of the present study, it was concluded that less than half of nurses exposed to a moderate level of workplace bullying behaviors. Also, above half of the nurses had moderate perception of wellbeing.

Recommendations

For hospital administrators:

-Implement and enforce zero-tolerance policies toward workplace bullying, supported by strict monitoring and accountability systems.

-Develop confidential and accessible reporting mechanisms to ensure nurses feel safe reporting bullying incidents without fear of retaliation.

For head nurses:

-Develop coping and resilience skills of nurses to strengthen their psychological resilience through stress management techniques to reduce the negative effects of bullying.

-Promote open communication between nurses and management to encourage staff to report bullying behaviors without fear of punishment or retaliation.

For nurse educators:

-Teach the psychological impact of violence, recognizing bullying behaviors and offering practical proactive strategies to mitigate burnout, depression and trauma.

For nurses:

-Seek of support from colleagues, supervisors, and professional counseling services.

-Engage in professional development through participation in training programs on communication skills, conflict resolution.

Future studies:

-Evaluate the effectiveness of anti-bullying interventions.

-Investigate organizational factors contributing to bullying including leadership, workload and staffing.

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Thriving at 'Relation between Head Nurses' Smart Leadership and Nurses Workplace

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Abstract

Background: Smart leadership is a modern leadership approach that integrates multiple forms of intelligence with the effective use of technology in managing healthcare organizations. It plays an important role in improving nurses' performance and creating a supportive work environment, which can affect nurses' thriving at the workplace. **Aim of the study:** Assess the relationship between head nurses' smart leadership and nurses' thriving at the workplace. **Research design:** A descriptive correlational research design was utilized. **Subjects:** The study included all head nurses (n=34) and a stratified random sample of nurses (n=380) working at Tanta International Teaching Hospital. **Tools:** Two tools were used for data collection; Smart Leadership Structured Questionnaire and Nurses' Thriving at Workplace Structured Questionnaire. **Results:** More than half (52.4%) of the nursing staff perceived a moderate level of smart leadership. Nearly half (48.1%) of the nurses reported a high level of thriving at the workplace. **Conclusion:** A statistically significant positive relationship was found between head nurses' smart leadership and nurses' thriving at the workplace. **Recommendations:** Implement training programs to enhance head nurses' smart leadership practices and adopt strategies that promote nurses' thriving at the workplace through supportive work environments and continuous professional development.

Keywords: Head nurses, Smart leadership, Thriving at Workplace.

Introduction

Head nurses play a pivotal role within the organizational structure, as they are directly responsible for overseeing workflow in nursing care units, coordinating tasks, and maintaining a safe and effective work environment (Alsalhi et al., 2024; Yu et al., 2024). Furthermore, their role extends beyond administrative duties to include guiding and motivating staff nurses. Therefore, leadership is considered an integral component of the head nurse's responsibilities (Li et al., 2025).

Nursing leadership is one of the primary skills that head nurses must develop, conceptualized as a person's ability to influence a group to achieve common goals (Zhang et al., 2022). It requires commitment, responsibility, empathy, decision-making skills, communication, and effective management (Lappalainen, Härkänen, & Kvist 2020). In nursing practice, head nurses play a vital role in establishing safe and healthy environments that enable nurses to deliver patient centered and high quality of care (Hughes et al., 2022; Hult et al., 2023). **Nursing leadership come in many style** traditional leadership includes autocratic and transactional styles, while modern leadership includes transformational, democratic **and smart leadership, one of the most**

modern types of leadership style (Yusuf et al., 2022).

Smart leadership is defined as an integrated approach that combines emotional intelligence, spirituality, rational decision-making, and the effective use of technology (Frias et al., 2021). It includes four dimensions: emotional leadership, which promotes trust and emotional intelligence; spiritual leadership, which fosters a shared vision and organizational commitment; rational leadership, which emphasizes logical and evidence-based decision-making; and technology-integrating leadership, which supports the use of digital technologies in leadership practices (Gomaa et al., 2024; Saha et al., 2023; Bayighomog & Arasli, 2022; Välimäki et al., 2023; Schmitz et al., 2023). Smart leadership is critical for enhancing patient safety, quality of care, decision-making, innovation, and staff development (Alsadaan et al., 2023). Furthermore, a smart head nurse is essential for fostering nurses' thriving and achieving organizational success through informed decision-making, problem-solving, and team motivation (Abood et al., 2023).

Thriving at the workplace refers to a feeling of vitality and learning at work and is influenced by nurses' psychological capital, workplace environment, mindfulness,

educational level, and years of experience (Zhai et al., 2023). It includes five dimensions: psycho-emotional well-being, social well-being, work-life integration, job design and experience, and learning, which collectively promote nurses' emotional well-being, positive relationships, work-life balance, effective job performance, and continuous professional development (Reyes-Rodriguez et al., 2025; Sharifi et al., 2024; Rashmi & Kataria, 2023; Othman et al., 2022; Alharbi et al., 2024). Thriving at work reduces absenteeism and turnover, enhances nurses' physical and psychological well-being, improves the quality of nursing care, and supports the sustainable development of the nursing profession (Moloney et al., 2020).

Significance of the study:

Healthcare organizations increasingly require leadership approaches that effectively respond to complex and rapidly changing work environments. Smart leadership has emerged as a contemporary approach that emphasizes strategic thinking, effective decision-making, and the optimal use of available resources. Despite its growing importance, the relationship between smart leadership and nurses' positive work-related outcomes remains insufficiently

explored (Elsehrawy, El-Ashry, & Abou Zeid, 2025).

Similarly, thriving at the workplace has become an important indicator of nurses' professional growth, vitality, and effective performance. However, limited empirical evidence has examined the leadership factors that promote nurses' thriving, particularly in hospital settings (Engström et al., 2025). Therefore, examining the relationship between head nurses' smart leadership and nurses' thriving at the workplace may provide valuable evidence to support leadership practices that enhance nurses' well-being and improve organizational performance.

Aim of the study

This study aims to:

Assess the relation between head nurses' smart leadership and nurses' thriving at workplace.

Research Questions:

1. What are the levels of head nurses' smart leadership?
2. What are the levels of nurses' thriving at workplace?
3. What is the relation between head nurses' smart leadership and nurses' thriving at workplace?

Subjects and Method

Research design:

A descriptive correlational research design was used in this study.

Setting:

The study was conducted in all inpatient departments and intensive care units at Tanta International Teaching Hospital, a tertiary teaching hospital in Gharbia Governorate, Egypt.

Subjects:

The study included all head nurses (N = 34) and a stratified random sample of nurses (n = 380) from the previously mentioned setting.

Tools of data collection:

The data of study was collected using two tools as follows:

Tool I: Smart Leadership Structured Questionnaire

The tool was developed by researcher guided by **Ronthy, Ekegren, and Mardberg (2013); Abdulrahman et al. (2023).**

It consisted of two parts

Part I: Personal Data: including; age, sex, marital status, level of education, department, position, years of experiences.

Part II: Smart Leadership Questionnaire: It was used to assess the level of smart leadership from the nursing staff point of view. It is composed of 32 items divided into 4 dimensions as follows:

Emotional leadership: 8 items, Spiritual leadership: 7 items, Rational leadership: 7 items, and Integrating technology: 10 items.

Scoring system:

Responses were measured on five points Likert Scale ranging from (1) strongly disagree, (2) disagree, (3) uncertain, (4) agree and (5) strongly agree. The score of each dimension was sum up and converted to percent score. The total scores were summed up and classified into levels according to statistical cut-off points where:

- High smart leadership level >75%.

- Moderate smart leadership level 60 % - 75%.

- Low smart leadership level < 60%.

Tool II: Nurses' Thriving at Workplace Structured Questionnaire

This tool was developed by researchers guided by **Peters, Sorensen, Katz, Gundersen, and Wagner (2021); Porath, Spreitzer, Gibson, and Garnett (2012).** It was used to assess nurses' thriving at workplace. It is composed of 41 items divided into 5 dimensions as follows:

Psycho-emotional well-being: 7 items, Social well-being from work: 8 items, Work-life integration: 7 items, Job design and experience of work: 10 items, Learning: 9 items

Scoring system:

Responses were measured on five points Likert Scale ranging from (1) strongly disagree, (2) disagree, (3) uncertain, (4) agree and (5) strongly agree. The score of each dimension was summed up and converted to

percent score. The total scores were summed up and classified into levels according to statistical cut-off points where:

- High thriving at workplace level >75%.
- Moderate thriving at workplace level 60 % - 75%.
- Low thriving at workplace level < 60%.

Method

1- Official permission to conduct the study was obtained from faculty of nursing Tanta and submitted to responsible authorities of International Teaching Hospital for permission to carry out the study

2- Ethical consideration:

a) Approval from Scientific Research and Ethical Committee at Faculty of Nursing was obtained with code No. (651- 5 -2025).

b) The researcher introduced himself to the participant, a full explanation of the aim and method of the study was done to obtain acceptance and cooperation as well as their informed consent.

c) The right to terminate participation at any time was accepted.

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

e) Assuring the nurses about the privacy and confidentiality of the collected data and explain that it was used for the study purpose only.

f) A code number was used instead of names

3- The tools of the study were developed by researcher after reviewing related literature. Since Arabic is the participants mother tongue, tools were translated into it.

4- The study tools were tested for content validity by five experts jury in the area of Nursing Administration from Faculty of Nursing Tanta University to check content validity and clarity of questionnaire and necessary modification done.

5- The experts' responses were represented in a four –points Rating Scale ranged from 4= strongly relevant 3= relevant 2= irrelevant 1= strongly irrelevant. Necessary modifications were done including clarification and simplifying work related words. The content validity for tool (I) smart leadership structured questionnaire was 95.5% and for tool (II) nurses' thriving at workplace structured questionnaire was 96.4%.

6- A pilot study was conducted on a sample (10%) of subjects (n=41) to check and ensure the clarity, applicability, and feasibility of the tools check and identify obstacles and problems that encountered during data collection and the necessary modifications were done and estimated the time to fill in the study tool. Answering the questionnaire

took approximately (20-30 minutes) The pilot was not excluded from study subjects because there was no major modification made.

7- Reliability of tool tested using Cronbach's Alpha coefficient factor, its value for the tool I was (0.941) and for tool II was (0.928).

8- Data collection phase: The data was collected from nurses who were working in the previously mentioned setting by the researcher, where the data was collected over six months from first of June 2025 up to the end of December 2025.

9- The questionnaires were hand – delivered to the study subjects in their work setting after explaining the aim of the study, during morning and afternoon shifts, according to their workload. The researcher met the nursing staff in small groups.

10- The questionnaires were completed by nursing staff in the presence of the researcher to ensure all items were answered and provide explanations required.

Result

Table (1): Illustrates distribution of nursing staff personal data. It shows that more than half (51.9%) of the nursing staff were in the age group ranging from (25 – 30) years, with a mean SD age of 29.66 ± 5.93 . More than two-thirds (68.6%) of nursing staff were females, approximately two-thirds (67.1%) of them were

married. Almost two thirds (67.9%) of the nurses had a Bachelor of Science in nursing degree, while less than one third (30.7%) graduated from a nursing technical institute. Furthermore, in terms of position, the majority (92.5%) of the nurses were staff nurses. Additionally, less than half (46.4%) of them had less than five years of nursing experience, with a mean SD of 6.68 ± 5.57 years.

Figure (1): Demonstrates the overall level of head nurses' smart leadership. More than half of the studied nursing staff had a moderate level of smart leadership, while more than one third of them had a high level, and minority of them had a low level of smart leadership.

Table (2): This table shows level of head nurses smart leadership dimension. Nearly half (46.6%, 44.2%) of the nursing staff had high levels of the emotional and rational dimensions of smart leadership respectively. however, about half (47.3%, 44%) of the nursing staff had moderate levels of integration of technology in leadership and the spiritual dimension of smart leadership respectively.

Figure (2): Represents the overall level of nurses' thriving at the workplace. It was noted that nearly half of the nursing staff reported a high overall level of thriving at the workplace. Additionally, about half

of the nursing staff perceived a moderate level of thriving. On the other hand, a minority of nurses reported a low level of thriving at the workplace.

Table (3): Illustrates the levels of nurses' thriving at the workplace dimensions. It shows that more than half (55.3%, 50.2%) of the nursing staff had a high level of the learning and social well-being dimensions of thriving at the workplace respectively. while nearly half equal percent (44.4%) of nursing staff had high and moderate level of the psycho-emotional dimension of thriving at the workplace. As well as, more than half (55.8%, 52.9%) of the nursing staff had a moderate level of the work-life integration and job design and experience dimensions of thriving at the workplace respectively.

Figure (3): Illustrates the correlation between head nurses' smart leadership and nurses' thriving at the workplace. The figure shows a statistically significant positive correlation between head nurses' smart leadership and nurses' thriving at the workplace at ($p < 0.001$)

Table (1): Distribution of nursing staff personal data (n = 414)

Demographic data	No.	%
Age (years)		
<25	65	15.7
25 – 30	215	51.9
>30	134	32.4
Min. – Max.	22.0 – 52.0	
Mean $\pm$ SD.	29.66 $\pm$ 5.93	
Sex		
Male	130	31.4
Female	284	68.6
Marital Status		
Married	278	67.1
Unmarried	136	32.9
Level of education		
Secondary nursing diploma	0	0.0
technical nursing diploma	127	30.7
Bachelor nursing degree	281	67.9
Post graduate studies	6	1.4
Department		
Internal medicine ICU	88	21.3
Pediatric ICU	39	9.4
Cardiothoracic ICU	48	11.6
Anesthesia ICU	25	6.0
Cardiac ICU	47	11.4
Neonatal ICU	19	4.6
Dialysis unit	18	4.3
Operating room unit	34	8.2
Oncology surgery	10	2.4
Gastrointestinal department	12	2.9
Outpatient clinics	20	4.8
Pediatric surgery	9	2.2
Vascular surgery	11	2.7
Neurosurgery	16	3.9
Cardiac catheterization	11	2.7
Endoscopy unit	7	1.7
Position		
Head nurse	34	7.5
Nurse	380	92.5
Years of experiences		
<5	192	46.4
5 – 10	135	32.6
>10	87	21.0
Min. – Max.	1.0 – 27.0	
Mean $\pm$ SD.	6.68 $\pm$ 5.57	

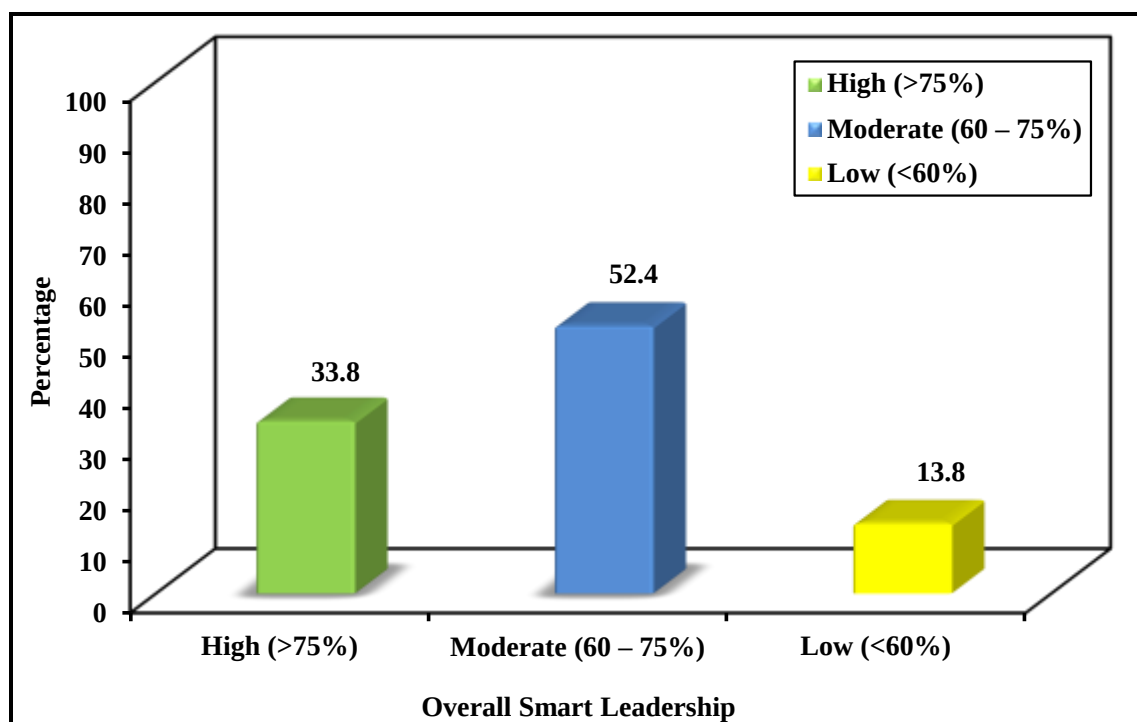


Figure (1): Overall level of head nurses' smart leadership

Table (2): Level of head nurses' smart leadership dimensions (n = 414)

Dimensions of smart leadership	High (>75%)		Moderate (60%-75%)		Low (<60%)	
	No.	%	No.	%	No.	%
A. Emotional Leadership	193	46.6	126	30.4	95	22.9
B. Spiritual leadership	157	37.9	182	44.0	75	18.1
C. Rational leadership	183	44.2	157	37.9	74	17.9
D. Integrating of Technology	110	26.6	196	47.3	108	26.1

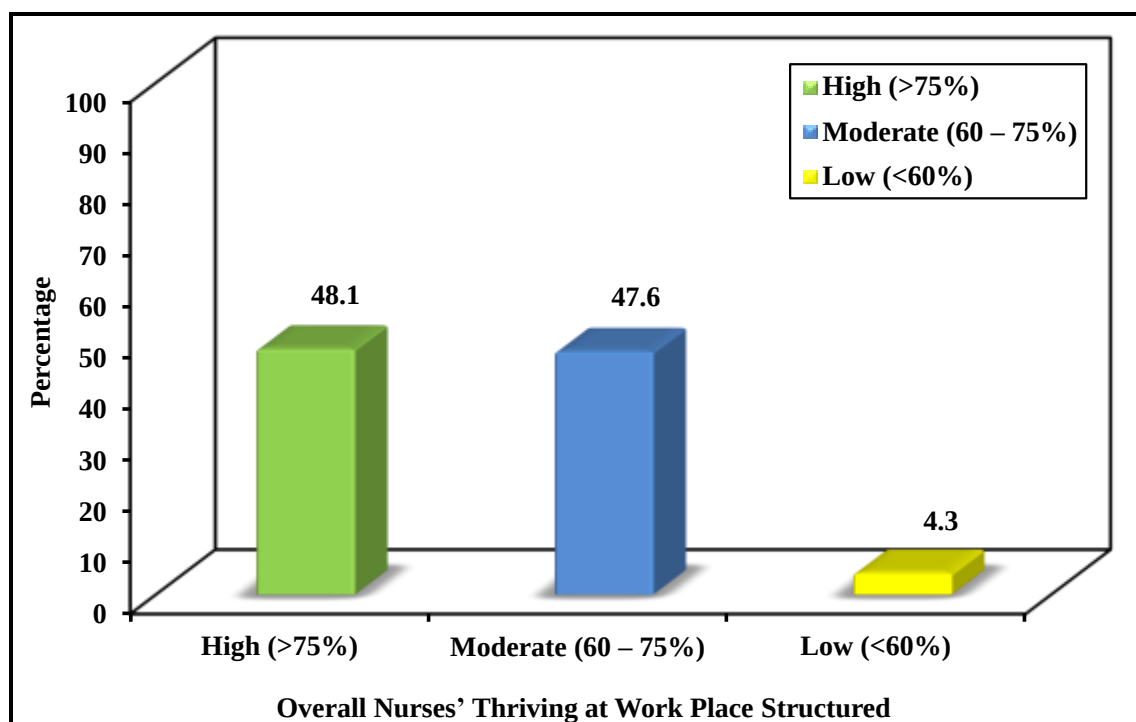


Figure (2): Overall level of nurses' thriving at workplace

Table (3): Level of nurses' thriving at workplace dimensions (n = 414)

Thriving at Workplace 'Nurses dimension	High (>75%)		Moderate (60%-75%)		Low (<60%)	
	No.	%	No.	%	No.	%
A. Psycho emotional	184	44.4	184	44.4	46	11.2
B. Social well-being	208	50.2	163	39.4	43	10.4
C. Work-life integration	109	26.3	231	55.8	74	17.9
D. Job design and experience	165	39.9	219	52.9	30	7.2
E. Learning	229	55.3	169	40.8	16	3.9

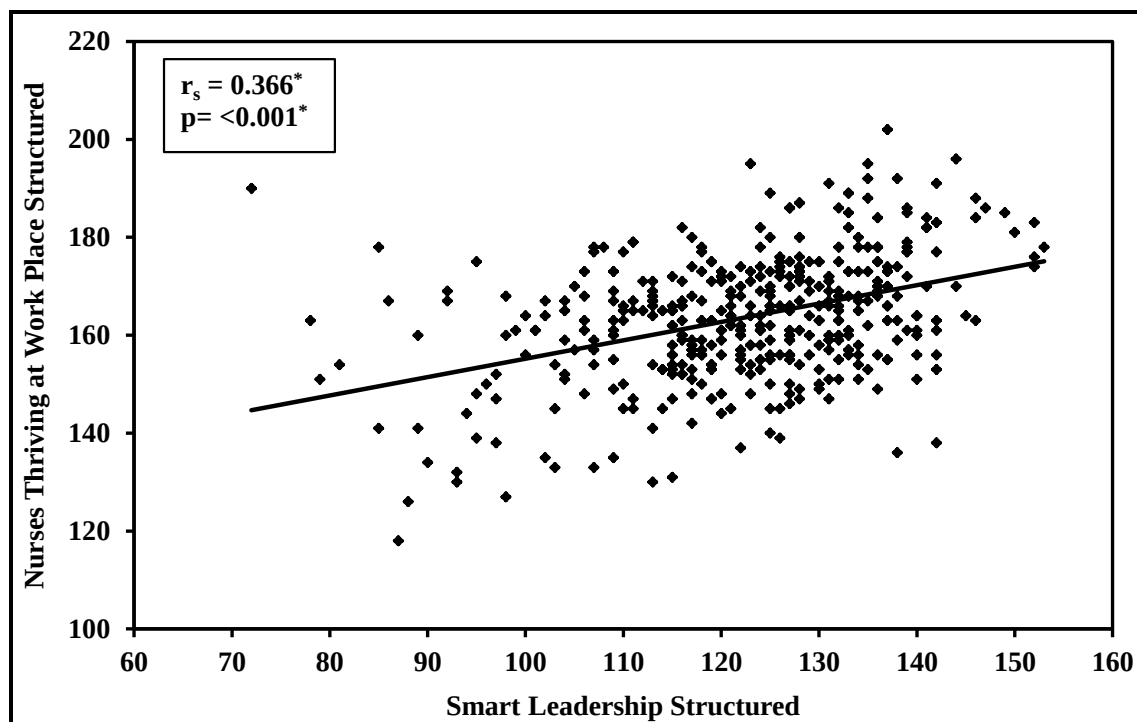


Figure (3): Correlation between head nurses' smart leadership and nurses thriving at workplace

Discussion

The present study revealed that more than half of the nursing staff perceived head nurses' smart leadership at a moderate level. This finding reflects the presence of supportive leadership behaviors alongside challenges in consistently implementing advanced strategic and technology-based leadership practices. Consistent with the present findings, **Xing et al. (2026)**; **Yeneget et al. (2025)**; **Gomaa et al. (2024)** reported that nurses perceived smart leadership at a moderate level. However, this finding contradicted **Alharbi and Almansour (2025)**, who reported very high levels of smart leadership among nurse managers.

The present study revealed that nearly half of the nursing staff perceived a high level of the emotional dimension of smart leadership. This finding reflects head nurses' ability to demonstrate emotional intelligence by promoting mutual respect, providing emotional support, actively listening to nurses, and creating a psychologically safe work environment that enhances nurses' sense of value and belonging. Consistent with the present findings, **Gomaa et al. (2024)**; **Almadani and Alamri (2024)**; **Chaudhry et al. (2024)** reported high levels of emotional leadership among nurse leaders. However, this finding contradicted **Ali et al. (2023)**, who reported moderate levels of

emotional leadership among head nurses.

The present study revealed that nearly half of the nursing staff perceived a moderate level of the spiritual dimension of smart leadership. This finding reflects head nurses' ability to demonstrate spiritual leadership practices, such as acting as positive role models and involving nurses in decision-making. However, heavy workloads and administrative responsibilities may have limited the consistent application of these practices, resulting in a moderate perception. Consistent with the present findings, **Gomaa et al. (2024); Abou Zeid et al. (2022); Ali et al. (2021)** reported a moderate level of spiritual leadership. However, this finding contradicted **Parinussa and Lameky (2025)**, who reported a low level of spiritual leadership.

The present study revealed that nearly half of the nursing staff perceived a high level of the rational dimension of smart leadership among head nurses. This finding reflects head nurses' ability to make logical decisions, solve problems effectively, set clear goals, and develop practical strategies to achieve organizational objectives. Consistent with the present findings, **Wang et al. (2025); Gonzalez Garcia et al. (2025); Hossny and Alotaibi (2024)** reported high levels of rational leadership and rational

decision-making among nursing managers. However, this finding contradicted **Gomaa et al. (2024)**, who found that the rational dimension of smart leadership was perceived at a low level.

The present study revealed that nearly half of the nursing staff perceived a moderate level of the integrating technology dimension of smart leadership among head nurses. This finding reflects head nurses' use of digital technologies to support work planning, information sharing, and patient care. However, limited technological resources, insufficient training, and heavy workloads may have restricted the consistent integration of technology into leadership practices, resulting in a moderate perception. Consistent with the present findings, **Alenezi et al. (2024); Navarro Martínez et al. (2024); Laukka et al. (2023)** reported a moderate level of technology integration in nursing leadership. However, this finding contradicted **Kotp et al. (2025)**, who reported a high level of technological integration in nursing leadership.

The present study revealed that nearly half of the nursing staff perceived a high level of thriving at the workplace, while about half perceived a moderate level. This finding reflects nurses' positive emotional well-being, supportive social relationships, continuous

learning opportunities, and the ability to maintain a balance between work and personal life, which together promote thriving at the workplace. Consistent with the present findings, **Elsehrawy et al. (2025); Engström et al. (2025); Wu et al. (2025)** reported moderate to high levels of thriving at work among nurses. However, this finding contradicted **Li et al. (2026)**, who reported low levels of thriving at work among nurses.

The present study revealed that nearly half of the nursing staff demonstrated a high level of psycho-emotional thriving at the workplace. This finding reflects nurses' sense of purpose, confidence in managing emotionally challenging situations, and ability to cope with work-related stress, contributing to their psychological well-being and psycho-emotional thriving. Consistent with the present findings, **Zhuang et al. (2025); Hasan and Alsulami (2024); Kohnen et al. (2023)** reported high levels of psycho-emotional well-being among nurses. However, this finding contradicted **Ahmed et al. (2026)**, who found a moderate level of psycho-emotional well-being among nurses.

The present study revealed that more than half of the nursing staff had a high level of social well-being at the workplace. This finding reflects positive interpersonal relationships,

teamwork, mutual respect, and a sense of belonging among nursing staff, which enhance social well-being in the workplace. Consistent with the present findings, **Meneses La Riva et al. (2025); Dziedzic (2025); Pietrzak et al. (2025)** reported high levels of social well-being among nurses. However, this finding contradicted **Lin et al. (2024)**, who found that social well-being among ICU nurses was at a moderate level.

The present study revealed that more than half of the nursing staff had a moderate level of work–life integration at the workplace. This finding reflects nurses' ability to balance their work and personal responsibilities to a certain extent. However, demanding workloads, rotating shifts, and time constraints limited their ability to consistently maintain an optimal work–life balance, resulting in a moderate level of work–life integration. Consistent with the present findings, **Abdallah and Mostafa (2021); Alasiry et al. (2025); Bekhet et al. (2025)** reported a moderate level of work–life balance among nurses. However, this finding contradicted **Tanti et al. (2025)**, who reported that most nurses experienced a low level of work–life balance.

The present study revealed that more than half of the nursing staff had a moderate level of job design and work experience dimension of

thriving at the workplace. This finding reflects nurses' positive perceptions of their work roles and professional experiences. However, heavy workloads, time pressure, and the complexity of nursing responsibilities may have limited their ability to consistently experience an optimal work environment, resulting in a moderate level of thriving related to job design and work experience. Consistent with the present findings, **Čukljek et al. (2025); Ahmed et al. (2024); Othman et al. (2022)** reported a moderate level of job design among nurses. However, this finding contradicted **Moisoglou et al. (2025)**, who found that nurses perceived job design at a low level. The present study revealed that more than half of the nursing staff had a high level of learning at the workplace. This finding reflects nurses' willingness to acquire new knowledge, learn from workplace experiences, and continuously develop their professional competencies. Ongoing learning opportunities and support from supervisors further enhance nurses' professional development. Consistent with the present findings, **Alharsan (2025); Kurtović et al. (2024); Mohammed et al. (2023)** reported high levels of learning among nurses. However, this finding contradicted **Jacob et al. (2023)**,

who found that the level of learning among nurses was low to moderate. The present study revealed a positive correlation between head nurses' smart leadership and nurses' thriving at the workplace. This finding reflects the role of smart leadership in creating a supportive work environment that promotes effective communication, nurses' empowerment, professional growth, and psychological well-being, thereby enhancing nurses' thriving at the workplace. Consistent with the present findings, **Gomaa et al. (2024); Elsehrawy et al. (2025); Li et al. (2024)** reported a positive association between smart leadership practices and nurses' thriving at workplace. However, this finding contradicted **Kim et al. (2023)**, who reported a weak association between smart leadership and nurses' thriving at work.

Conclusion

The findings of the present study revealed that more than half of the nursing staff perceived a moderate level of head nurses' smart leadership, while more than one third perceived a high level of smart leadership. Nearly half of the nursing staff reported a high level of thriving at the workplace, while about half reported a moderate level of thriving. Moreover, there was a highly statistically significant positive correlation between head

nurses' smart leadership and nurses' thriving at the workplace.

Recommendations

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

- Implement continuous training programs to enhance head nurses' smart leadership practices, particularly emotional, spiritual, rational, and technology integration competencies.
- Develop organizational strategies that promote nurses' thriving at the workplace by strengthening psychological well-being, social support, work–life integration, and continuous learning.
- Provide adequate organizational and technological resources to support the effective implementation of smart leadership practices.
- Conduct further studies to examine the impact of smart leadership interventions on nurses' thriving, performance, and organizational outcomes in different healthcare settings.

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Chewing Sugar-Free Gum to Enhance Gastrointestinal Recovery Following Elective Abdominal Surgeries

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Abstract

Background: Postoperative ileus and delayed gastrointestinal recovery remain prevalent complications following abdominal surgery, thereby prolonging hospital stays and increasing healthcare costs. Sham feeding via gum chewing has been proposed as a low-cost, non-pharmacological strategy to stimulate GI motility. **Aim:** Evaluate the effect of chewing sugar-free gum on enhancing gastrointestinal recovery and reducing the occurrence of postoperative gastrointestinal symptoms following elective abdominal surgeries. **Design:** A quasi-experimental post-test-only non-equivalent control group design was employed. **Setting:** The study was conducted at the general surgery departments at Mansoura University Hospital, Egypt. **Subjects:** A purposive sample of 140 adult patients undergoing elective abdominal surgeries. **Tools:** Data were collected using three structured tools: **Tool I:** Personal and Clinical Data Form. **Tool II:** Gastrointestinal Recovery Assessment Sheet, and **tool III:** Postoperative Gastrointestinal Symptom Assessment Sheet. The study group initiated scheduled sugar-free gum chewing in the early postoperative period alongside routine care. **Results:** The study group demonstrated significantly accelerated gastrointestinal recovery compared to the control group. The mean time to first bowel sounds was 5.82 ± 1.43 vs. 6.68 ± 1.59 hours ($p = 0.002$). Significant reductions were observed in the study group for time to first hunger sensation 9.09 ± 1.74 vs. 13.68 ± 2.98 hours ($p < 0.001$), time to first passage of flatus was 16.01 ± 2.16 vs. 18.31 ± 2.02 hours ($p < 0.001$), and time to first defecation was 24.11 ± 3.04 vs. 25.99 ± 3.00 hours ($p < 0.002$). **Conclusion:** Early postoperative sham feeding with sugar-free gum is a safe, economically viable, and clinically effective intervention that significantly accelerates gastrointestinal functional recovery and mitigates distressing GI symptoms following elective abdominal surgery. **Recommendations:** Chewing sugar-free gum might be standardized and integrated into routine clinical protocols and Enhanced Recovery After Surgery pathways for patients undergoing elective abdominal procedures. **Keywords:** Elective abdominal surgery, Gastrointestinal motility, Postoperative ileus, Sugar-free gum.

Introduction

Abdominal surgery is among the most commonly performed hospital-based interventions, accounting for a substantial proportion of both elective and emergency procedures undertaken to treat a wide range of medical conditions (**Gloor et al., 2025**). Postoperative complications continue to be a significant clinical concern despite advancements in surgical procedures and perioperative management. They have detrimental effects on morbidity, mortality, hospital length of stay, and related healthcare expenses (**Rekavari & Mahakalkar, 2024**).

Post-abdominal surgery, a certain degree of paralytic ileus is common as a result of several reasons, including the use of perioperative opioids, the stimulation of afferent reflexes linked to peritoneal irritation, local and widespread intestinal inflammation, and the release of inhibitory neurotransmitters from the bowel wall. Abdominal distention, delayed bowel movements, nausea, vomiting, inability to eat, extended hospital stays, and higher expenses are common outcomes of this (**Tuscharoenporn et al., 2024**).

Postoperative complications (POCs) negatively impact numerous significant aspects of patients'

health, with a projected mortality rate of 0.79%–5.7%. POCs were predicted to occur in roughly 7%–15% of patients undergoing abdominal operations (**Dajenah et al., 2022**). According to epidemiological research, POCs in abdominal surgeries range from 15% to 30% of cases, depending on the type of surgery, the patient's clinical status, and the available infrastructure (**Corrêa et al., 2025**).

Gastrointestinal recovery after abdominal surgery is a vital part of postoperative care and a major factor in overall surgical results. The typical recovery process involves the gradual return of gastric, small bowel, and colonic movements, which are essential for tolerating oral intake and restoring bowel function. Usually, the small intestine regains function within 0 to 24 hours after surgery; the stomach within 24 to 48 hours; and the colon within 48 to 72 hours. Delays in recovery not only extend the duration of hospital stay but also raise the risk of complications, decrease patient comfort, and increase healthcare costs. Therefore, speeding up gastrointestinal recovery is a primary goal of enhanced recovery after surgery (**Xie et al., 2024**).

Although symptom relief following abdominal surgery is a cornerstone of recovery, postoperative pain,

nausea, vomiting, bloating, and constipation are common consequences of surgical trauma, anesthesia, and opioid use. These symptoms impair patient comfort and satisfaction, delay mobilization, and may contribute to further complications. Effective symptom management is therefore a core element of enhanced recovery after surgery protocols **(Xu et al., 2025)**.

Nurses play a central role in achieving this goal through systematic monitoring, early recognition, and timely interventions.

Nursing responsibilities include multimodal pain management, reducing opioid side effects, encouraging early mobilization, supporting oral intake, and implementing non-pharmacological interventions such as chewing sugar-free gum **(Arslan & Çelik, 2024)**.

Chewing gum has emerged as a simple, inexpensive, and non-pharmacological strategy to enhance gastrointestinal recovery following abdominal surgery. Acting as a form of sham feeding, the act of chewing stimulates cephalo-vagal reflexes, promotes salivary and gastrointestinal secretions, and activates digestive motility. By mimicking food intake, gum chewing initiates the cephalic phase of digestion, which triggers enzyme

release and primes the gastrointestinal tract for function even before oral feeding resumes **(Hsu & Szu, 2022)**. Recent systematic reviews and meta-analyses confirm that gum chewing is associated with earlier passage of flatus and stool and a shorter hospital stay, suggesting it may be a practical nursing-led intervention to accelerate postoperative recovery **(Wang et al., 2025)**.

Significance of the study

Following abdominal surgery, postoperative gastrointestinal (GI) dysfunction represents a significant clinical challenge that is linked to delayed oral intake, extended hospital stays, increased medical expenses, and decreased patient comfort **(Xie et al., 2024)**. However, national epidemiological data regarding the incidence of postoperative GI dysfunction in Egypt remain limited. International evidence indicates that the reported incidence of postoperative GI dysfunction, particularly postoperative ileus, ranges from approximately 10% to 30%, depending on the type of surgery and the diagnostic criteria applied **(Animaw et al., 2025)**.

Despite the availability of pharmaceutical therapies, these therapies may have adverse side effects and require additional

resources. Chewing sugar-free gum has become a straightforward, affordable, and non-pharmacological strategy that activates digestive secretions and vagal pathways, thereby increasing gastrointestinal motility through sham-feeding processes (Gezer et al., 2025). Thus, this study aimed to evaluate the effect of chewing sugar-free gum on enhancing gastrointestinal recovery and reducing the occurrence of postoperative gastrointestinal symptoms following elective abdominal surgeries.

Operational definitions:

- **Gastrointestinal recovery:** the restoration of normal gastrointestinal function after elective abdominal surgeries, as evidenced by the earlier return of bowel sounds, hunger feeling, flatus passage, defecation, as well as a decrease in postoperative gastrointestinal symptoms like nausea, vomiting, gagging, and abdominal distension. During the first 24 hours following surgery, gastrointestinal recovery was assessed using **tool II** (Gastrointestinal Recovery Assessment Sheet) and **tool III** (Postoperative Gastrointestinal Symptoms Assessment Sheet), which were developed by the researchers.
- **Elective abdominal surgeries:** Any planned, non-emergency surgical

procedure involving the abdominal cavity following prior patient scheduling and preoperative preparation.

Aim of the study

The purpose of the study was to evaluate the effect of chewing sugar-free gum on enhancing gastrointestinal recovery and reducing the occurrence of postoperative gastrointestinal symptoms following elective abdominal surgeries.

Research Hypotheses:

- Patients undergoing elective abdominal surgeries who receive the sugar-free gum-chewing intervention are expected to demonstrate a significantly accelerated return of gastrointestinal function.
- Patients undergoing elective abdominal surgeries who receive the sugar-free gum-chewing intervention are expected to demonstrate significantly lower occurrence of postoperative gastrointestinal symptoms.

Subjects and Method

Research design:

A quasi-experimental post-test-only non-equivalent control group design was employed.

Setting:

The study was conducted in the general surgery departments of Mansoura University Hospital,

Mansoura, Egypt. These departments provide surgical care for patients undergoing various elective abdominal surgeries.

Subjects:

A purposive sample of 140 male and female adult fully conscious patients attending the previously mentioned setting, who are scheduled for elective abdominal surgical procedures, were allocated into two equal groups (study and control group).

Inclusion criteria: Patients cooperative toward chewing gum, aged between 20 and 60 years, hemodynamically stable in the postoperative period, fully conscious and oriented, willing to participate, and provided informed consent were included in the study.

Exclusion criteria: Patients who had maxillofacial or significant dental conditions interfering with chewing; pre-existing bowel obstruction or paralytic ileus; severe postoperative complications requiring ICU admission; and inability to communicate reliably were excluded.

Sample size calculation: The sample size was estimated using G*Power software (version 3.1.9.7), based on a literature-derived effect size (Cohen's $d = 0.585$) extracted from a recent comparable study (Gezer et al., 2025), an alpha (α)

significance level of 0.05, a statistical power ($1-\beta$) of 0.95, and an equal allocation ratio (1:1), 128 participants (64 per group) were required to detect a statistically significant difference. To compensate for an anticipated 10% dropout and attrition rate during the acute postoperative period, the final recruitment target was expanded to **140 participants** (70 per group). An organized flow diagram that shows enrollment, group allocation, assessment, and data analysis is used to show participant allocation and flow (**Figure 1**).

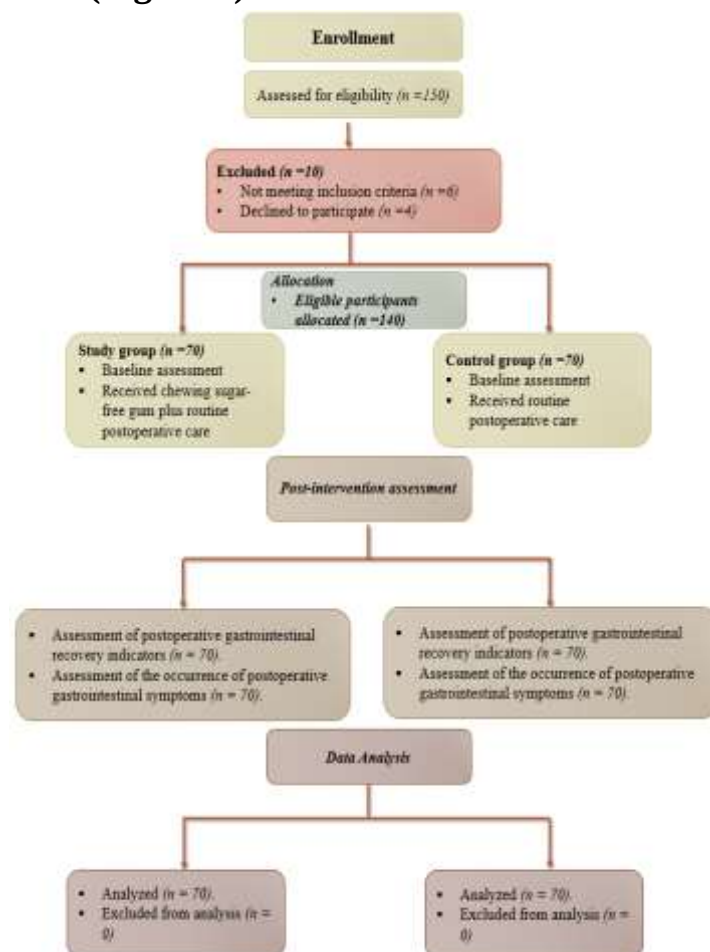


Figure (1): Flow of participants throughout the study

Tools of data collection

Three tools were employed to collect the relevant data, namely:

Tool I: Personal and Medical Data

Form: The researchers developed this tool after reviewing the related recent literature (Hsu & Szu, 2022; Wang et al., 2025), and it consisted of two parts: **Part 1: Personal data** of patients, such as age, gender, marital status, educational level, working condition, residence, and monthly income. While part 2 is related to: **Medical data**, such as previous history of abdominal surgery, body mass index, presence of comorbidities, bowel elimination pattern, type of surgery, and preoperative fasting hours.

Tool II: Gastrointestinal Recovery

Assessment: A structured tool developed by the researchers after an extensive review of relevant literature and similar previous studies (Viannay et al., 2021; Xie et al., 2024). It is designed to assess postoperative gastrointestinal recovery through objective and patient-reported indicators of intestinal function. This tool is used to evaluate the return of bowel activity during the early postoperative period. It consisted of the following indicators (Time to first: bowel sound; feeling of hunger; passage of flatus & defecation).

Regarding the Time to first bowel sound, it assessed by the presence of audible intestinal sounds using abdominal auscultation and recorded in hours following surgery; **time to first feeling of hunger**, recorded in hours following surgery until the patient first reports a subjective sensation of hunger; **time to first passage of flatus**, recorded in hours following surgery until the patient reports the first passage of gas; **finally the time to first defecation**, recorded in hours following surgery until the patient reports the first passage of stool.

Scoring system:

Postoperative gastrointestinal recovery was assessed using a time-based scoring approach. The duration (in hours) from the end of surgery until the occurrence of each gastrointestinal recovery indicator was recorded separately. Each indicator was analyzed independently by calculating the mean time for each group. Shorter recorded times indicate faster and better postoperative gastrointestinal recovery, whereas longer times reflect delayed recovery (Hsu & Szu, 2022).

Tool III: Postoperative Gastrointestinal Symptom Assessment.

The researchers developed this tool following a thorough analysis of

pertinent literature and other related studies (Elsaid et al., 2021; Zahid et al., 2025; Zhao et al., 2025) to assess the occurrence of postoperative gastrointestinal symptoms following elective abdominal surgeries. This tool consisted of an assessment of four postoperative gastrointestinal symptoms: nausea, vomiting, gagging, and abdominal distension. Gastrointestinal symptoms were assessed at four predefined intervals within the first 24 hours following elective abdominal surgeries.

Scoring system:

Postoperative gastrointestinal symptoms assessment was scored using a dichotomous scoring technique. At each postoperative time interval (0–<4 hours, 4–<8 hours, 8–<12 hours, and 12–24 hours), each symptom (nausea, vomiting, gagging, abdominal distension) was independently recorded as present (scored one) or absent (scored zero). The same patient could experience multiple symptoms.

For interpretation, each symptom was considered as an individual dichotomous outcome, with frequencies and percentages calculated to describe the occurrence of nausea, vomiting, gagging, and abdominal distension at each

postoperative time interval (Gezer et al., 2025).

Method:

Validity and reliability of the study tools.

The content validity of the study tools was determined by a panel of five experts in the general surgery specialty and medical-surgical nursing. The tools were assessed for their clarity, relevance, simplicity, applicability, comprehensiveness, and appropriateness in relation to the study objectives; some modifications were made based on their suggestions. Reliability of the data collection tools was assessed using Cronbach's alpha coefficient. The Cronbach's alpha for tool I was 0.91, tool II was 0.90, and tool III was 0.89.

Pilot Study:

Before the data collection phase, a pilot study was conducted on a preliminary sample of 14 patients, representing 10% of the total target sample size, to evaluate the feasibility, clarity, and applicability of the study tools and data collection procedure. Additionally, it enabled estimation of the time required for data collection and ensured the smooth implementation of the study protocol. Patients included in the pilot study met the same eligibility criteria as those of the main study. Based on the pilot findings,

modifications were made accordingly, and all patients who participated in this pilot study were excluded from the final main study sample to maintain methodological rigor and statistical integrity.

Ethical consideration:

This study received formal institutional approval from the Ethical Committee for Scientific Research at the Faculty of Nursing, Mansoura University, Egypt (IRB: SS.26.04.6). Before data collection, administrative permission was secured from the general surgery departments' chairmen following a comprehensive briefing on the research protocol and objectives. After being thoroughly informed about the goals and methods of the study, all participating patients provided informed consent. It was made clear to participating patients that they had the decision to withdraw at any moment without suffering any consequences or any compromise to their standard of clinical care. Lastly, to rigorously safeguard privacy and data confidentiality, all participating patients' information was anonymized using a secure data-coding system, and researchers guaranteed that the collected data would be restricted exclusively to research purposes.

Fieldwork of data collection Procedure:

The data collection phase was executed over a period of three months, from April to July 2026. The data collection procedure was meticulously arranged into four successive phases, each of which was painstakingly completed to guarantee the accomplishment of the study's purpose.

Preparatory Phase:

Official approval was obtained from the Faculty of Nursing Research Ethics Committee and the administrative authorities of Mansoura University Hospital before initiating the study. The head of the general surgery department was informed about the purpose of the study, the date, and the time of starting the data collection. After a thorough literature review, the study tools were developed by the researchers, and their validity and reliability procedures were ensured as described previously.

Allocation and baseline assessment phase:

During this phase, the researchers recruited participants who fulfilled the predetermined inclusion criteria from the previously mentioned settings in the preoperative phase. The researchers introduced themselves to each eligible participant and clearly explained the

aim, nature, and procedures of the study. Informed consent was obtained from each one before participation. Participants were then allocated randomly into two equal groups (the study and control groups) based on the order of admission, where the first eligible patient was assigned to the study group, the second to the control group, and so on, in an alternating sequence. An initial assessment was carried out to collect baseline personal and medical data for eligible patients in the two groups using tool I.

Implementation phase:

The chewing gum protocol was clearly explained to each eligible patient assigned to the **study group** only in the preoperative period. The researchers gave each patient in the study group an adequate number of sticks of sugar-free gum. Participants in the study group were instructed to chew one stick of commercially available sugar-free gum for 15 minutes every 2 hours, starting 2 hours postoperatively, excluding sleeping periods, until the first passage of stool is achieved or until hospital discharge. Gum chewing was performed at a comfortable pace, and patients were encouraged to adhere strictly to the intervention schedule. The intervention was monitored by the

researchers and the participant's caregivers to ensure compliance with the protocol and to monitor any adverse effects or intolerance related to gum chewing.

Patients assigned to the **control group** received routine postoperative nursing care only. Routine care was provided according to the hospital's standard postoperative protocol, which included monitoring of vital signs, wound and postoperative complications assessment, pain control, administration of prescribed medications, maintenance of intravenous fluid therapy, encouragement of early ambulation as tolerated, respiratory exercises, monitoring of bowel function recovery, and gradual advancement of oral intake according to the surgeon's instruction

Evaluation phase:

Each patient in both the study and control groups underwent systematic postoperative assessment of gastrointestinal recovery indicators using **tool II**. Furthermore, patients in both groups were also assessed for the occurrence of postoperative gastrointestinal symptoms using **tool III**, and all findings were recorded to ensure accuracy and consistency of data collection.

Statistical analysis

Data was coded, entered, and analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 26.0 (IBM Corp., Armonk, NY, USA). Quantitative variables were expressed using mean, standard deviation (SD), minimum, and maximum values, whereas qualitative variables were presented as frequencies and percentages. The normality of quantitative data was evaluated using the Shapiro-Wilk test. Comparisons between the study and control groups regarding quantitative variables were performed using the independent samples t-test for normally distributed data. For variables that were not normally distributed, the Mann-Whitney U test was applied. Qualitative variables were compared using the Chi-square test. All statistical tests were two-sided. A p-value of less than 0.05 was considered statistically significant.

Results

Table 1 illustrates that the studied groups were comparable in terms of their personal data. The mean age was 41.24 ± 8.08 years in the study group and 41.61 ± 9.40 years in the control group. 71.4% and 70% of the study and control groups, respectively, were males. The majority of studied patients were married (84.3% vs. 85.7%) in study

& control group, more than half of them had completed secondary education (51.4% vs. 52.9%), more than two fifths of them (44.3% vs. 47.1%) worked physically, more than two-thirds resided in rural areas (72.9% vs. 67.1%) and reported inadequate monthly income (68.6% vs. 74.3%) of study and control group. No statistically significant differences were observed between the two groups regarding any personal data ($p > 0.05$).

Table 2 showed that the studied groups were comparable in their medical data. The mean BMI was 28.48 ± 4.41 kg/m² in the study group and 29.15 ± 4.55 kg/m² in the control group. A previous history of abdominal surgeries was reported by only 12.9% and 17.1% of patients, respectively. Approximately three-quarters of patients in the study and control groups had ≥ 3 times/week bowel elimination pattern (71.4% vs. 74.3%). About two-thirds of patients in the study and control groups had no comorbidities (62.9% vs. 60.0%), and the majority of them fasted 6-8 hours preoperatively (75.7% vs 80.0%), respectively. No statistically significant differences were found between the two groups regarding any medical data ($p > 0.05$).

Figure 2 demonstrates that the highest proportion of patients in both groups were overweight,

accounting for 44.3% in the study group and 41.4% in the control group, while 37.1% and 40%, respectively, were obese. No statistically significant difference was observed between the two groups regarding BMI category distribution ($p = 0.915$).

Figure 3 shows that hernia repair accounted for the highest proportion in both groups, representing 61.4% in the study group and 58.6% in the control group, followed by cholecystectomy with 27.2% and 25.7%, respectively, while appendectomy constituted the lowest proportion, representing 11.4% vs. 15.7% in the study and control groups. No statistically significant difference was observed between the two groups ($p = 0.760$).

Table 3 displays a statistically significant improvement in gastrointestinal recovery in the study group compared to the control group, with consistently lower mean hours recorded across all postoperative gastrointestinal recovery indicators. The study group showed reduced time to first bowel sounds (5.82 ± 1.43 vs. 6.68 ± 1.59 hours), first feeling of hunger (9.09 ± 1.74 vs. 13.68 ± 2.98 hours), first passage of flatus (16.01 ± 2.16 vs. 18.31 ± 2.02 hours), and first defecation (24.11 ± 3.04 vs. 25.99 ± 3.00 hours), indicating faster

gastrointestinal recovery in the study group. All differences were statistically significant ($p < 0.05$).

Table 4 displays statistically significant differences in the occurrence of postoperative gastrointestinal symptoms between the study and control groups across all postoperative time intervals (0-<4 hours, 4-<8 hours, 8-<12 hours, and 12-24 hours). The study group consistently experienced fewer episodes of nausea, vomiting, gagging, and abdominal distension than the control group ($p < 0.05$).

Table (1): Personal data of the control and study groups (n=140)

Variables	Control Group (n=70)		Study Group (n=70)		X^2 or t	P - value
	No.	%	No.	%		
Age						
- <35	13	18.6	15	21.4	0.358	0.836
- 35-45	33	47.1	34	48.6		
- 46-60	24	34.3	21	30.0		
Mean $\pm$ SD	41.61 $\pm$ 9.40		41.24 $\pm$ 8.08		$t=0.224$	0.823
Min.-Max.	21-60		25-59			
Gender						
- Male	49	70.0	50	71.4	0.034	0.853
- Female	21	30.0	20	28.6		
Marital status						
- Single	4	5.7	3	4.3	0.462	0.927
- Married	60	85.7	59	84.3		
- Widow	4	5.7	5	7.1		
- Divorced	2	2.9	3	4.3		
Educational levels						
- Primary	8	11.4	11	15.7	0.571	0.752
- Secondary	37	52.9	36	51.4		
- University	25	35.7	23	32.9		
Work						
- Not working	17	24.3	15	21.4	0.551	0.759
- Physical work	33	47.1	31	44.3		
- Office work	20	28.6	24	34.3		
Residence						
- Rural	47	67.1	51	72.9	0.544	0.461
- Urban	23	32.9	19	27.1		
Monthly income						
- Inadequate	52	74.3	48	68.6	0.560	0.454
- Adequate	18	25.7	22	31.4		

SD: Standard Deviation

 χ^2 : Chi-Square test

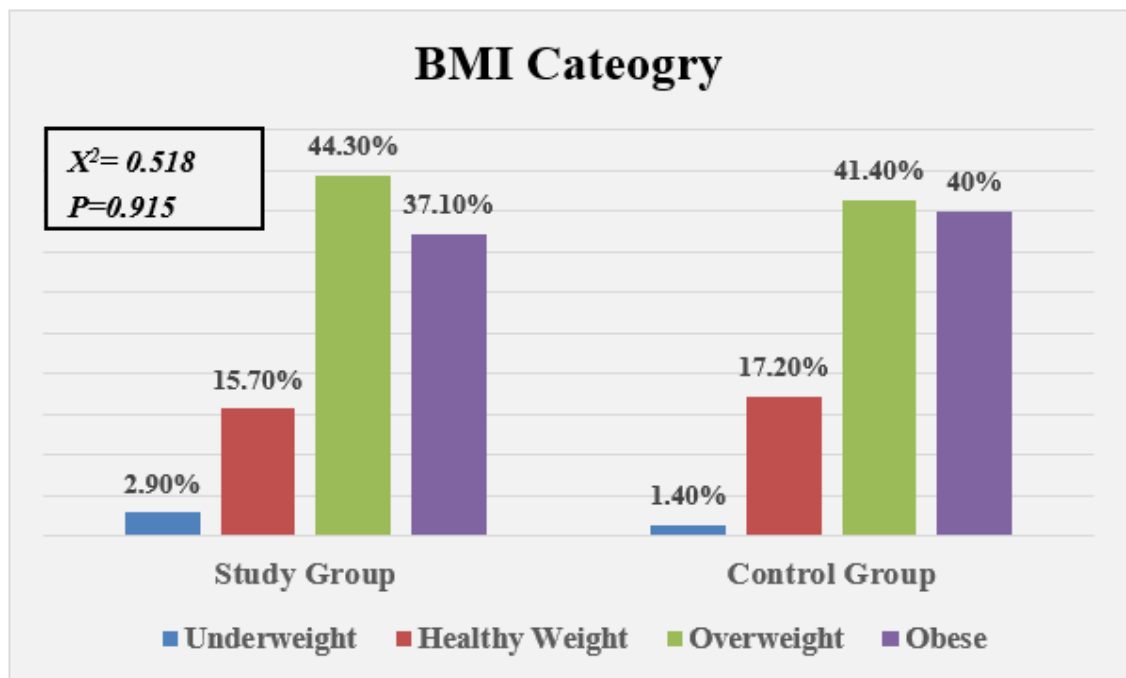
t: Independent Samples

T test

Table (2): Medical data of the control and study groups (n=140)

Variables	Control Group (n=70)		Study Group (n=70)		X^2 or t	P - value
	No.	%	No.	%		
History of Abdominal Surgeries						
- No	58	82.9	61	87.1	0.504	0.478
- Yes	12	17.1	9	12.9		
Body Mass Index (BMI)						
Mean $\pm$ SD	29.15 $\pm$ 4.55		28.48 $\pm$ 4.41		$t=0.880$	0.380
Bowel Elimination Pattern (Weekly)						
- < 3 times	18	25.7	20	28.6	0.144	0.704
- $\geq$ 3 times	52	74.3	50	71.4		
Co-morbidities						
- None	42	60.0	44	62.9	0.805	0.669
- Hypertension	13	18.6	15	21.4		
- Diabetes Mellitus	15	21.4	11	15.7		
Preoperative Fasting Hours						
- 6-8 hours	56	80.0	53	75.7	0.373	0.541
- More than 8 hours	14	20.0	17	24.3		

SD: Standard Deviation

 X^2 : Chi-Square test t : Independent Samples T test**Figure (2): Percentage distribution of the studied groups according to BMI Category**

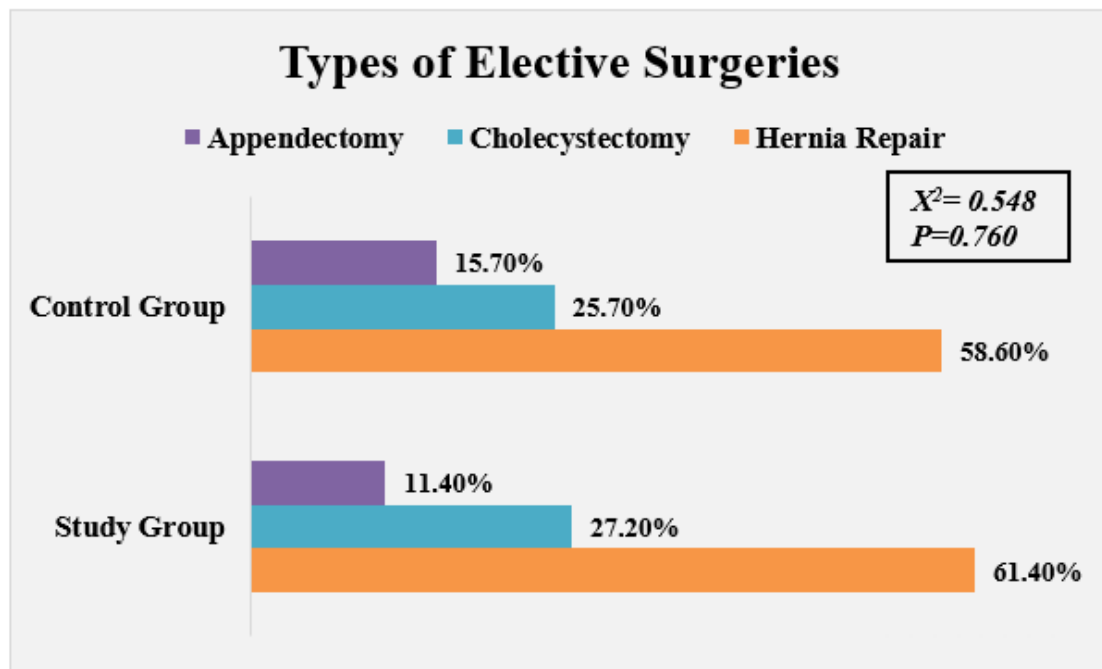


Figure (3): Percentage distribution of the studied groups according to types of elective surgeries

Table (3): Comparison of postoperative gastrointestinal recovery indicators between the control and study groups (n=140)

Variables	Control Group (n=70)	Study Group (n=70)	<i>U</i>	<i>P-value</i>
Time to first bowel sound (hours)				
Mean ± SD	6.68 ± 1.59	5.82 ± 1.43	1715.50	0.002*
Min.-Max.	4-9	4-8		
Time to first feeling of hunger (hours)				
Mean ± SD	13.68 ± 2.98	9.09 ± 1.74	492.50	<0.001*
Min.-Max.	9-18	6-12		
Time to first passage of flatus (hours)				
Mean ± SD	18.31 ± 2.02	16.01 ± 2.16	1110.50	<0.001*
Min.-Max.	15-23	12-20		
Time to first defecation (hours)				
Mean ± SD	25.99 ± 3.00	24.11 ± 3.04	1734.00	0.002*
Min.-Max.	22-36	20-30		

P*: P-value "significant at <0.05"

SD: Standard Deviation

U: Mann-Whitney test

Table (4): Comparison of the occurrence of postoperative gastrointestinal symptoms between the control and study groups across postoperative time intervals (n=140)

Variables	Control n (%)	Study n (%)	X ²	P-value
Nausea				
- 0–<4 hours	24 (34.3%)	13 (18.6%)	4.45	0.035*
- 4–<8 hours	20 (28.6%)	8 (11.4%)	6.43	0.011*
- 8–<12 hours	15 (21.4%)	5 (7.1%)	5.83	0.016*
- 12–24 hours	12 (17.1%)	2 (2.9%)	7.94	0.005*
Gagging				
- 0–<4 hours	19 (27.1%)	9 (12.9%)	4.46	0.035*
- 4–<8 hours	14 (20.0%)	4 (5.7%)	6.38	0.012*
- 8–<12 hours	8 (11.4%)	1 (1.4%)	5.82	0.016*
- 12–24 hours	4 (5.7%)	0 (0.0%)	4.12	0.042*
Vomiting				
- 0–<4 hours	20.0 (28.6%)	10 (14.3%)	4.24	0.039*
- 4–<8 hours	15 (21.4%)	5 (7.1%)	5.83	0.016*
- 8–<12 hours	12 (17.1%)	3 (4.3%)	8.05	0.014*
- 12–24 hours	9 (12.9%)	1 (1.4%)	6.89	0.009*
Abdominal distension				
- 0–<4 hours	9 (12.9%)	2 (2.9%)	4.83	0.028*
- 4–<8 hours	19 (27.1%)	7 (10.0%)	6.80	0.009*
- 8–<12 hours	25 (35.7%)	11 (15.7%)	7.33	0.007*
- 12–24 hours	21 (30.0%)	7 (10.0%)	8.75	0.003*

P*: P-value "significant at <0.05"

X2: Chi-Square test

Discussion

According to the current study, patients in the study group exhibited significantly faster postoperative gastrointestinal recovery and fewer occurrences of postoperative gastrointestinal symptoms than those in the control group. Significant reductions were observed in the mean times to first bowel sounds, first feeling of hunger, first passage of flatus, and first defecation in the

study group compared to the control group. The observed improvement may be attributed to the physiological effects of sham feeding. The most plausible physiological explanation is the activation of the cephalic-vagal reflex through sham feeding. Mastication without nutrient ingestion stimulates vagal efferent pathways, which in turn enhance gastrointestinal hormone release that

stimulates the enteric nervous system and revitalizes intestinal motility (**Gungorduk & Ozdemir, 2021**).

According to the study's findings, the study and control groups are comparable at the first assessment, as there were no statistically significant differences between the two groups regarding all personal data, as well as medical data. It is consistent with the findings of **Tuscharoenporn et al. (2024)** systematic review and meta-analysis of randomized controlled trials, which reported that the personal and clinical characteristics of patients assigned to study and control groups were generally comparable.

In the same vein, a recent randomized controlled trial about the “Effect of Chewing Gum on Postoperative Gastrointestinal Recovery in Patients Undergoing Abdominal Surgery” conducted by **LN et al. (2026)** supported the current study findings, as they found no statistically significant differences in relation to the studied groups' baseline demographic, clinical characteristics, and surgical profile in terms of age, gender, and types of surgeries. Additionally, a meta-analysis of randomized controlled trials conducted by **Sinz et al. (2023)** found that the included studies generally compared clinically similar intervention and control groups, which allowed a reliable assessment of the independent effect of gum

chewing on postoperative bowel recovery. Taken together, the study and control groups' similar personal and medical data show that group allocation was successful and reduced the impact of potential confounding variables. Consequently, the notable significant differences in gastrointestinal recovery can be more confidently attributed to the effect of chewing gum rather than to variations in patients' personal or medical data.

Effect of chewing sugar-free gum on gastrointestinal recovery indicators.

The current study showed that chewing sugar-free gum effectively enhanced gastrointestinal recovery indicators. Participants in the study group showed earlier return of bowel sounds, earlier feeling of hunger, reduced time to first passage of flatus, and defecation. Therefore, the first study hypothesis is supported. It is consistent with a recent study by **Bagheri et al. (2026)**, which found that chewing gum significantly enhanced postoperative gastrointestinal recovery as compared to routine care, with a shorter time to first gas passage and stool. As well, a former study by **Altraigey et al. (2020)** reported that chewing gum significantly improved intestinal recovery with faster onset of bowel movements, first audible intestinal sounds, passage of flatus, and passage of stool in their randomized

controlled trial evaluating the "Effect of Gum Chewing on the Return of Bowel Motility after Planned Cesarean Delivery."

Comparable evidence was also reported in a meta-analysis of randomized controlled trials conducted by **Roslan et al. (2020)**, which quantitatively analyzed ten trials. The authors demonstrated that chewing gum significantly reduced the occurrence of postoperative ileus compared with standard care, with a significant reduction observed in time to passage of flatus and time to defecation, confirming a consistent improvement in postoperative gastrointestinal recovery outcomes. Further support is provided by a recent umbrella review on the effect of chewing gum in adult patients after gastrointestinal surgery, conducted by **Lew et al. (2025)**, which concluded that gum chewing may significantly improve postoperative recovery by reducing time to first flatus and time to first bowel movement, thereby reinforcing its role as a simple and effective adjunct within enhanced recovery protocols.

Moreover, **Wang et al. (2026)** reported that chewing gum significantly reduced time to first flatus and time to first bowel movement, with an additional reduction in postoperative bowel obstruction in their systematic review and meta-analysis. Similarly, **Yin et**

al. (2023) reported in a meta-analysis of randomized controlled trials involving patients undergoing gynecological cancer surgery that gum chewing significantly reduced postoperative ileus, shortened time to first flatus and first bowel movement, and decreased hospital stay compared with routine care. In addition, gum chewing significantly decreased postoperative ileus, shortened the time to first flatus and first bowel movement, and decreased hospital stay when compared to routine care.

These findings are consistent with a study conducted by **Hsu and Szu (2022)**, which showed that the intervention group's time to first flatus and stool was significantly shorter. An Egyptian study titled "The Effect of Chewing Gum on Postoperative Outcome of Cesarean Section," in which **Abdel Hameed et al. (2025)** found that the study group had much shorter postoperative gastrointestinal recovery times than the control group. This included earlier bowel sound return, earlier flatus passage, earlier fluid intake, and improved comfort. In the same direction, **Gupta et al. (2025)** discovered that chewing gum following laparoscopic cholecystectomy successfully promotes early bowel peristalsis and shortens the duration of postoperative ileus, as evidenced by an earlier return of bowel sounds and an overall

quicker recovery of the gastrointestinal tract.

Effect of chewing sugar-free gum on the occurrence of postoperative gastrointestinal symptoms.

The findings of the present study showed statistically significant differences in the occurrence of postoperative gastrointestinal symptoms between the study and control groups in all postoperative time intervals (0-<4 hours, 4-<8 hours, 8-<12 hours, and 12-24 hours). The study group consistently reported fewer occurrences of nausea, vomiting, gagging, and abdominal distension than the control group. The profound reduction in postoperative gastrointestinal symptoms observed comprehensively in this study carries major, transformative implications for fundamentally improving overall patient comfort and optimizing the trajectory of surgical recovery. Severe abdominal distension and persistent, intractable nausea are frequently cited by postoperative surgical patients as significantly more physically distressing and psychologically debilitating than the acute incisional pain itself (**Xiang et al., 2022**).

The findings of the study are in accordance with previous research that evaluated the effects of chewing gum on nausea, vomiting, and intestinal Functions of surgical patients, conducted by **Bayraktar**

and Kutlu (2021), which showed that chewing gum significantly enhanced intestinal function after surgery, lessened gastrointestinal symptoms like nausea and vomiting, and promoted an earlier recovery of bowel activity when compared to standard postoperative care. Further support is provided by the systematic review and meta-analysis about the “Effectiveness of Chewing Gum on Nausea and Vomiting Following Post-procedure”, conducted by **Liao et al. (2024)**, which pooled randomized trials and found that chewing gum significantly reduced postoperative vomiting.

Similar results were also reported by **Abdel Hameed et al. (2025)**, who found that patients who chewed gum after surgery had better recovery patterns and less gastrointestinal discomfort, including fewer postoperative symptoms like nausea, vomiting, and abdominal distension, than control groups. **Darvall et al. (2025)**, on the other hand, found that chewing gum was not better than standard antiemetic therapy for postoperative nausea and vomiting in a multicenter randomized trial involving female surgical patients. The gum-chewing group had a longer time to symptom resolution, and a lower percentage of patients achieved complete response, indicating that its antiemetic effect may be limited when compared with pharmacological interventions.

Overall, the accumulated evidence from the present study and supporting literature confirms that chewing gum is an effective, safe, and low-cost adjunct intervention that enhances postoperative gastrointestinal recovery following elective abdominal surgery. It consistently accelerates the return of bowel function and reduces selected gastrointestinal symptoms, thereby contributing to improved postoperative outcomes and patient comfort (Kadirogullari et al., 2022; Prasad et al., 2025; Sammut et al., 2021). These findings support the integration of chewing gum into standardized enhanced recovery after surgery protocols as a simple, evidence-based nursing intervention.

Conclusion

Chewing sugar-free gum significantly enhances postoperative gastrointestinal recovery following elective abdominal surgeries. It accelerates the return of bowel function, including bowel sounds, appetite, passage of flatus, and defecation. Additionally, chewing sugar-free gum is associated with a reduction in selected postoperative gastrointestinal symptoms, including nausea, gagging, vomiting, and abdominal distension, contributing to improved patient comfort and overall postoperative recovery.

Recommendations

For clinical practice:

-Integrate sham feeding via sugar-free chewing gum as an evidence-based, non-pharmacological adjunct within standardized Enhanced Recovery After Surgery protocols. This safe and cost-effective intervention should be routinely prescribed to stimulate cephalic-vagal activation, thereby accelerating gastrointestinal motility and mitigating the risk of postoperative ileus in patients undergoing elective abdominal surgeries.

For nursing administration and education:

-Nursing leadership should institutionalize standardized clinical pathways that incorporate gum-chewing regimens into routine postoperative care plans. To ensure clinical efficacy and patient safety, structured educational programs must be developed for nursing staff. Training should focus on identifying appropriate patient candidates, conducting baseline assessments for aspiration risk or dental contraindications, monitoring compliance, and documenting gastrointestinal milestones accurately.

For future research:

- Further research with larger sample sizes is recommended to standardize the optimal timing, frequency, and duration of gum chewing across different surgical populations.
- While the safety and feasibility of this intervention are well-supported, future multi-center randomized

controlled trials (RCTs) with larger, diverse cohorts are warranted.

- Future investigations should focus on establishing standardized, evidence-based protocols.
- Additionally, research should explore the efficacy of this intervention across specific surgical subspecialties (e.g., colorectal vs. gynecological oncology laparotomies) and evaluate its direct impact on health economic outcomes, such as hospital length of stay and readmission rates.

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Conflict of interest :

No conflict of interest related to this study.

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Efficacy of Care Bundle Regarding Blood Transfusion Errors on Nurses' Performance

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Abstract

Background: Blood transfusion errors remain a significant challenge in healthcare settings and can result in serious adverse consequences for patients. Nurses play a pivotal role in ensuring the safety of blood transfusion procedures. **Aim:** Evaluate the efficacy of care bundle regarding blood transfusion errors on nurses' performance. **Design:** Quasi experimental research design. **Setting:** Internal Medicine Departments and Hematology Unit of Tanta Main University Hospital. **Subjects:** A convenience sampling of all (50) nurses working in the mentioned setting. **Tools:** Two tools were used; **Tool I:** Nurses' Knowledge Regarding Blood Transfusion Errors Structured Interview Questionnaire consisted of two parts, **Part 1:** Socio-demographic data, **Part 2:** Nurses' knowledge regarding blood transfusion errors, **Tool II:** Nurses' Practice Observational Checklist divided into three main phases; pre, during and post-transfusion phase. **Results:** The findings revealed a highly statistically significant improvement in nurses' knowledge and practices immediately after implementation of the care bundle and at the two-week follow-up compared with the pre-program assessment ($p < 0.001$). **Conclusion:** The care bundle was effective in improving nurses' knowledge and practices regarding blood transfusion errors and contributed positively to enhancing the quality and safety of blood transfusion care. **Recommendation:** Continuous in-service educational programs, periodic competency assessments, and regular monitoring of blood transfusion practices are recommended to sustain and further improve nurses' performance.

Keywords: Blood transfusion errors, Care bundle, Nurses' performance.

Introduction

Although blood transfusions can save lives, they can also have fatal

outcomes if they go wrong. Since only one-third of unfavorable events have obvious clinical effects and hospitals do not report all incidents to registration services, the true incidence of transfusion errors is likely underreported. Transfusion is a complicated procedure with several crucial components that present opportunities for mistakes. Thus, mistakes made during patient identification, sample labeling, blood component prescription, laboratory testing, collection, and administration culminate in acute hemolysis due to ABO incompatibility **(Mohd Noor et al., 2021)**.

Errors in transfusion medicine can be caused by inadequate knowledge or incomplete information, but they are more often caused by distraction, exhaustion, or inattention. Medical professionals are responsible for prescribing blood components; however, nursing staff may be assigned to complete the request form, perform pre-transfusion sampling, and administer the component **(Brown & Brown, 2023)**.

Nurses play a crucial role in blood transfusion services. Their responsibilities include monitoring patients experiencing adverse reactions, administering blood products, sampling prior to transfusion, keeping accurate records, and being aware of the warning signs of blood product transfusion.

Additionally, nurses use their knowledge to support patient education and informed consent for transfusions **(Lu, Lezzar, Vörvá, & Shevkoplyas, 2019)**.

A structured educational care bundle has been proven to transform clinical performance by equipping frontline nurses with the necessary clinical skills, critical judgment, and evidence based knowledge required to handle complex transfusion procedures accurately and safely. Educational bundles serve as structured decision support mechanisms that streamline multi step protocols into cohesive, interlocking tasks. By enforcing the strict principle of all compliance across clinical units, these interventions significantly reduce the incidence of preventable transfusion errors, optimize immediate patient outcomes, and promote a resilient culture of safety within healthcare institutions **(Aloweni et al., 2021; Shastry et al., 2023)**.

Important strategies to prevent and early detect blood transfusion errors:

1. Verification of Physician's Order: The clinical transfusion pathway must always initiate with a valid, comprehensive physician's order that strictly specifies the required blood component, the precise volume to be infused, the requested rate of administration, and any specific prophylactic pre medications. This crucial baseline

step ensures that the transfusion therapy is clinically justified, minimizes the inappropriate utilization of biological resources, and guarantees that the intervention is tailored exactly to the recipient's dynamic physiological needs. Frontline nurses must validate this order against the patient's active electronic health records to confirm that the clinical trigger criteria are met before requesting any product from the laboratory, thereby preventing unnecessary exposure to transfusion related hazards (Ali & Abdalrahim, 2022; Association for the Advancement of Blood & Biotherapies [AABB], 2023).

2. Meticulous Patient Identification: Confirming positive patient identification through two independent identifiers specifically the patient's full name, unique hospital identification number, and date of birth must be executed systematically before blood administration. Bedside misidentification remains one of the most common and fatal causes of administrative transfusion errors, frequently leading to irreversible ABO incompatibility. Professional nursing protocols dictate that these identifiers must be verified verbally by asking the patient to state their details, while concurrently cross matching the patient's wristband details against the formal medical charts. This dual verification

mechanism serves as an absolute barrier against identity mix ups in busy medical surgical wards (Ali & Abdalrahim, 2022; British Society for Haematology [BSH], 2022).

3. Blood Sample Collection and Labeling: Blood specimens intended for compatibility testing and cross matching must be collected under strict aseptic conditions to prevent baseline contamination and labeled immediately at the patient's bedside. Nurses must never engage in the dangerous shortcut of pre labeling collection tubes prior to drawing blood, as this practice exponentially amplifies the risk of Wrong Blood in Tube (WBIT) errors. Meticulous alignment between the tube label, the patient's actual bedside presence, and the laboratory requisition form is mandatory to ensure that the blood bank receives an accurate biological sample, thereby preventing subsequent laboratory testing from generating a compatible unit that is mismatch fatal to the actual recipient (Bolton-Maggs, 2021; Mo et al., 2023).

4. Compatibility Testing and Cross-matching: Laboratory staff must perform precise ABO grouping, Rh typing, and serological cross matching between the donor's red blood cells and the recipient's plasma to eliminate any risk of immune incompatibility. This multi layered laboratory testing phase serves as a crucial systematic check point

designed to intercept unexpected antibodies that could trigger acute intravascular hemolysis. For individuals presenting with chronic transfusion requirements, such as those diagnosed with Thalassemia, extended antigen matching is highly integrated into modern cross matching techniques. Nurses must understand these laboratory parameters to effectively interpret compatibility slips before initiating the bedside infusion line (AABB, 2023; El-Ghamrawy et al., 2022).

5. Technical Inspection of Blood Components: Prior to hanging any blood product, the nurse bears ultimate professional accountability for conducting a meticulous physical inspection of the blood component bag. This process involves verifying the structural integrity of the container, checking the formal expiration date, and examining the product for abnormal color changes, unexpected clots, turbidity, or potential micro leaks. Any compromised, damaged, or expired blood units must be discarded immediately and reported to the blood bank, as transfusing a physically degraded or contaminated component can rapidly introduce bacterial pathogens into the patient's circulation, triggering severe septic shock or immediate hemolytic reactions (AABB, 2023; Hassan et al., 2022).

6. Bedside Double Check Verification: At the immediate point of care, a formal bedside double check must be performed independently by two qualified nurses or a nurse and a physician before the infusion line is opened. This final barrier requires the simultaneous, active verification of the patient's identity, the unique blood bag donor number, the component type, the compatibility label, and the accompanying administrative documentation. Bypassing this double check or engaging in passive confirmation without independent reading represents a critical safety breakdown. Adherence to this strict dual verification mechanism effectively intercepts near miss errors, serving as the last line of defense against administering the wrong blood unit to the wrong patient (Bolton-Maggs, 2021; Hassan et al., 2022).

7. Recording of Baseline Vital Signs: A comprehensive assessment of the patient's physiological parameters specifically temperature, blood pressure, pulse, respiratory rate, and oxygen saturation must be recorded immediately before starting the transfusion. These baseline vital signs provide an essential, customized reference point that allows healthcare providers to differentiate between preexisting clinical symptoms and the early

manifestations of acute transfusion reactions. Failure to document these parameters accurately renders subsequent clinical monitoring ineffective, preventing the timely identification of subtle febrile or hemodynamic changes that occur during the initial phase of fluid administration (**Hassan et al., 2022; Soliman et al., 2023**).

8. Initiation and Bedside Monitoring: The blood transfusion must be initiated at a controlled, slow rate, typically restricted to 2 mL/min during the initial fifteen minutes of administration. Frontline nurses must maintain an uninterrupted bedside presence during this Golden Window of Vigilance, as the most severe, life threatening immunological adversities, such as acute anaphylaxis or hemolytic crises, manifest early after exposure to a few milliliters of a foreign biological product. Observing the patient closely for subjective and objective changes during this phase allows for immediate therapeutic cessation before a lethal volume of incompatible blood is infused (**Ali & Abdalrahim, 2022; Shastri et al., 2023**).

9. Continuous Documentation and Observation: Following the initial critical phase, patient evaluation must be conducted systematically at 15 minutes, 30 minutes, hourly, and at the final completion of the transfusion. Frontline nurses must maintain meticulous documentation

of vital sign changes, fluid balances, and clinical responses within the permanent medical charts. Early clinical recognition of abnormal symptoms such as low grade fever, severe rigors, dyspnea, flank back pain, generalized urticaria, or sudden hypotension mandates immediate discontinuation of the blood product, keeping the IV-line open with normal saline, and rapid notification of the medical team (**Hassan et al., 2022; Soliman et al., 2023**).

10. Post Transfusion Care and Surveillance: Upon completion of the procedure, the nurse must accurately document the exact termination time, the total volume transfused, the patient's overall tolerance, and the post transfusion vital signs. Used blood bags and administration sets must be disposed of according to strict biomedical waste and infection control policies. Furthermore, any suspected adverse events must be reported directly to institutional hemovigilance systems, blood banks, and infection surveillance committees. Participating in these reporting systems fosters hospital wide accountability, drives continuous safety audits, and enhances systemic risk mitigation protocols across all medical surgical units (**Aloweni et al., 2021; Soliman et al., 2023**).

Additionally, according to modern clinical surveillance frameworks, every healthcare facility performing

biological infusions is systematically required to submit at least one annual institutional facility survey, which provides detailed baseline information regarding the total transfusion activities and compliance metrics within the institution. This comprehensive survey acts as a continuous quality control mechanism, ensuring that hospital administrations are actively engaged in auditing, monitoring, and critically reviewing their bedside transfusion practices to eliminate operational variance (**Bolton-Maggs, 2021; Kacker et al., 2023**).

Therefore, the primary objective of this study was to evaluate the efficacy of care bundle regarding blood transfusion errors on nurses' performance at Tanta Main University Hospital. By exploring the immediate and long-term behavioral transitions triggered by this care bundle, alongside the modulating effects of nurses' socio-demographic characteristics, this research aims to provide an empirical blueprint for institutional protocol rollouts designed to enhance clinical standards, foster a culture of patient safety, and advance safe transfusion management.

The aim of the study was to:

Evaluate the efficacy of care bundle regarding blood transfusion errors on nurses' performance at Tanta Main University Hospital.

Research hypothesis:

Nurses' performance who participate in the care bundle regarding blood transfusion errors are expected to be improved.

Subjects and Method

Study design:

Quasi experimental study design was used in this study.

Study settings:

The present study is conducted at Internal Medicine Departments and Hematology Unit at Tanta Main University Hospital and the Psychiatric Neurology Centre.

Study subjects:

A convenience sample of 50 nurses; 27 from internal medicine department and 23 from hematology unit were included in the present study.

Tools of data collection:

Two tools were used for data collection in the study.

Tool (I): Nurses' Knowledge Regarding Blood Transfusion Errors Structured Interview Questionnaire: it was developed by the researcher to collect data after extensive review of related references (**Abd Elhy & Kasemy, 2017; Kumarage et al., 2017; Kozier et al., 2018**).

It consisted of two parts:

Part one: Socio-demographic data, it included pertinent data about nurses' code, age, gender, educational qualification, years of experience, years of experience in blood transfusion, and previous

participation in transfusion-related training programs.

Part two: Nurses' knowledge regarding blood transfusion errors, which includes multiple-choice and true/false questions that assessed nurses knowledge related to:

-Pre-transfusion responsibilities (patient identification, checking Investigation, monitoring vital signs, Cross-matching, blood requisition, consent).

-Intra transfusion procedure: (rate of administration, monitoring Vital signs, monitoring patient, reaction identification, and actions taken during reactions).

-Post-transfusion care (documentation, observation for delayed reactions, management of transfusion-related complications, and notification of the blood bank).

Tool II: Nurses' Practice Observational Checklist

This tool was developed by the researcher after an extensive review of related literature (**Mohammad & Moghaz, 2019; Aly & Ahmed, 2021; Shahin, 2023; Ragheb, 2024**) to assess nurses' actual performance related to blood transfusion and consisted of 35 steps divided into three main categories:

Pre transfusion procedures: Which include 13 practices related to patient preparation, prepare necessary equipment and IV line, Explain the procedure to the patient, IV line checking, and verification

procedures, Check blood bag label, Inspect blood for clots/discoloration, Wash hands and put on clean gloves.

During transfusion procedures: Which include 9 practices related to; monitor vital signs, Complete identification and verification (Blood group type, RH, Expiration date, patient's name), Document the start time of transfusion, identification of transfusion reactions, and appropriate actions in case of adverse reactions.

Post-transfusion procedures: Which include 13 practices related to Check baseline vital signs (Temperature, Blood pressure, Respiration, Pulse) immediately after completion of blood transfusion and then periodically, documentation the time the blood transfusion was completed, the amount of blood transfused and the duration of the transfusion, Record administration of blood and patient's response, follow-up for delayed reactions, and reporting to the blood bank if any.

Method

1. An Official Permission to carry out the study was obtained from the responsible authorities.

2. Ethical consideration:

-Ethical approval of Faculty of Nursing Scientific Research and ethical committee was obtained; Code No (696-6-2025).

-Written consent was obtained from every nurse included in this study after an explanation of the aim of the

study and assuring them of confidentiality of collected data.

-Confidentiality and anonymity were maintained, and the right of withdrawal was reserved.

-Privacy of the studied nurses was maintained.

3. All tools were developed by the researcher after extensive review of the relevant and most updated literature.

The developed tools were tested for content validity for clarity and applicability by nine experts in the field for content validity, clarity and applicability.

5. A pilot study was conducted before actual study on 5% of studied nurses to test the applicability of the tools and to determine any obstacles that may be encountered during the period of data collection. Minor needed modifications were done and pilot samples were included in the study.

6. Suitable reliability test was done. Test retest reliability was applied on the previously mentioned tools.

Reliability for Tool I part II: Nurses' Knowledge about Blood Transfusion is 0.729 and Tool II: Nurses' Practices Regarding Blood Transfusion is 0.719.

7. Data was collected over a period of 5 months, starting from September 2025 to January 2026.

8. The study was conducted at four educational phases which include: assessment, planning, implementation and evaluation.

Phase1: Assessment Phase:

- **Knowledge Assessment:** Nurses' baseline knowledge about blood transfusion was assessed using Tool I Part 1 and 2 prior to the care bundle.

-**Practice Assessment:** Nurses' actual performance related to blood transfusion procedures was observed and documented using Tool II.

Phase 2: Planning Phase:

Based on the data collected during the assessment phase and a review of recent literature, researcher developed a tailored care bundle addressing the nurse's performance related to blood transfusion errors. The educational content was reviewed and validated by a panel of experts in medical-surgical nursing. The educational materials included Illustrated booklets, PowerPoint presentations, Videos demonstrating correct transfusion practices, Posters and visual aids.

Phase 3: Implementation phase

The Care Bundle consisted of five training sessions, two theoretical sessions and three practical sessions which carried out over a period of two weeks.

Sessions were conducted to the studied nurses in small groups (5–7 nurses) in the nursing room at the Internal Medicine Department and Hematology Unit, Tanta Main University Hospital.

Session 1: (Theoretical) An introduction to Blood Transfusion and Safety Principles.

Session 2: (Theoretical) Transfusion Nursing Responsibilities.

Session 3: (Practical) Nursing responsibilities pre and During Blood Transfusion.

Session 4: (Practical) Post-Transfusion Nursing Responsibilities.

Session 5: (Practical) Responsibility of nurses regarding blood transfusion errors.

Evaluation Phase:

Nurses' knowledge and practice were evaluated immediately and two weeks' post-implementation of care bundle using the same tools (Tool I part II & Tool II). The effectiveness of the care bundle was determined by comparing pre- and post-intervention scores.

Statistical analysis:

Data was analyzed using SPSS software. Categorical variables were evaluated using the Chi-square (χ^2) test and Friedman test (Fr) to compare practice levels across the three study periods. Continuous data and mean practice scores were analyzed using repeated measures ANOVA (F-test), with sequential pair-wise comparisons conducted via the Post Hoc Test (adjusted Bonferroni). Statistical significance was securely established at $p \leq 0.05$.

Results

Table (1): Represents the Socio-demographic characteristics of studied groups. It presents that more than half of the nurses (62%) were in the age group of 30 to less

than 40 years. Regarding gender, the vast majority (94%) was females, and 92% were married. In terms of educational level, 56% held a Bachelor's degree in nursing, while 38% had Technical Institute diploma.

Regarding professional experience, 44% of the nurses had from 5 to 10 years of experience as a nurse, and 86% had less than 10 years of experience specifically in blood transfusion or medical units. Notably, a high percentage of the studied nurses (96%) had not attended any previous training programs related to blood transfusion.

Table (2): Represent the distributions of nurses' mean knowledge scores regarding blood transfusion error pre and post the care bundle. The results indicate that the mean knowledge score significantly increased from 11.76 ± 2.83 pre care bundles to a peak of 18.86 ± 1.46 immediately post care bundles. **At the two-week follow-up,** the mean score of knowledge remained high at 17.22 ± 2.41 , showing a slight decrease compared to the immediate post-care bundle, yet remaining much higher than the baseline.

Regarding the comparison between specific periods, a highly statistically significant improvements were found between the pre and immediate post care bundles, as well as between the pre and two-week follow up and between immediate post care bundle

and two week follow up: $P=0.001$ each indicating a slight decline in knowledge retention over time but maintaining an overall significant improvement compared to pre-educational bundles. **The table also shows** a highly statistically significant difference in the mean knowledge scores of the studied nurses throughout the study periods ($P<0.001$).

Table (3): Represents the distribution of the studied nurses' Total Knowledge Levels Regarding Blood Transfusion across the Study Periods Pre the care bundle, it proves that less than half of the nurses (46%) had a poor knowledge level, while only 18% achieved a good level. **Immediately following the care bundle,** a remarkable shift was observed as the majority of the nurses (98%) attained a good knowledge level, and the poor level completely disappeared (0%).

At two-week follow-up, although there was a slight decline, 82% of the nurses maintained a good knowledge level, compared to only 2% in the poor category. **Moreover,** same table demonstrated that there were highly significant differences of studied nurses' total knowledge throughout the study periods where $p=0.001$.

Table (4): Represents the Comparison of Nurses' Total Practice Mean Scores Across the Study Periods. It represents that Pre the care bundle implementation,

nurses demonstrated lowest practice scores across all study periods: before (9.60 ± 1.53), during (6.30 ± 1.45), and after blood transfusion (9.08 ± 1.96), resulting in an overall baseline practice mean score of (24.98 ± 2.95).

Immediately post the care bundle, mean scores increased significantly across all study periods ($p1 < 0.001$). The practice scores before transfusion jumped to (12.46 ± 0.76), during transfusion rose to (8.40 ± 0.86), and after transfusion reached (12.04 ± 1.05). Consequently, the overall post-intervention practice score peaked at (32.90 ± 2.06).

At the two-week follow-up, despite a slight and expected decline compared to the immediate post care bundles results ($p3 < 0.001$), the nurses' performance remained highly sustained and significantly higher than the baseline levels ($p2 < 0.001$). The retention scores were recorded at (11.32 ± 1.33) for before, (7.88 ± 0.92) for during, and (11.06 ± 1.62) for after transfusion phases, maintaining an overall practice mean score of (30.26 ± 2.97).

This table also displays a highly statistically significant improvement in the mean scores of nurses' practices regarding blood transfusion across the three study periods ($p < 0.001$).

Table (5): Represents the distribution of Nurses According to Their Total Level of Overall

Practices. It demonstrates that **Pre the care bundles**, the majority of the studied nurses demonstrated unsatisfactory overall performance, with 56% at a fair level and 10% at a poor level, while only 34% achieved a good level. This baseline deficiency was particularly evident during transfusion, where 36% of nurses scored at a poor level.

Immediately post the care bundles, a massive shift occurred as overall good practices surged to 98%, with 0% remaining at a poor level. Individually, good practice levels reached 100% before transfusion, 94% during transfusion, and 98% after transfusion.

At the two week follow up, despite a slight shifting of scores, excellent retention was maintained; overall good practices remained very high at 95%, with 88% before, 90% during, and 84% after transfusion categorized as good. These results demonstrate a highly significant improvement in nurses' total levels of practice regarding blood transfusion after implementing the care bundle throughout the study period ($P < 0.001$).

Table (6): Represents the relation between Knowledge and Socio demographic Data in each period. It reveals that in the pre care bundles, no statistically significant differences were found based on age ($p = 0.547$), gender ($p = 0.790$), education ($p = 0.325$), or experience ($p = 0.292$).

Similarly, in the immediate post the care bundles, differences remained non-significant for all variables, including age ($p = 0.540$) and experience ($p = 0.510$), proving the bundle's uniform efficacy.

Moreover' same table presents that at the two week follow up, most variables showed no significant relation ($p > 0.05$) except for attendance of previous training, which exhibited a statistically significant relation ($p = 0.024$) where nurses with no previous training achieved a higher retention mean score (17.38 ± 2.33) than those with prior training (13.50 ± 0.71).

Table (7): Represents the relation between Practice and Socio-demographic Data in each period. It proved that in the pre and immediate post the care bundles, no statistically significant differences were found across all nurses' socio-demographic data, including age ($p = 0.876$, $p = 0.901$), gender ($p = 0.990$, $p = 0.512$), and education ($p = 0.394$, $p = 0.465$), respectively showing uniform skill acquisition.

However, at the two week follow up, a highly statistically significant relation was observed regarding years of experience as a nurse ($p < 0.001$), with 5–10 years maintaining the highest practice retention (31.95 ± 2.32). Additionally, years of experience in blood transfusion unit showed a significant relation ($p = 0.005^*$), where nurses with less than

10 years of experience demonstrated significantly higher retention scores (30.72 ± 2.87) than those with longer service years.

Table (1): Distribution of the studied Nurses' according to their socio-demographic data (n = 50)

	No.	%
Age		
21 – <30 years	13	26.0
30 – <40 years	31	62.0
40 – <50 years	4	8.0
50 years or above	2	4.0
Gender		
Male	3	6.0
Female	47	94.0
Marital Status		
Married	46	92.0
Single	2	4.0
Divorced	0	0.0
Widowed	2	4.0
Educational level		
Diploma	3	6.0
Technical Institute	19	38.0
Bachelor	28	56.0
Master	0	0.0
Doctorate	0	0.0
Years of experience as a nurse		
<5 years	11	22.0
5 - 10 years	22	44.0
>10 years	17	34.0
Years of experience in blood transfusion/medical units		
<10 years	43	86.0
10 years or more	7	14.0
Attendance of previous training program related to blood transfusion		
No	48	96.0
Yes	2	4.0
If yes		
Name of the training program		
Blood transfusion course	1	50.0
Blood transfusion precaution	1	50.0
Duration		
3 Days	2	100.0

Table (2): Distribution of nurses' mean knowledge scores regarding blood transfusion error pre and post the care bundle (n=50)

Overall Knowledge Mean Scores (0 – 20)					
	Pre	Immediately Post	After 2 Weeks	F	p
Min. – Max.	6.0 – 18.0	13.0 – 20.0	11.0 – 20.0	140.049*	<0.001*
Mean ± SD.	11.76 ± 2.83	18.86 ± 1.46	17.22 ± 2.41		
Sig. bet. Periods	p1<0.001*, p2<0.001*,p3=0.001*				

*: Statistically significant at $p \leq 0.05$

P1: p value for comparing between pre and immediate after

P2: p value for comparing between pre and two-weeks after

P3: p value for comparing between immediate and two-weeks after

Table (3): Distribution of studied nurses' total knowledge level regarding blood transfusion pre and post the care bundle (n = 50)

Levels of	Pre		Immediately Post		After 2 Weeks		Fr	p
	No.	%	No.	%	No.	%		
Good ($\geq 75\%$)	9	18	49	98	41	82	70.652*	<0.001*
Fair (60 – 74%)	18	36	1	2	8	16		
Poor (<60%)	23	46	0	0	1	2		

Fr: Friedman test

* Statistically significant at $p \leq 0.05$

Table (4): Comparison of Nurses' Total Practice Mean Scores across the Study Periods (n = 50)

	Pre	Immediate y Post	After 2 Weeks	F	p
A – Before blood transfusion (0 – 13)					
Min. – Max.	6.0 – 13.0	10.0 – 13.0	8.0 – 13.0	87.033	<0.001*
Mean ± SD.	9.60 ± 1.53	12.46 ± 0.76	11.32 ± 1.33		
Sig. bet. Periods	p ₁ <0.001*, p ₂ <0.001*, p ₃ <0.001*				
B – During blood transfusion (0 – 9)					
Min. – Max.	4.0 – 9.0	6.0 – 9.0	6.0 – 9.0	46.374	<0.001*
Mean ± SD.	6.30 ± 1.45	8.40 ± 0.86	7.88 ± 0.92		
Sig. bet. Periods	p ₁ <0.001*, p ₂ <0.001*, p ₃ =0.030*				
C – After blood transfusion (0 – 13)					
Min. – Max.	5.0 – 13.0	8.0 – 13.0	6.0 – 13.0	47.485	<0.001*
Mean ± SD.	9.08 ± 1.96	12.04 ± 1.05	11.06 ± 1.62		
Sig. bet. Periods	p ₁ <0.001*, p ₂ <0.001*, p ₃ =0.001*				
Overall Practices (0 – 35)					
Min. – Max.	18.0 – 30.0	24.0 – 35.0	23.0 – 35.0	125.33 9	<0.001*
Mean ± SD.	24.98 ± 2.95	32.90 ± 2.06	30.26 ± 2.97		
Sig. bet. Periods	p ₁ <0.001*, p ₂ <0.001*, p ₃ <0.001*				

P1: value for comparing between pre and immediate after

P2: p value for comparing between pre and two-weeks after

P3: p value for comparing between immediate and two-weeks after

Table (5): Distribution of Nurses according to their total Practice levels pre and post the care bundle (n = 50)

Levels of practice	Pre		Immediately Post		After 2 Weeks		Fr	p
	No.	%	No.	%	No.	%		
A- Before blood transfusion								
Poor (<60%)	4	8.0	0	0.0	0	0.0	32.806*	<0.001*
Fair (60% – 75%)	17	34.0	0	0.0	6	12.0		
Good (>75%)	29	58.0	50	100.0	44	88.0		
B- During blood transfusion								
Poor (<60%)	18	36.0	0	0.0	0	0.0	38.774*	<0.001*
Fair (60% – 75%)	9	18.0	3	6.0	5	10.0		
Good (>75%)	23	46.0	47	94.0	45	90.0		
C- After blood transfusion								
Poor (<60%)	9	18.0	0	0.0	1	2.0	37.077*	<0.001*
Fair (60% – 75%)	18	36.0	1	2.0	7	14.0		
Good (>75%)	23	46.0	49	98.0	42	84.0		
Overall Practices								
Poor (<60%)	5	10.0	0	0.0	0	0.0	50.667*	<0.001*
Fair (60% – 75%)	28	56.0	1	2.0	5	5.0		
Good (>75%)	17	34.0	49	98.0	45	95.0		

*: Statistically significant at $p \leq 0.05$

Table (6): Relation between mean score of nurses' Knowledge and their Socio-demographic data throughout the study period

	No.	Pre Mean $\pm$ SD.	Immediately Post Mean $\pm$ SD.	After 2 Weeks Mean $\pm$ SD.
Age (years)				
21 – <30	13	12.31 $\pm$ 2.50	18.38 $\pm$ 2.14	16.62 $\pm$ 2.90
30 – <40	31	11.71 $\pm$ 3.12	18.97 $\pm$ 1.17	17.52 $\pm$ 2.28
40 – <50	4	10.0 $\pm$ 0.82	19.25 $\pm$ 0.96	17.25 $\pm$ 2.50
>50	2	12.50 $\pm$ 2.12	19.50 $\pm$ 0.71	16.50 $\pm$ 0.71
F (p)		0.717 (0.547)	0.730 (0.540)	0.473 (0.703)
Gender				
Male	3	11.33 $\pm$ 1.15	19.67 $\pm$ 0.58	15.67 $\pm$ 4.51
Female	47	11.79 $\pm$ 2.90	18.81 $\pm$ 1.48	17.32 $\pm$ 2.27
t (p)		0.267 (0.790)	0.989 (0.328)	1.155 (0.254)
Marital Status				
Married	46	11.74 $\pm$ 2.81	18.85 $\pm$ 1.51	17.22 $\pm$ 2.38
Single	2	15.0 $\pm$ 0.0	19.50 $\pm$ 0.71	18.0 $\pm$ 1.41
Divorced	0	–	–	–
Widowed	2	9.0 $\pm$ 0.0	18.50 $\pm$ 0.71	16.50 $\pm$ 4.95
F (p)		2.401 (0.102)	0.248 (0.782)	0.188 (0.830)
Educational level				
Diploma	3	9.67 $\pm$ 2.08	19.0 $\pm$ 1.0	19.33 $\pm$ 1.15
Technical Institute	19	11.53 $\pm$ 2.93	18.74 $\pm$ 1.52	17.32 $\pm$ 2.54
Bachelor	28	12.14 $\pm$ 2.79	18.93 $\pm$ 1.49	16.93 $\pm$ 2.36
Master	0	–	–	–
Doctorate	0	–	–	–
F (p)		1.153 (0.325)	0.109 (0.897)	1.395 (0.258)
Years of experience as a nurse				
<5 years	11	12.91 $\pm$ 2.17	18.45 $\pm$ 2.34	16.55 $\pm$ 3.08
5 - 10 years	22	11.27 $\pm$ 3.28	18.86 $\pm$ 1.17	18.09 $\pm$ 1.87
>10 years	17	11.65 $\pm$ 2.47	19.12 $\pm$ 1.05	16.53 $\pm$ 2.32
F (p)		1.264 (0.292)	0.683 (0.510)	2.749 (0.074)
Years of experience in blood transfusion unit				
<10 years	43	11.95 $\pm$ 2.90	18.91 $\pm$ 1.48	17.42 $\pm$ 2.24
10 years or more	7	10.57 $\pm$ 2.07	18.57 $\pm$ 1.40	16.0 $\pm$ 3.21
t (p)		1.206 (0.234)	0.561 (0.577)	1.124 (0.298)
Attendance of previous training				
Yes	2	9.0 $\pm$ 0.0	18.50 $\pm$ 0.71	13.50 $\pm$ 0.71
No	48	11.88 $\pm$ 2.83	18.88 $\pm$ 1.48	17.38 $\pm$ 2.33
t (p)		1.425 (0.161)	0.353 (0.725)	2.326* (0.024*)

*: Statistically significant at $p \leq 0.05$

Table (7): Relation between Practice mean scores and Socio-demographic data of the studied nurses throughout the study periods

	No.	Pre Mean $\pm$ SD.	Immediately Post Mean $\pm$ SD.	After 2 Weeks Mean $\pm$ SD.
Age (years)				
21 – <30	13	24.46 $\pm$ 3.71	32.85 $\pm$ 2.76	29.62 $\pm$ 2.29
30 – <40	31	25.10 $\pm$ 2.86	32.97 $\pm$ 1.74	30.58 $\pm$ 3.30
40 – <50	4	25.25 $\pm$ 1.71	32.25 $\pm$ 2.50	30.50 $\pm$ 3.11
>50	2	26.0 $\pm$ 1.41	33.50 $\pm$ 2.12	29.0 $\pm$ 1.41
F (p)		0.229 (0.876)	0.193 (0.901)	0.436 (0.728)
Gender				
Male	3	25.0 $\pm$ 3.61	33.67 $\pm$ 0.58	29.33 $\pm$ 5.51
Female	47	24.98 $\pm$ 2.95	32.85 $\pm$ 2.12	30.32 $\pm$ 2.84
t (p)		0.012 (0.990)	0.660 (0.512)	0.553 (0.583)
Marital Status				
Married	46	24.91 $\pm$ 2.98	32.83 $\pm$ 2.11	30.48 $\pm$ 2.96
Single	2	25.0 $\pm$ 4.24	34.0 $\pm$ 0.0	28.50 $\pm$ 0.71
Divorced	0	–	–	–
Widowed	2	26.50 $\pm$ 2.12	33.50 $\pm$ 2.12	27.0 $\pm$ 2.83
F (p)		0.269 (0.765)	0.389 (0.680)	1.724 (0.189)
Educational level				
Diploma	3	23.67 $\pm$ 4.16	32.0 $\pm$ 2.0	29.0 $\pm$ 1.0
Technical Institute	19	24.47 $\pm$ 3.15	33.32 $\pm$ 1.06	31.16 $\pm$ 3.0
Bachelor	28	25.46 $\pm$ 2.70	32.71 $\pm$ 2.54	29.79 $\pm$ 3.0
Master	0	–	–	–
Doctorate	0	–	–	–
F (p)		0.951 (0.394)	0.778 (0.465)	1.522 (0.229)
Years of experience as a nurse				
<5 years	11	24.73 $\pm$ 3.98	32.55 $\pm$ 2.98	29.45 $\pm$ 2.46
5 - 10 years	22	25.50 $\pm$ 2.46	33.14 $\pm$ 1.73	31.95 $\pm$ 2.32
>10 years	17	24.47 $\pm$ 2.85	32.82 $\pm$ 1.85	28.59 $\pm$ 2.98
F (p)		0.625 (0.540)	0.310 (0.735)	8.768* (<0.001*)
Years of experience in blood transfusion unite				
<10 years	43	24.95 $\pm$ 2.93	33.09 $\pm$ 2.03	30.72 $\pm$ 2.87
10 years or more	7	25.14 $\pm$ 3.34	31.71 $\pm$ 1.98	27.43 $\pm$ 1.90
t (p)		0.156 (0.877)	1.670 (0.102)	2.916* (0.005*)
Attendance of previous training				
Yes	2	27.0 $\pm$ 1.41	34.0 $\pm$ 1.41	28.0 $\pm$ 4.24
No	48	24.90 $\pm$ 2.98	32.85 $\pm$ 2.08	30.35 $\pm$ 2.94
t (p)		0.987 (0.328)	0.766 (0.447)	1.099 (0.277)

*: Statistically significant at $p \leq 0.05$

Discussion

One of the most crucial and high alert procedures in modern medicine is blood transfusion, which remains indispensable for treating acute blood loss, chronic anemia, complex surgical operations, and severe hematological disorders. Despite its indisputable therapeutic value, the entire clinical pathway must strictly adhere to evidence based protocols to successfully mitigate the risks of severe transfusion reactions, circulatory overload, or incorrect patient identification **(Fung & Grossman, 2021)**.

Frontline nurses occupy the absolute center of this clinical process bearing ultimate professional and legal accountability to verify compatibility, monitor patient physiological responses, and implement standardized bedside safety procedures. Consequently, patient clinical safety and survival outcomes are directly influenced by the nurses' theoretical knowledge, clinical skills, and professional self-assurance **(Hijji et al., 2019)**.

The primary purpose of the present study was to evaluate the efficacy of a care bundle regarding blood transfusion errors on nurses' performance at Tanta Main University Hospital. Therefore, this discussion section attempts to systematically interpret these results in light of the larger body of contemporary literature. It provides a

deeper understanding of the efficacy of procedural educational bundles in nursing performance by highlighting the contextual similarities or differences between the observed improvements and global evidence.

Regarding socio demographic characteristics of the studied nurses, the current study showed a predominant female presence with a significant concentration in the mid-career age group, indicating a mature workforce actively engaged in clinical practice. This age concentration aligns perfectly with international workforce reports which stated that mid-career nurses constitute the substantial majority of hospital-based staff across acute care tertiary institutions, providing stability to the clinical environment **(World Health Organization [WHO], 2023)**. In terms of educational background, the findings demonstrated that more than half of the participants held a Bachelor's degree in nursing, which represents an academically qualified sample capable of complex cognitive processing and critical thinking. However, a critical baseline finding in the current study was that the vast majority of the studied nurses had never attended previous formal training programs related to blood transfusion safety. This significant training gap represents a major institutional deficit that is consistently highlighted by **Dehghan**

Nayeri et al. (2022), who argued that formal academic education alone is inherently insufficient for preparing nurses to handle highly specialized and rapidly evolving bedside procedures safely over their careers. This lack of specialized education logically explains why nearly half of the participants initially presented with poor total knowledge and practice compliance levels during the pre-intervention phase. This view is supported by **Mubeen et al. (2023)**, who explained that the continuous absence of structured in-service training workshops inevitably triggers a severe knowledge-decay phenomenon, forcing frontline staff to rely on outdated memory or traditional routines rather than evidence-based practices. Furthermore, **Shastri et al. (2021)** stated that even in tertiary care institutions, experienced staff frequently lack updated knowledge regarding complex immunohematology concepts, which confirms that clinical experience without continuous educational support cannot guarantee safe patient outcomes.

Regarding Nurses' Knowledge of Blood Transfusion, reflecting on the baseline cognitive evaluation, the results of the current study demonstrated a suboptimal and deficient baseline, where only a small minority of the studied nurses possessed a good knowledge level

prior to the intervention. This finding is in total agreement with a local study conducted in Egypt by **Elhy and Kasemy (2017)**, who evaluated hospital nurses and reported that the majority exhibited unsatisfactory and poor baseline transfusion knowledge before targeted care bundles were introduced. Similarly, **Hassan et al. (2020)** stated that widespread theoretical deficiencies exist among nurses regarding blood safety protocols, which severely compromise patient clinical outcomes.

Moreover, **Encan and Akin (2019)** conducted a study showing that significant baseline knowledge gaps are common across healthcare settings, particularly noting that nurses score the lowest in identifying immunological transfusion reactions and blood warming parameters. Conversely, this low baseline stands in contrast with the findings of **Kavaklioglu et al. (2017)**, who observed a remarkably high baseline knowledge level among their studied nurses, where the vast majority already demonstrated accurate awareness of transfusion reaction symptoms **before any intervention**, attributing this to the presence of mandatory regular orientation tests enforced by their hospital administration.

Following the implementation of the care bundle, the current study demonstrated a highly statistically

significant improvement in the nurses' overall cognitive understanding. This remarkable upgrade aligns with an intervention study by **Yesilbalkan et al. (2019)**, which concluded that introducing structured blood transfusion training courses successfully and significantly expands nurses' theoretical comprehension and clinical reasoning scores post the care bundle. Similarly, **Lee et al. (2023)** confirmed that target-oriented educational interventions and simulation-based programs successfully expand nurses' clinical decision-making abilities and theoretical foundation. This study supports the idea that clinical success stems directly from the multifaceted nature of the care bundle, which combined immediate feedback and interactive visual materials, making complex concepts easy to apply.

In analyzing specific cognitive dimensions, the current study showed a massive post-intervention jump in knowledge regarding the first step before transfusion and the purpose of the informed consent form. This result is supported by **Dehghani et al. (2024)**, who stated that interactive training modules are significantly superior to traditional brochures because they successfully enhance nurses' active understanding of informed consent processes, ethical dimensions, and patient rights. Additionally, the nurses' knowledge

regarding proper blood warming parameters and strict vital signs monitoring schedules reached near perfection immediately post-intervention.

This acquisition is consistent with the views of **Kaur et al. (2022)**, who emphasized that proper blood warming and close physiological monitoring are critical since their neglect is an established root cause of non-hemolytic febrile responses and delayed error detection. Furthermore, knowledge regarding immediate actions during a transfusion reaction and reporting minor reactions improved significantly, which matches the results of **Aboelnasr et al. (2024)**, who reported that structured bundles empower nurses to recognize acute complications early and cooperate effectively with the blood bank.

At the two-week follow-up, the current study showed that the nurses' knowledge levels exhibited a slight, partial longitudinal decline, yet the total scores remained substantially higher than the pre-care bundle baseline. This pattern of a minor decline following immediate training is strongly supported by **Roudsari et al. (2021)**, who demonstrated that while structured bundles are highly effective for short-term information retention, the psychological curve of forgetting over time is an inevitable phenomenon. Therefore, as argued by **Durmaz Akyol et al. (2025)**,

continuous professional development initiatives and periodic reinforcement sessions are mandatory to counteract knowledge decay and maintain safe standards over time.

Regarding Nurses' Clinical Practices of Blood Transfusion, the current study revealed a transformative and statistically significant improvement in the nurses' comprehensive practices post implementation of care bundle. This positive behavioral compliance is in total agreement with clinical intervention trials conducted by **Brown and Brown (2023)**, which demonstrated that consolidating theoretical bundles with practical demonstrations leads to immediate and positive shifts in bedside nursing habits. Similarly, **Al-Hussami et al. (2022)** reported that care bundles are highly effective in restructuring actual clinical habits and aligning nursing performance with patient safety goals.

On the other hand, these findings stand in contrast with an observational study by **Mohamed and Ahmed (2022)**, who observed that nursing practice compliance failed to improve despite knowledge gains, blaming severe nurse shortages and continuous heavy workloads that forced staff to take practical shortcuts at the bedside.

In evaluating the practices executed specifically **before initiating the blood transfusion process**, the

current study showed low baseline compliance in critical preparatory steps such as preparing equipment, verifying orders, and obtaining patient consent, followed by a significant increase and near-perfect compliance post-intervention. This improvement is consistent with the findings of **Aloweni et al. (2021)**, who concluded that the systematic structure of care bundles helps minimize human errors and omissions during the pre-transfusion phase, ensuring that patient identity verification and blood bag label checking are executed precisely.

This systematic preparation is vital for hospital departments, as any omission during the initial verification stages can lead to catastrophic bedside errors, making the structured care bundle an irreplaceable clinical tool for ensuring absolute safety prior to hooking up the patient to the blood product.

During the active transfusion phase, when the blood product is actively being administered, the current study identified critical baseline practice gaps in hanging normal saline and documenting the exact start time of the transfusion. These deficits were completely resolved immediately post the care bundle, where the nurses achieved perfect compliance in essential patient identification verification and close reaction observation. This

clinical achievement is strongly supported by **Aboelnasr et al. (2024)**, who emphasized that training nurses on strict vigilance during the first fifteen minutes of transfusion is life-saving, as the most severe and life-threatening immunological blood reactions manifest during this specific timeframe.

It can be inferred that regular monitoring during the active transfusion process is the primary defense line against acute clinical complications. The marked improvement observed in the nurses' vigilance under the care bundle reflects an enhanced sense of professional accountability and systematic procedural understanding. This is in alignment with the findings of **Brown and Brown (2023)**, who pointed out that structured checklists and care bundle steps significantly reduce the incidence of missed vital signs checks and delayed response times during blood component infusions. This proves that continuous practical reinforcement directly ensures that bedside surveillance remains a high priority among clinical nursing staff throughout the active administration period.

Post-transfusion data in the current study revealed significant baseline deficits in checking urine output and color, returning the blood transfusion bag to the bank according to policy, and recording the client's overall

response to the therapy. These practices improved significantly post-intervention alongside perfect compliance in documenting late reactions and notifying the physician immediately. This result is in agreement with **Shastry et al. (2021)**, who stated that regular post-transfusion evaluation, particularly monitoring renal output volume and color, is the cornerstone for the early detection of acute hemolytic complications resulting from unrecognized ABO incompatibility.

Cumulatively, the total practice levels across all stages showed that the proportion of nurses exhibiting good overall practices surged immediately post-intervention and was successfully maintained at a high level during the follow-up. This matches the longitudinal observations of **Brown and Brown (2023)**, who prove that care bundles successfully translate cognitive understanding into safer bedside realities. The sustained compliance in post-transfusion documentation and vital signs monitoring confirms that the care bundle model effectively breaks down traditional nursing habits, replacing them with a continuous cycle of patient safety that does not end when the blood bag is transfused but extends into comprehensive post-procedural vigilance.

Regarding correlation between nurses' knowledge and practice, the cumulative outcomes of the current

study demonstrated a positive correlation between the baseline deficits in the nurses' theoretical knowledge and the concurrent limitations of their baseline practice compliance. Prior to the educational intervention, the observed poor cognitive scores directly corresponded with fair or poor overall clinical performance. This clear intersection is strongly supported by **Aloweni et al. (2021)**, who asserted that when frontline clinicians lack standardized, evidence-based rationales for procedural steps, their clinical execution inevitably deteriorates into subjective shortcuts.

Following the implementation of the care bundle, the synchronized upward surge in both knowledge and total practice scores proves that theoretical proficiency serves as the necessary foundation for manual accuracy. This alignment matches the empirical findings of **Brown and Brown (2023)**; **Yesilbalkan et al. (2019)**, which validated that the implemented care bundles highly affect nurses' performance as they successfully align cognitive processing with immediate practice. Therefore, it can be inferred that establishing cognitive clarity through an integrated training model successfully ensuring that frontline nurses execute bedside safety protocols with higher accuracy and systematic precision.

Regarding relation between knowledge, practice mean Scores and socio-demographic characteristics of the studied nurses, the current study revealed no statistically significant differences across almost all baseline variables, including age, gender, and educational level during both the pre-intervention and immediate post-intervention phases.

This baseline uniformity indicates that cognitive deficits and practical gaps regarding blood transfusion error were widespread among the staff initially, regardless of their academic degrees or age variations, which is in total agreement with **Elhy and Kasemy (2017)**; **Hassan et al. (2020)**, who observed that hospital nurses frequently exhibit homogenous poor baseline scores irrespective of their backgrounds.

Furthermore, the lack of demographic significance immediately post care bundle reflects uniform skill and knowledge acquisition across the entire sample, proving that a well-structured care bundle neutralizes demographic variations, making the intervention equally accessible and effective for diploma, technical, or bachelor-degree nurses, a phenomenon that is strongly supported by **Almazan et al. (2023)**.

However, at the two week follow up assessment, highly statistically significant relationships emerged in

the current study regarding the nurses' professional experience parameters. The findings showed a strong correlation with overall years of nursing experience, where the mid-career demonstrated the highest retention scores in both knowledge and clinical practices compared to those with fewer years or senior staff with extensive service history.

Additionally, years of experience specifically within the blood transfusion unit showed a significant relationship with retention, where nurses with fewer years of specialized service maintained significantly higher practice and cognitive scores over time than those with prolonged specialization. This critical correlation is consistent with the empirical observations of **Mohamed and Ahmed (2022)**, who reported that mid-career nurses often demonstrate superior long-term retention and higher compliance with newly introduced evidence-based guidelines compared to senior staff.

The result of the present study indicates that mid-career nurses possess the optimal combination of clinical adaptability, professional maturity, and cognitive openness required to internalize and sustain new evidence-based bundles within active hospital divisions. In contrast, senior nurses with prolonged service years may exhibit higher resistance to changing their long standing traditional habits or reliance on

informal peer routines, leading to a faster return to old baseline habits during follow-up phases.

The present study highlights the urgent institutional need highlighted by **Almazan et al. (2023)**; **Mubeen et al. (2023)** for establishing targeted motivational strategies, continuous reinforcement sessions, and regular audit cycles specifically tailored for senior nursing staff during hospital protocol roll outs to ensure long term practice stability and absolute patient clinical survival.

Regarding the impact of the Care Bundle on Nurses' performance, the overall findings of the current study highlight the profound and transformative effectiveness of the care bundle in establishing a sustainable clinical practice modification among the studied nurses. The transition from an unsatisfactory baseline to near-perfect compliance immediately following the care bundle, and its strong preservation during the longitudinal evaluation, proves that care bundles serve as highly efficient tools for overcoming institutional knowledge decay.

The long-term efficacy of the care bundle is in total agreement with **Aloweni et al. (2021)**; **Aboelnasr et al. (2024)**, who demonstrated that care bundles optimize nursing competency because they create standardized clinical pathways that

resist natural procedural deterioration.

Furthermore, the robust retention observed at the follow-up assessment highlights that the care bundle successfully counteracted the psychological curve of forgetting often seen after traditional lecturing. This sustainable impact is strongly supported by **Brown and Brown (2023); Yesilbalkan et al. (2019)**, who stated that combining immediate practical demonstrations with interactive training elements successfully cement behavioral updates over time.

Ultimately, the present study outcomes prove that the intervention successfully bridged the gap between complex academic guidelines and daily hospital operations, effectively breaking down outdated clinical routines and replacing them with a sustainable institutional culture centered entirely around blood transfusion safety and patient clinical survival.

Conclusion

The findings of the current study conclude that the implementation of the structured care bundle was highly effective in systematically improving both the theoretical knowledge and clinical practice compliance of nurses regarding blood transfusion errors. The care bundle successfully bridged the gap between passive theoretical knowledge and actual manual application, driving the nursing staff

toward near-perfect compliance with international safety guidelines. Furthermore, this positive behavioural and cognitive shift was successfully sustained during the longitudinal follow-up phase. This underscores that structured, multifaceted care bundles serve as an irreplaceable strategic tool for promoting information retention, enhancing clinical decision-making capacity, reducing knowledge decay, and safeguarding patient clinical safety thresholds within acute tertiary care hospital environments, consequently eliminate blood transfusion.

Recommendations

Based on the results and conclusions established by the present study, the following actionable recommendations are suggested across clinical practice, nursing education, and future research tracks:

1. Recommendations for Clinical Practice

- Hospital administration should adopt the structured educational care bundle as a mandatory; core component of the formal orientation program for all newly hired and transferred nursing staff assigned to acute medical and surgical units especially for those who assigned at blood transfusion units.
- Standardized, evidence-based transfusion protocols, clinical flowcharts, and double-checking safety checklists must be

permanently posted at patient bedsides and within central nursing stations as permanent visual anchors.

- A specialized Blood Safety and Transfusion Auditing Committee should be established within each blood transfusion department to continuously monitor nurses' bedside compliance, evaluate error rates, and deliver immediate performance feedback.

2. Recommendations for Nursing Education

- Continuous, mandatory in-service training workshops and periodic refresher courses should be conducted systematically every six months to successfully counteract the natural knowledge-decay phenomenon and keep staff updated on modern transfusion guidelines.

- Academic nursing curricula should heavily integrate competency-based learning modules and high-fidelity scenario simulations specifically tailored around acute blood transfusion emergencies and systemic complication recognition.

3. Recommendations for Future Research

- Replicating the current study design utilizing a significantly larger sample size and across diverse geographical locations or multiple health systems to strengthen the external validity and generalizability of the findings.

- Conducting longitudinal follow-up research spanning six months to one year to evaluate the absolute long-

term durability and retention stability of the acquired clinical practices.

- Investigating the direct downstream impact of the care bundle rollout on the actual incidence rates of bedside transfusion errors, acute hemolytic reactions, and overall patient clinical outcomes.

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Head Nurses, Spiritual Leadership and Its Relation to Staff Nurses, Organizational Identification

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Abstract

Background: Spiritual leadership among head nurses emphasizes vision, hope, faith, altruistic love, and meaning in work, which fosters trust, commitment, and ethical behavior among staff nurses. Organizational identification refers to the psychological bond that staff nurses build with their institutions, enhancing loyalty and performance. **Aim:** Assess head nurses' spiritual leadership and its relation to staff nurses' organizational identification. **Setting:** Basion Central Hospital, affiliated to the Ministry of Health and Population. **Design:** A descriptive correlational research design. **Subject:** All head nurses (N = 145) and all staff nurses (N = 523) working in the previously mentioned settings. **Tools:** Two tools were used. Tool I: Spiritual Leadership Scale. Tool II: Organizational Identification Questionnaire. **Result:** Two-thirds of head nurses had a low level of overall spiritual leadership. Regarding staff nurses, below half had a moderate level of overall organizational identification. The highest ranked dimension of spiritual leadership was meaning/calling. The highest ranked dimension of organizational identification was integration of goals and values. There was a positive significant correlation between head nurses' overall spiritual leadership and staff nurses' overall organizational identification. **Conclusion:** Head nurses demonstrated low spiritual leadership levels, while staff nurses showed moderate organizational identification levels, with a significant positive correlation between both variables. **Recommendation:** Hospital administrators should adopt spiritual leadership principles into management frameworks, strengthen communication channels between head nurses and staff nurses, and develop recognition and reward systems that reinforce organizational loyalty and commitment. **Keywords:** Basion Central Hospital, Head Nurses, Organizational Identification, Spiritual Leadership, Staff Nurses.

Introduction

Healthcare organizations, spiritual leadership are particularly important due to the demanding and emotionally taxing nature of the profession. Staff nurses often face high levels of stress, burnout and ethical dilemmas, making it essential for leaders to provide support that goes beyond material incentives (**Bayighomog & Arasli, 2022**). By fostering a work environment based on meaning, compassion and shared values, spiritual leadership enhances job satisfaction, emotional resilience and commitment among staff nurses. It also contributes to better patient care, as staff nurses who feel valued and connected to their work are more engaged, empathetic and motivated to provide high-quality care (**Dalle Ave & Sulmasy, 2021**).

Spiritual leadership consists of several key dimensions, including vision, hope/faith, altruistic love, calling/membership, productivity, meaning and organizational commitment. Vision provides a shared purpose and direction, inspiring staff nurses to align their efforts with organizational goals. Hope and faith instill confidence in the future and encourage perseverance during challenges. Altruistic love fosters a culture of care, empathy and mutual respect, strengthening relationships within the workplace. Calling and membership create a sense of belonging, helping

staff nurses feel valued and connected to their work. Productivity ensures that spiritual leadership translates into tangible outcomes, improving efficiency and performance. Finally, meaning and organizational commitment enhance job satisfaction and dedication, ensuring that staff nurses are not only productive but also passionate about their roles and contributions to healthcare services (**Zhang & Yang, 2021**).

Organizational Identification in health care refers to the psychological bond between staff nurses and their organization, where staff nurses define themselves in relation to their workplace. It reflects the extent to which they perceive the organization's values, goals and mission as part of their own self-concept. When they strongly identify with their organization, they develop a sense of belonging, pride and commitment, which influences their attitudes and behaviors at work. Organizational identification goes beyond job satisfaction, as it fosters a deeper emotional and cognitive connection, shaping their motivation and loyalty (**Abbasi et al., 2021**).

The importance of health care organizational identification lies in its ability to enhance staff nurse engagement, job performance and overall workplace cohesion. Staff nurses who strongly identify with their organization exhibit higher

levels of motivation, as they perceive their work as meaningful and aligned with their personal values. The impact of health care organizational identification extends to both staff nurses and organizational outcomes. At the staff nurses level, they experience greater psychological well-being, as they feel valued and connected to their workplace. They are more likely to display organizational citizenship behaviors. At the organizational level, strong identification leads to higher productivity, improved morale and a positive work culture.

Aim of the study

Examine the head nurses' spiritual leadership and its relation to staff nurses' organizational identification.

Research Questions

What is the relation between head nurses' spiritual leadership and staff nurses' organizational identification?

Subjects and Method

Research design:

Descriptive correlational research design was utilized to conduct this study

Setting:

The study was conducted on all departments of Basion Central Hospital, which is affiliated to the ministry of Health and Population, including all Intensive Care Units (Pediatric, Neonatal, Medical, and Intermediate ICUs) and other departments (Emergency, Hemodialysis, Pediatric, Medical,

Obstetrics, Operating Rooms, Blood Bank, Sterilization, Physical Therapy, Infection Control, Quality Assurance, and Continuous Training).

Subject:

All head nurses (N = 145) and all staff nurses (N = 523) work in the previously mentioned settings.

Tools of data collection

Tool I: Spiritual Leadership scale

Part 1: **Personal data** of head nurses such as: age, gender, marital status, level of education, department and years of experience.

Part 2: **Spiritual Leadership Scale**, adapted by **Zhang, and Fry (2021)** and modified by the researcher after reviewing related literature which consisted of 34 items covered seven dimensions namely: Vision, Hope/Faith, Altruistic Love, Meaning/Calling, Membership, Organizational Commitment, and Productivity.

Scoring system

Head nurses' responses were measured on a five-point Likert Scale ranging from "5" (strongly agree) to "1" (strongly disagree), and the score was summed up and divided according to cutoff points as 3 levels:

- High level > 75%.
- Moderate level 60-75%.
- and Low level < 60%.

Tool II: Organizational Identification Questionnaire

Developed by the researcher based on relevant literature. It included two parts:

Part 1 for **personal data** of staff nurses (age, gender, marital status, level of education, department, and years of experience).

Part 2: **Staff Nurses' Organizational Identification Questionnaire** which consists of 15 items covered 3 dimensions namely: Categorization of the self and self-labeling, Integration of goals and values, and Affective attachment of nurses to the organization. Staff nurses' responses were measured on a five-point Likert Scale ranging from "5" (strongly agree) to "1" (strongly disagree).

The score was summed up and divided according to cutoff points as 3 levels:

-High level > 75%.

-Moderate level 60-75%.

-and Low level < 60%.

Method

Official permission was obtained from the Dean of Faculty of Nursing to the director of Basion Central Hospital.

Ethical considerations

Approval was taken from the scientific ethical committee before conducting the study code number (162/12/2022).

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

-Confidentiality and privacy for participant was taken into consideration regarding data collection.

-Study subjects' consent to participate in the study was obtained after informed them about the privacy of information, nature of the study, their right to withdraw and the confidentiality of their name.

Tools of the study were developed by the investigators and translated into Arabic.

Tools I and II presented to a jury of five experts in the area of specialty to check their content validity. The experts were; four Professors and one assistant professor of Nursing Administration from Faculty of Nursing, Tanta University. Necessary modifications were done.

Face validity value of tool (I) was 96.7 % & tool (II) 95%.

A pilot study was carried out on 10% of head nurses (n= 3) and staff nurses (n= 56) According to feedback from pilot study, the tool was modified by the investigator.

Reliability of tools was tested using Cronbach Alpha Coefficient test. Reliability of tool (I) was 0.891, and reliability of tool (II) was 0.879.

Data collection phases: The questionnaire was distributed on in small group at their work setting. The subjects recorded the answer in the presence of the investigator to ascertain that all questions were answered.

The data was collected within 6 months. From the beginning of March 2023 to the end of August 2023.

Results

Table (1): Reveals head nurses' personal data. More than half (55.9%) of head nurses were in the age group ranging from 35 to 40 years. All head nurses were female, the majority (98.6%) were married, and (54.5%) of head nurses had 10 to 15 years of experience. Equal Percent (14.5%) worked in intensive care units, emergency and quality assurance team. Their education shows that 40.7%, 34.5% and 24.5% respectively had post graduate diploma, Bachelor of sciences in Nursing and nursing secondary diploma.

Table (2): Presents staff nurses' personal data. It is noted that 44.6% of staff nurses were in the age group ranging from 25 to 30 years. Majority (97.3%) of staff nurses were female and 80.9% were married. Staff nurses (38.4%) had 5 to less than 10 years of experience. 68.1% were graduated from nursing technical institute, and 27.5% worked in intensive Cove units.

Table (3): Represents ranking mean of head nurses' spiritual leadership dimensions. The table reveals that the first rank for average mean score was 3.74 ± 0.68 for meaning/calling dimension. The second ranked mean was 3.43 ± 0.97

for productivity, the third rank was 3.15 ± 0.81 for hope/faith and the fourth rank was 3.14 ± 0.79 for vision dimension. Followed by fifth rank of average mean score for membership dimension 2.86 ± 0.83 . The sixth rank of average mean 2.84 ± 0.83 for altruistic love dimension. The lowest average mean score was 2.81 ± 0.76 ranked lowest for organizational commitment dimension of spiritual leadership.

Table (4): Represents staff nurses average ranking mean of organizational identification dimensions. It was observed that the overall average mean score for organizational identification was 3.47 ± 0.58 . The table reveals that the first rank of average mean score 3.58 ± 0.68 was for integration dimension, followed second rank mean was 3.47 ± 0.73 for categorization dimension, then, third rank was for mean 3.37 ± 0.67 for affective dimension of organizational identification.

Figure (1): Describes level of head nurses' overall spiritual leadership. Two thirds of head nurses had low level of overall spiritual leadership, below one-third had moderate level and only few had a high level of overall spiritual leadership.

Figure (2): Reveals levels of staff nurses' overall organizational identification. Below half of staff nurses had a moderate level of overall organizational identification.

More than one-third of staff nurses had low levels and only small percent had high level of overall organizational identification.

Figure (3): Shows correlation between head nurses levels of overall spiritual leadership and staff nurses levels of overall organizational identification. There was positive significant correlation between head nurses' levels of overall spiritual leadership and staff nurses' levels of overall organizational identification. ($r=0.167$, $p=0.045$).

Table (1): Head nurses personal data (N = 145)

Items	No.	%
Age (years)		
<35	32	22.1
35 – 40	81	55.9
>40	32	22.1
Min. – Max.	31.0 –50.0	
Mean ± SD.	38.05 ±4.44	
Gender		
Male	-	-
Female	100	100.0
Marital status		
Married	143	98.6
Unmarried	2	1.4
Years of experience		
<10	16	11.0
10 –15	79	54.5
>15	50	34.5
Min. – Max.	5.0 –29.0	
Mean ± SD.	15.01 ±5.92	
Department		
Intensive Care Units	21	14.5
Emergency	21	14.5
Hemodialysis	10	6.9
Pediatric	4	2.8
Medical	4	2.8
Obstetrics &Gynecology	6	4.1
Operating Rooms	10	6.9
Blood Bank	2	1.4
Sterilization Department	4	2.8
Physical Therapy Department	2	1.4
Infection Control Team	20	13.8
Quality Assurance Team	21	14.5
Continuous Training Team	20	13.8
Education level		
Nursing Secondary Diploma	36	24.8
Nursing Technical Institute	0	0.0
Bachelor of Science in Nursing	50	34.5
Postgraduate Nursing Diploma	59	40.7

Table (2): Staff nurses' personal data (N = 523)

Items	No.	%
Age (years)		
<25	109	20.8
25 – 30	233	44.6
>30	181	34.6
Min. – Max.	19.0 –58.0	
Mean ± SD.	29.71 ±5.86	
Gender		
Male	14	2.7
Female	509	97.3
Marital status		
Married	423	80.9
Unmarried	100	19.1
Years of experience		
<5	193	36.9
5 - <10	201	38.4
10-<15	67	12.8
≥15	62	11.9
Min. – Max.	0.33 –38.0	
Mean ± SD.	7.43 ±6.21	
Department		
Intensive Care Units	144	27.5
Emergency	80	15.3
Hemodialysis	55	10.5
Pediatric	20	3.8
Medical	43	8.2
Obstetrics &Gynecology	35	6.7
Operating Rooms	60	11.5
Blood Bank	15	2.9
Sterilization Department	25	4.8
Physical Therapy Department	5	1.0
Infection Control Team	17	3.3
Quality Assurance Team	13	2.5
Continuous Training Team	11	2.1
Education level		
Nursing Secondary Diploma	56	10.7
Nursing Technical Institute	356	68.1
Bachelor of Science in Nursing	88	16.8
Postgraduate Nursing Diploma	23	4.4

SD: Standard deviation

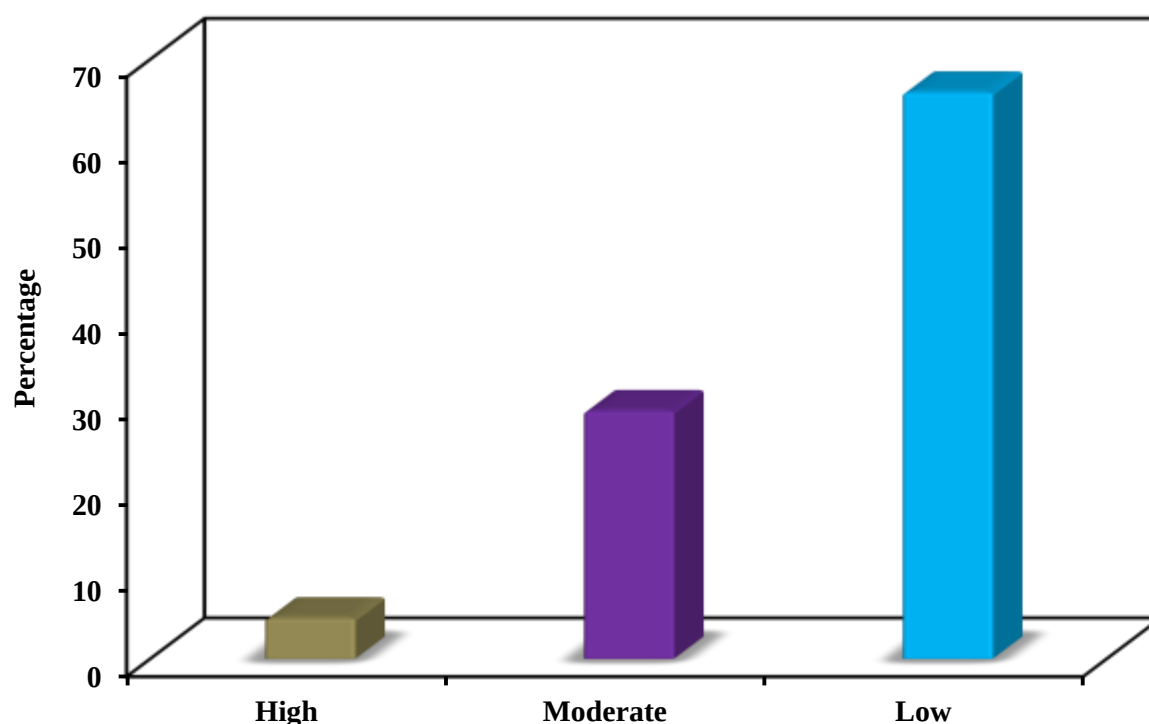


Figure (1): Levels of head nurses' total spiritual leadership

Table (3): Ranking of head nurses spiritual leadership dimensions (N = 145)

Dimensions of Spiritual leadership	Total score			Score(1-5)	Rank
	Score range	Min. – Max.	Mean $\pm$ SD.	Mean $\pm$ SD.	
□ Vision	(5 – 25)	5.0 – 22.0	15.72 $\pm$ 3.96	3.14 0.79	4
- Hope/Faith	(4 – 20)	6.0 – 18.0	12.61 $\pm$ 3.25	3.15 0.81	3
- Altruistic Love	(6 – 30)	6.0 – 27.0	17.06 $\pm$ 4.98	2.84 0.83	6
- Meaning/Calling	(5 – 25)	10.0 – 24.0	18.71 $\pm$ 3.39	3.74 0.68	1
- Membership	(4 – 20)	4.0 – 18.0	11.44 $\pm$ 3.31	2.86 $\pm$ 0.83	5
-Organizational Commitment	(5 – 25)	5.0 – 22.0	14.03 $\pm$ 3.79	2.81 0.76	7
-Productivity	(5 – 25)	5.0 – 25.0	17.14 $\pm$ 4.87	3.43 $\pm$ 0.97	2
Overall	(34 – 170)	67.0 -147.0	106.7 $\pm$ 19.27	3.14 $\pm$ 0.57	

SD: Standard deviation

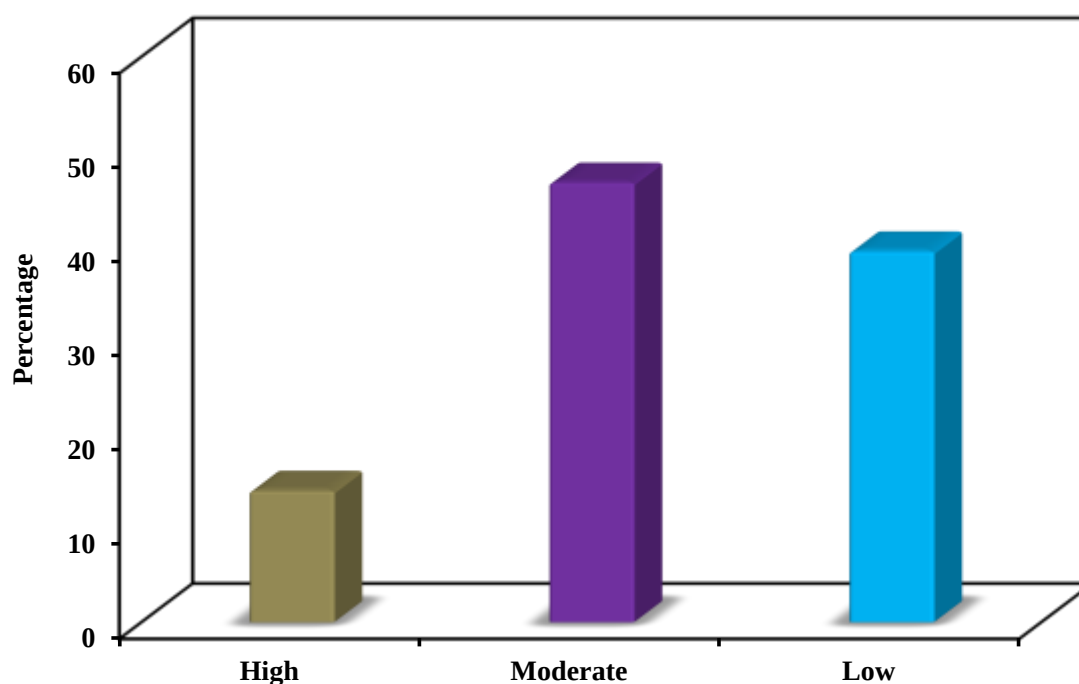


Figure (2): Levels of staff nurses total organizational identification (N=523)

Table (4): Ranking of staff nurses' organizational identification dimensions (N=523)

Dimensions of Organizational Identification	Total score			Average Score (1–5)	Rank
	Score range	Min. – Max.	Mean ± SD.	Mean ± SD.	
-Categorization	(5 – 25)	5 – 25	17.34 ± 3.66	3.47 ± 0.73	2
-Integration	(5 – 25)	5 – 25	17.89 ± 3.42	3.58 ± 0.68	1
-Affective	(5 – 25)	5 – 25	16.83 ± 3.37	3.37 ± 0.67	3
-Overall	(15 – 75)	15 – 74	52.06 ± 8.71	3.47 ± 0.58	

SD: Standard deviation

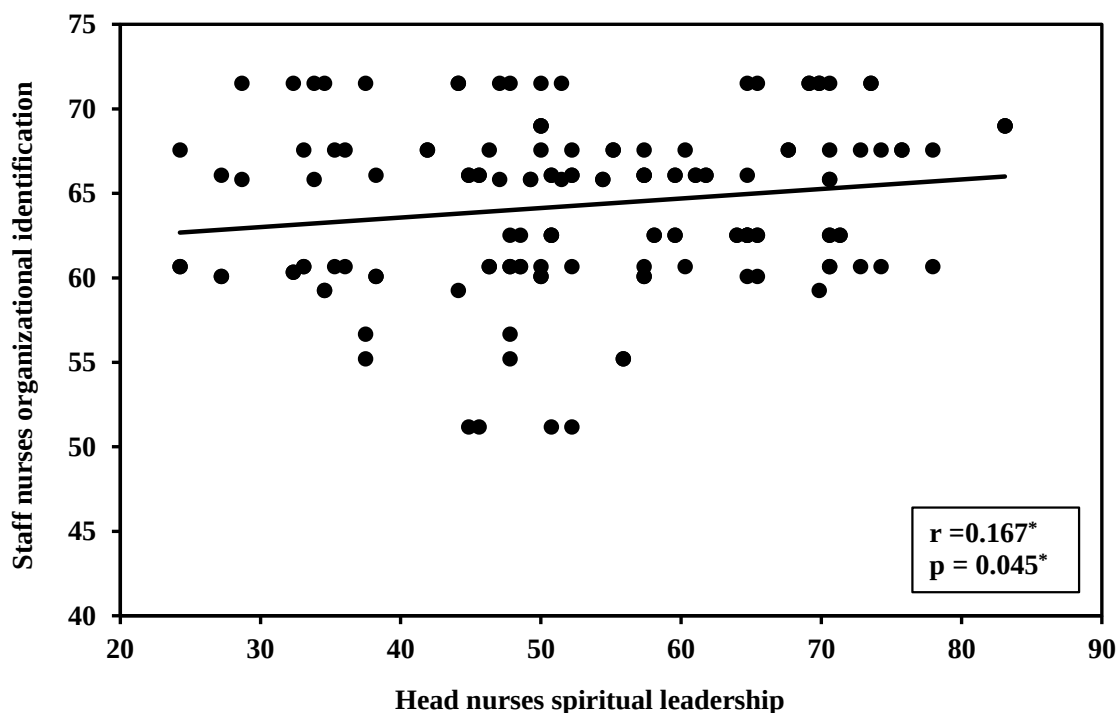


Figure (3): Correlation between head nurses, levels of overall spiritual leadership and staff nurses, levels of overall organizational identification

Discussion

Head nurses' spiritual leadership is new paradigm in health care system and dominant variable in shaping health care environment, staff nurses' autonomy and organizational identification (Saad et al., 2021). Staff nurses with strong organizational identification tend to exhibit higher levels of job satisfaction, commitment, and retention, ultimately contributing to improved patient care and organizational effectiveness. The relationship between head nurses' perceived spiritual leadership behaviors and staff nurses' levels of organizational identification is not investigated.

Present study result demonstrated that almost two thirds of head nurses showed low level of overall spiritual leadership and below one third had

moderate level. Most probably due to their lack of awareness related to the concept of spiritual leadership. Besides their limited ability to integrate such leadership into their practices. As well as the organizational cultures of Basion central hospital prioritize task-oriented over spiritually grounded leadership. Adding to the absence of role models demonstrating spiritual leadership. Furthermore, the high workloads and stress commonly experienced in head nurses positions which may hinder the development and practice of spiritual leadership qualities. Most probably head nurses need to have valued insight into the crucial role of spiritual leadership in augmenting nurse colleagues' altruistic tenderness and passion. Also, they have the need for reinforcing and cultivating leadership traits to foster more compassionate

and motivated nursing workforce (**Zou et al., 2023**).

In this concern, a study carried out by **Parinussa and Lameky (2025)**, titled "Exploring the Role of Spiritual Leadership among Nurse Colleagues: An Associative Analysis of Its Impact on Passion and Altruism" agree with present study result and reported that three fifths of the studied nurses perceived the spiritual leadership of head nurses as poor. This study underscores the pivotal role of spiritual leadership and supervision in enhancing nurses' capacity to provide comprehensive spiritual care.

Along with present study findings, **Saad et al. (2021)**, in their study "Effect of Spiritual Leadership Educational Program for Head Nurses on Staff Nurses' Job Enjoyment", revealed that only 16.3% of head nurses demonstrated high spiritual leadership skills prior to the educational intervention, while post-intervention results showed a significant improvement, with over 85% of head nurses reaching high skill levels. Conversely to present study result **Ahmed et al. (2024)**, through their research "Assessing Spiritual Leadership among Head Nurses and Their Assistants: A Cross-Sectional Study", addressed that about two thirds of the head nurses and their assistants demonstrated high levels of spiritual leadership, suggesting a positive trend in leadership development. **Hamza et al. (2025)**, in their study "The Influence of Perceived Spiritual Leadership on Nurse Colleagues' Altruism and Passion", found that the

highest percentage of nurse colleagues reported high levels of perceived spiritual leadership.

The present study result revealed that nearly half of the studied staff nurses had a moderate level of overall organizational identification. This may be because staff nurses view their managers as a representative of the organization and through their social interactions, they learn, respect, and identify with the organization's values and goals. Besides, understanding the ways spiritual leaders influence nurses' organizational identification and may provide new knowledge about strategies to enhance nurses' participation and compliance with patient-safety initiatives. **Mao et al. (2023)** in their research "Organizational Identification in European Nursing Contexts", reported that the largest proportion of participants perceived a high level of organizational identification.

The present study results highlighted that there was positive significant correlation between head nurses' overall perception levels of spiritual leadership and staff nurses' organizational identification. This may be due to the fact that spiritual leadership fosters a sense of purpose, intrinsic motivation, and alignment with organizational values, which can enhance staff nurses' sense of identification with their organization. Spiritual leadership, characterized by vision, hope/faith, and altruistic love, creates a supportive and meaningful work environment that resonates with the personal and professional values

of nursing leaders (**Rhyu et al., 2023**).

When staff nurses perceive their leaders as spiritually grounded and ethically driven, they are more likely to feel valued, connected, and committed to the organization's mission. This emotional and moral alignment naturally strengthens their organizational identification, as they see themselves as integral contributors to a shared purpose and vision.

Along with the present study findings, **Ahmed et al. (2024)**, in their study titled "Spiritual Leadership and Organizational Trust among Nursing Staff", revealed a significant relationship between nursing managers' levels of spiritual leadership and staff nurses' organizational trust. This suggests that spiritual leadership can enhance both organizational commitment and identification among nursing staff. Consistently, **Samul (2024)**, through the research "Spiritual Leadership and Job Satisfaction: A Managerial Perspective in Healthcare", found that managers' high perception of spiritual leadership was associated with increased job satisfaction among their teams, indicating that spiritual leadership positively influences staff members' emotional connection to the organization.

Likewise, **Khalaaf et al. (2022)**, in their study "The Role of Spiritual Leadership in Enhancing Nurses' Motivation and Organizational Identification", reported a significant correlation between head nurses' spiritual leadership knowledge and skills and staff nurses' motivation.

Their findings suggest that spiritual leadership enhances organizational identification through increased motivation and engagement.

Conclusion

Two thirds of head nurses showed low level of overall spiritual leadership. Below half of staff nurses had a moderate level of overall organizational identification and only small percent had high level. There was positive significant correlation between head nurses' levels of overall spiritual leadership and staff nurses' levels of overall organizational identification ($r=0.167$, $p=0.045$).

Recommendation

The study recommended that:

- Head nurses apply leadership practices that highlight hope, faith, and altruistic love to improve team morale and reduce feelings of conflict or disconnection.

- Strengthen communication channels with staff nurses, ensuring their concerns are heard and addressed in a transparent and supportive way.

- Encourage participatory decision-making to foster a sense of membership and belonging among nursing staff.

- Staff Nurses need to actively engage in professional development activities that enhance their organizational identification, such as training on teamwork, ethical practice, and value integration.

- Staff nurses strengthen peer collaboration and communication to improve affective attachment and categorization.

- Future Research need to conduct

longitudinal studies to assess the long-term impact of spiritual leadership on nurses' organizational identification.

-Investigate intervention models such as leadership training programs, mentorship, or organizational culture reforms on both leadership behaviors and staff nurses' identification.

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Effect of Educational Program Regarding Plasmapheresis on Nurses' Performance for Patients with Autoimmune Diseases

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Abstract

Background: Plasmapheresis is an essential therapeutic procedure used in the management of autoimmune diseases. **Aim:** This study aimed to evaluate the effect of educational program regarding plasmapheresis on nurses' performance for patients with autoimmune diseases. **Design:** A quasi-experimental design was utilized. **Setting:** The study was conducted at Plasmapheresis units at the following locations: hemodialysis unit at Tanta New Urology & Nephrology Hospital, Center of Psychiatry and Neurological Diseases Treatment and Internal Medicine Hospital. **Subjects:** A convenient sample of 88 nurses. **Tools:** **Tool I;** Nurses knowledge' structured interview questionnaire which consisted of two parts: **Part (A):** Nurses' Socio-demographic data and **Part (B):** Nurses' knowledge regarding plasmapheresis for autoimmune disease patients. **Tool II;** Nurses' practice regarding plasmapheresis observational checklist for autoimmune disease patients **Result:** The study revealed high knowledge levels rose from a baseline of 9.1% to 96.6% immediately post-program, with 69.3% retention at the 3-month follow-up ($p = 0.001$). Similarly, satisfactory clinical practice jumped from 6.8% pre-to 100% post-intervention and remained high at 83% during follow-up ($p = 0.001$). **Conclusion:** The educational program improved nurses' plasmapheresis knowledge and practice. **Recommendation:** The study recommends that standardized protocols should be integrated into clinical routines and continuous training.

Keywords: Autoimmune diseases, Clinical practice, Educational program, Nurses knowledge, Plasmapheresis.

Introduction

Autoimmune diseases (ADs) are defined as disorders of the immune system, in which B and T lymphocytes mistakenly attack the body's own tissues, sequency resulting in the formation and precipitation of immune complexes (Du et al., 2025). As shown by epidemiological studies, incidence of autoimmune diseases has risen by 19.1% yearly globally, with rheumatological diseases as lupus and Sjögren's rising by 7.1% yearly (Kcox, 2025).

Therapeutic plasma exchange (TPE) has emerged as a key intervention in the management of autoimmune diseases. (Parisi et al., 2026). Plasmapheresis is considered a complex nursing procedure, requiring a distinct combination of specialized knowledge and technical proficiency. Nurses hold a great responsibility among health care teams in the facilitation and carrying out the plasmapheresis procedure, including the clinical and educational, investigative and advisory roles. (Karam et al., 2023). Pre-procedure of plasmapheresis, the nurse should verify patient identity, informed consent should be obtained, obtaining a comprehensive medical history, setting up plasmapheresis machine and its parameters, and assessing fluids of substitution (Abd El Samed et al., 2022).

Significance of the study:

It is noteworthy that previous training often focused on equipment and technical aspects, while neglecting important areas such as patient competence and safety (Escolar et al., 2022). This necessitates an elevation of knowledge and practice of nurses involved in care of patients undergoing plasmapheresis.

Aim of the study:

This study aims to evaluate the impact of educational program regarding plasmapheresis on nurses' performance for patients with autoimmune diseases.

Research hypothesis:

H1: The study group who receives the educational program is expected to exhibit improvement of their knowledge regarding plasmapheresis process for patients with autoimmune diseases.

H2: The study group who receives the educational program is expected to exhibit improvement of their practice regarding plasmapheresis process for patients with autoimmune diseases.

Subjects and Method

Research Design:

A quasi-experimental research design was used to conduct this study.

Setting:

The study was conducted at Plasmapheresis units in the following three settings:

I: Hemodialysis unit at Tanta New Urology& Nephrology Hospital.

- The unit is situated on the 2nd floor and consists of one room with one bed, one SICHUAN Nigale (XJC 2000) plasmapheresis machine and 75 nurses who are mainly working in dialysis department; additionally, according to their working schedule and alternatively are responsible for plasmapheresis processes.

II: Center of Psychiatry and Neurological Diseases Treatment

- The unit is situated on the 3rd floor and consists of three SICHUAN Nigale (XJC 2000) Plasmapheresis machines with three beds and three nurses responsible for plasmapheresis processes.

III: Internal Medicine Hospital

- The unit is situated in 3rd floor and consists of one room with one bed, one SICHUAN Nigale (XJC 2000) plasmapheresis machine and ten nurses (10) who are responsible for plasmapheresis processes.
- All three settings are affiliated to Tanta University Hospitals.

Subjects:

A convenient sample size comprises 88 nurses based on Yamane's formula $n = N/[1+Ne^2]$

Tools for data collection:

Tool I: Nurses knowledge' structured interview

questionnaire: This tool was constructed by this investigator based on a comprehensive review of latest and pertinent literature (Mathew et al., 2023; Oto et al., 2022; Sergeant,

2023) and jury opinion. It comprised two parts as follows:

Part (I): Nurses' Socio-demographic data: This part contained pertinent data about the studied nurses as age, code, gender, marital status, educational level, years of experience in nursing and plasmapheresis unit.

Part (II): Nurses' knowledge regarding plasmapheresis for autoimmune disease patients: This part was designed to assess nurses' knowledge regarding plasmapheresis processes for autoimmune disease patients before and after receiving the educational program. All questions were multiple choice questions with a total number of 37 questions.

Scoring system:

Two levels of scoring for questions were used as follows:

- Correct answer (1)
 - Don't know or incorrect answer (0)
- The total scoring system of patients' knowledge was summed up, converted to percentage and nurses' knowledge level was classified as the following:
- High $\rightarrow > 80\%$ of the total score.
 - Moderate $\rightarrow \geq 60\% - 80\%$ of the total score.
 - Low $\rightarrow < 60\%$ of the total score.

Tool II: Nurses' practice regarding plasmapheresis observational checklist for autoimmune disease patients: This tool was derived from Camarda et al. (2023); Nicabi et al. (2023) and was adjusted by the

researcher after analyzing related literature and jury opinion. This tool included three parts:

Part 1: Nursing practice before plasmapheresis for autoimmune disease patients.

Part 2: Nursing practice during plasmapheresis for autoimmune disease patients.

Part 3: Nursing practice after plasmapheresis processes for autoimmune disease patients.

Scoring system:

- Done practices were scored (1).
 - Not done practices were scored (0).
- The total practices score was summed up, converted to percentage and classified as follows:
- Satisfactory practice $\rightarrow \geq 80\%$ of the total score.
 - Unsatisfactory practice $\rightarrow < 80\%$ of the total score.

Method

1-An official permission to carry out the study was obtained from the Dean of the Faculty, Head of Medical Surgical Nursing Department Tanta University and Director of Tanta University Hospitals.

2- Ethical consideration

- a. The ethical committee approval of Faculty of Nursing at Tanta University was obtained in 21/5/2025 with code (664-5-2025).
- b. An informed consent was obtained from all nurses after providing an appropriate explanation of study aim and study details.

- c. Each participant was informed that they have the right to withdraw from the study any time without reason or effect in their working status.
- d. Nurses did not experience any discomfort or injury as a result of the study's design.
- e. Confidentiality and privacy were maintained regarding collected data.
- f. Tools for data collection were modified by the researcher after reviewing related literature and jury opinions.

3-Content validity

A panel of seven medical-surgical nursing professionals from the Faculty of Nursing evaluated each tool's content validity.

4- Pilot study

- A pilot study was conducted on nine (9) nurses to test the applicability of the tools.
- The pilot samples were included in the main study sample since minor modifications were required.

5- Reliability of the tool

- Alpha Cronbach's test was used to test tool reliability and the estimated reliability.
- Reliability of tool (1) Part 1 is 0.912, Tool (1) Part 2 is 0.876 and Tool II is 0.863.

6-Field work

- Data was collected over a period of 6 months starting from August 2025 to January 2026.
- A sample of 88 nurses was selected and equally divided into 11 groups each group consists of (8) nurses

according to nurses' working schedule and convenience.

- The process of data collection was achieved through four phases:
- a. **Assessment phase (pre-test):** Data is gathered four days a week during morning or afternoon shifts. Each nurse was given a self-administered questionnaire (Tool I) to complete, and it took them between ten and fifteen minutes to complete it. Also, the researcher utilized direct observation and the observational Checklist (Tool II) to assess the baseline practical competence of nurses prior to educational program. It was estimated that the assessment procedure would take two to three hours.
- b. **Planning phase:** After gathering data, the researcher creates a plan for conducting the study.

Generalized goals of the educational program:

- Enhance nurses' knowledge and practice regarding plasmapheresis process for autoimmune disease patients.

Specific objectives of the educational program:

1. Differentiate between indications and contraindication of plasmapheresis process.
 2. perform competent and efficient nursing care for autoimmune disease patients with plasmapheresis (pre, during and after the process).
- The researcher created the educational program's material

through colored guidelines booklet based on pre-assessment and reviewing literature (**Stieglitz et al., 2024**) to meet nurse's needs. The research supervisors reviewed it, and it was prepared in Arabic. The researcher planned to use teaching methods as an educational booklet, discussion, power point presentation, demonstration, videos and pictures that expected to help in covering theoretical and practical information then arrange a schedule for educational session's conduction.

c- Implementation phase: During this stage, the researcher divided the nurses under study into groups (11 groups) each group consists of (8) nurses according to nurses' working schedule and convenience. Immediately following the pretest, the researcher distributed the educational colored guidance booklet to all nurses to aid in review and provide instruction. The booklet was written in plain Arabic and contained images to aid the nurse in understanding the information. The researcher demonstrated four teaching sessions for every group; two theoretical and two practical sessions as each session lasted (30-45 minutes) through four consecutive days as the following:

- **Session one:** (Theoretical session) It included knowledge about components, and function of the blood and plasmapheresis process,

definition and type of plasmapheresis process.

- **Session two** (Theoretical session) It included knowledge about indications and contraindication of plasmapheresis process.
- **Session three:** (Practical session) It included skills about preparations of patients and the machine before plasmapheresis processes.
- **Session four:** (Practical session) It included skills concerned to care of patients before, during and after plasmapheresis.
- Every session began with a short summary of the previous session's content, followed by the objectives of the new topics.
- During the sessions, learning was enhanced through discussion, brainstorming, encouragement, and reinforcement. The researcher gave nurses a chance to clarify any misunderstandings and ask questions at the conclusion of each session.
- PowerPoint, videos and pictures were used by the researcher in each session to facilitate delivery of the educational content.

d- Evaluation phase: The researcher assessed the nurse's knowledge and practice related to plasmapheresis processes for autoimmune disease patients using tool (1) part 2 filled by nurses and tool 2 part (1, 2 and 3) checked by the researcher through observational checklist two times; right away and three months following the educational program to

evaluate the effectiveness of the educational program.

Results

Table 1: Distribution of studied nurses according to their sociodemographic data.

Demonstrates that more than three quarters of nurses who were studied (79.5%) aged 20: < 30 years old and hold bachelor's degree. It also shows that half of sample (50%) have no experience in plasmapheresis.

Figure (1): Distribution of studied nurses according to their total knowledge score level regarding plasmapheresis throughout study.

This figure shows that more than half of study sample 55.7% lie in low knowledge category prior to educational program. However, remarkable improvement was observed immediately after the educational program, with 96.6% of the studied nurses shifting into high knowledge category. This percentage decreased after three months from the educational program to 69.3% in high knowledge category.

Table 2: Mean score of the studied nurses according to their practice level about the plasmapheresis for autoimmune disease patients throughout study periods. This table shows that mean scores of nursing practice increased markedly immediately after implementation of the educational program (21.47) more than any phase of educational program. While follow-up mean

scores showed a slight decline (20.76) compared with the immediate post-test but remained considerably higher than the pre-educational mean score 9.32. This table also shows highly statistically significant differences in nurses' practice scores across the three assessment periods ($p \leq 0.01$).

Figure (2): Distribution of studied nurses according to their total practice level regarding plasmapheresis throughout study.

This figure illustrates that nearly all study sample 93.2% lies in unsatisfactory level of practice prior to educational program while nurses who have satisfactory level of practice greatly improved immediately after educational program to reach 100% of studied nurses. Following three months of training program, the percentage of nurses who were studied and have a satisfactory level of practice slightly decreased to reach 83% of total studied nurses.

Table 3: Relationship between nurses' knowledge and practice throughout educational program regarding r value: This table illustrates the correlation between the nurses' overall practice and knowledge scores during the time frame of the study. It shows a consistent, statistically significant positive relationship between knowledge and practice throughout the study intervals. In the pre-

educational program phase, a statistically highly significant, positive correlation was observed between the participants' knowledge and practice ($r = .432, p = .001$). Immediately following the implementation of the program, the correlation remained statistically significant, though it shifted to a weak positive correlation ($r = .219, p = .041$). Notably, the strongest correlation was recorded during the follow-up phase after three months of the program implementations. The findings indicate a moderate positive correlation that is statistically highly significant ($r = .528, p = .001$).

Table (1): Distribution of the studied nurses according to their socio-demographic data, receiving previous educational training on plasmapheresis and content of training program

Sociodemographic characteristics	Studied nurses (n=88)	
	No	%
Age		
▪ 20- < 30 y	70	79.5
▪ 30 - < 40 y	12	13.6
▪ 40 - < 50 y	1	1.1
▪ ≥ 50 y	5	5.7
Sex		
▪ Male	46	52.3
▪ Female	42	47.7
Marital status		
▪ Married	35	39.8
▪ Single	49	55.7
▪ Widow	4	4.5
Educational		
▪ Diploma	3	3.4
▪ Technical institute	12	13.6
▪ Bachelor	70	79.5
▪ Master	3	3.4
Years of Experience in nursing		
▪ < 1 year	0	0
▪ 1 - < 3 years	54	61.4
▪ 3 - < 6 years	12	13.6
▪ ≥ 6 years	22	25
Years of Experience in plasmapheresis unit		
▪ No	44	50
▪ < 1 year	29	33
▪ 1 - < 3 years	2	2.3
▪ 3 - < 6 years	7	8
▪ ≥ 6 years	6	6.8
Position title		
▪ Staff nurse	57	64.8
▪ Nurse supervisor	29	33
▪ Head nurse	2	2.3
Have you received previous training on plasmapheresis?		
▪ Yes	22	25
▪ No	66	75
Content of training program		
▪ Definition of plasmapheresis	9	10.2
▪ Indication of plasmapheresis	10	11.4
▪ Complication of plasmapheresis	9	10.2
▪ How to operate plasmapheresis machine	18	20.5
▪ Nursing role in plasmapheresis procedure (before, during and after)	5	5.7
▪ Others (importance of plasmapheresis for autoimmune disease patients)	1	1.1

Figure1: Distribution of nurses according to their total knowledge score level regarding plasmapheresis throughout study

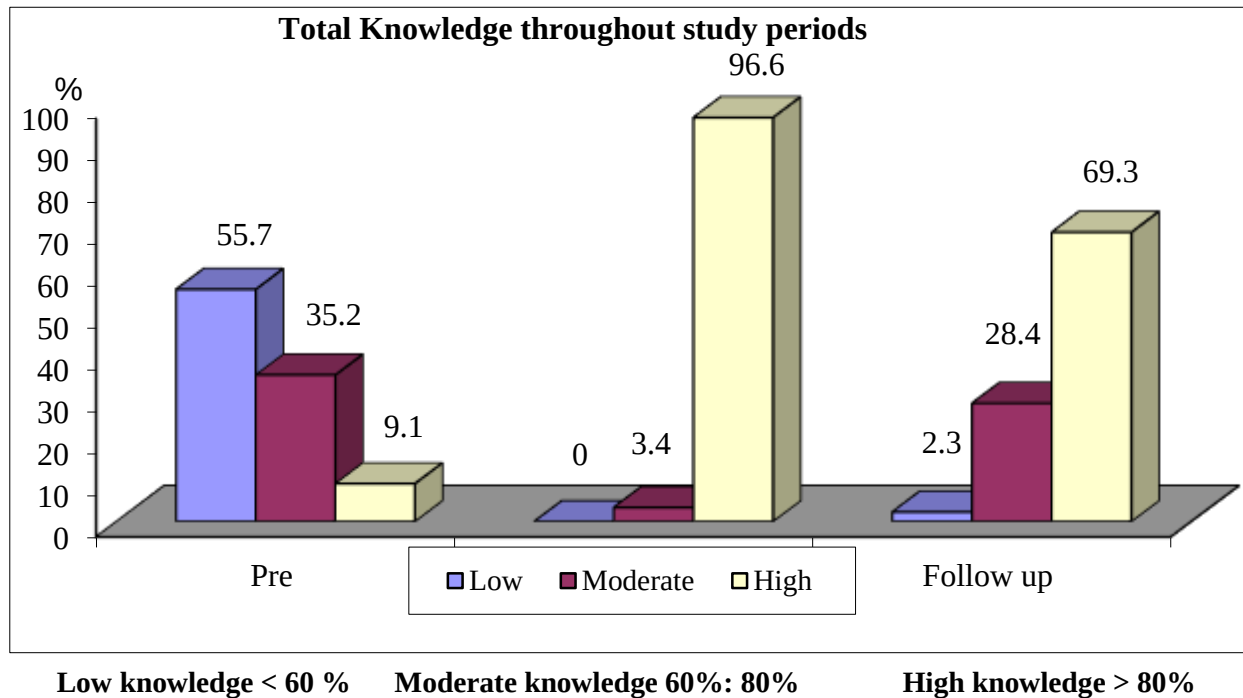


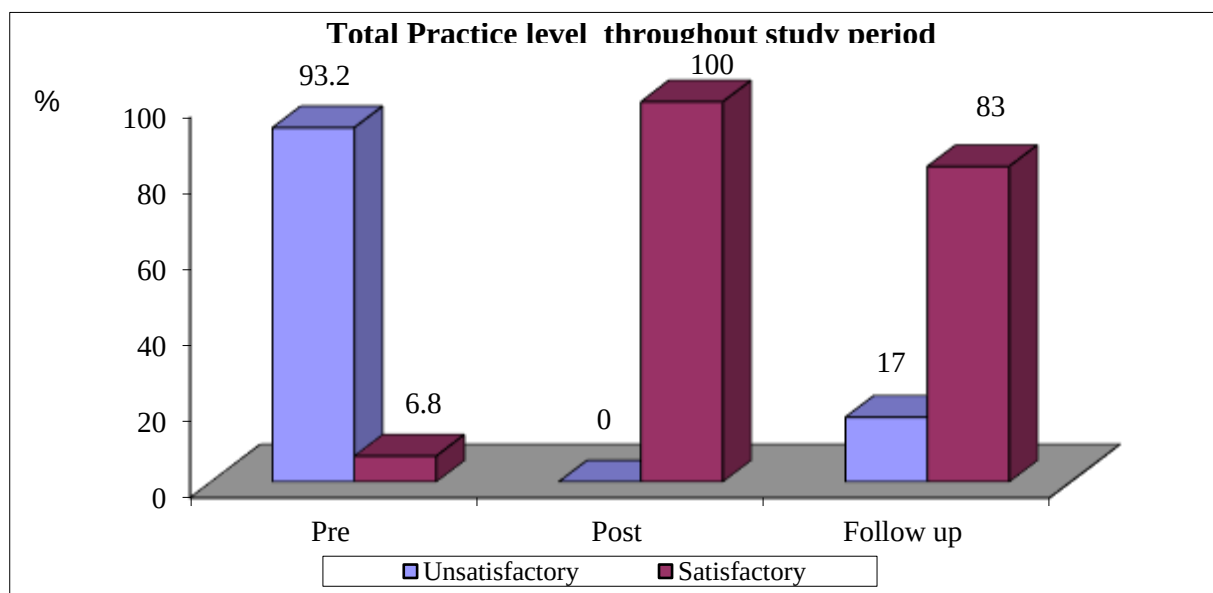
Table 2: Mean score of the studied nurses according to their practice level about the plasmapheresis for autoimmune disease patients throughout study periods

Nursing practice		Pre-educational program	Post-immediately educational program	Follow up educational program	f. test	p. value
Before plasmapheresis procedure	Range	3 – 39	34 – 41	29 – 41	255.934	0.001**
	Mean ± SD	18.76 ± 11.48	40.15 ± 1.45	38.39 ± 3.4		
During plasmapheresis procedure	Range	2 – 17	21 – 27	17 – 27	737.897	0.001**
	Mean ± SD	10.07 ± 4.71	26.57 ± 0.99	25.09 ± 2.57		
Post plasmapheresis procedure	Range	2 – 14	17 – 22	16 – 22	810.986	0.001**
	Mean ± SD	9.32 ± 3.23	21.47 ± 1.05	20.76 ± 1.89		

**** Highly statistically significant p value ≤ .01**

f. test: Repeated measures ANOVA

Figure 2: Distribution of nurses according to their total practice level regarding plasmapheresis throughout study



Satisfactory level $\geq 80\%$ unsatisfactory level $< 80\%$

Table 3: Relationship between nurses' knowledge and practice throughout educational program regarding r value

Total practice	Total Knowledge	
	r	P value
Pre educational program	0.432	0.001**
Post immediately	0.219	0.041*
Follow up after three months	0.528	0.001**

* Significant p value $< .05$

** Highly statistically significant p value $< .01$

Discussion

Plasmapheresis is considered an important therapeutic modality for patients with autoimmune diseases and requires competent nursing care to ensure patient safety and prevent procedure-related complications. Therefore, continuous educational programs are essential to enhance nurses' knowledge and clinical practice regarding plasmapheresis (Abd El Hafeez et al., 2025).

Sociodemographic characteristics of the studied nurses

Regarding the age of the nurses under study, the current study found high prevalence of younger generations, specifically between twenty to less than thirty years old. This may be attributed to the rigorous physical demands and high technological complexity which naturally require newly graduated, high-energy professionals capable of managing intensive clinical workloads. This finding is heavily supported by Ünlügedik and Akbaş (2023), who found that advanced blood purification and critical care environments are increasingly staffed by younger nursing generations. Conversely, this outcome contrasts with Hassan et al. (2022), who found that nurses who work in high-risk therapeutic apheresis units are old.

Regarding educational background, most of the nurses under study had a bachelor's degree in nursing. This

finding is explained by strict institutional policies and clinical quality guidelines that restrict technical diploma nurses from operating highly complex, extracorporeal plasmapheresis machines independently due to the high risk of severe patient complications. This clinical reality is strongly aligned with the conclusions of Schnelli et al. (2023), who argued that nurses with bachelor's degree are required for more patient's safety and high quality of care especially in critical areas. However, this finding contrasts with the national healthcare workforce distribution in Egypt, where technical diploma and institute graduates historically constitute the vast majority and represent the operational backbone of the nursing workforce. (Naeimabadi et al., 2026)

In terms of the nurses' experience in the plasmapheresis unit, the current study revealed that half of the nurses under investigation had never performed plasmapheresis before. This lack of experience may be due to the high turnover rate of young nurses in university hospitals, where staff are frequently changed or rotated between departments. This finding is supported by Goda et al. (2023), who similarly observed that low years of specialized experience were possessed by over half of the nursing personnel working in plasmapheresis facilities. On the

other hand, this result contrasts with **Amein et al. (2024)**, whose assessment of plasmapheresis units demonstrated that over half of the active nursing personnel had over five years of specialized experience.

Regarding the nurses' total knowledge score levels regarding plasmapheresis throughout the study phases. In the pre-program phase, most of the nurses who were studied stated low to moderate knowledge level. However, right after the educational program's establishment, a massive improvement was achieved. At the 3-month follow-up phase, the therapeutic knowledge was remarkably sustained, with more than two thirds of the nurses maintaining a high knowledge level, despite a minor and natural drop to a moderate level among less than third of the sample. From the researcher's clinical point of view, the baseline deficiency is directly related to nurses operate specialized extracorporeal machines based on mechanical routine rather than an evidence-based academic rationale. The immediate post-program surge clearly indicates that the educational material was comprehensive, clear, and perfectly tailored to the baseline educational needs of university hospital staff. Moreover, the strong retention after three months reflects the active cognitive engagement of the nurses, who integrated these

newly acquired concepts into their daily clinical practice, thereby preventing the typical rapid memory decay.

This outcome aligns with a study by **Amein et al. (2024)**, who showed that a structured educational intervention leads to an immediate and significant improvement in nurses' theoretical knowledge and technical competencies. However, **Kadhim (2023)** found that the work environment has an impact on the performance of nurses not only educational programs.

Mean score of the studied nurses according to their practice level about the plasmapheresis for autoimmune disease patients throughout study periods, the longitudinal evaluation demonstrated a highly statistically significant improvement across all clinical performance throughout the study periods. Prior to the educational program, the nurses' mean practice scores were considerably low across all three dimensions. This baseline deficiency reflects that clinical performance often relies on informal bedside habits. This finding is aligned with **Abdel-Salam et al. (2023)** who observed profound baseline deficiencies in the pre-educational phase. However, this contradicts with **Alrashdi et al. (2025)** who found that heavy clinical workloads in acute wards often restrict nurses from reviewing

updated standard operating procedures. Immediately following the implementation of the educational program, a substantial increase in clinical performance was observed. This finding is in line with **Farag et al. 2025** who proved that when nurses are exposed to systematic educational programs, their capacity to align with evidence-based standards is rapidly achieved. At the three-month follow-up evaluation, the nurses successfully retained a high level of clinical competency, maintaining strong practice levels across all procedures. This result is in line with **Pandian et al. (2024)** who found that minor decay in skills over time is widely documented as a natural consequence of the forgetting curve, especially if certain complex maneuvers are not performed on a daily basis. Conversely, this viewpoint is challenged by **Sherlock et al. (2022)**, who revealed that the long-term success of an evidence-based program depends greatly on having dedicated nurses. These nurses use their good relationships and social networks to overcome resistance from staff and adapt the protocols to fit the daily work routine.

Regarding the total practice level of the studied nurses throughout the study phases, the pre-educational program findings revealed a substantial deficit in clinical skills related to

plasmapheresis management. The great majority of the samples under study demonstrated inadequate practice. From the standpoint of the researcher, this baseline deficiency can be rationally attributed to several institutional factors. as shortage of specialized, continuous in-service training programs. Furthermore, the routine undergraduate nursing curricula often touch upon apheresis only theoretically, leaving newly graduated nurses to learn these high-acuity skills via trial and error during clinical shifts.

This baseline practice deficiency is directly substantiated by empirical data from **Elsayed et al. (2024)**. who established that a vast majority of studied nurses exhibited unsatisfactory baseline knowledge and incompetent clinical performance prior to structured intervention. However, **Farag et al. (2025)** revealed that a notable segment of evaluated nurses maintained a satisfactory level of baseline procedural practice prior to the implementation of educational guidelines.

Immediately following the implementation of the educational program, a dramatic improvement in practice proficiency was observed. This comprehensive improvement strongly underscores the clinical efficacy of the educational sessions. This conclusion corresponds with **Abdel-Salam et al. (2023)**, who

reported a similar immediate post-program boost in nurses' clinical competence regarding advanced critical care procedures. Conversely, **Alshammari et al. (2022)** suggests that formal training programs and structured instructional strategies are not the exclusive drivers of technical mastery and continuous workplace immersion and routine hands-on have role in improving practice.

At the three-month follow-up assessment, the findings indicated a slight, gradual decline in the percentage of nurses who maintain a satisfactory practice level. From researchers' point of view, this long-term fluctuation is a normal educational phenomenon. This specific pattern of skill retention and subsequent natural degradation aligns with the findings of **Farag et al. (2025)**, who documented a predictable longitudinal decay in both theoretical knowledge and psychomotor proficiency among nurses within plasmapheresis units. In contrast, a study by **Stochlinski et al. (2026)** indicates that complex procedural skill retention can be effectively preserved over a three-month post-intervention period. Their results prove that simple, competency-based simulation even when using low-cost, self-made models is just as effective as expensive simulators for maintaining long-term technical performance.

Regarding the correlation between the studied nurses' total knowledge and total practice scores, the pre-educational program results showed a statistically significant positive correlation. Clinically, this makes perfect sense because a nurse cannot properly manage extracorporeal circuits or troubleshoot machine alarms without understanding the underlying theoretical principles.

This outcome conforms to **Nalesso et al. (2022)** who verified that due to the high technological complexity of apheresis devices and the management of technical alarms are intrinsically linked to the acquisition of adequate conceptual knowledge by the nursing staff. Conversely, a study by **Smith and Johnson (2023)** demonstrated that actual clinical execution is deeply bound to leadership, organizational culture, and systemic capabilities.

Immediately after implementing the program, the correlation was still positively statistically significant. Consequently, this outcome demonstrates that structured clinical training is highly effective at closing individual performance gaps and elevating the entire nursing staff to a standardized level of proficiency. This phenomenon aligns with **Amein et al. (2024)** who stated that the training effectively elevated the post-program competency scores of almost all participating nurses. On the other hand, a different perspective

by **Saifan et al. (2021)** suggests that the drop in correlation. The authors found that learning concepts in a classroom does not automatically lead to safe practice at the bedside. Their findings showed that workplace barriers, like heavy workloads and too much paperwork, often stop nurses from using their knowledge in real clinical situations.

At the three-month follow-up, the correlation increased significantly, showing a highly statistically significant correlation. As months passed without continuous reinforcement, individual differences reappeared because nurses forgot theoretical facts and lost manual precision at different rates. Crucially, this higher correlation at three months proves that the nurses who retained their knowledge were the exact same individuals who maintained safe clinical practice. This long-term trend confirms that continuous knowledge retention is essential for sustaining technical proficiency in high-acuity environments. This insight is in strict agreement with **Glarcher et al. (2025)**, who verified that keeping clinical skills at a high level is not a one-time result, but rather a process of ongoing learning. On the other hand, a different perspective by **Alilyyani et al. (2024)** suggests that the long-term sustainability of clinical skills is driven by hands-on

experience rather than continuous classroom education.

Conclusion

It can be derived from the current study's results that the execution of the educational program regarding plasmapheresis for autoimmune disease patients yielded an extensive and dramatic increase in nurses' knowledge and clinical practices.

Recommendations

For Clinical Practice:

- In the clinical area, it is highly recommended to integrate the standardized plasmapheresis protocols and evidence-based guidelines utilized in this program into the daily routine of specialized apheresis units.

For Nursing Education and Training:

- Institutional hospital administrations should mandate continuous, periodically updated in-service training programs focusing on advanced apheresis therapies rather than relying on one-time instructional sessions.

For Nursing Administration:

- Healthcare directors and nursing managers need to foster a supportive institutional environment by allocating the necessary resources, advanced equipment, and updated learning materials that facilitate strict adherence to evidence-based plasmapheresis protocols.

For Future Research:

-Further research should be directed toward replicating this study with a larger, randomized controlled sample across multiple geographical settings and diverse healthcare sectors to enhance the generalizability of the findings.

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