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Effect of Implementing Educational Program on Nurses' Perception Regarding Application of Artificial Intelligence in Hemodialysis Unit

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Abstract

Background: Artificial intelligence is rapidly renovating healthcare sector. However, deficient AI- related knowledge and perceptions among nurses may limit its effective implementation, stressing the need for educational interventions. **Aim:** evaluate the effect of implementing educational program on nurses' perception regarding application of artificial intelligence in hemodialysis unit. **Design:** Quasi experimental research design was utilized. **Setting**: Hemodialysis unit of New Nephrology Surgical Hospital, Tanta Main University Hospital. **Subject:** All nurses (60) from the above-mentioned setting. **Tools:** Two tools used in this study: **Tool I:** Nurses' Knowledge Self-administered Questionnaire. **Tool II:** Nurses' Attitude Regarding Artificial Intelligence Applications Questionnaire. **Results:** The findings indicated that the majority of the studied nurses had a poor level of knowledge prior to the program's implementation while the majority of them showed a good knowledge level, reflecting a highly significant improvement p value <0.001 following the program. Additionally, most nurses initially displayed a negative attitude toward artificial intelligence, but the majority exhibited a positive attitude after the program, highlighting a highly significant change. **Conclusion:** Implementation of educational program had a positive impact on nurses' knowledge and attitudes. **Recommendations:** Continuing institutional educations for nurses who are working in hemodialysis units to prepare them for effective use of AI in nursing practice thus improve patient outcomes and satisfaction.

Keywords: Artificial Intelligence, Educational Program, Hemodialysis Unit, Perception.

Introduction

End-stage renal disease (ESRD) is a serious and widespread health disorder that can be life-threatening. It represents the advanced stage of chronic kidney disease (CKD) and develops when the glomerular filtration rate (GFR) decreases to below 15 mL/min/1.73 m² **(Morad, Salem, Salem, & Rabie, 2024).**

Hemodialysis (HD) is a life-saving procedure used to replace renal function particularly the excretory capacity, among patients diagnosed with end-stage renal disease (ESRD). This procedure removes excess body fluid and nitrogenous waste products from the bloodstream. With the increasing prevalence of patients undergoing hemodialysis, there is a growing need for enhanced monitoring and proactive management to anticipate and address potential complications **(Patil, 2024).**

Recently, Artificial Intelligence is implemented as an interesting strategy in various fields of medicine, including nephrology. It could be applied to monitor hemodialysis, improve clinical care, and follow-up transplant recipients. The potential of AI in nephrology aims to improve kidney dialysis for CKD patients by reducing frequency and enhancing quality of life **(Singh et al., 2024).**

As part of Egypt's Vision 2030, artificial intelligence (AI) is being progressively integrated into several sectors, particularly the healthcare sector. The Egyptian government is promoting AI adoption through continuous support for research, innovation, and technological development. According to the national strategy, AI and robotics are expected to contribute approximately 7.7% to the country's Gross Domestic Product (GDP) by 2030. This vision reflects Egypt's commitment to establishing a technology-driven society supported by AI and advanced digital technologies **(Egypt's Artificial Intelligence Future, 2020).**

The integration of artificial intelligence into hemodialysis machines has transformed the way this essential therapy is delivered. Modern dialysis systems incorporating artificial intelligence algorithms support the real-time monitoring and adjustment of dialysis parameters. Through the analysis of multiple clinical indicators, such as blood pressure, electrolyte levels, and fluid balance, these systems support individualized treatment planning. As a result, AI-assisted hemodialysis contributes to reducing complications, such as hypotension, while providing

treatment that is accurately adapted to each patient's current clinical needs; with accuracy which is not achievable with traditional methods rely primarily on intermittent monitoring and clinical judgment **(Rather, Wani, & Rasheed, 2024).**

Effective integration of artificial intelligence into nursing practice requires nurses to acquire adequate knowledge and awareness of its applications. Although considerable research has focused on developing AI technologies and evaluating their effectiveness after implementation, relatively few studies have examined nurses' understanding of AI or their readiness to incorporate it into routine clinical practice **(Mohamed, Mohamed, Mahmoud, & Heggy, 2023).**

Providing regular education and training for clinicians, nurses, and other healthcare professionals is essential to keep pace with the rapid advancement of technology. As artificial intelligence (AI) and machine learning (ML) continue to evolve, healthcare professionals need to continuously update the knowledge and skills required for their effective use in clinical practice. Such educational efforts are necessary to ensure the accurate interpretation of AI and ML outputs and their appropriate application in ways that support clinical judgment and decision-making among healthcare providers **(Ramalhete et al., 2024).**

Significance of the study:

To enhance competitiveness in the labor market, there is a pressing need for a fundamental transformation toward the digitalization of the healthcare sector. As part of this transformation, artificial intelligence (AI) has become an important consideration for healthcare administrators and providers. This has led to increasing concerns of the most appropriate approach to incorporating AI into healthcare practice, either through full implementation or gradual integration **(Mohamed et al., 2023).**

The attitudes and perceptions of healthcare professionals particularly nurses are important determinants in the successful integration of artificial intelligence into nursing practice. Positive perceptions of AI among nurses can contribute to improve efficiency in healthcare delivery, and boosted quality of care. In contrast, doubt or resistance may hinder its adoption and constrain the realization of its full potential benefits **(Geneedy, Hemaida, & Aboelfetoh, 2024).**

The aim of this study was to evaluate the effect of implementing educational program on nurses'

perception regarding application of artificial intelligence in hemodialysis unit.

Research Hypotheses: -

1. Application of AI educational program is expected to exhibit improvement of hemodialysis unit nurses' knowledge.
2. Application of AI educational program is expected to exhibit improvement of hemodialysis unit nurses' attitude.

Subjects and Method

Research design: a quasi-experimental research design was used.

Study settings:

The study was conducted at the hemodialysis unit of New Nephrology Surgical Hospital, Tanta Main University Hospital; the unit is located at the first and second floor which includes two rooms in each floor for dialysis with a total of 47 hemodialysis machines.

Study subjects: -

All available nurses (60) from the previously mentioned setting who are directly providing care for the patients undergoing hemodialysis.

Study tools:

Two tools were used as follow:

Tool (I): Nurses' Knowledge Self-administered Questionnaire:

This tool was developed by the researcher after extensive review of the recent and related literatures **(Lennartz et al., 2021; Shimon, Shafat, Dangoor, & BenShitrit, 2021; Mohamed et al., 2023**; **Elderiny, Ahmed, & Elhoty, 2024; Hablass, Abdelsamad, & Mohamed, 2025)** to assess nurses' knowledge about application of artificial intelligence in hemodialysis unit, it consisted of two parts:

Part (A): Nurses' personal data: Included data about; code, gender, age, educational level, marital status, years of experience in nursing field, years of experience in hemodialysis unit and received training about artificial intelligence in hemodialysis unit.

Part (B): Nurses' knowledge regarding AI self-administered assessment questionnaire; it comprised multiple choice questions and divided into three main sections to assess knowledge of nurses related to:

1) Artificial intelligence overview (6) questions.

2) Specific application of artificial intelligence in hemodialysis unit (9) questions.

3) Challenges and solutions for application of artificial intelligence in hemodialysis unit (4) questions.

Scoring systems:

One score was allotted to each correct answer and zero score for each incorrect answer. The possible

obtained total scores ranged from 0 to 19, total knowledge scores of the nurse' response were summed up and converted to percentage then categorized into:

- Poor (<60%) of the total scores.
-Average (60-80%) of the total scores.
- Good (>80%) of the total scores.

Tool (II): Nurses' Attitude Regarding Artificial Intelligence Applications Questionnaire:

This tool was adopted by **(Hablass et al., 2025)** and was adapted by the researcher after extensive review of recent and related literature**.** It includes (13) statements to assess nurses' attitude regarding artificial intelligence applications in hemodialysis unit.

Scoring system:

Scoring of AI attitude was scored through five-point Likert scale as follows; (1) for strongly disagree, (2) for disagree, (3) for Neutral, (4) for Agree and (5) for strongly agree". The sums of the scores then were converted to percentage and categorized into:

- Negative attitude (<60%) of the total score.
- Positive attitude (≥60%) of the total scores.

Method

Administrative process:

An official Permission to carry out the study was obtained from the responsible authorities of the selected setting before conducting the study through official letters from Faculty of Nursing explaining the purpose of the study.

Ethical consideration:

- Approval of scientific research ethical committee at Faculty of Nursing was obtained with code number (657-5-2025).
- Confidentiality and privacy were taken into consideration as regarding data collection.

Content validity:

The content validity of the developed tools was tested for clarity and applicability by a jury of five experts in Medical Surgical Nursing specialist at Faculty of Nursing, Tanta University and nephrology and urology specialist at Tanta University Hospital to ensure their validity, accordingly minor necessary modifications were done.

A pilot study:

A pilot study was conducted on (6) nurses in order to test the clarity, feasibility; relevance and applicability of the tools different items, only minor modifications were done before the main study. The pilot study samples were included in the total sample of the study.

Reliability of the tools:

Cronbach's alpha test reliability was applied on the previously mentioned

tools. Reliability of knowledge questionnaire was 0.719 and attitude questionnaire was 0.950. This proves that the tools are instruments with good reliability.

Data collection:

- Data were collected over a period of 8 months, started from July 2025 to February 2026.
- The researcher explained the purpose of the study, and obtains the informed consent from those who are willing to participate in the study.
- The researcher visited the study setting 4 days/week (Sunday, Monday, Tuesday and Thursday) to distribute and collect the self-administered filled questionnaires.
-Nurses structured self-administered questionnaire was filled by the nurses three times to assess their demographic characteristics and their knowledge as well as their attitudes towards integrating artificial intelligence in hemodialysis units; it took about 15 – 20 minutes to be fulfilled.
- **The present study was conducted through four phases** as the following:

I. Assessment phase:

Assessment was done using Tool I part A and part B and Tool II to assess nurses' knowledge and attitude regarding artificial intelligence in hemodialysis unit and to determine their educational needs.

II. Planning Phase:

- This phase was formulated based on data from the assessment phase, literature review priorities, goals and identified nurse's needs.
- Goals and expected outcomes criteria were taken into consideration.

The planning phase included the following:

- An illustrative structured colored booklet was prepared and written in simple Arabic language supported by illustrative pictures as a guide for the studied nurses.
- Educational program: nurses were divided into (6) subgroups; each subgroup consisted of 5-10 nurses according to their assigned working shifts. The researcher carried out the sessions that were scheduled in the morning shifts. The time for each session lasts for 30-45 minutes.

III. Implementation phase:

The educational program was carried out by the researcher for the studied nurses throughout 3 sessions at the morning shift as follow:

1. First session: start with welcoming the participants and introduce myself and recall overall aim and sessions of educational Program.

- Educate the nurses about definition of artificial intelligence in the context of healthcare, core technologies of artificial intelligence and how it works, advantages and disadvantages of AI and applications of artificial intelligence in healthcare.

2. Second session: educate the nurses about the primary goal of using AI in the hemodialysis unit, current and potential applications of artificial intelligence in the hemodialysis units, skills required for nurses for the effective integration of AI in hemodialysis units and nurses' role in AI implementation.

3. Third session: included knowledge about challenges associated with artificial intelligence implementation, recommendations for safe and effective AI implementation, and ethical considerations related to AI use in the hemodialysis units.

IV. Evaluation Phase: The researcher evaluated nurses' knowledge and attitude immediately and 2 months after the Implementation of an educational program using Tool, I part B and Tool II.

Results

Table (1): Represents that more than three quarters of the studied nurses (78.3%) were in the age group from (20 - <30) years old, and (65.0%) were female, and more than half (55.0%) were married. Most of the studied nurses (96.7%) had a bachelor degree of nursing. Regarding years of nursing experience, more than half (58.3%) of the studied nurses had (1 - <5) years of experience in nursing, while less than half and same percent (41.7%) had (<1) and (1 - <5) years of experience in hemodialysis unit. All studied nurses (100%) had not received any previous training courses related to artificial intelligence.

Figure (1): Shows a statistically significant improvement has been occurred in overall level of knowledge for studied nurses, as revealed by none of the studied nurses demonstrate good knowledge level prior to program implementation which has been improved dramatically immediately to good level (93.3%) and slightly decreased to (85%) two months post educational program implementation.

Table (2): Proves that the majority of the studied nurses (86.7%) had a negative attitude level prior to implementation of the educational program with a mean score and SD of 26.48 ± 10.13. whereas, immediately post implementation of the educational program the majority

of studied nurses (91.7%) had a positive attitude level with a mean score and SD of 52.93 ± 7.88. Moreover, two-month post implementation of educational program, the majority of studied nurses (93.3%) had a positive attitude level with a mean score and SD of 53.13 ± 8.50, with statistical significance improvement regarding total attitude levels throughout the study periods and between the study periods since p value= <0.001each**.**

Figure (2): Illustrates that the majority of studied nurses (86.7%) had negative attitude level, while minority (13.3%) had a positive attitude level prior to program implementation while the majority of them (91.7%) had a positive attitude level immediately post program implementation. Additionally, two months post the educational program the majority of studied nurses (93.3%) sustain the positive attitude level.

Table (3): Shows that there was a statistically significant positive correlation between nurses' overall knowledge and attitude levels only two months post implementation of the educational program where p value= 0.003.

Table (1): Distribution of the studied nurses according to nurses' personal data (n = 60)

Nurses' personal data	No.	%
Age		
20 - <30	47	78.3
30 - <40	10	16.7
40 - <50	3	5.0
Gender		
Male	21	35.0
Female	39	65.0
Marital Status		
Single	27	45.0
Married	33	55.0
Educational level		
Nursing Diplom	2	3.3
Bachelor of Nursing	58	96.7
Years of Experience in Nursing		
<1	10	16.7
1 - <5	35	58.3
5 - <10	12	20.0
≥ 10	3	5.0
Years of experience in the hemodialysis unit		
<1	25	41.7
1 - <5	25	41.7
5 - <10	7	11.7
≥ 10	3	5.0
Have you received any training on artificial intelligence?		
No	60	100.0
Have you received any training on artificial intelligence in the hemodialysis unit?		
No	60	100.0

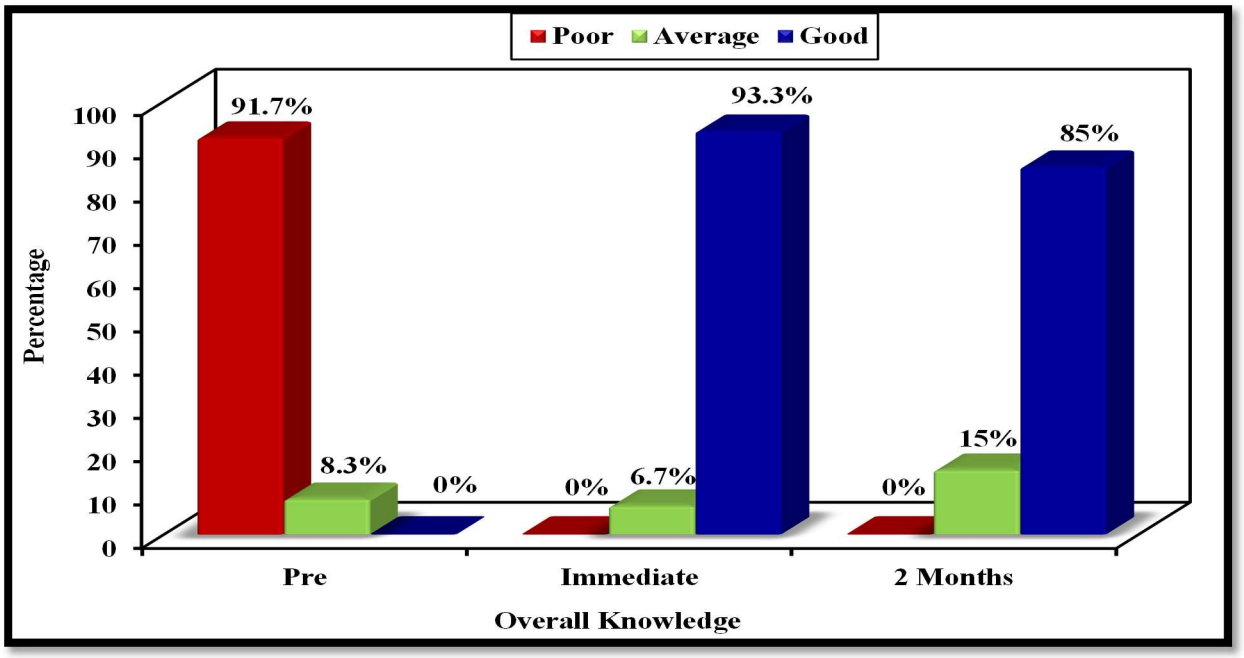

Figure (1): Distribution of the studied nurses according to overall knowledge throughout the study period (n = 60)

Table (2): Distribution of the studied nurses according to mean score and total attitude levels throughout the study period (n = 60)

	Pre		Immediately post		2 Months post		Test of Sig.	P
	No.	%	No.	%	No.	%		
Levels of Attitude Negative (<60%) Positive (≥60%)	 52 8	 86.7 13.3	 5 55	 8.3 91.7	 4 56	 6.7 93.3	 Q= 86.808*	 <0.001*
Total Score (13 – 65) Min – Max. Mean ± SD.	 17.0 – 52.0 26.48 ± 10.13		 27.0 – 63.0 52.93 ± 7.88		 23.0 – 63.0 53.13 ± 8.50		 F= 194.259*	 <0.001*
Sig. bet. Periods	p_1<0.001*, p_2 <0.001* , p_3= 1.000							

SD: **Standard deviation** **Q**: **Cochran's test**

F: F test (ANOVA) with repeated measures, Sig. bet. periods was done using **Post Hoc Test (adjusted Bonferroni)**

p: p value for comparing between the three studied periods

p_1: p value for comparing between **Pre** and **Immediate**

p_2: p value for comparing between **Pre** and **2 Months**

p_3: p value for comparing between **Immediate** and **2 Months**

*: Statistically significant at $p \leq 0.05$

Figure (2): Distribution of the studied nurses according to total attitude levels throughout the study period (n = 60)

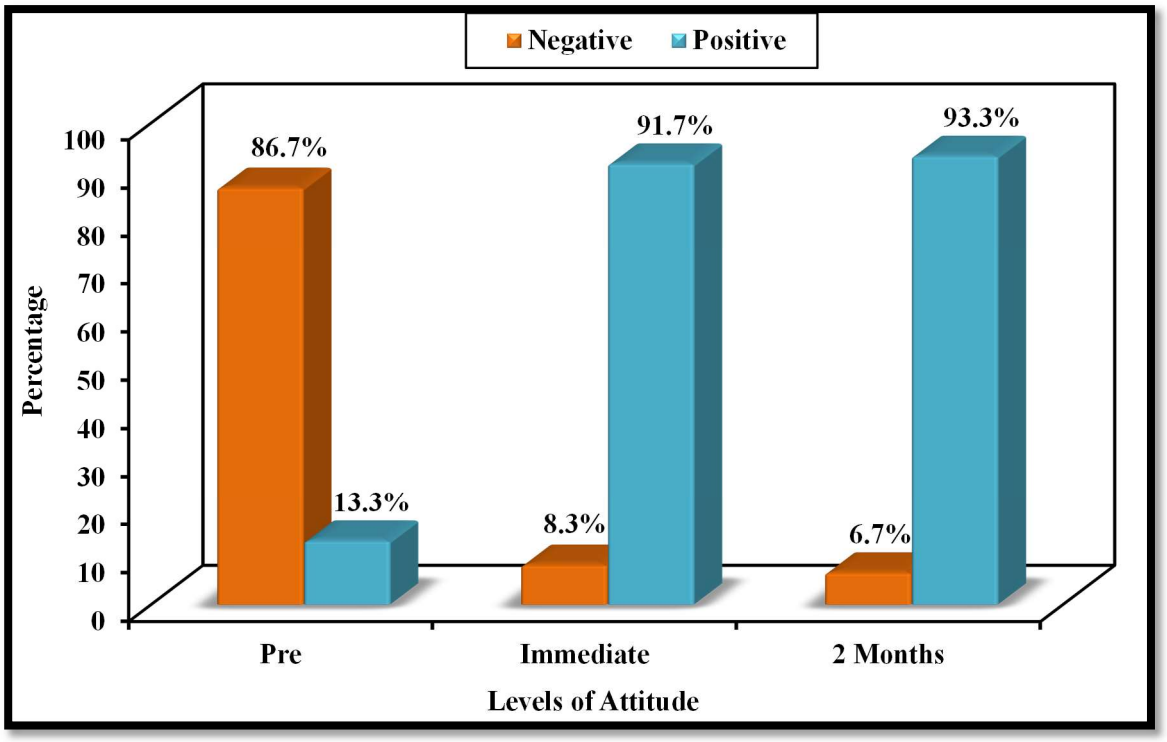

Table (3): Correlation between knowledge and attitude immediately and 2 months post implementation of the educational program (n = 60)

	Immediately post		2 Months post	
	R	P	R	P
Knowledge vs. Attitude	0.121	0.356	0.372*	0.003*

r: Pearson coefficient *: Statistically significant at $p \leq 0.05$

Discussion:

Healthcare professionals, mainly nurses, require adequate knowledge and positive perceptions regarding AI applications to enable their effective integration and utilization in clinical practice **(David-Olawade et al., 2026)**. Therefore, the current study was conducted to evaluate the effect of implementing an educational program on nurses' perception regarding the application of artificial intelligence in hemodialysis unit.

The finding of the present study shown that more than three quarters of the studied nurses were in the age group from (20 - <30) years, from the researcher point of view this result may be linked to increase employment of newly graduated nurses in critical departments, including hemodialysis units. It also considers the effective time to learn and participate in educational and technology related initiatives, particularly those related to artificial intelligence applications in healthcare.

This result was in agreement with **Alrashedi et al. (2026),** who reported that more than half of the studied nurses were aged 20 to 29 years. On the other hand, this result was in contrast with **Atalla et al. (2025),** who reported that more than half of the studied nurses their age ranged from (40-50) years. Regarding gender, the current study clarified that less than two thirds of the studied nurses were female, which may be explained by the increasing number of males entering the nursing profession, although nursing has traditionally been a female-dominated profession.

This finding was consistent with **Liu et al. (2025),** who found that most of the studied nurses were female. On the other hand, this finding in contrast with study by **Alrashedi et al. (2026),** who illustrated that less than two thirds of the nurses were male. **Concerning marital status,** the present study revealed that more than half of the studied nurses were married, which goes in the same line with **Ghazy, Diab, and Shokry (2023),** who stated that the majority of the studied nurses were married.

On the other hand, this result was against **Çoban and Beydağ (2025),** who reported that almost two thirds of the studied nurses were single. **Regarding educational level,** the current study illustrated that most of the studied nurses had bachelor degree of nursing, which supported with **Geneedy et al. (2024),** who noted that more than half of the studied nurses had bachelor's degree of nursing. On the other hand, this finding disagreement with study by **Elshamy, Fouda, Elbialy, and**

Mahmoud (2026), who found that the majority of the studied nurses were nursing technicians with a secondary diploma or technical institute education.

As regard years of experience in the nursing field, the finding of the present study represented that more than half of the studied nurses had (1 - <5) years of experience in nursing which is compatible with **Geneedy et al. (2024),** who found that more than half of nurses had 1-5 years of nursing experience. On the other hand, this finding was disagreed with **Çoban and Beydağ (2025),** who reported that less than half of the studied nurses have 6 years and above of nursing experience.

Regarding levels of knowledge of the studied nurses about artificial intelligence overview, applications of artificial intelligence in the hemodialysis unit, and challenges and solutions in applying AI in the hemodialysis unit, the current study showed highly statistical significant differences of the studied nurses' knowledge throughout the study periods where majority of nurses reporting poor knowledge level before the program which has been improved dramatically immediacy post and slightly decline at the follow up with significant differences for all knowledge sub items in addition to overall knowledge level which may be attributed to the effectiveness of the competency program where they are provided with an Arabic educational booklet, the concise presentation of each session using simple clear educational method, the interactive discussions, motivation and reinforcement and also; it was the first time for the studied nurses to attend educational sessions about artificial intelligence.

This result nearly consistent with the study by **Hablass et al. (2025)**, who revealed that nearly two thirds of the studied nurses had average general knowledge about artificial intelligence, nearly half of the nurses had poor knowledge about its application in hemodialysis unit and more than half had poor knowledge about challenges and suggested solutions. These outcomes also was harmony with study by **Areshtanab, Rahmani, Vahidi, Saadati, and Pourmahmood (2025)** and matched with **Wang et al. (2024),** who revealed that most of the participants had a low level of knowledge of AI and lacked knowledge of AI, particularly in nursing.

Moreover, the finding was in line with study by **Mohamed et al. (2023),** who reported that the majority of nurses had improved overall knowledge level immediately after the educational

program implementation with highly statistically significant differences among all domains scores of nurses' knowledge of artificial intelligence between before, immediate after intervention and follow-up. On the other hand, this finding contradicted with study by **Almulhem et al. (2026),** who found that more than two thirds of the participants demonstrated a high level of knowledge about AI.

According to mean score and overall attitude, the current study found that there was a statistical significance improvement regarding overall attitude of the studied nurses toward the application of AI in hemodialysis unit throughout the study period. The absence of statistically significant differences between the immediately post and two month follow up period indicated that the educational program had a sustained effect on improving nurses' attitudes overtime.

This finding consistent with **Mohamed et al. (2023),** who illustrated that the total attitude positive Mean ± SD score improved from pre to immediate post intervention. Conversely, these outcomes were inconsistent with **Sandanasamy, McFarlane, Okamoto, and Couper (2025),** who revealed that the average positive attitude of nurses towards AI, as observed in three studies was reflecting a generally high positive attitude among nurses.

Concerning the correlation between post **nurses' knowledge and attitude regarding AI,** the present study revealed a statistically significant positive correlation was reported only two-month post educational program which may be due to AI had not yet been implemented in the hemodialysis unit in the study setting and nurses attitude is difficult to be changed until knowledge improved.

This finding aligns with the results of **El-Monem, Rashed, and Hasanin (2023),** who reported a highly statistically significant correlation between staff nurses' perceptions of artificial intelligence technology, their professional identity, and their problem-solving abilities. Similarly, this result harmony with **Omari et al. (2024)**, who illustrated that there was a significant positive association between knowledge, attitude, perception and intention towards the use of AI. Additionally, this finding was in line with **Almarwani and Hebeshy (2026),** which revealed a moderate positive correlation between knowledge and attitudes.

Regarding relation between nurses' personal data and their

levels of knowledge throughout the study period, the finding of the present study demonstrated that the educational program was successful in improving nurses' knowledge regarding artificial intelligence irrespective of their personal characteristics. This was evidenced by the absence of statistically significant differences in knowledge levels pre and immediately after program implementation regarding all demographic characteristics.

Two months post program implementation, a statistically significant relationship was found only between nurses' level of knowledge and both educational qualification and years of nursing experience,

This finding goes in the same line with (**Sandanasamy et al., 2025; Hablass et al., 2025; Elshamy et al., 2026),** who demonstrated that there was significance relation between nurses' level of education and their total level of knowledge. Also, this finding aligns with a study conducted by **Reigas and Šukienė (2025),** who explained that there was a statistically significant positive correlation between level of knowledge regarding artificial intelligence in primary healthcare and participant's age, educational qualification, and years of experience.

Concerning relation between nurses' personal data and their attitude throughout the study period, the present study revealed no statistically significant relationship between nurses' attitude toward artificial intelligence and any of the studied personal characteristics before and two months after program implementation. However, immediately after the intervention, significant relationships were reported with age, educational qualification, years of nursing experience, and years of experience in the hemodialysis unit which may indicate that the educational program enhanced nurses' acceptance of artificial intelligence across all participants, while differences in educational background and professional experience influenced the degree of immediate response to the program.

This result is consistent with **Elshamy et al. (2026)** who reported that a statistically significant relationship was found between total attitude level score of nurses and their age, educational level, and job grade. Similarly, **Sandanasamy et al. (2025),** revealed a significant relationship between nurses' education level and attitude toward AI.

Conclusion: The educational program led to significant improvements in nurses' overall levels of knowledge and attitudes regarding application of artificial in hemodialysis unit.

Recommendations: based on the findings of the current study, the following recommendations are derived and suggested:

For nurses:

- Continuing institutional educations for nurses to prepare them for effective use of AI thus improve patient outcomes and satisfaction.
- Regular in-service educational programs about AI and advanced technologies to advance nurses' knowledge and enhance their attitude regarding artificial intelligence.

For administration:

- Establishing institutional polices supporting the safe, ethical and effective integration of artificial intelligence technologies into hemodialysis patient care.
- Establishing interdisciplinary teams of nurses, technologists, and AI specialists to stimulate information exchange and create approaches to improve patient care.

For nursing education:

- Integrating principles and concepts of artificial intelligence in undergraduate nursing curriculum.
- Strengthen partnerships between nursing faculties and healthcare institutions to provide practical exposure to AI applications in clinical settings.

Further researches:

- Scale up the current educational program to include nurses working in hemodialysis units across multiple hospitals and healthcare sectors to evaluate its effectiveness on a broader scale.

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Effect of Exercise Program on Depressionand Functional Status in Postoperative Patients with Breast Cancer

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Abstract

Background: Breast cancer remains the most commonly diagnosed cancer among women worldwide and represents a major public health concern due to its high incidence, treatment-related burden, and long-term physical and psychological consequences. **Aim:** This study aimed to evaluate the effect of exercise program on depression and functional status in postoperative patients with breast cancer. **Design:** Quasi-experimental research design was utilized to conduct study. **Setting:** The study was conducted at outpatient oncology at Fayoum University Hospital. **Sample:** A purposive sample of 50 postoperative patients with breast cancer. **Tools:** Three tools were used for data collection**.** Tool I: Demographic and medical data questionnaire. Tool II: Beck Depression Inventory (BDI-II). Tool III: Functional Assessment of Cancer Therapy - Breast (FACT-B). **Results:** There was a statistically significant improvement in depression level and all functional status subscales after implementation of exercise program compared to preprogram. The mean depression score decreased significantly from 31.26 pre-program to 18.68 post-program and further to 11.24 at follow-up. Also, the mean functional status score increased from 50.22 pre-program to 98.94 post-program and reached 114.9 at follow-up. **Conclusion:** Exercise program significantly alleviated depression symptoms and improving functional status among postoperative patients with breast cancer. **Recommendation:** Implementing structured exercise programs as routine postoperative care for patients with breast cancer to improve psychological well-being and functional status.

***Keywords*:** Breast cancer, Depression, Exercise Program & functional status

Introduction

Breast cancer (BC) remains the most commonly diagnosed cancer among women worldwide and represents a major public health concern due to its high incidence, treatment-related burden, and long-term physical and psychological consequences. According to recent global cancer statistics, breast cancer accounts for approximately one in four cancer cases among women, with increasing survival rates attributed to advances in early detection and multimodal treatment strategies, including surgery, chemotherapy, radiotherapy, and hormonal therapy **(Sung et al., 2024).**

Although surgical intervention is a cornerstone in breast cancer management, postoperative patients frequently experience a wide range of adverse outcomes that negatively affect their quality of life. Postoperative breast cancer patients often suffer from physical impairments such as reduced functional status, pain, fatigue, limited range of motion, and decreased muscle strength, which may persist long after surgery. These physical limitations can interfere with activities of daily living and hinder the patient's ability to resume normal social and occupational roles **(Campbell, Sheikh, Sambo, Pharr, & Doescher, 2025)**

In addition to physical challenges, psychological complications particularly depression are highly prevalent among women following breast cancer surgery. Depression in this population is associated with poorer treatment adherence, prolonged recovery, impaired functional outcomes, and increased healthcare utilization **(Carreira et al., 2024).**

Exercise programs have emerged as an effective non-pharmacological intervention to improve both physical and psychological outcomes in breast cancer survivors. Structured exercise interventions—including aerobic exercise, resistance training, and flexibility exercises—have been shown to enhance functional capacity **(Schmitz et al., 2023).**

Nurses play a pivotal role in assessing functional status, identifying depressive symptoms, and implementing or coordinating exercise-based rehabilitation programs **(Campbell et al., 2025).**

Significance of the study

Breast cancer remains one of the most prevalent malignancies among women worldwide, representing approximately 11.7% of all new cancer cases, with over 2.3 million new cases and 685,000 deaths reported in 2023**(World Health Organization, 2024).**

In Egypt, breast cancer represents a major public health concern, comprising 32–35% of all cancers among women, with an incidence rate of 50–55 new cases per 100,000 women annually It is the leading cause of cancer-related morbidity and mortality among Egyptian women, **(Egypt National Cancer Registry Program, 2025).**

Globally, 30–45% of postoperative breast cancer patients report clinically significant depressive symptoms during the first year after surgery. while 55–60% report functional impairment therefore this study aimed to evaluate the effect of exercise program on depression and functional status in postoperative patients with breast cancer. **(Mohamed & Hassan, 2025)**.

Aim of the study

The aim of the study was to evaluate the effect of exercise program on depression and functional status in postoperative patients with breast cancer.

Research Hypothesis

H1: The exercise program will be positively effects on depression in postoperative patients with breast cancer than before program

H2: The exercise program will be improved mean score of functional status post implementation of the exercise program than before program.

Subjects and Methods

Research design:

Quasi experimental research design was utilized to conduct study.

Setting:

This study was conducted at Oncology Outpatient Clinic at Fayoum University Hospital.

Sample:

The purposive sample consisted of 50 Postoperative Patients with Breast Cancer at Oncology Outpatient Clinic at Fayoum University Hospital. They recruited based on the following Inclusion criteria: Patients aged 20 to 60 years and patients with mastectomy and lumpectomy. Exclusion criteria: Patients experiencing visual, audible, or verbal communication difficulties and patients with diagnosed mentally disability and previous exercise program

Tools of data collection:

Data was collected by using the following three tools:

Tool I: Structured Interview Questionnaire: This tool was designed by the researcher to collect patient data relation to the following.

Part A: Demographic data Such as: age, educational level, residence, employment status, household income and marital status.

Part B: Medical data such as: Chronic disease, family history of breast cancer, site and types of surgery, hemoglobin level (Hb) of the patient and treatment measures

Tool II: Beck Depression Inventory (BDI-II): It developed by Beck et al., (1979). And was used to assess the depression levels. It consists of 21 items measuring cognitive, emotional, motivational, and somatic symptoms of depression.

Scoring system:

Each item is assigned 0–3 scores. The possible score range can be determines the severity of depression as follow:

- 1-10 normal
- 11-16 Mild mood disturbance
- 17-30 Moderate depression
- 31-40 Severe depression
- Over 40 Extreme depression

Tool III: Functional Assessment of Cancer Therapy – Breast (FACT-B): It developed by Brady et al., (1997). Is a 37-item instrument designed to measure five domains of HRQOL in breast cancer patients: Physical, social, emotional, functional well-being as well as a breast-cancer subscale (BCS).

Scoring system:

It using 0- to 4-point scale, response choices vary from 0 (not at all) to 4 (very much), which is attached to each statement. The total FACT-B score ranges from 0 to 123. FACT-B will be administered at baseline and after program.

Ethical consideration:

Ethical approval will be obtained from Fayoum University Supreme Committee for Scientific Research Ethics and will be assured that confidentiality and privacy were considered. Each patient has the right to withdraw from the study at any time. Ethics, valves, culture and beliefs were respected.

Validity:

Content validity was conducted to determine the tools covers the aim in this study, the tools were tested and evaluated by a jury of five experts in the field of Medical Surgical Nursing to review the tools for clarity, relevance, comprehensiveness, accuracy, understandable and applicability. Minor modifications were done and the final forms were developed.

Pilot study:

The pilot study was carried out on 10% (5) patient of the total sample, to test the feasibility, clarity, relevancy and applicability of the study tools to achieve the study objectives and determine the time needed for conducting the study. The subject included in the pilot study was included to the main study.

Reliability:

Cronbach's alpha was used to measure the internal consistency of the tools used in this study, the result was as the following the reliability Beck Depression Inventory was (0.941) and functional status was (0.977) the statistical equation of Cronbach's alpha test reliability ranges from 0 to 1, Cronbach's alpha more than 0,7 indicate acceptable reliability.

Field work

- An approval was obtained from a scientific ethical committee of Fayoum University.
- An approval was obtained from the director of El-Fayoum University Hospital.
- An informed consent was obtained from each participant prior to data collection after an explanation of the purpose of the study.
- Data collection of this study was carried out in the beginning of July 2025 to the end of December 2025.
- The researcher was assessed effectiveness of exercise program by using the tool II and Tool III at three phases (pretest, posttest and follow up).
- The study was conducted in four phases namely: assessment, planning, implementation and evaluation.
- Assessment phase: A baseline assessment was carried out by the researcher for all the study subjects by using sociodemographic and medical data, beck depression inventory scale (BDI-II), and functional assessment of cancer therapy- breast (FACT-B) questionnaire. This assessment was collected prior to conducting the pre-exercise program.

A- Planning phase: This phase was formulated based on the study subjects' assessment. Exercise program was given by the researcher through face-to-face communication with study groups in the form of a colored booklet that takes about one month for development. They were designed by the researcher in the Arabic language.

- The exercise program was planned according to two sessions; The sessions were from (9 AM to 10 AM) and from (11 AM to 12 PM) each Sunday.

- The teaching methods included a colored booklet that had been distributed to study groups and videos about the program with discussion and answer any questions for the patient.

- Preparatory phase: The exercise program was designed in Arabic language after reviewing the related review of the past, current Arabic and English related literature covering various aspects of the problem was done, using available

books, articles, periodicals, journals to get acquainted with the research problem and develop the content.

- A panel of experts' professors in the field of the study including the supervisors of the work. In the light of their comments, the necessary modifications were carried out by the researcher and the final form of the program was stated.

C- Implementation phase: Each participant was given pocket of exercise program and the researcher teached them how to do this exercise.

- The participants were divided into ten group and each group consist of five patients. 2 sessions per day through 2 days per week. The duration of each session ranges from 45-60 minutes to provide patient time to discuss and answer questions.
- After two months, data collection of this study was carried out again by the questionnaire to assess effect of exercise program on depression and functional status post implementation of exercise program.

D- Evaluation Phase: Each patient was evaluated three times; the first evaluation is in the baseline assessment. The second evaluation was done two months after implementation of exercise program. While third evaluation on follow up for patients after two another mothes within 15-20 minutes to estimate the effect of exercise program on depression and functional status.

E- Statistical design

The collected data were organized, tabulated and statistical analyzed using the statistical package for social science (SPSS). The statistical analysis was done using percentage range, chi square (X^2), T- test.

$P > 0.05$ Non significant

$P \leq 0.05$ significant

$P < 0.001$ High significant

Results

Table (1): Frequency and percentage distribution of the demographic characteristics among the studied patients. It presents that (54.0%) of the studied patients their ages ranged from 40<50 years, with a mean age of 41.3± 8.6 years. Furthermore, 66.0% of them were married, 54.0% of them were secondary education. Considering employment status, more than two thirds (68.0%) were housewives, (32%) were workers. Regarding residence, nearly two third of the study sample (66%) leaved in urban areas. Referring to the monthly income of sample, less than three quarters (72%) had not enough income.

Table (2): Frequency and percentage distribution of medical data among subjects of the sample. It shows that more than half (58.0%) had comorbid such as hypertension,

diabetes, heart disease and gastrointestinal problems. In addition, (42%) had no comorbidity. Regarding family history, (54%) were history of breast cancer. As regard site of surgery more than half (58%) were surgery at right breast. Moreover, (66%) of patients perform partial mastectomy. In addition, (66%) of them followed Luminal treatment protocol. As regard Hemoglobin level half (50%) of them were 7-<11.

Table (3): Comparison between the studied postoperative patients with breast cancer regarding to their depression at study period of implementation of exercise program. It represents that, there was a marked decrease in all depression items after implementation of exercise program compared to preprogram with highly statistically significant difference at (P= < 0.01). As evidence, the mean score of sadness and self-dislike decreased from 1.48±0.67 and 1.62±0.63 pre-program to 0.92±0.66 and 0.62±0.63 post-program, and further to 0.60±0.53 and 0.60±0.53 at follow-up. Also, the mean score of the irritability and tiredness or fatigue decreased from 1.56±0.78 and 1.38±0.63 pre-program to 0.96±0.57 and 0.84±0.58 post-program, and further to 0.60±0.57 and 0.52±0.54 at follow-up.

Figure (1): Percentage distribution of total patients with breast cancer depression at study period of implementation of exercise program. It shows that, there is a marked improvement in total postoperative patients with breast cancer ' depression post implementation of exercise program and follow up phase, with a highly statistically significant difference at (P= < 0.001) between pre, post implementation of exercise program and follow up phase. As evidence, only 56.0% of the studied postoperative patients with breast cancer have moderate depression level pre implementation of exercise program. While changed to 36.0% post implementation of exercise program and 22.0% at follow up phase.

Table (4): Comparison between the studied patients regarding total functional status throughout study periods of implementation of exercise program. illustrates that, there was a marked improvement in all functional status subscales after implementation of exercise program compared to preprogram with highly statistically significant difference at (P= < 0.01). As evidence, the mean score of total functional status increased from 50.22±18.63 pre-program to 98.94±17.64 post-program, and further to 114.9±14.04 at follow-up.

Figure (2): Total mean score of patients' depression and functional status throughout study periods of implementation of exercise program.

Demonstrates a marked improvement in patients' outcomes following the exercise program. The mean depression score decreased substantially from 31.26 pre-program to 18.68 post-program and further to 11.24 at follow-up. Conversely, the mean functional status score showed a significant increase from 50.22 pre-program to 98.94 post-program, reaching 114.9 at follow-up.

Table (5): Relationship between demographic characteristics of the studied patients and their total functional status throughout study periods of implementation of exercise program.

Reveals that, there is highly statistically significant relation between total postoperative patients with breast cancer' functional status at pre-program and their demographic characteristics as age, educational level, residence, income and occupation at (P= < 0.01). While, there is no statistically significant relation with marital status at (p=>0.05). Furthermore, the results reveal that, there is highly statistically significant relation between total postoperative patients with breast cancer' functional status at post-program and their age, educational level, residence and income at (P= < 0.01). Also, there is statistically significant relation with occupation at (p=<0.05). while, there is no statistically significant relation with marital status at (p=>0.05). Moreover, the results reveal that, there is highly statistically significant relation between total postoperative patients with breast cancer' depression at follow up phase and their age, educational level, residence, income and occupation at (P= < 0.01). while, there is no statistically significant relation with marital status at (p=>0.05).

Table (6): Correlation between total postoperative patients with breast cancer' depression and functional status throughout study periods of implementation of exercise program.

explains that, there was high a significant statistical negative correlation between total patients' depression score and their functional status throughout study periods of implementation of exercise program at (P= < 0.01).

Table (1): Frequency and percentage distribution of the demographic characteristics among the studied patients (n=50)

Demographic characteristics	No.	%
Age (Years)		
20-<30	2	4.0
30-<40	15	30.0
40-<50	**27**	**54.0**
50-60	6	12.0
Mean ± SD **41.3 ± 8.6**		
Marital status		
Single	0	0.0
Widow	5	10.0
Married	**33**	**66.0**
Divorced	12	24.0
Educational level		
Don't read and write	4	8.0
Essential education	9	18.0
Secondary education	**27**	**54.0**
University education	8	16.0
Postgraduate	2	4.0
Employment status		
Working	16	32.0
Housewives	**34**	**68.0**
Residence		
Urban	**33**	**66.0**
Rural	17	34.0
Family income		
Enough	11	22.0
Not enough	**36**	**72.0**
Enough & save	3	6.0

Table (2): Frequency and percentage distribution of medical data among subjects of the sample (n=50)

Medical history	No.	%
Chronic diseases		
Hypertension	**12**	**41.4**
Diabetes	8	27.6
Heart diseases	3	10.3
Gastrointestinal diseases	6	20.7
No comorbidity	21	42.0
Family history for breast cancer		
Yes	**27**	**54.0**
No	23	46.0
Site of surgery		
Right breast	**29**	**58.0**
Left breast	18	36.0
Both breasts	3	6.0
Type of surgery		
Total mastectomy	17	34.0
Partial mastectomy	**33**	**66.0**
The treatment protocol		
Luminal	**33**	**66.0**
HER2- positive	11	22.0
Triple negative	6	12.0
Hemoglobin level		
Less than 7	20	40.0
7-<11	**25**	**50.0**
11-14	5	10.0

Table (3): Comparison between the studied postoperative patients with breast cancer regarding to their depression at study period of implementation of exercise program (n=50)

Items	Pre-intervention	Post-intervention	After two months	Test of Sig.	P value
	Mean ± SD	Mean ± SD	Mean ± SD		
Sadness	1.48±0.67	0.92±0.66	0.60±0.53	59.07	p=0.000
Pessimism	1.44±0.64	0.84±0.61	0.40±0.49	68.40	p=0.000
Past Failure	1.50±0.51	0.84±0.58	0.52±0.50	62.59	p=0.000
Loss of Pleasure	1.54±0.70	0.96±0.57	0.52±0.50	58.93	p=0.000
Guilty Feelings	1.68±0.68	0.90±0.61	0.56±0.50	72.52	p=0.000
Punishment Feelings	1.54±0.70	0.92±0.60	0.54±0.50	60.11	p=0.000
Self-Dislike	1.62±0.63	0.62±0.63	0.60±0.53	66.15	p=0.000
Self-Criticalness	1.62±0.66	0.94±0.58	0.56±0.50	65.17	p=0.000
Suicidal Thoughts or Wishes	1.12±0.55	0.78±0.61	0.48±0.50	44.65	p=0.000
Crying	1.42±0.73	0.94±0.58	0.60±0.49	52.29	p=0.000
Agitation	1.36±0.69	0.86±0.60	0.54±0.50	52.21	p=0.000
Loss of Interest	1.44±0.64	0.82±0.56	0.54±0.50	56.60	p=0.000
Indecisiveness	1.60±0.60	0.94±0.61	0.62±0.53	60.60	p=0.000
Worthlessness	1.44±0.54	0.84±0.58	0.48±0.50	65.90	p=0.000
Loss of Energy	1.36±0.52	0.82±0.52	0.50±0.50	58.55	p=0.000
Changes in Sleeping Pattern	1.62±0.72	0.92±0.56	0.56±0.54	59.63	p=0.000
Irritability	1.56±0.78	0.96±0.57	0.60±0.57	61.50	p=0.000
Changes in Appetite	1.60±0.75	0.88±0.59	0.56±0.54	69.68	p=0.000
Concentration Difficulty	1.30±0.58	0.96±0.57	0.46±0.50	69.68	p=0.000
Tiredness or Fatigue	1.38±0.63	0.84±0.58	0.52±0.54	57.13	p=0.000
Loss of Interest in Sex	1.62±0.66	0.88±0.62	0.48±0.50	67.62	p=0.000

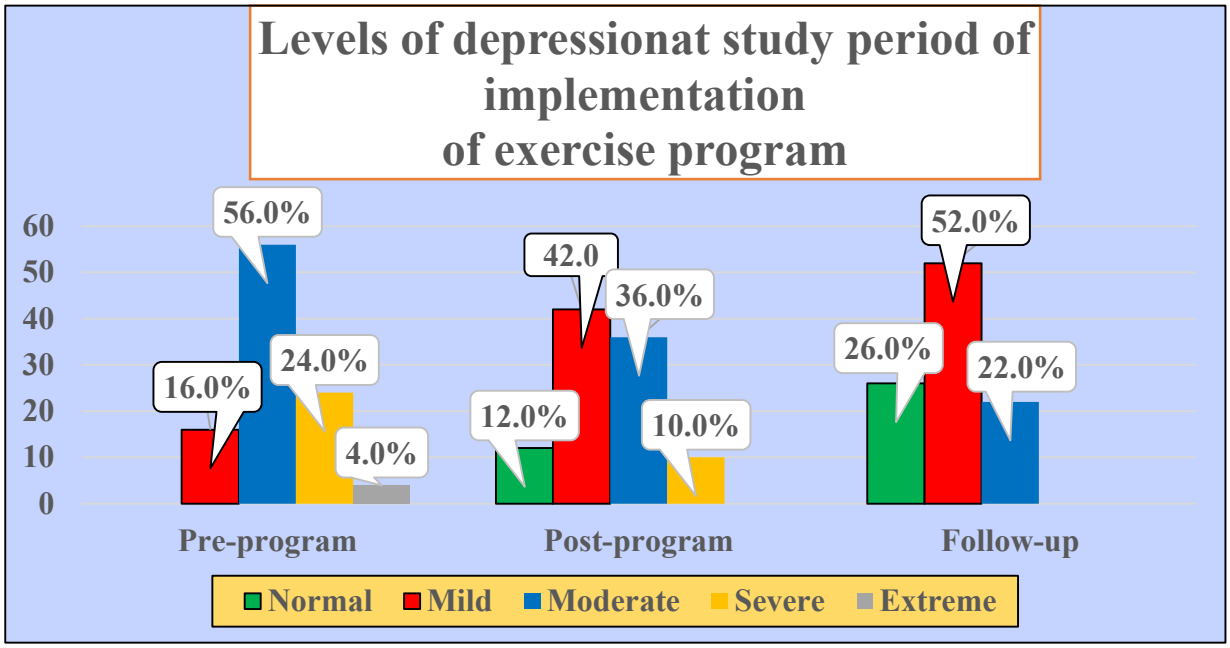

Figure (1): Percentage distribution of total patients with breast cancer depression at study period of implementation of exercise program (n=50)

Table (4): Comparison between the studied patients regarding total functional status throughout study periods of implementation of exercise program (n=50)

Functional status subscales	Pre-program	Post-program	Follow-up	Test of Sig. (p_3)	P value
	Mean ± SD	Mean ± SD	Mean ± SD		
Physical Well-Being	9.36±3.46	19.56±3.81	24.20±2.93	98.04	p=0.000
Social / Family Well-Being	10.38±4.44	18.94±3.29	22.22±2.76	97.13	p=0.000
Emotional Well-Being	8.0±2.98	16.50±3.03	17.70±2.60	94.32	p=0.000
Functional Well-Being	9.40±3.63	18.56±3.25	20.98±2.56	99.03	p=0.000
Breast cancer-specific concerns	13.08±4.75	25.40±4.85	29.86±4.07	100.0	p=0.000
Total functional status score	**50.22±18.63**	**98.94±17.64**	**114.9±14.04**	**100.0**	**p=0.000**

Significant at p ‹ 0.05. **Highly significant at p ‹ 0.001.

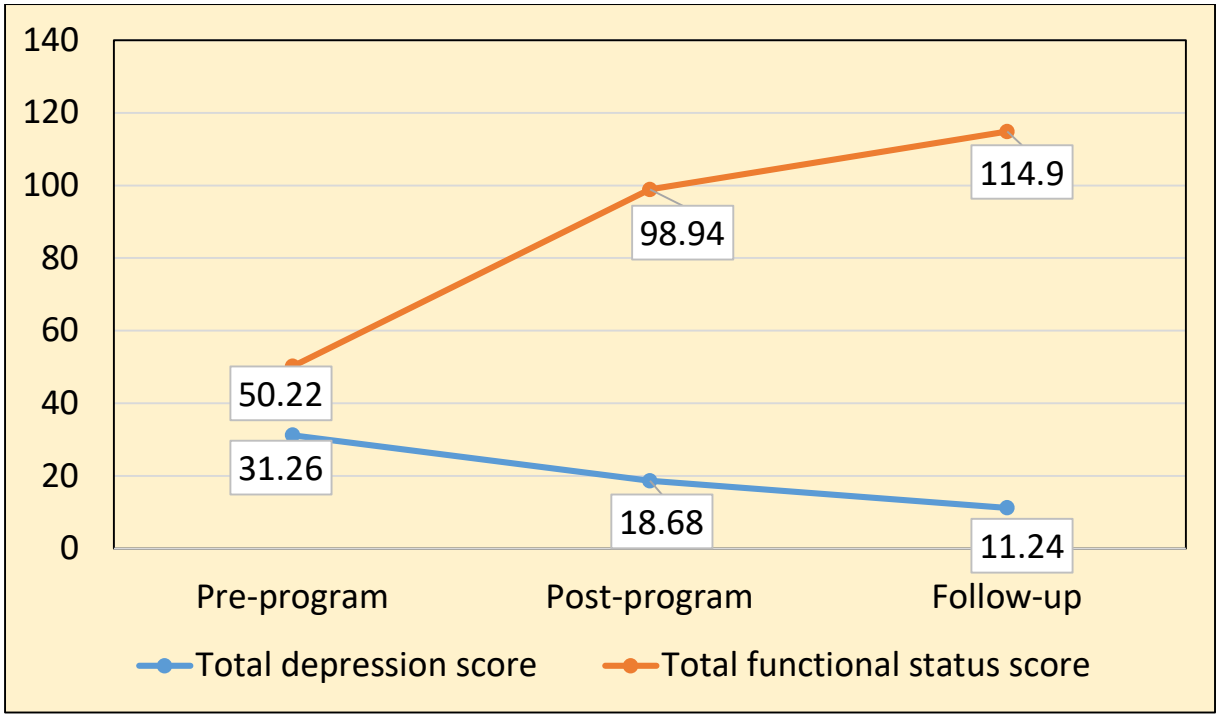

Figure (2): Total mean score of patients' depression and functional status throughout study periods of implementation of exercise program (n=50)

Table (5): Relationship between functional status and demographic characteristics of the studied patients throughout study periods of implementation of exercise program (n=50)

Demographic characteristics		Total of functional status		
		Pre-program Mean ± SD	Post-program Mean ± SD	Follow up Mean ± SD
Age (Years)	20-<30	25.0±1.41	73.0±9.63	96.50±6.36
	30-<40	39.40±13.06	92.73±9.63	107.2±6.52
	40-<50	64.5±6.04	111.8±4.13	126.0±4.04
	50-60	21.16±2.22	64.83±4.11	90.33±3.50
Kruskal-Wallis Test		**39.69 p=0.000****	**39.97 p=0.000****	**39.62 p=0.000****
Educational level	Don't read &write	20.25±2.06	63.25±4.27	89.0±3.55
	Basic	29.44±11.93	80.88±13.6	100.1±8.16
	Secondary	53.74±11.42	104.9±10.0	118.8±9.24
	University	70.50±4.37	113.6±1.18	128.3±1.50
	Postgraduate	75.0±0.0	111.5±0.70	128.0±0.0
Kruskal-Wallis Test		**36.57 p=0.000****	**26.96 p=0.000****	**32.01 p=0.000****
Residence	Urban	59.36±12.08	107.3±7.82	121.5±8.36
	Rural	32.47±16.23	82.58±20.0	102.2±14.27
Mann-Whitney Test		**4.269 p=0.000****	**3.190 p=0.000****	**4.361 p=0.000****
Income	Enough	67.45±4.96	114.0±1.0	128.8±2.04
	Not enough	42.91±16.71	93.27±17.8	109.6±13.11
	Enough & save	74.66±0.57	111.6±0.57	127.6±0.57
Kruskal-Wallis Test		**30.25 p=0.000****	**17.56 p=0.000****	**26.30 p=0.000****
Marital status	Married	10.20±14.4	84.80±26.4	106.0±20.72
	Widowed	11.06±14.6	98.48±17.6	114.5±13.85
	Divorced	15.58±18.8	106.0±8.64	119.7±10.11
Kruskal-Wallis Test		**2.172 p=0.338**	**2.068 p=0.356**	**2.081 p=0.363**
Occupation	Work	23.06±19.9	109.1±7.13	123.4±8.92
	Don't work	6.882±9.59	94.14±19.11	110.9±14.33
Mann-Whitney Test		**3.167 p=0.002****	**2.324 p=0.020***	**3.167 p=0.002****

Significant at p ‹ 0.05. **Highly significant at p ‹ 0.001.

Table (9): Correlation between studied variables (n=50)

Variables		Total depression score		
		Pre-program	Post-program	Follow-up
Total functional status score	r	-0.867	-0.878	-0,953
	p	0.000**	0.000**	0.000**

Significant at p ‹ 0.05. **Highly significant at p ‹ 0.001.

Discussion

Breast cancer is one of the most common cancers among women worldwide and remains a major health concern. Although advances in medical and surgical treatment have improved survival rates, many patients experience significant physical and psychological consequences after surgery **(Campbell et al., 2025).**

Postoperative patients often suffer from reduced functional status, pain, fatigue, and limitations in daily activities. In addition, depression is a common psychological problem in this group and can negatively affect recovery, quality of life, and adherence to rehabilitation programs. Exercise has been widely recommended as an important component of cancer rehabilitation, as it contributes to improving physical function and reducing psychological distress in breast cancer survivors **(Hayes et al., 2024)**.

Regarding socio demographic characteristics, the present study showed that slightly more than half of breast cancer patients were aged 40–<50 years, this is may be partial consistency with global evidence, with variation attributed to population structure and reproductive risk patterns. This finding is supported by **Harbeck et al. (2023)** in the study "Breast cancer" which confirms that breast cancer incidence increases with age. In contrast **Siegel et al. (2022)**, reported that the highest incidence globally is still concentrated in women aged ≥50 years.

In relation to Marital status, The present study showed that more than two thirds of studied patients were married, marital status is a psychosocial factor influencing coping, not disease development, this finding in line with study by **Jacobsen and Jim (2023)** in "Psychosocial interventions for anxiety and depression in cancer patients" reported that majority of patients were married. On other hand study of **Harbeck et al. (2023)** confirm that marital status has no biological association with breast cancer incidence.

As regards medical history: The present study demonstrated that more than half of the patients had comorbid condition, including hypertension, diabetes, and heart disease. From the researcher's perspective, this confirms that medical history plays a crucial role in shaping disease burden and treatment outcomes. Although these conditions are not direct risk factors for breast cancer, they increase the complexity of disease management and may contributed to agreater

burden of care. This finding is agreement with **(Olsen, Fischer, Bossuyt, & Goetghebeur, 2024),** who reported a high prevalence of comorbid conditions among breast cancer patients and confirmed their association increased risk of post-operative complication and less favorable clinical outcomes.

Similarly, **Jagsi et al. (2024),** in "Postoperative complications, functional outcomes, and quality of life after breast cancer surgery", supported that comorbidities are common and significantly influence recovery.

Regarding family history, the present study revealed that more than half of patients had a positive family history of breast cancer. This is consistent with **Chamseddine et al. (2022),** which confirmed the strong role of inherited genetic mutations in increasing breast cancer risk. **Furthermore, Ambrosone et al. (2025),** who highlighted the role of genetic and epigenetic factors in susceptibility. However, **World Health Organization (2023)** indicates that the majority of breast cancer cases are sporadic rather than hereditary. From the researcher's perspective, the relatively high percentage observed in this study may reflect familial clustering or increased awareness and reporting within the studied population.

Regarding the depression levels:

The present study demonstrated a statistically significant reduction in all depressive symptoms after implementation of the exercise program. From the researcher's perspective, these findings strongly support integrating structured exercise programs into routine breast cancer care protocols to improve both psychological and physical outcomes.

This finding is supported by **the American Society of Clinical Oncology in the guideline**: "Exercise, Diet, and Weight Management During Cancer Treatment: ASCO Guideline" which confirmed that structured exercise significantly reduces depressive symptoms and improves psychological well-being in cancer patients. Similarly, **World Health Organization report (2023)** "WHO guidelines on physical activity and sedentary behaviour" stated that regular physical activity reduces symptoms of depression, anxiety, and fatigue among individuals with chronic diseases including cancer.

Regarding The Functional status:

The present study demonstrated a highly statistically significant improvement in functional status among post-operative breast cancer patients following the

implementation of the exercise program. These findings indicate that structured exercise rehabilitation plays a crucial role in enhancing functional recovery after breast cancer surgery. This is consistent with **Lin et al. (2023)** "Effect of Exercise on rehabilitation of breast cancer surgery patients", reported that postoperative exercise significantly improves upper limb function, shoulder mobility, muscle strength, and overall functional capacity. More recently, a 2025 systematic review by **Xue (2025),** **"**Exercise-based interventions for postoperative rehabilitation in breast cancer patients:", demonstrated that post-surgical exercise significantly improves upper limb strength and functional recovery.

Regarding the depression and functional status throughout study periods of implementation of exercise program: The present study demonstrated a marked improvement in both depression and functional status among post-operative breast cancer patients following the implementation of the exercise program. From the researcher's perspective, the significant improvement in both depression and functional status observed in the present study may be attributed to the structured, progressive, and supervised nature of the exercise program.

The result supported by **Zhang et al. (2025),** "Effects of exercise on depression and anxiety in breast cancer survivors, reported that exercise significantly reduces depression in breast cancer survivors particularly with multicomponent training programs.

Similarly, **Sun et al. (2024),** "Effects of Physical Activity on Quality of Life, Anxiety and Depression in Breast Cancer Survivors, reported that physical activity significantly improves psychological outcomes, including depression, in breast cancer survivors.

The relations and Correlation between the studied variables.

The findings revealed a strong negative statistically significant correlation between total depression score and total functional status score among postoperative breast cancer patients across all study periods (pre-program, post-program, and follow-up). The correlation strengthened over time, reaching its highest level at follow-up. This indicates that higher functional status is consistently associated with lower levels of depression among the studied patients.

From the researcher's perspective, the strong negative correlation

observed in this study reflects the beneficial impact of exercise-based rehabilitation programs in enhancing functional status, physical independence, reducing fatigue, and improving self-efficacy. These improvements contribute significantly to better psychological adaptation and reduction in depressive symptoms among postoperative breast cancer patients.

This finding is consistent with the randomized controlled trial conducted by **(Mostafaei, Azizi, Jalali, Salari, & Abbasi, 2021)** titled "Effect of exercise on depression and fatigue in breast cancer women undergoing chemotherapy", who demonstrated that structured exercise significantly reduced depression levels and improved functional outcomes in breast cancer patients.

Similarly, a recent systematic review and meta-analysis by **Li et al. (2025)** titled "Effect of physical exercise on quality of life of women surviving breast cancer" found that exercise interventions significantly improve physical functioning and reduce psychological distress, including depressive symptoms in breast cancer survivors.

In the other hand, this finding is not fully supported by **Yamani et al. (2024)** in the study "Variability in Psychological Response to Exercise in Cancer Patients", which suggested that the effect of exercise on depression may vary depending on individual and clinical factors.

Conclusion:

- Pre exercise program the patient had depression symptoms and a decrease in functional status for all patients in the studied group.
- The patients' depression level and functional status improved significantly after implementation of the exercise program.
- There was a negative statistically significant correlation between functional status and depression among the studied group across all study periods.

Recommendations:

Recommendations for patients:

- Implement structured exercise programs as routine postoperative care for patients with breast cancer to improve psychological well-being and functional status.

Recommendations for furthers researches:

- Replication of the study on large probability sample from various regions, to achieve generalization.
- Future research should compare the effectiveness of different types of exercise interventions on psychological and functional outcomes.

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Influence of Ethical Climate on Nursing Staff Job Performance

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Abstract

Background: Positive ethical climate is necessary for nursing staff to encourage their adherence to ethical principles, enhance healthcare quality, and improve their organizational long-term viability. **Aim**: Assess the influence of ethical climate on nursing staff job performance. **Subjects and Method**: Descriptive-correlation research design was used. **Setting and subjects:** All (N=549) nursing staff working in intensive care units at Tanta University Main Hospitals. **Tool**: Two tools were used**, Tool (1)** Nursing Staff Perception of Ethical Climate Scale. **Tool (2)** Nursing Staff Job Performance Self-Report Questionnaire. **Results**: About half (47.0%) and (30.2%) nursing staff respectively had high and moderate perception level of ethical climate. Majority (86.2%) of nursing staff showed satisfactory level of job performance. **Conclusion**: There was a statistically significant positive correlation between overall ethical climate and nursing staff job performance. **Recommendations**: Hospital administrators need to conduct training educational program about ethical climate. Foster supportive and ethical leadership style to strengthen the relationship between managers and staff. Conduct regular workshops focusing on nursing care plan activities and innovation.

K*eywords:* Ethical climate, Job performance and Nursing staff.

Introduction

Ethical climate is a major organizational issue that required being a top priority of nursing managers**.** It forms a crucial component of overall hospital climate and constitutes correct behavior and how ethical issues should be handled within hospitals**.** As nursing staff encounter many unpredictable problems while performing their daily activities**.** Thus, presence of ethical climate may boost nursing staff satisfaction, improve their job performance, and strengthen their organizational commitment **(Ermias, 2023).**

Assessing ethical climate illustrate ways to achieve healthy safe environment. Formulating policies that emphasize ethical care and provide guidelines for nursing staff performance. Preventing stress while promoting satisfaction and positive interactions. The ethical climate consists of five dimensions that are related to peers, physicians, patients, managers and hospitals (**Fradelos et al., 2021)**.

Nursing staff are the cornerstone of hospitals. They have longest closest contact with patients to deliver exceptional care quality **(Mohamed, El-sayed, & Mostafa, 2022).** Nursing staff job performance constitutes their ability to effectively fulfill their tasks and fully performed their duties in patient care**.** It also encompasses their knowledge and skills in clinical work **(Song, Shi, Zheng, Lu, & Chen, 2024).** It involves nine dimensions namely work habits, staff relationships and communication, patient communication, nursing care plan activities, material planning and coordination, safety measures and patient safety, documentation, keeping up to date technically and innovation **(Mohamed & Ghalab, 2022)**.

Significance of the study

Ethical climate is an organizational variable that can change or improve working conditions. Presence of ethical climate may prevent nursing staff stress and promotes their satisfaction, commitment and positive interactions **(Mousavi, Kamali, & Eyvanaki, 2022)**.

The aim

Assess the influence of ethical climate on nursing staff job performance.

Research Question

-What is the influence of ethical climate on nursing staff job performance?

Study design

A descriptive correlation study design was used.

Setting

The present study was carried out within the intensive care units of Tanta University Main Hospitals, including Cardiac, Neonates, Neurology, Pediatric, Medical, and Chest ICUs.

Subjects

The study subjects included all (N=549) nursing staff working at previously mentioned settings and available at the time of data collection

Tools of data collection

Two tools were used data collection:

Tool I: **Nursing Staff Perception of Ethical Climate Scale.** It included two parts:

Part 1: **Personal characteristics of nursing staff**

Part 2: Nursing Staff Perception of Ethical Climate Scale. It was adopted and modified by **Ozdoba, Dziurka, Pilewska-Kozak, & Dobrowolska (2022)** and used by researcher to assess nursing staff perception regarding ICU ethical climate through 27 items divided into five dimensions: peers, physicians, patient, managers, and hospitals.

Nursing staff perception was measured on a five points Likert Scale ranging from 5 to 1 as strongly agree= 5, agree= 4, undecided=3, disagree= 2 and strongly disagree =1. The total score calculated by cut off points and summing scores of all categories. The total scores represent varying levels as follows: high level ≥ 75%, moderate level 60% - < 75% and low level of perception of ethical climate < 60%.

Tool II: Nursing Staff Job Performance Self Report. It was adopted and modified by **Ahmed, El Sayed, Mohamed, & Elsaeed (2023)** and used by researcher to assess nursing staff job performance through 57 items divided into nine dimensions: work habits, staff relations and communication, patient communication, nursing care plan activities, material planning and coordination, safety measures and patient safety, documentation, keeping up-to-date technically, and innovation.

Nursing staff job performance was measured on a five points Likert Scale ranging from: always (5), sometimes (4), often (3), rarely (2) and never (1). The total score calculated by cut off points and summing scores of all categories. The total scores represent varying levels as follows: Satisfactory level ≥ 75% and unsatisfactory level < 75% of the total score.

Methods

- An official permission to conduct the study was obtained from the Dean of Faculty of Nursing Tanta

University to the authoritative of Tanta University Main Hospital.

Ethical considerations

a) Consent of the ethical committee of the Faculty of Nursing was obtained (443-4-2024).
b) Nature of the study didn't cause any harm or pain to the nursing staff.
c) Nursing staff consent to participate in the study was obtained after explanation about the privacy and the confidentiality of information obtained from them, nature of the study and their right to withdraw from the study at any time.
d) Confidentiality and privacy were taken into consideration regarding data collection.

- Tools I and II were translated into Arabic and submitted to five experts in the area of specialty to check their content validity and clarity of questionnaire.
- The experts' responses were represented in four points Likert Scale ranging from (1-4); 1 = not relevant, 2 = little relevant, 3 = relevant and 4 = strong relevant.
- Necessary modification was done including; clarification, omission of certain items and adding others and simplifying work related words. The face validity value of tool (I) was 80% and tool (II) was 80%.
- A pilot study was carried out on a sample (10%) of nursing staff (n=55) nurses, and were excluded from the main study sample during the actual collection of data to test clarity, applicability and to determine the needed time to complete the questionnaire.
- Reliability of tools was tested using Cronbach Alpha Coefficient test. Reliability of tool (I) was 0.929 and 0.944 for tool (II).
- The data were collected from nursing staff by the researcher in different areas under study during working hours to distribute the questionnaire. The data was collected over period of six months started from 1/7/2025 until 30/10/2025.
- The estimated time needed to complete the questionnaire items from nursing staff was (20 -30) minutes.

Results

Table (1): Shows personal characteristics of nursing staff. Nursing staff (55.9%) was technical nurse, while 39.0% and 5.1% were registered nurses and head nurses respectively. The age of nursing staff ranged (18.0 – 57.0) years with mean 28.69 ± 5.77. More than sixty percent (63.9%) aged ≤ 30 years old, and majority (83.1%) were females. Nursing staff 41.2% worked at neurology ICU, while 20.6%, 14.6%, and 11.7% worked at cardiac, neonates, and chest ICUs respectively. More than two third

(44.1%) of nursing staff had technical diploma in nursing, while 42.8% had other studies. Nursing staff (51.7%) had ≤ 5 years of experience with mean experience (6.36 ± 5.50) years.

Figure (1): Shows overall levels of nursing staff perception regarding ethical climate. Nearly half of nursing staff had high perception level regarding ethical climate. While around quarter of them had either moderate or low perception level.

Table (2): Shows ranking of nursing staff perception of ethical dimensions. The highest two mean percent score 79.74 was for peers' dimension, then patients dimension with percent score 76.58. Followed by nurse managers dimension with percent score 70.92, and physicians dimension with percent score 66.27. Hospitals dimension came in the last rank (5) with mean percent score 61.81 ± 24.22.

Figure (2): Shows overall levels of nursing staff job performance. Majority of nursing staff showed satisfactory level of job performance. While, only few of nursing staff showed unsatisfactory level.

Table (3): Shows ranking of nursing staff job performance dimensions. The first rank mean percent score 92.18 was for safety measures and patient safety dimension. Followed by the second rank for documentation dimension with percent score 92.11. The third rank for patient communication dimension with percent score 91.17 and fourth rank was staff relations and communication dimension with percent score 89.30. The fifth rank was keeping up-to-date technically dimension showed 88.50 score percent. Work habits was the sixth rank dimension with percent score 87.52. Material planning and coordination dimension was the seventh rank with percent score 85.34. Innovation dimension was the eighth with percent score 83.27. Nursing care plan activities dimension came in the last rank with mean percent score 82.92.

Figure (3): Shows correlation between ethical climate and nursing staff job performance. There was a statistically significant positive correlation between overall levels of ethical climate and nursing staff job performance at ($r = 0.519$, $P < 0.001$).

Table (4): Shows relation between levels of nursing staff perception of ethical climate and personal characteristics. There was a statistically significant relation between levels of nursing staff perception of ethical climate and their age, sex and department at (P <

0.001). There was astatistically significant relation between levels of nursing staff job performance and their position and department at (P < 0.001).

Table (5): Shows relation between levels of nursing staff job performance and personal characteristics.

Personal characteristics of nursing staff	No.	%
Position		
Technical nurse	307	55.9
Registered nurse	214	39.0
Head nurse	28	5.1
Age		
≤30	351	63.9
>30	198	36.1
Min – Max.	18.0 – 57.0	
Mean ± SD.	28.69 ± 5.77	
Sex		
Female	456	83.1
Male	93	16.9
Department		
Cardiac ICU	113	20.6
Neonates ICU	80	14.6
Neurology ICU	226	41.2
Pediatric ICU	22	4.0
Medical ICU	44	8.0
Chest ICU	64	11.7
Qualification		
Technical diploma	242	44.1
Bachelor of nursing	72	13.1
Other studies	235	42.8
Years of experience		
≤5	284	51.7
>5	265	48.3
Min – Max.	0.42 – 34.0	
Mean ± SD.	6.36 ± 5.50	

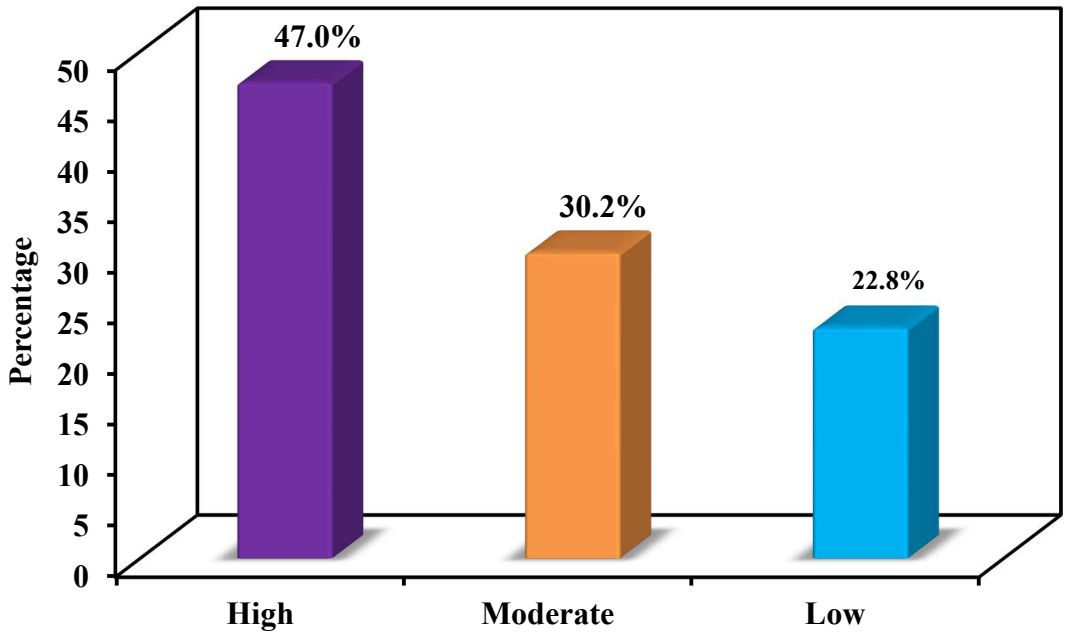

Figure (1): Overall levels of nursing staff perception regarding ethical climate

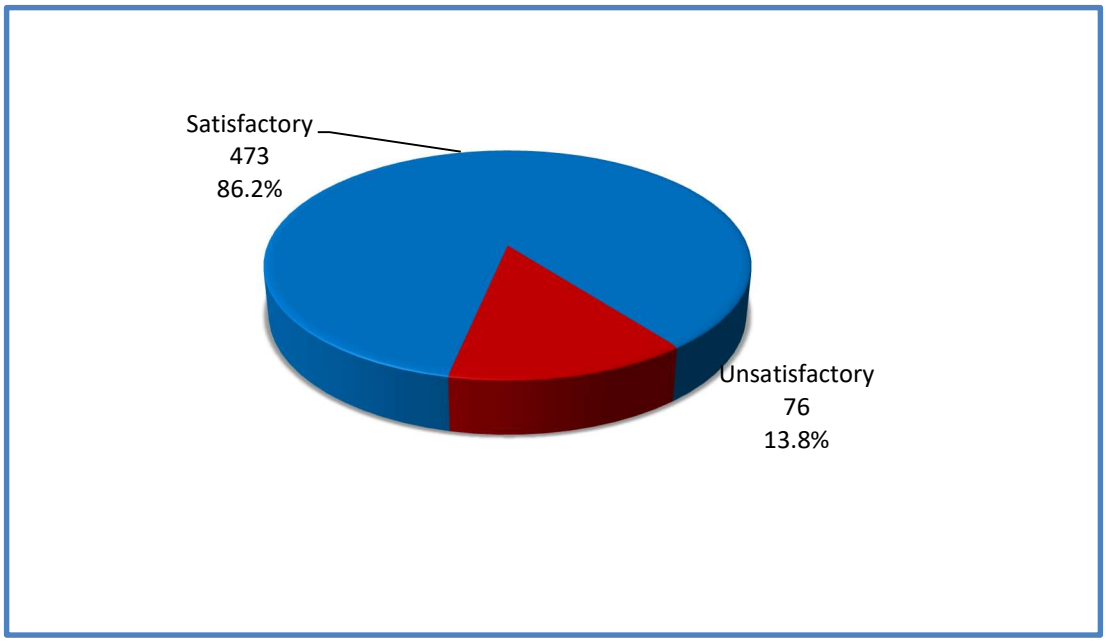

Figure (2): Overall levels of nursing staff job performance (n = 549)

Table (2): Ranking of nursing staff perception of ethical climate dimensions

Ethical climate dimensions	Min. – Max.	Mean ± SD	Mean	Rank
Peers	4.0 – 20.0	16.76 ± 2.63	79.74	1
Physicians	4.0 – 20.0	14.60 ± 3.74	66.27	4
Patients	4.0 – 20.0	16.25 ± 2.59	76.58	2
Nurse managers	6.0 – 30.0	23.02 ± 5.29	70.92	3
Hospitals	5.0 – 25.0	17.36 ± 4.84	61.81	5
Overall	32.0 – 115.0	88.0 ± 15.53	70.65 ± 16.88	

Table (3): Ranking of nursing staff job performance dimensions

Job performance	Min.–Max.	Mean ±SD	Mean	Rank
Work habits	20.0 – 35.0	31.50 ± 3.46	87.52	6
Staff relation and communication	15.0 – 30.0	27.43 ± 3.27	89.30	4
Patient communication	19.0 – 35.0	32.53 ± 3.46	91.17	3
Nursing care plan activities	17.0 – 35.0	30.22 ± 4.95	82.92	9
Material planning and coordination	2.0 – 10.0	8.83 ± 1.49	85.34	7
Safety measures and patient safety	19.0 – 35.0	32.81 ± 3.53	92.18	1
Documentation	16.0 – 30.0	28.11 ± 3.06	92.11	2
Keeping up-to-date technically	12.0 – 25.0	22.70 ± 2.99	88.50	5
Innovation	2.0 – 10.0	8.66 ± 1.78	83.27	8
Overall	134.0–245.0	222.8±23.21	88.66±11.84	

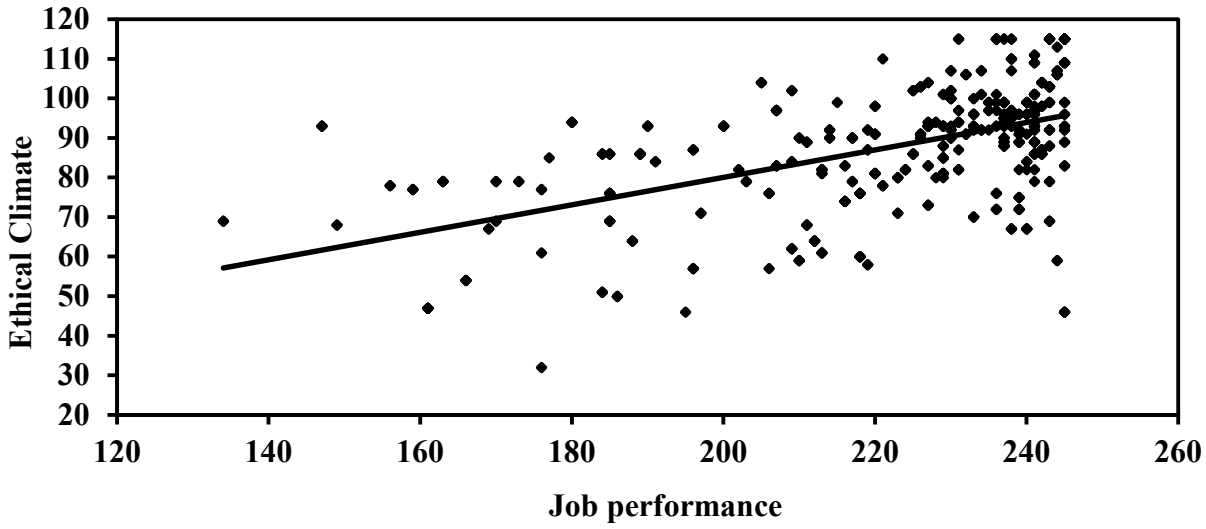

Figure (3): Correlation between ethical climate and nursing staff job performance

Table (4): Relation between levels of nursing staff perception of ethical climate and personal characteristics

Nursing staff personal characteristics	Levels of ethical climate						χ^2	P
	Low (n = 125)		Moderate (n = 166)		High (n = 258)			
	No.	%	No.	%	No.	%		
Position								
Technical nurse	61	48.8	94	56.6	152	58.9	4.982	0.289
Registered nurse	58	46.4	61	36.7	95	36.8		
Head nurse	6	4.8	11	6.6	11	4.3		
Age (years)								
≤30	89	71.2	89	53.6	173	67.1	11.618*	0.003*
>30	36	28.8	77	46.4	85	32.9		
Sex								
Female	86	68.8	142	85.5	228	88.4	23.966*	<0.001*
Male	39	31.2	24	14.5	30	11.6		
Department								
Cardiac ICU	23	18.4	38	22.9	52	20.2		
Neonates ICU	6	4.8	15	9.0	59	22.9		
Neurology ICU	69	55.2	73	44.0	84	32.6	56.932*	<0.001*
Pediatric ICU	4	3.2	8	4.8	10	3.9		
Medical ICU	-	-	14	8.4	30	11.6		
Chest ICU	23	18.4	18	10.8	23	8.9		
Qualification								
Technical diploma	64	51.2	72	43.4	106	41.1	9.409	0.052
Bachelor of nursing	7	5.6	23	13.9	42	16.3		
Other studies	54	43.2	71	42.8	110	42.6		
Years of experience								
≤5	73	58.4	78	47.0	133	51.6	3.725	0.155
>5	52	41.6	88	53.0	125	48.4		

Table (5): Relation between levels of nursing staff job performance and personal characteristics

Nursing staff personal characteristics	levels of nursing staff job performance				χ^2	P
	Unsatisfactory (n = 76)		Satisfactory (n = 473)			
	No.	%	No.	%		
Position						
Technical nurse	35	46.1	272	57.5	16.179*	^{MC}p <0.001*
Registered nurse	29	38.2	185	39.1		
Head nurse	12	15.8	16	3.4		
Age (years)						
≤30	50	65.8	301	63.6	0.132	0.717
>30	26	34.2	172	36.4		
Sex						
Female	59	77.6	397	83.9	1.848	0.174
Male	17	22.4	76	16.1		
Department						
Cardiac ICU	23	30.3	90	19.0	15.238*	^{MC}p= 0.007*
Neonates ICU	10	13.2	70	14.8		
Neurology ICU	28	36.8	198	41.9		
Pediatric ICU	4	5.3	18	3.8		
Medical ICU	-	-	44	9.3		
Chest ICU	11	14.5	53	11.2		
Qualification						
Technical diploma	41	53.9	201	42.5	4.670	0.097
Bachelor of nursing	11	14.5	61	12.9		
Other studies	24	31.6	211	44.6		
Years of experience					0.672	0.412
≤5	36	47.4	248	52.4		
>5	40	52.6	225	47.6		

Discussion

Nursing staff plays vital role as patient advocates. Their continuous contacts with patients enable prompt identification of ethical issues. However ethical climate refers to the extent to which ethical standards are implemented within healthcare organizations. Creating a positive ethical climate in hospitals encourages adherence to ethical principles, enhances healthcare quality, and improves organizational long-term Viability **(Hawash, ELsayed, & Sobhy Mohamed, 2025)**.

Ethical climate

Concerning the level of nursing staff perception of the overall ethical climate, the current study revealed that less than half of nursing staff showed high level of perception. While one-third and one-fifth of nursing staff had moderate and low levels, respectively. This finding may be attributed to nursing staff obliged to follow professional values, organizational policies, and ethical guidelines within hospital settings leading to enhance nursing staff awareness of their ethical practices. However, variations in nursing staff experience, workload, and managerial support may explain the moderate and low levels of perception among some of them.

This result is strongly supported by **Aty, Mahmoud, & Ismail (2024)** study on ethical work climate and patient safety among nurses in medical and surgical inpatient units at Benha University Hospital which reported that nearly half of nurses perceived a high level of ethical work climate. **Abd-Elmoghith, Mahmoud, & Abdel-Azeem (2024)** not support present study and reported that most of nurses had a negative perception of ethical climate. Their study on innovative work behavior and ethical climate perceptions among nursing personnel.

Finding of present study indicated that the majority of nursing staff had a high perception level regarding peers dimension which may be attributed to the fact of nursing staff perception that they work with competent colleagues and listen to their concerns. As well as support them in solving complex patient care problems, and contribute to the provision of safe patient care within their units. This result is consistent with **Mohamed, El-sayed, & Mostafa (2022)** study about relationship between nurses' perception of ethical work climate and moral distress. They found that more

than two-thirds of staff nurses perceived the peers' dimension as ethical, attributed to cooperation among them in solving difficult patient care problems, sharing concerns, and ensuring safe patient care through competent colleagues.

Present study showed that more than two third of nursing staff had a high perception level regarding patients' dimension. This may be attributed to nursing staff respect for patients' rights and needs. As well as the patients were aware of what to expect from their care. This finding is consistent with **Carpes, Dalmolin, Maciel, Costa, Magnago, Andolhe (2023)** reported a high patient satisfaction mean score, highlighting that effective nurse–patient communication enhances understanding of patient needs, advocacy, and ethical climate perception. But the present study contradicts **Mohamed, El-sayed, & Mostafa (2022)** study**.** They found that about half of nurses perceived the patients' dimension as an unethical work climate.

Regarding the nurse managers' dimension, the present study showed that more than sixty percent of nursing staff had a high perception level regarding nurse managers dimension, and minority of nursing staff had a low and moderate perception level. The fact is that those nursing staff perceived that their nurse managers are respected, support good clinical decision-making, guide appropriate patient care, and assist in resolving care-related problems. However, there were some variations in perceived support, trust, and managerial responsiveness in addressing nursing staff concerns, which may explain the presence of moderate and low perceptions among some of nursing staff.

Present study result is inconsistent with **Borhani, Abbaszadeh, Bahrampour, Ameri, & Aryaeenezhad (2021).** They reported that the managers' dimension achieved the highest score among the five ethical climate dimensions.

Regarding the physicians' dimension, the present study reported that more than half of nursing staff had a high perception level regarding physicians' dimension. This may be attributed to mutual respect between nursing staff and physicians regarding patient care decisions. As well as the presence of trust and collaborative professional relationships between nursing staff and physicians. This finding is consistent with **Awad, Hassan, & Mostafa (2024)** study about nurse-physician collaboration as perceived

by nurses and its' relation to professional autonomy and team commitment. They revealed that more than half of nurses had a high level of perception regarding nurse–physician collaboration in relation to professional autonomy and team commitment.

In contrast, present study disagrees with **Wang, Li, Wei, Zhang, Tang, & Lu (2022)** study. They found that nurses' perception of the physician relationship dimension was the lowest one among other ethical climate dimensions.

The present study showed that more than one third of nursing staff had a high perception level regarding hospitals dimension. While, more than half of nursing staff showed either low or moderate level of perception to hospitals' dimension. This finding may be attributed to the fact that present study hospital management give encouragement and support for creative nursing care. Besides the application of presence policies that facilitate high-quality care, and align with the institution's mission and vision. As well as the efforts of hospital management to address workplace issues openly and gives support for innovative problem-solving. Result of present study is supported by **Hawash, ELsayed, & Sobhy Mohamed (2025)** whom reported that the relationship with hospitals' dimension had relatively low perception, and minority of participants indicating a high perception level.

Job performance

Concerning overall job performance, the present study demonstrated that the majority of nursing staff had a satisfactory level of job performance. This may be due to nursing staff commitment to professional responsibilities and their adherence to clinical standards. Besides, the continuous supervision and clever management activities within hospital settings. All of these factors contribute to maintaining satisfactory level of job performance among most of nursing staff.

Result of present study supported by **Ismail, Fauzi, Durai, & Isa (2025)** whom reported that nurses had high level of job performance. Their study was about determining the impact of work-life balance and job satisfaction on nurses' performance in teaching hospitals. Also, **Daba et al. (2024)** whom found that the majority of nurses had high level of job performance.

Results of present study disagree with **Elksas, Mansy, Aly, & Abdo (2024)** study. They found that more than

three-quarters of staff nurses had a low level of job performance. Their study was on workplace ostracism, job performance, and work alienation.

Concerning safety measures and patient safety, the present study indicated that the majority of nursing staff had a satisfactory level of safety measures and patient safety dimension. This may be attributed to nursing staff adherence to infection control practices, such as hand hygiene, application of the five rights of medication administration and maintaining a safe organized work environment. Besides nursing staff following of safety protocols to prevent physical and clinical hazards (e.g., following bed rails and infection control guidelines).

This finding is in line with study of **Raddi, Kulkarni, Jadhav, & Ray (2025)** reported high satisfactory level of ninety-eight percent in patient safety performance.

Concerning documentation, the present study demonstrated that the majority of nursing staff had a satisfactory level of documentation dimension. This may be attributed to accurate organized recording of nursing care activities, documentation of all performed procedures, use of ink for records, and clear reporting of patients' current conditions. This finding is strongly supported by **Abd El Rahman, Ibrahim & Diab (2021)** and **Mohamed, Fathy, & helaly (2025).** They reported high documentation performance.

While patient communication in present study revealed that the majority of nursing staff had a satisfactory level regarding patient communication dimension. This may be attributed to nursing staff respect for patients' dignity, maintenance of confidentiality, polite behavior, and timely response to patients' needs. This finding is supported by **Yazew, Gebrie & Aynalem (2020)**. They study nurses' communication skill and associated factors and found effective communication skills among nurses.

Regarding staff relations and communication, the present study demonstrated that the majority of nursing staff had a satisfactory level regarding staff relations and communication dimension. This may be attributed to nurses' clear communication with colleagues and their mutual respect among healthcare team members. Beside the effective collaboration in achieving unit objectives, and adherence to ethical guidelines in professional communication within the healthcare team.

Dimension of keeping up-to-date technically, data revealed satisfactory level on majority of nursing staff. Most probably due to nursing staff efforts toward self-improvement. Beside their beyond expectation goal achievement, and their knowledge of common diseases in their work area. This finding is consistent with **Elmohmady, Abo Gad, Ramadan & Hamdy (2020),** who reported a very high-performance rate in this aspect. Contrary to **Dumbre, Upendra, Waghmare, Zacharias, & Salve (2025)** reported that only fifty-three percent of staff nurses had an advanced level of digital competencies.

Present study showed that the majority of nursing staff had satisfactory level of work habits dimension. This may be attributed to the fact that the nursing staff adhere to work schedules, responsible for assigned tasks. As well as accept all work-related instructions. Besides, they always show compliance with applicable laws, policies, and unit directives.

Results of present study disagree with **Mohamed & Ghalab (2022),** they found a moderate level of work habits among nurses. They explained that these discrepancies may be due to variations in administrative systems, workload pressures, and the use of clinical monitoring tools across different healthcare settings.

Present study showed that the majority of nursing staff had a satisfactory level for material planning and coordination dimension. This may be due to nursing staff effective utilization of available support services such as laboratory, pharmacy, and laundry. As well as due to their ability to assess the need for equipment and materials required for patient care. This finding is supported by **Abd Elnaby, Ghoneimy, & Ismail (2025).** Their study was on person–organization fit and its relation to nurses' job performance which reported high satisfactory rate**.**

The present study demonstrated that the majority of nursing staff had a satisfactory level of innovation dimension. This may be due to nursing staff creativity in developing new or improved nursing care methods. As well as due to generating innovative solutions to clinical problems. This finding is supported by **El-Sayed M & Abdel-Azeem M (2022)** study about the relationship between workforce agility and staff nurses' innovative work behavior at critical care units. They reported that more than two thirds of staff nurses

had a satisfactory level of performance in innovation. While, **Abd El Muksoud et al. (2022)** study on leadership behaviors and innovative work behaviors among nurses, reported that thirty-seven percent of staff nurses had a high level of innovative work behaviors.

Evaluating the levels of performance in nursing care plan activities of present study revealed that the majority of nursing staff had a satisfactory level of nursing care plan activities dimension. This may be attributed to nursing staff ability to evaluate patients' responses to nursing interventions, prioritize patient problems, and select appropriate nursing interventions.

Relations

Current study showed there was a statistically significant relation between levels of nursing staff perception of ethical climate and their age, sex and department. The statistically significant relationship with age may reflect differences in maturity, coping abilities, and exposure to clinical situations. Where the older nursing staff tend to have broader experience in handling ethical issues and interpreting organizational climate. Sex differences may lead to variations in communication styles, emotional expression, and role expectations within the healthcare environment. Most probably this sex differences influenced how ethical situations are perceived and evaluated.

Really, the significant association with department can be justified by the fact that different clinical units (e.g., Neurology ICU, Neonates ICU) vary in workload intensity, patient acuity, teamwork structure, and frequency of ethical dilemmas. All of which shape nursing staff perception of the ethical climate. On the other hand, the none significant relationship with position, qualification, and years of experience may indicate that ethical climate perception is more influenced by the current work environment and interpersonal dynamics than by formal job title, academic degree, or length of service. Yet the ethical climate is a shared organizational experience shaped more by context than by individual professional status alone.

Mohamed, Abed, & Hassan (2020) study on relationship between ethical work climate and organizational commitment among staff nurses. They found a statistically significant relationship between ethical work climate and age as well as work department among staff nurses.

Current study showed that there was a statistically significant relation between levels of nursing staff job performance and their position and department. These findings may be explained by the nature of nursing staff roles and the structure of clinical work environments. The significant association between job performance and both position and department can be attributed to differences in job responsibilities, workload intensity, and scope of practice.

While the lack of significant relationships between level of nursing staff perception of ethical climate with age, sex, qualification, and years of experience suggests that job performance in this setting may be more strongly shaped by organizational and contextual factors rather than purely individual demographic characteristics. In other words, when nurses work within structured protocols, supervision systems, and standardized care procedures, their performance tends to depend more on the work environment and assigned role than on personal attributes such as age or educational background.

Zhang et al. (2025) study about the effect of the nurse-patient relationship on the job performance of nurses in tertiary public hospitals in China. They found that job performance scores significantly differed according to job title among nurses in tertiary public hospitals in China. Also, **Al-Zawahreh et al. (2026)** study about impact of communication competence on job performance among registered nurses. They reported that the type of clinical unit significantly influenced nurses' job performance.

Correlation

Current study demonstrated that there is statistically significant positive correlation between overall levels of ethical climate and nursing staff job performance. This may be explained by the fact that a supportive ethical climate promotes adherence to professional standards, strengthens teamwork and trust among nursing staff. Also increases nursing staff motivation, which ultimately enhances their job performance. **Aty, Mahmoud, & Ismail (2024)** study reported positive correlation between ethical work climate and patient safety among nursing staff. They concluded that ethical leadership by hospital administrators and managers can improve nurses' performance and patient safety outcomes.

On the contrary, **Khanam, Tarab, & Khan (2025)** study about examining the link between responsible leadership and employee sustainable

performance. They reported that ethical climate functions mainly as a partial mediator rather than a direct predictor of employee sustainable performance. They suggested that in high-pressure clinical environments such as ICUs. The nurses' performance is largely driven by strict clinical protocols, professional accountability, and mandated standards of care. Therefore, even when ethical climate varies, performance levels may remain stable because nurses are required to maintain high-quality care regardless of perceived ethical conditions, making professional obligations stronger predictors of performance than ethical climate itself.

Conclusion

The present study concludes that there was highly statistically significant positive correlation between nursing staff total perception of ethical climate and their total performance at intensive care units of Tanta University Main Hospital.

Recommendations

For hospital administrators

- Conduct training program for nursing staff about ethical Promote an ethical climate by establishing clear policies that support nursing staff.

For nursing manager

- Organize training programs to enhance nursing managers' roles as a trusted resources and supportive leaders for their staff.

For nursing staff

- Enhance technical competency through continuous self-improvement and staying updated with the latest evidence-based nursing practice.

For future research

- Replicating this study across different healthcare settings beyond ICU to compare the correlation between ethical climate and performance in various clinical environments.

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Pediatric Nursing Students' Knowledge and Practice Regarding Neonatal Cardio Pulmonary Resuscitation

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Abstract

Background: Neonatal Cardiopulmonary Resuscitation (NCPR) is a highly specialized, time-critical sequence of interventions requiring adequate knowledge and clinical competence among nursing students. **Aim** of this study was to assess nursing students' knowledge and practice regarding neonatal cardiopulmonary resuscitation. **Research design:** A descriptive cross-sectional research design was conducted. **Sampling:** A randomized sampling of 180 pediatric nursing students who were enrolled in pediatric nursing course at Faculty of Nursing, Tanta University during the academic year 2024- 2025. **Two tools** were employed to collect the required data**: Tool (I);** Neonatal cardiopulmonary resuscitation knowledge questionnaire. **Tool (II)**; Neonatal cardiopulmonary resuscitation observational checklists. **The results** of the present study revealed that more than three quarters of students (76.7%) demonstrated high knowledge, meanwhile less than three quarters of them (71.7%) demonstrated satisfactory practice of NCPR procedure. **Conclusion:** The study demonstrated high level of knowledge and practice regarding neonatal cardiopulmonary resuscitation among nursing students. **The study recommended** developing structured, evidence-based educational strategies to enhance students' preparedness in neonatal emergency care.

Keywords: Cardio-pulmonary resuscitation, Knowledge, neonatal, nursing students, practice

Introduction

The neonatal period, is defined as the first 28 days of life. It is the most vulnerable period for child survival and is associated with the highest risk of neonatal morbidity and mortality worldwide. A major physiological challenge during this period is the successful transition from intrauterine to extrauterine life, particularly the initiation of spontaneous breathing, which typically occurs within the first few moments after birth. This transition involves complex cardiopulmonary and physiological adaptations that replace placental function and establish independent respiratory and circulatory systems while maintaining physiological homeostasis. These rapid and coordinated changes are essential for neonatal survival, as the respiratory and cardiovascular systems must undergo significant functional adjustments to support life outside the womb **(Sweety, Gauba, & Jeba, 2024).**

Birth asphyxia is the most common cause necessitating cardiopulmonary resuscitation (CPR) during the immediate postnatal period, as timely resuscitative interventions are essential to facilitate the newborn's successful transition to extrauterine life. During this transition, the fluid-filled lungs take over the role of gas exchange from the placenta, establishing independent pulmonary respiration. Disruption of this complex process may result in neonatal hypoxemia, hypercapnia, and metabolic acidosis, which can subsequently impair tissue perfusion and progress to bradycardia and circulatory failure if prompt and effective resuscitation is not initiated. Consequently, Therefore, a thorough understanding of the distinctive physiological and clinical characteristics of newborns is essential for delivering age-specific, evidence-based resuscitation interventions that optimize neonatal outcomes (**Krishnaprasadh & Pozun, 2026**; **Mani et al., 2025**).

Neonatal resuscitation is a fundamental aspect of emergency pediatric care, employing structured, evidence-based algorithm-driven approaches designed to support newborns who fail to establish effective spontaneous respiration or circulation during the transition to extrauterine life (**Sawyer et al., 2024)**. In most cases, resuscitation is required due to respiratory problems that hinder the interconversion of oxygen and CO_2. The main focus of neonatal resuscitation is to ventilate the newborn’s lungs adequately.

Although most infants adapt without assistance, approximately 5% to 10% of newborn infants need help to initiate breathing at birth, while nearly 1% need advanced resuscitative measures to restore cardiorespiratory function **(Lee et al., 2025).**

The American Heart Association (AHA) and the American Academy of Pediatrics (AAP) have established standardized, evidence-based neonatal resuscitation guidelines that incorporate age-specific physiological principles and clinical priorities. These algorithm-driven recommendations emphasize the delivery of timely, precise, and well-coordinated interventions to optimize survival outcomes. Effective implementation of these guidelines requires healthcare providers, particularly nurses, to possess comprehensive theoretical knowledge, advanced clinical skills, and a high level of professional competence that enable nurses to rapidly assess neonatal emergencies, make sound clinical decisions, and provide appropriate, evidence-based resuscitative care tailored to the newborn's condition and the resources available **(Martínez et al., 2024)**

Nursing students represent future frontline healthcare providers; consequently, their preparedness in performing NCPR is critical to ensuring optimal neonatal survival and clinical outcomes. (**Hassan, Patil, Pattabi, & Singh, 2025**). However, several studies have reported persistent deficiencies in both theoretical knowledge and practical competence among nursing students, which may adversely affect the quality of resuscitative care and survival rates. These gaps are often attributed to multiple educational factors, including insufficient clinical exposure, opportunities for hands-on practice, reliance on traditional teaching methods, insufficient use of simulation-based training, and the absence of regular refresher training programs (**Miranda et al., 2025; Zulkifli et al., 2026**). In light of these challenges, there is a pressing need for a comprehensive assessment of nursing students' knowledge and practical competence in NCPR in order to identify educational deficiencies and guide evidence-based curriculum development, ultimately enhancing students' clinical performance, self-confidence, and preparedness to deliver timely and effective neonatal resuscitation in

emergency settings **(Khutade, Insulkar, & Athare, 2026).**

Significance of the study: Approximately 2.4 million newborns die annually worldwide, with birth asphyxia accounting for nearly one-quarter of these deaths. International estimates indicate that roughly 10% of all newborns require resuscitation at birth **(Abumfareh et al., 2026).** Neonatal cardiopulmonary resuscitation is therefore a critical life-saving intervention that demands a high level of accuracy, prompt clinical judgment, technical precision, and a high level of professional competence among nurses. Consequently, assessing nursing students' knowledge and competencies in NCPR is essential for determining their preparedness to manage life-threatening neonatal emergencies effectively. Such assessments provide valuable evidence for identifying educational gaps, informing curriculum development, and guiding nurse educators in adopting structured, evidence-based teaching strategies to enhance students' preparedness Ultimately, strengthening NCPR education contributes to improving neonate safety, higher-quality neonatal care, and better clinical outcomes by ensuring that future nurses are adequately equipped with essential knowledge and resuscitation skills.

Aim of the study

The study was conducted to assess nursing students' knowledge and practice regarding neonatal cardiopulmonary resuscitation.

Research question

1. What are the levels of nursing students' knowledge regarding neonatal cardiopulmonary resuscitation?
2. What are the levels of nursing students' practice in performing neonatal cardiopulmonary resuscitation procedure?

Subjects and Method

A descriptive cross-sectional study design was utilized in the present study. The study was conducted at Clinical Pediatric Skill Laboratory for third level nursing students, Faculty of Nursing, Tanta University, which affiliated to the Ministry of Higher Education and Scientific Research.

Sample: A randomized sampling of 180 pediatric nursing students who were enrolled in pediatric nursing course "neonatal area" at the academic year 2024- 2025 and were willing to participate in the study.

Two tools were used in the current study as follows:

Tool I: **Neonatal Cardiopulmonary Resuscitation Questionnaire (NCPQ):**

A structured questionnaire sheet was developed by the researcher; it consisted of two parts:

Part (1): Students' socio-demographic characteristics: It included data such as students' age, sex, residence.

Part (2): Students' Knowledge about Neonatal Cardiopulmonary Resuscitation: It was developed by the researcher after reviewing recent related literatures **(Aziz et al., 2021; Topjian et al., 2021; Akl et al., 2021; Dean, & Gregory, 2020).** It was designed in 32 multiple choice questions (MCQs) that cover students' knowledge regarding neonatal cardiopulmonary resuscitation procedure such as: CPR definition, indications, basic principles of CPR, sequence of CPR, principles of chest compression, complications of CPR, and when to stop. The total score of this test was 64 points; two marks for each MCQ.

Students' knowledge was scored as follows:

- Correct and complete answer was scored (2)
- Correct and incomplete answer was scored (1)
- Incorrect, or don't know answer was scored (0)

The total score of students' knowledge was calculated and classified into:

- Low level of knowledge is less than 60% of the total score.
- Moderate level of knowledge 60% - 80% of the total score.
- High level of knowledge more than 80% of the total score.

Tool (II): Neonatal Cardiopulmonary Resuscitation Observational Checklists:

This tool was developed by the researcher after revision of the recent, related literatures and guided by **(Pediatric Nursing clinical book, 2024; Nourkami-Tutdibi et al., 2020; Topjian et al., 2020)** to evaluate the pediatric nursing students' performance of neonatal cardiopulmonary resuscitation procedure.

Scoring system for students' practice was as follows:

- Done completely was scored (1).
- Incompletely done, not done, or incorrectly done were scored (0).

The total score for students' skills was calculated as follows:

- Unsatisfactory level of practice less than 80 % of the total score.

- Satisfactory practice level more than 80 % of the total score.

Method

Administrative and ethical consideration:

- An official permission for data collection was obtained from the Dean of the Faculty of Nursing, Tanta University, prior conducting the study.
- Ethical approval from the research ethics committee of the Faculty of Nursing, Tanta University was attained [Code 433- 4- 24].
- Nature of the study didn't induce any physical, social or psychological harm or risks to the entire sample.
- Confidentiality of information about nursing students was taken into consideration.
- Informed consent to participate in the study was obtained from the students after explaining the aim of the study and being informed they had the right to withdraw at any time without providing a reason and without affecting the students' teaching or marks.

Tools Development: Two tools were used in the current study.

Methods of data collection

- The study's tools were examined for content validity by a jury of 5 experts in pediatric nursing; who appraised the tools for clarity, relevance, understanding, comprehensiveness, and easiness for administration. Modifications were made in accordance. The face validity was calculated based on experts' opinion; it was 98.5%.
- A pilot study was carried out on 10% of the sample (18 students) that were randomly selected and then excluded from the study sample to judge the tools for its clarity, applicability, feasibility, and to determine problems that may be encountered during data collection process, and the necessary modifications were done.
- The study tools were tested by the pilot subjects. The test of reliability (cronbach's alpha) was 0.878 for tool (I), 0. 0.991for tool (II), that indicates high reliability of the tools used for data collection in the current study.

The field of work:

- A structured, self-administered questionnaire was completed by each participant to collect demographic data and assess their knowledge. In addition, the researcher directly observed each student's performance in the pediatric clinical laboratory and completed a standardized practice checklist to evaluate their practical competencies.

Statistical analysis:

The collected data were organized, tabulated, fed to the computer and statistically analyzed to identify areas of strength and gaps in knowledge and competences regarding neonatal CPR among nursing students using statistical package for social sciences, version (28). Descriptive statistics were described to summarize demographic characteristics, knowledge responses, and competences responses using frequency and percentage for qualitative data, while quantitative data were designated using mean and standard deviation.

Results

Table (1): Shows the percentage distribution of the studied students in relation to socio-demographic characteristics. This table reveals that 71.4% of studied students were 21 years old, with mean age (21.28 ± 0.454). it was observed that the majority of the studied students (85%) were females. It was noticed that more than two-thirds of students (68.3%) were living in rural areas.

Table (2): Indicates the percentage distribution of the studied students regarding their level of knowledge about neonatal cardiopulmonary resuscitation. It was found that less than three quarters of studied student (73.4%) gave correct and complete answers regarding definition of CPR. It was observed that exactly three quarters of students (75%) presented correct and complete answers about basic principles of CPR. It was clarified that more than three quarters of students (78.3%) articulated correct and complete answers regarding the principle of chest compression. Regarding the principles of airway management and effective breathing, it was discovered that nearly two thirds of students (73.3%) stated correct and complete answers.

Table (3): Clarifies percentage distribution of the studied students regarding total level of knowledge regarding neonatal cardiopulmonary resuscitation. It was observed that more than three quarters of studied students (76.7%) had high knowledge about NCPR. it was spotted that Mean ± SD of the studied students' knowledge was 53.53±12.042.

Table (4): Displays percentage distribution of the studied students regarding level of practices related to neonatal cardio-pulmonary resuscitation specifying initial neonatal stabilization steps and assessment. It was observed that 71.7%, of studied students demonstrated stimulation of neonate

correctly. It was also evident that 76.7%, of studied students performed initial steps of resuscitation correctly. It was observed that 75% of studied students initiated positive pressure ventilation timely and correctly**.**

Table (5): Presents percentage distribution of the studied students regarding level of practices related to neonatal cardio- pulmonary resuscitation steps. This table showed that 70% of studied students demonstrated correct bag squeezing technique at a precise rate. It was also evident that 68.3% of studied had taken appropriate action and initiated chest compression timely. It was observed that 80% of studied students performed chest compression techniques accurately. It was spotted that 68.3% of studied students gave epinephrine to neonate timely and accurately.

Table (6): Presents percentage Distribution of the Studied Students Regarding Total Levels Practice Scores Concerning Neonatal Cardio- Pulmonary Resuscitation. It was observed that less than three quarters of studied students (71.7%) had satisfactory practice level. It was spotted that Mean ± SD of the studied students' practice was 61.98 ± 23.942.

Table (1): Percentage distribution of the studied students according to their socio-demographic characteristics. (no. = 180)

Socio-demographic characteristics	No.	%
Age (years)		
20	0	0.0
21	129	71.7
22	51	28.3
Mean ±SD	**21.28±0.454**	
Gender		
Male	27	15.0
Female	153	85.0
Residence		
Rural	123	68.3
Urban	57	31.7

Table (2): Percentage distribution of the studied students regarding their level of knowledge about neonatal cardio- pulmonary resuscitation. (no. = 180)

Students' Knowledge about NCPR	Correct and complete answer		Correct and incomplete answer		Incorrect answer or don't know	
	No.	%	No.	%	No.	%
Definition of CPR	132	**73.4**	24	13.3	24	13.3
Indication of NCPR	129	71.7	-	-	51	28.3
Basic principles of CPR	135	**75.0**	42	23.3	3	1.7
Sequence of NCPR	141	78.3	33	18.3	6	3.3
Principle of chest compression	141	**78.3**	21	11.7	18	10.0
Principles of airway management and effective breathing	132	**73.3**	30	16.7	18	10.0
The effect of epinephrine during resuscitation attempt	156	86.7	-	-	24	13.3
How to ensure successful insertion of an intraosseous needle	138	76.7	-	-	42	23.3
Complications of NCPR	138	76.7	-	-	42	23.3
Time to stop neonatal cardiopulmonary resuscitation	129	71.7	-	-	51	28.3

Table (3): Percentage distribution of the studied students regarding total level of knowlege about neonatal cardio- pulmonary resuscitation. (no. = 180)

Total knowledge about Neonatal Cardio- Pulmonary Resuscitation	No.	%
Low	**15**	**8.3%**
Moderate	**27**	**15.0%**
High	**138**	**76.7%**
Mean ± SD	**53.53 ±12.042**	

Table (4): Percentage distribution of the nursing students' practices of initial neonatal stabilization and assessment steps (no. = 180)

Initial neonatal stabilization steps and assessment	Done		Not done	
	No.	%	No.	%
- Stimulate the neonate by drying and place the neonate under radiant warmer.	129	**71.7**	51	28.3
- Quickly assess for Term gestation, clear amniotic fluid, breathing/ crying, good muscle tone? If answer is NO, Start initial steps	123	86.3	57	31.7
- Perform the initial steps of resuscitation (PSDSR) as required	138	**76.7**	42	23.3
- After performing initial steps; assess for breathing, heart rate and color;	129	71.7	51	28.3
- **If breathing normally** provide observational care	138	76.7	42	23.3
- If **labored breathing and central cyanosis**: clear airway, apply SpO2 monitor, and provide supplemental O2 as needed.	135	75.0	45	25.0
- If apnea or gasping/ HR <100 bpm/ persistent cyanosis after 10 min of 100% free flow oxygen: **Initiate bag and mask ventilation**	135	**75.0**	45	25.0

Table (5): Percentage distribution of the nursing students' practices of neonatal cardio-pulmonary resuscitation steps. (no. = 180)

Neonatal Cardio- Pulmonary Resuscitation Steps	Done		Not done	
	No.	%	No.	%
- Place the mask on the neonate's face so that it covers the chin, mouth and the nose	123	68.3	57	31.7
- Form a seal between the mask and the neonate face using C-E clamp technique	132	73.3	48	26.7
- Squeeze the bag with only two fingers with a rhythm of (breathe, two, three, breathe, two, three…), at a rate of 40: 60 /minute.	126	**70.0**	54	30.0
- After 5-10 inflation look for chest elevation. If chest is not rising, follow **MR SOPA**	120	66.7	60	33.3
- Continue bag and mask ventilation for 30 seconds	132	73.3	48	26.7
- Reassess the neonate by checking for umbilical pulsations	135	75.0	45	25.0
- **If HR > 100/ minute**: Wean off ventilation gradually, then evaluate the color if cyanosed give free flow oxygen as before.	105	58.3	75	41.7
- **If HR <100/ minute**, continue bag and mask ventilation and connect oxygen, consider laryngeal or EET insertion	132	73.3	48	26.7
- **If HR < 60/ minute:** Intubate if not already done, Coordinate with PPV with 100% Oxygen, Begin Chest compression	123	**68.3**	57	31.7
- Compressions are delivered on the **lower third of the sternum** to a depth of approximately of 1/2 to 3/4 inch	105	58.3	75	41.7
- **Techniques of neonatal chest compression**	144	**80.0**	36	20.0
- The chest should be allowed to re-expand fully during relaxation, but the rescuer's thumbs should not leave the chest.	99	55.0	81	45.0
- Compressions and ventilations must be coordinated, repeat One-and-Two-and-Three-and-Breathe-and……	123	68.3	57	31.7
- After **60 seconds** of coordinated chest compressions and ventilation, suspend both, and check the heart rate	135	75.0	45	25.0
- **If heart rate is >100 b/m**, discontinue compressions and gradually discontinue ventilation.	126	70.0	54	30.0
- **If heart rate is > 60 beats/minute**, discontinue compressions and continue ventilation.	135	75.0	45	25.0
- **If HR continue to be <60/ minute:** Give Epinephrine (1:10000)	123	**68.3**	57	31.7
- If neonate starts breath spontaneously give post-resuscitation care	126	70.0	54	30.0
- If neonate is not breathing, continue coordinated ventilation and chest compression and medication for maximum of 20 minutes	129	71.7	51	28.3

Table (6): Percentage distribution of the studied students regarding total level practice scores concerning neonatal cardio- pulmonary resuscitation (no. = 180)

Total practice concerning neonatal cardio-pulmonary resuscitation	No.	%
Satisfactory	129	71.7%
Unsatisfactory	51	28.3%
Mean ± SD	**61.98 ± 23.942**	

Discussion

Assessing nursing students' knowledge and practice levels regarding NCPR is critical, given the importance of NCPR in the management of high-acuity, life-threatening neonatal emergencies that require prompt, accurate, and effective intervention. The socio-demographic findings revealed that more than two thirds of students aged 21 years old with a mean age of **21.28±0.454**, predominantly female, and more than two-thirds residing in rural areas. From the researcher's prespective, Age similarity resulted as the participants were drawn from the same academic population, female predominance reflects the general gender distribution in nursing faculties that can be explained by the institutional enrollment pattern as the nursing has traditionally been viewed as a female-dominated profession, rooted in its historical association with caregiving and nurturing roles.

These results were consistent with study of **(Emam, Mohammad, & Araby, 2024)** who discloses that the majority of study group and about two third of control group were in the same age group >20 years with a mean age of 21.15±0.414 and 20.99±0.513 years old respectively, and more than half of both groups were female. More than half of study group & two thirds of control group lived in the rural area. **(Agm, Sabaq, & Abdullah 2024)** who conducted a study to "evaluate the effect of virtual reality as a teaching strategy on pediatric nursing students' performance regarding cardiopulmonary resuscitation" were in agreement with the current study as the vast majority and all of both study and control groups respectively were in the age group of 20: 22 years, with more than half and less than two thirds of the

studied nursing students in both study and control groups were from rural area respectively.

A comprehensive level of knowledge is fundamental for the effective performance of NCPR as it enables healthcare providers to accurately recognize neonatal cardiorespiratory emergencies and implement timely, evidence-based interventions. Because newborns possess unique anatomical, physiological, and developmental characteristics that differ significantly from those of older children and adults, healthcare providers must apply age-specific resuscitation principles to ensure safe, appropriate, and effective management **(Dinberu, & Yemane, 2024)**.

Regarding nursing students' knowledge, the current findings demonstrate that more than two-thirds of the participants provided satisfactory responses across most of knowledge domains of NCPR as they correctly and completely identified the definition of CPR, sequence of resuscitation, principles of chest compression and airway management, the role of epinephrine, intraosseous access, and complications of neonatal resuscitation, furthermore, the overall knowledge level was found to be high among more than three quarters of students. These findings suggest that students possess a relatively sound theoretical understanding of the core components of neonatal resuscitation, which may reflect the inclusion of neonatal emergency care concepts within the undergraduate nursing curriculum and exposure to skill laboratory-based instruction.

Despite the generally satisfactory findings, important knowledge gaps were identified where more than one-quarter were unable to correctly identify the indications for NCPR and the appropriate time to terminate NCPR, while nearly one-quarter of students were unable to correctly identify complications of NCPR and intraosseous access, and demonstrated incomplete knowledge regarding basic principles of CPR. This may be attributed to several educational factors, including limited exposure to neonatal emergency situations during clinical placements, insufficient opportunities for repetitive hands-on practice, inadequate simulation-based learning, and the reliance on traditional lecture-based teaching methods.

The current result was matched with **(Pawase, 2020)** who conducted "a study to assess the effectiveness of training programme on knowledge

and skills regarding newborn resuscitation among student nurses (3rd Year BSc) at Sdmions Dharwad" and found that in pre- test majority of subjects having good knowledge and in post-test majority of subjects having excellent knowledge about NCPR.

The current findings align with **(Sendo, Teshome, Jirata, Gebrewold, & Gemechu, 2025)** who conducted a study on "Effect of "helping Babies Breathe" training on Ethiopian undergraduate midwifery students' knowledge and skills in neonatal resuscitation at public universities: A non-randomized quasi-experimental study" and repotted that more than two thirds of students demonstrated adequate knowledge related to NCPR pre training interventions and all of students demonstrated adequate knowledge after training.

Additionally, **Balakrishnamony, & Balasubramanian, (2019)** who evaluated the " effectiveness of neonatal resuscitation simulation (NRS) on knowledge regarding neonatal resuscitation among nursing students in selected nursing colleges" was in harmony with the current study as they reported higher levels of moderate knowledge among the majority of nursing students.

Conversely, the present findings differ from those reported by a survey by (**Edeoghosa, & Ehitiemoria, 2026)** about" Knowledge, attitude and practice of basic life support among medical students in the University of Benin" which revealed that more than two thirds of respondents exhibited poor knowledge about BLS for neonates. However, despite the difference in the overall level of knowledge, this survey was consistent with the current study in identifying deficiencies in specific CPR-related concepts, particularly regarding the recommended chest compression depth, as the majority over-estimated it at 2–2.5 inches.

Practical competence in NCPR is a critical objective of undergraduate nursing education that represents a fundamental indicator of readiness for safe clinical practice. Nursing students must not only acquire theoretical understanding of resuscitation guidelines but also demonstrate the ability to apply these principles accurately and confidently in simulated or real clinical settings. Competence in this context extends beyond technical execution to include critical thinking, rapid decision-making, effective communication within the resuscitation team, and coordinated team performance, all of which

directly influence neonatal survival outcomes **(Hassan, Patil, Pattabi, & Singh, 2025; Miglani et al., 2026).**

Regarding the nursing students' practice level, the present study demonstrated that less than three quarters of nursing students possessed satisfactory level of practice regarding NCPR. Likewise, high performance was demonstrated in the initial assessment of the neonate, initiating the performance of initial resuscitation steps, providing observational care for normally breathing neonates, administering supplemental oxygen when indicated, and initiating bag-mask ventilation for neonates with apnea or gasping respirations. These findings suggest that nursing students have developed acceptable competence in the initial stages of neonatal resuscitation, likely due to availability of laboratory practice and structured clinical teaching.

However, lower performance was observed in more technically demanding procedures, including correct chest compression depth, allowing complete chest recoil, and coordinating chest compressions with ventilation. These findings indicate that psychomotor skills requiring precise coordination remain challenging for many students, that may be attributed to lack of repeated hands-on practice as mastery of these skills generally requires repeated deliberate practice and high-fidelity simulation.

This finding comes in line with **Mohammed, & Ahmed, (2022)** who conducted a study to appraise "The effect of simulation training on nurses and intern nursing students' skill, confident and satisfaction regarding neonatal resuscitation" and found that the majority of intern nursing student were competent in total skill performance about NCPR.

The findings of the current study was also in the same direction with a study conducted by **(Abumfareh et al., 2026)** about **"**Evaluating the knowledge and practice of nurses regarding neonatal resuscitation in neonatal intensive care units in West Bank hospitals: a cross-sectional study " who showed that self-reported practice was high among study participants with the vast majority reported 'good' practice. Likewise, the finding was supported by **(Sendo et al., 2025)** who reported that more than three quarters of nursing students demonstrated the required practical skills of NCPR.

Regarding critical gaps in practice, the present study revealed that less than half of students didn't compress the chest at the correct site or depth. This finding agreed with **(Ali,**

Eldakhakhny, Mohamed, & Hanfy, 2023) who reported in thesis entitled "Evaluate Nurse's Practice Regarding Neonatal Resuscitation at Zagazig University Hospitals" that only one third of studied nurses had correctly identified the appropriate compression depth.

The present study finding also disclosed that less than one third of students didn't correctly coordinate compressions and ventilations nor perform correct administration of epinephrine in correct dosage. These findings were in accordance with **(Abumfareh et al., 2026)** who reported that less than half of students demonstrate a practical gap in coordinating compression-to-ventilation ratio and epinephrine dosing.

Conclusion:

The results of this study reveal that nursing students demonstrated satisfactory level of knowledge and practice regarding Neonatal Cardiopulmonary Resuscitation (NCPR).

Recommendations:

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

1. Enhance the practical component of the existing NCPR training by implementing structured, competency-based educational strategies that foster psychomotor skill proficiency, critical thinking, decision-making, and adherence to current neonatal resuscitation guidelines.
2. Implement periodic simulation-based refresher sessions and competency assessments to reinforce psychomotor skills and maintain proficiency in NCPR over time.
3. Ensure continuous evaluation and updating of NCPR educational programs to ensure alignment with current international resuscitation guidelines, including those of the American Heart Association (AHA).
4. Investigate the effectiveness of combining structured teaching approaches with simulation-based education and periodic refresher training on student outcomes.
5. Replicate the study with larger and more diverse samples to enhance generalizability.

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Factors Affecting Dietary Compliance among Patients with Chronic Obstructive Pulmonary Disease

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Abstract

Background: Chronic Obstructive Pulmonary Disease (COPD) management extends beyond pharmacological therapy to require sustained dietary compliance, essential for preserving muscle mass and functional capacity, yet the factors influencing this compliance remain poorly characterized among COPD patients, particularly within Egyptian nursing practice. **Aim:** was to assess factors affecting dietary compliance among patients with chronic obstructive pulmonary disease. **Design:** A descriptive research design was utilized. **Setting:** The study was conducted at Chest Diseases Hospital, Tanta University Hospital, Gharbia Governorate, Egypt. **Subject:** a purposive sample of 200 adult COPD patients aged 21–60 years, of both sexes, conscious and able to communicate effectively. **Tools:** Three tools were used: Tool I a structured assessment questionnaire covering sociodemographic and clinical characteristics; Tool II a dietary compliance sheet, comprising a food diary and a seven-item weekly adherence scale; Tool III a physical activity assessment, using accelerometer and the Six-Minute Walk Test. **Results:** Most patients (84.0%) demonstrated low dietary compliance, highest for high-fiber intake and lowest for increasing caloric intake. Compliance showed no significant association with diet type or physical activity but varied significantly across all socio-demographic characteristics ($p<0.05$). **Conclusion:** Dietary non-compliance was common among COPD patients and was determined mainly by socioeconomic and educational factors rather than diet prescription or activity level. **Recommendations:** Nutritional education for COPD patients should be restructured from the single day format identified. The study should be replicated on large group of patients.

***Keywords*:** Chronic Obstructive Pulmonary Disease; Dietary Compliance; Nutritional Education; Physical Activity.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) remains one of the most burdensome causes of chronic morbidity and premature death worldwide. Defined by persistent, largely irreversible airflow limitation and a sustained inflammatory response in the airways, it carries a considerable global burden of illness tied inextricably to preventable exposures such as tobacco smoke, indoor air pollution, and childhood respiratory infections **(Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2024; World Health Organization, 2021).**

The World Health Organization ranked COPD as the third leading cause of death globally in 2019, accounting for approximately 3.23 million deaths, nearly 80% of which occurred in low- and middle-income countries where healthcare access and air-quality protections remain insufficient **(World Health Organization, 2021).** The disease currently affects more than 300 million people worldwide **(Soriano et al., 2020).**

Beyond its pulmonary manifestations, COPD is strongly associated with extra pulmonary complications, most notably malnutrition and skeletal muscle wasting, which compound breathlessness and accelerate functional decline **(Beijers et al.,2022).** Malnutrition affects an estimated 20% to 45% of COPD patients globally, and in an Egyptian cohort nearly half of stable outpatients were found to be malnourished, with documented consequences for dyspnea severity and quality of life **(Marco et al., 2019; Ruby,2021).**

Good nutrition improves respiratory muscle function, exercise tolerance, and immune defense, whereas chronic nutritional inadequacy accelerates disease progression and raises mortality risk **(Janssen et al., 2023).** Dietary compliance—the degree to which patients follow their prescribed nutritional recommendations—has therefore been identified as a core, rather than peripheral, component of COPD management **(Collins, Nathan, Roberts, & Wilkinson, 2021).** Yet adherence remains poor across most clinical settings, undermined by a complex interplay of physical, psychological, financial, and health-system barriers **(McAuley & Maddocks, 2023).**

Several practical and personal barriers make eating well difficult for many COPD patients, including diminished taste and smell, poor dental health, fatigue, depression, social isolation, medication side effects, financial strain, and real-world difficulties with shopping and cooking **(Terashima.,**

et al.,2017; TerBeek et al.,2018). The clinical cost of non-adherence is considerable: malnourished COPD patients are hospitalized at rates estimated to be 1.5 to 2 times higher than their well-nourished counterparts, alongside faster functional decline and reduced long-term survival **(Collins, Yang, Chang, & Vaughan, 2019; Tashkin, Amin, & Kerwin, 2020).**

Significance of the Study

Despite this weight of evidence, the literature on dietary compliance in COPD remains dominated by descriptions of malnutrition prevalence, offering comparatively little insight into the specific patient-related, disease-related, socioeconomic, and health-system factors that determine whether an individual patient actually follows the dietary advice given, particularly outside high-income settings **(Collins et al., 2019; Tashkin et al.,2020; Wiśniewski et al., 2014).** Research from culturally and economically diverse settings, including low- and middle-income populations, has been explicitly called for to build evidence capable of informing culturally appropriate, resource-sensitive interventions **(McAuley&Maddocks, 2023; Wiśniewski et al., 2014;).**

Nurses and dietitians are recognized as central to sustaining dietary adherence through patient education, individualized counseling, and continuous follow-up **(McAuley & Maddocks,2023; Stoilkova-Hartmann, Franssen, Augustin, Wouters, & Barnard, 2018).** the findings of this study are expected to inform nurse-led dietary compliance screening and counseling protocols, strengthen the nutritional content of nursing education, and support hospital-level quality improvement efforts aimed at reducing malnutrition-related readmissions among Egyptian COPD patients.

Aim of the Study

The study aimed to assess the factors affecting dietary compliance among patients with chronic obstructive pulmonary disease.

Research Questions:

1. What are the levels of dietary compliance among patients with chronic obstructive pulmonary disease?
2. What are the different factors affecting dietary compliance of patients with COPD?

Subjects and Method

Study design

A descriptive research design was used in this study to systematically characterize dietary compliance and physical activity levels among patients with COPD and to identify the factors associated with variation in compliance.

Setting

This study was conducted at Chest Diseases Hospital, Tanta University Hospital, Gharbia Governorate, affiliated to Ministry of High Education and Scientific Research.

Subjects

A purposive sampling technique was used to recruit study participants. The targeted sample comprised 200 patients with confirmed COPD diagnoses, drawn from the statistical records of Chest Diseases Hospital, which documented 428 registered patients during 2023. The minimum required sample size was calculated using power analysis through the Epi-Info statistical software package, as recommended by the World Health Organization **(World Health Organization & Centers for Disease Control and Prevention, 2002),** assuming a 95% confidence interval, an estimated dietary adherence rate of 40%, and a margin of error of 7%, yielding a minimum requirement of 188 patients; the final sample was set at 200 to allow for potential data loss.

Inclusion criteria: inclusions were adults aged between 21 and 60 years, of either sex, conscious and cognitively oriented with the capacity to communicate effectively.

Exclusion criteria: Patients with renal or hepatic dysfunction, acute or chronic respiratory failure, lung malignancy, gastrointestinal disorders, or endocrine pathologies.

Tools of the study

Three validated and structured data collection tools were developed for use in this study, guided by a comprehensive review of recent literature in COPD management and nutritional science.

Tool I: Structured Assessment Questionnaire. This tool was developed by the researcher, drawing upon recent literature **(Beijers et al., 2022; Davalos-Yerovi et al., 2021; Shalit et al., 2016)** to elicit comprehensive baseline information regarding the sociodemographic and clinical profiles of participants. It comprised two parts: *Part 1*, sociodemographic data (age, sex, marital status, education, occupation, income, disease duration, residence, and prior exposure to dietary education); and *Part 2*, clinical data, including disease history, smoking status, medication use, home oxygen therapy**, (Gold, 2024**) economic and psychological stressors, chemosensory(taste and smell) and oral health status, functional limitation in daily activities, psychological symptoms, and anthropometric measurements (weight, height, waist circumference, and body mass index).

Tool II: Dietary Compliance Assessment Sheet. This instrument

was adapted from **(Donaire-Gonzalez et al., 2013; Shalit et al., 2016; Tan et al., 2011)** to assess dietary compliance among COPD patients. It comprised two parts: Part 1, a three-day food diary quantifying average daily servings across five food groups (dairy, meat/protein, fruits, vegetables, and grains), following the Australian Dietary Guidelines; and Part 2, a seven-item scale adapted from **(Tan et al., 2011**), recording the number of days per week (0–7) on which patients adhered to specific dietary behaviors, following a healthy eating plan, tracking the food plan, consuming > servings of fruits/vegetables daily, eating protein-rich foods, moderating sweets intake, eating high-fiber foods, and increasing caloric intake to gain weight.

Scoring system: Dietary compliance was operationally scored as good compliance (adherence on ≥5 days/week) or low compliance (adherence on <5 days/week).

Tool III: Physical Activity Level Assessment. This validated instrument was adopted from **(Patel, Benzo, Slivka, & Sciurba, 2007)** to objectively monitor physical activity and estimate energy expenditure. It captured energy expenditure (MET-min/day), total duration of physical activity (min/day), intensity of activity (METs), and total daily step count, combined with the Six-Minute Walk Test and eight consecutive days of triaxial accelerometer monitoring worn on the right arm (valid if worn ≥70% of waking hours on ≥3 days).

Scoring system: Physical activity was classified as light (<3 METs), moderate (3–<6 METs), or vigorous (≥6 METs), based on median MET values, with 50% and 65% of maximum oxygen consumption serving as demarcation points for moderate and vigorous activity, respectively.

Method

1. **Obtaining approval:** Official written permissions were obtained from the Dean of the Faculty of Nursing, the Director of Chest Diseases Hospital, and the Director of Outpatient Clinics prior to the commencement of data collection.

2. Ethical considerations: Ethical approval was granted by the Scientific Research Ethics Committee, Faculty of Nursing, Tanta University **(Approval Code: 539-10-2024).** Informed consent was obtained from every eligible and conscious participant after explanation of the study aims and procedures. Confidentiality was maintained by substituting participant names with anonymous numeric codes, and no invasive procedures were performed.

3. Development of the data collection tools: Tool I was

developed by the researcher based on recent literature review, while Tools II and III were adopted were adopted from previously validated tools with little modification.

4**. Content validity**: All three tools were submitted to a jury of five experts in Medical-Surgical Nursing and Chest Medicine, who evaluated each item for relevance, clarity, and appropriateness of content, Feedback provided by the jury was reviewed and incorporated into the final version of the tools prior to the pilot study.

5**. Pilot study**: A pilot study was conducted on a randomly selected sub-sample comprising 10% of the target population (n = 20) to assess the feasibility, clarity, and applicability of the tools. Participants included in the pilot study were subsequently included in, whereas the modification wasn't much

6. Reliability: The internal consistency of the study instruments was assessed using Cronbach's Alpha coefficient based on the pilot sample. Tool I (57 items) achieved $\alpha = 0.871$; Tool II (13 items) achieved $\alpha = 0.902$; and Tool III (2 items) achieved $\alpha = 0.886$. The overall reliability coefficient for all 72 items was 0.818.

7. Data collection Procedure: Following ethical approval and pilot testing, data collection was completed from March 2025 to April 2026 through structured face-to-face interviews conducted by the researcher, in combination with clinical record review and direct anthropometric measurement. Tool II was specifically used to assess patients' self-reported dietary adherence on a daily basis, based on their personal recall of food intake over the preceding days.

8. Statistical data analysis: Data were organized, tabulated, and analyzed using SPSS software, version 30. For quantitative data, the range, mean, and standard deviation were calculated. For qualitative data, comparisons were made using the Chi-square test (χ^2), or Fisher's Exact test where appropriate. The independent-samples t-test was used for comparison between the means of two groups, and one-way analysis of variance (ANOVA, F-test) for more than two groups. Correlations between variables were evaluated using Pearson's correlation coefficient (r). Statistical significance was adopted at $P < 0.05$ (*), and high significance at $P < 0.01$ (**) **(Gerstman,2010).**

Results

Table (1): Distribution of the studied COPD patients according to their socio-demographic characteristics (n = 200), It shows that Patients aged 50–60 years constituted the largest age subgroup (56.0%), against a minimum of 0.5%

among those aged 21 to less than 30 years. The sample was nearly evenly divided by sex (51.0% male, 49.0% female), with married patients forming the clear majority (80.5%). Secondary education was the most frequently reported level (25.0%) and read-and-write the least (15.0%). Employees represented the largest occupational group (37.0%), and 44.5% of patients earned more than 6000 EGP monthly. Rural residents made up 55.0% of the sample.

Figure (1&2): percent and ranks of weekly nutritional commitment among the studied COPD patients (n = 200), shows that the highest compliance (77.86%) Eating high fiber diet, whereas increasing calorie intake to gain weight showed the lowest compliance (11.57%). Overall, the majority of the studied patients (84.0%) had low dietary compliance, while only 16.0% achieved good dietary compliance.

Table (2): Distribution of the studied COPD patients according to their functional capacity and physical activity (n = 200) It shows that Most patients (72.0%) could walk continuously for 6 minutes without stopping; 28.0% could not, of whom 48.2% managed only 3 minutes. Dyspnea was the most common limiting symptom (51.8%), while fatigue and chest pain were equally the least reported (12.5% each).

Table (3): Percentage distribution of the studied COPD patients regarding their MET level (metabolic equivalent of task) (n = 200), The table presents light physical activity was the predominant MET category (64.5%), followed by moderate activity (35.5%); no patients reached the vigorous category (0.0%). The overall MET score ranged from 1.21–3.90 (mean 2.51 ± 0.533).

Table (4): Relation between dietary compliance level of the studied COPD patients and both type of prescribed nutrition and MET level (n = 200*)* It presents that no statistically significant association was found between type of prescribed nutrition and dietary compliance level (χ^2 = 2.081, P = 0.721); the low-calorie/high-protein regimen predominated in both the low-compliance (60.0%) and good-compliance (11.0%) groups. Similarly, no significant association was found between Metabolic Equivalent of Task level and dietary compliance level (Fisher's Exact test, P = 1.000).

Table (5): Correlation matrix between dietary compliance level, time of physical activity, energy expenditure, and MET level among the studied COPD patients (n = 200), Time of physical activity showed a statistically highly significant positive correlation

association with energy expenditure (r = 0.813, P = 0.000) and with MET level (r = 0.612, P = 0.000); energy expenditure and MET level were also highly significantly correlated (r = 0.581, P = 0.000) whereas dietary compliance level showed weak, non-significant correlations with physical activity level (r = 0.003, P = 0.963), energy expenditure (r = -0.050, P = 0.483), and MET level (r = 0.112, P = 0.114).

Table (6): Relation between socio-demographic characteristics of the studied COPD patients and their dietary compliance level (n = 200) It demonstrates statistically significant relation between dietary compliance level and all examined socio-demographic characteristics. Dietary compliance scores increased with advancing age (F = 4.29, p = 0.006), were significantly higher among males than females (t = 7.29, p = 0.008), and varied significantly according to marital status, being highest among married patients (F = 4.28, p = 0.006).

Significant differences were also observed according to educational level, with university-educated patients showing the highest compliance (F = 2.86, p = 0.025), occupation, with retired and employed patients demonstrating higher compliance than manual workers and those not working (F = 9.84, p < 0.001), monthly income, with compliance increasing progressively with higher income (F = 13.43, p < 0.001), and residence, with urban residents showing higher compliance than rural residents (t = 4.13, p = 0.038), with the highest mean dietary compliance score reported among retired patients (4.23 ± 0.93) and the lowest among patients aged 21–<30 years (2.00 ± 0.00).

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Table (1): Distribution of the studied COPD patients according to their socio-demographic characteristics (n = 200)

Characteristics	N	%
Age (in years)		
21 – <30	1	0.5
30 – <40	13	6.5
40 – <50	74	37.0
50 – 60	112	56.0
Gender		
Male	102	51.0
Female	98	49.0
Marital status		
Single	14	7.0
Married	161	80.5
Divorced	15	7.5
Widowed	10	5.0
Education level		
Illiterate	33	16.5
Read and write	30	15.0
Basic education	43	21.5
Secondary education	50	25.0
University education	44	22.0
Occupation		
Not working	58	29.0
Manual worker	55	27.5
Employee	74	37.0
Retired	13	6.5
Monthly income (EGP)		
< 3000	28	14.0
3000 – 6000	83	41.5
> 6000	89	44.5
Residence		
Rural	110	55.0
Urban	90	45.0

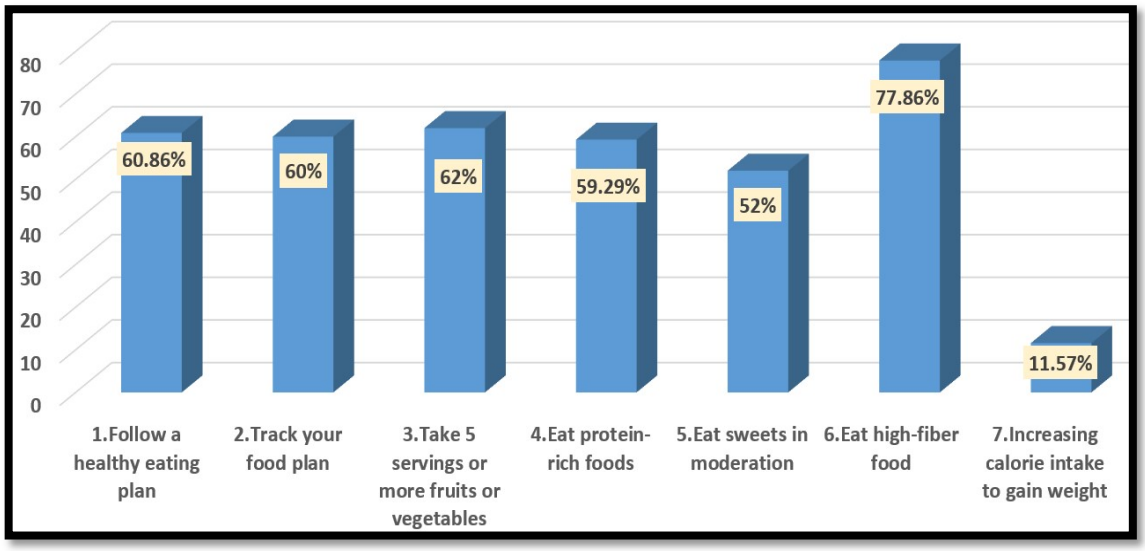

Figure (1): Mean percentage of weekly nutritional commitment of the studied COPD patients

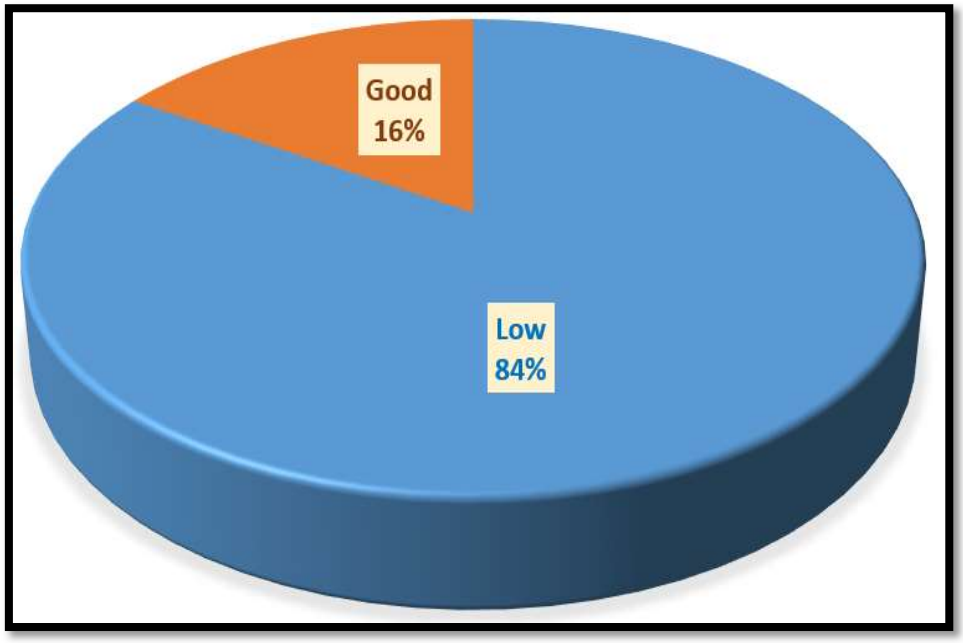

Figure (2): Percentage distribution of the studied COPD patients regarding their level of dietary compliance

Table (2) Distribution of the studied COPD patients according to their functional capacity and physical activity (n = 200)

Items	N	%
Able to walk continuously for 6 minutes without stopping		
Yes	144	72.0
No	56	28.0
Duration of continuous walking without rest, minutes (n = 56)		
2 minutes	18	32.1
3 minutes	27	48.2
4 minutes	11	19.7
Symptoms experienced while walking (n = 56)		
Dyspnea	29	51.8
Fatigue	7	12.5
Chest pain	7	12.5
Dizziness	13	23.2

Table (3): Percentage distribution of the studied COPD patients regarding their MET level (metabolic equivalent of task) (n = 200)

MET level	N	%
Light (< 3)	129	64.5
Moderate (3 – <6)	71	35.5
Vigorous (≥6)	0	0.0
Range (1.21 – 3.90) / Mean ± SD: 2.51 ± 0.533		

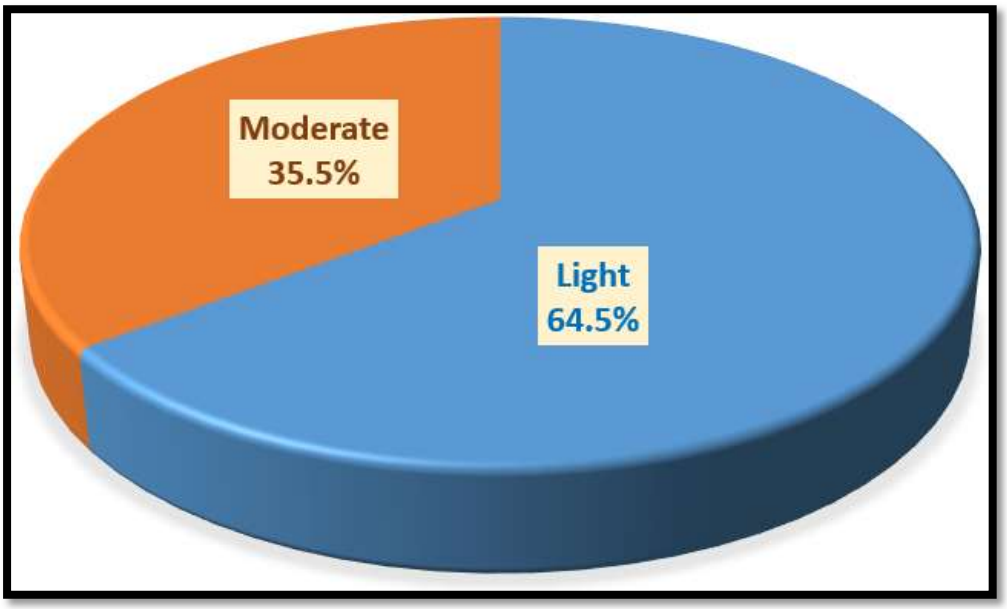

Figure (3): Percentage distribution of the studied COPD patients regarding their MET level

Table (4): Relation between dietary compliance level of the studied COPD patients and both type of prescribed nutrition and MET level (n = 200)

Variable	Low		Good		Test value / P
	N	%	N	%	
Type of prescribed nutrition					
Low calorie, low protein	1	0.5	0	0.0	χ^2=2.081 P=0.721
Low calorie, moderate protein	3	1.5	0	0.0	
Low calorie, high protein	120	60.0	22	11.0	
Moderate calorie, high protein	43	21.5	10	5.0	
High calorie, high protein	1	0.5	0	0.0	
MET level					
Light	108	54.0	21	10.5	FE test P=1.000
Moderate	60	30.0	11	5.5	

χ^2: Chi-square test; FE: Fisher's Exact test. The listed test value and P-value refer to the overall (omnibus) test for each variable as a whole, not to individual subcategories

Table (5): Correlation matrix between dietary compliance level, time of physical activity, energy expenditure, and MET level among the studied COPD patients (n = 200)

	Physical activity level	Energy expenditure	MET level
Dietary compliance level – r	0.003	-0.05	0.112
Dietary compliance level – P	0.963	0.483	0.114
Time of physical activity – r	—	**0.813****	**0.612****
Time of physical activity – P	—	0.000	0.000*
Energy expenditure – r	—	—	**0.581****
Energy expenditure – P	—	—	0.000*

r: Pearson's correlation coefficient. * Statistically significant at P < 0.05. ** Statistically highly significant at P < 0.01.

Table (6): Relation between socio-demographic characteristics of the studied COPD patients and their dietary compliance level (n = 200)

Characteristics	Dietary compliance level (Mean ± SD)	Test value (F/t)	P-value
Age (years)			
21 – <30	2.00 ± 0.00	F=4.29	P=0.006*
30 – <40	3.46 ± 0.660		
40 – <50	3.78 ± 0.688		
50 – 60	3.92 ± 0.699		
Gender			
Male	3.96 ± 0.716	t=7.29	P=0.008*
Female	3.69 ± 0.680		
Marital status			
Single	3.21 ± 0.699	F=4.28	P=0.006*
Married	3.89 ± 0.686		
Divorced	3.80 ± 0.775		
Widowed	3.70 ± 0.675		
Education level			
Illiterate	3.61 ± 0.659	F=2.86	P=0.025*
Read and write	3.70 ± 0.702		
Basic	3.72 ± 0.734		
Secondary	3.96 ± 0.699		
University	4.05 ± 0.680		
Occupation			
Not working	3.55 ± 0.705	F=9.84	P=0.000*
Manual	3.67 ± 0.695		
Employee	4.09 ± 0.553		
Retired	4.23 ± 0.927		
Monthly income (EGP)			
< 3000	3.36 ± 0.731	F=13.43	P=0.000*
3000 – 6000	3.73 ± 0.664		
> 6000	4.07 ± 0.654		
Residence			
Rural	3.74 ± 0.673	t=4.33	P=0.039*
Urban	3.94 ± 0.740		

F: ANOVA test (variables with > 2 categories); t: independent-samples t-test (binary variables). * Statistically significant at P < 0.05.

Discussion

Chronic obstructive pulmonary disease (COPD) remains one of the leading causes of chronic morbidity and mortality worldwide, and its management has moved decisively beyond bronchodilator and anti-inflammatory therapy alone to encompass the preservation of muscle mass, functional capacity, and overall nutritional reserve **(Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2024; World Health Organization, 2021).** Nutritional decline in COPD is rarely attributable to disease severity in isolation; it is more accurately understood as the end point of a chain that begins with a prescribed diet and ends with what a patient actually eats, a chain in which dietary compliance constitutes the decisive link. Because this link is shaped simultaneously by disease-related, psychological, sensory, economic, and educational factors, a purely clinical evaluation of nutritional status is insufficient to explain why some patients adhere to nutritional advice while others do not. The present study was undertaken to characterize this chain of influence in a sample of Egyptian patients with COPD, and the findings, discussed below in the same sequence in which they were presented in the Results chapter, are interpreted in light of the most current national and international evidence.

Regarding the Socio-Demographic Characteristics of the Studied Patients ,the present study demonstrated that patients in the fifth and sixth decades of life constituted the largest proportion of the sample, a distribution that is consistent with the well-established epidemiological understanding of COPD as a disease of cumulative exposure, whose clinical expression typically becomes apparent only after decades of airway insult from tobacco smoke, biomass combustion, or occupational pollutants **(GOLD, 2024).** The near-equal distribution between male and female patients observed in the current study is a somewhat more striking finding, since COPD has traditionally been regarded as a predominantly male disease. This near parity, however, is in agreement with a documented shift in the regional epidemiology of COPD across the Middle East and North Africa, where a rising female share of the disease burden has been attributed to indoor biomass exposure, occupational smoke, and

changing smoking patterns among women **(Feizi et al., 2022).**The predominance of rural residence recorded in this sample carries a more direct clinical implication than a purely demographic one: it signals restricted access to dietitian-led counseling and structured pulmonary rehabilitation, services that remain heavily concentrated in urban referral centers, a geographic imbalance that is discussed further below in relation to its effect on dietary compliance.

Regarding Dietary Compliance, the predominance of low dietary compliance recorded in the present study sits comfortably within the range reported internationally for COPD and other chronic disease populations, where adherence to prescribed nutritional advice is more often the exception than the rule. This finding is supported by a recent global meta-analysis pooling data from more than five thousand patients with COPD, which placed the combined prevalence of malnutrition and nutritional risk at roughly one in three to one in two patients **(Deng, Zhang, Bian, Zhou, & Hou 2023),** a figure difficult to reconcile with anything other than widespread, sustained difficulty with dietary self-management across health systems and disease severities. Comparable adherence deficits have been documented well beyond the respiratory setting, in hypertensive and diabetic populations managed in comparably resource-constrained health systems, where non-adherence clusters heavily around modifiable behavioural and socioeconomic barriers rather than around the technical adequacy of the advice given **(Abera, Yazew, Legesse, & Kuyu, 2024; Atinafu, & Tilahun, 2025).**

In the present study, adherence was not depressed uniformly across the seven nutritional commitment items assessed; it was strongest for the high-fiber intake item, and weakest for the item instructing patients to increase caloric intake to promote weight gain. Read in that light, the near-floor adherence to the calorie-increase item observed here (11.57%, the lowest of the seven items) is not best understood as a marker of poor self-management. Given that the large majority of this sample carried a low-calorie prescription and were already overweight or obese, an instruction to eat more in order to gain weight was, for most patients, clinically discordant with their own circumstances, and the obesity-paradox evidence **(Tenda et al., 2024)** suggests that declining to pursue further weight gain may, if

anything, have been the more physiologically appropriate response for this population.

Regarding Physical Activity Level, Energy Expenditure, and MET Level, the predominance of light-intensity activity and the complete absence of vigorous activity recorded in the present study are consistent with evidence documenting markedly reduced habitual movement among patients with COPD relative to age-matched healthy adults; such reduced activity has been shown to independently predict hospitalization and mortality rather than merely track disease severity **(Waschki et al., 2011).** This finding is corroborated by a recent scoping review synthesizing forty-two studies on physical activity in COPD, which reached a closely similar conclusion, reporting that reduced activity is close to universal in this population and is shaped by a dense interplay of physiological, psychological, and environmental barriers, chief among them breathlessness, fear of dyspnea-provoking exertion, and fatigue **(Xinyue, Lihua, & Yong, 2023).**

The fact that most patients in the present sample were nonetheless able to complete the six-minute walk test unassisted suggests that the shortfall in habitual daily activity reflects behavioural and environmental constraint at least as much as absolute physiological incapacity, a gap that structured pulmonary rehabilitation and graded exercise prescription are specifically designed to close.

Regarding the Relationship Between Dietary Compliance and Both Type of Prescribed Nutrition and MET Level, in the present study, neither the specific composition of the prescribed diet nor the patient's objectively measured MET-based activity level bore any meaningful relationship to whether that patient actually followed the dietary plan. This null finding does not undermine the clinical relevance of correct prescribing; rather, it confirms what the behavioural-adherence literature has argued for some time, namely that writing a technically correct diet is a necessary but insufficient condition for securing patient behaviour. This result is supported by evidence that adherence in chronic disease is driven substantially more by health literacy, self-efficacy, and the presence or absence of structured follow-up support than by the caloric or macronutrient arithmetic of the prescription itself **(Hovell et al., 2018; Martínez-Gestoso et al., 2022).** A recent systematic review of tailored dietary advice and

dietitian involvement in COPD reached a closely related conclusion, noting that individualized, dietitian-delivered counselling improves outcomes chiefly through sustained contact and behavioural reinforcement rather than through refinement of the nutrient targets themselves, and that interventions relying on a prescription alone, without accompanying behavioural support, consistently underperform **(Bell, Lawson, Penz, & Cammer, 2024).** Since prescribing practice of the studied patient already appeared clinically appropriate, as discussed above, this dissociation indicates that the principal opportunity for improving compliance lies not in refining the diet itself but in the behavioural and educational support surrounding it.

Regarding the Correlation Between Dietary Compliance, Physical Activity Time, Energy Expenditure, and MET Level, the three physical-activity-related variables assessed in the present study were strongly and significantly intercorrelated with one another, a tight clustering that is expected on physiological and mathematical grounds, since all three metrics are derived from the same accelerometer-based monitoring and are conceptually nested. This internal consistency serves as a useful validity check on the physical activity assessment tool used in this study. By contrast, dietary compliance showed uniformly weak and non-significant correlations with all three activity-related variables, indicating that being more physically active conferred no discernible advantage, or disadvantage, for dietary adherence, and vice versa. This dissociation is a noteworthy departure from the general health-behaviour literature, which often describes clustering of favorable lifestyle behaviours within the same individual. A plausible explanation for the present finding, supported by longitudinal work on physical activity in stable COPD, is that the two behavioural domains are governed by substantially different determinants: physical activity in COPD is constrained predominantly by dyspnea severity and lower-limb functional performance rather than by broader self-management variables **(Vézina & Cantin, 2018)** whereas dietary compliance, , as discussed in the following section, is constrained predominantly by socioeconomic and educational factors. This carries a direct practical implication for future intervention design: since the present descriptive study did not test any intervention directly, programs aimed at raising a patient's activity

level should not be assumed to produce spillover improvement in dietary adherence, and the reverse holds equally, so the two domains most plausibly require distinct, purpose-built components within an integrated care model **(Stoilkova-Hartmann et al., 2018).**

Regarding the Factors Affecting Dietary Compliance: Relation to Socio-Demographic Characteristics, the consistent, statistically robust gradient linking dietary compliance age, marital status, education, occupation, income, and residence— with income and occupation showing the strongest associations and educational level the weakest —observed in the present study is arguably the single most important finding of this investigation, both for its breadth, since it held across every socio-demographic variable examined, and for its congruence with the wider literature on nutritional adherence in chronic disease. This finding is consistent with reports identifying financial hardship and low educational attainment among the most stubborn barriers to dietary self-management, since nutrient-dense foods generally cost more than energy-dense alternatives, and lower health literacy reduces both comprehension of dietary advice and the perceived relevance of following it **(Terashima et al., 2017).).** Comparable gradients by income and education have recently been reported for dietary adherence in hypertensive and diabetic patients managed in comparably resource-limited African health systems, lending cross-national support to the notion that these socioeconomic determinants operate broadly across chronic disease rather than being specific to COPD or to the present study setting **(Abera et al., 2024; Atinafu & Tilahun, 2025).**

The advantage observed among urban residents in this sample is readily explained by the concentration of dietetic counselling and pulmonary rehabilitation services in referral centers, a geographic imbalance for which telehealth-based nutrition coaching has been specifically proposed as a pragmatic remedy in recent COPD literature **(Armand, Kim, & Kim, 2024; Janjua, Powell, Atwal, & Cockett, 2021).** The benefit associated with retirement plausibly reflects the additional time and reduced occupational stress available for meal planning once the demands of paid work have receded, while the advantage seen among married patients in the current study is consistent with evidence that shared household responsibility for food purchase and preparation

improves dietary outcomes in chronic respiratory disease **(McAuley& Maddocks, 2023; Stoilkova-Hartmann et al., 2018).**

The finding that male patients demonstrated better dietary compliance than female patients in the present study departs from the pattern most often reported in the general adherence literature, where women more frequently report healthier eating habits and greater dietary self-regulation than men **(Desroches et al., 2013; Egele & Stark, 2023).** This discrepancy is worth taking seriously rather than dismissing as statistical noise, because the direction of sex differences in dietary adherence has been shown in several recent studies to be highly context-dependent, reversing under the influence of household roles, caregiving obligations, and cultural expectations surrounding food preparation. Supporting this interpretation, cohort evidence from outside the respiratory field has shown that women are more likely than men to follow structured, routine-oriented eating patterns, yet this same structure can become a liability rather than an asset when the routine being followed is dictated by family preference rather than by a woman's own prescribed regimen **(Feraco et al.,2024).** Related work examining diet quality alongside medication adherence in cardiovascular patients has similarly shown that the association between gender and adherence behaviour cannot be assumed to run in a fixed direction, and depends heavily on which specific behaviour, and which household context, is being measured **(Leblay et al., 2025).** In the cultural context of the present study setting, where women conventionally bear primary responsibility for preparing meals for the entire household according to shared family preference rather than their own individual prescription, it is plausible that this very role paradoxically reduces personal dietary adherence relative to male patients, whose meals may be more readily individualized around their own prescribed plan. This remains an interpretive hypothesis rather than a demonstrated mechanism; the descriptive, cross-sectional design of the present study cannot establish it, and it warrants dedicated qualitative or mixed-methods investigation before being treated as an explanation rather than a plausible reading of the data.

Conclusion

Dietary non-compliance was common among patients with COPD attending Chest Diseases

Hospital, Tanta University Hospital, affecting the large majority of the sample. This shortfall was patterned along socioeconomic and educational lines rather than by the technical content of the dietary prescription or by physical activity status, and it coexisted with, but was not directly explained by, a high prevalence of taste and olfactory function, economic, and psychosocial burden. Dietary compliance and physical activity appear to be governed by distinct determinants and should be addressed as separate, purpose-built targets within COPD care.

Recommendations

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

For Patients

- Reconcile dietary counseling with each patient's actual body mass index and prescribed diet type,
- Replace single-day nutrition education with a longitudinal program that includes scheduled reinforcement sessions.
- Nutritional educational materials, including pictorial and verbally delivered content, for COPD patients
- Actively involve family members, particularly spouses, in dietary education sessions,
- Establish dedicated dietitian or nutrition-nursing clinics accessible to COPD patients at the point of diagnosis, and consider outreach or telehealth-based nutritional counseling to extend structured support to rural patients.
- Extend insurance coverage to include nutritional counseling and, where clinically indicated, oral nutritional supplements.

For Future Research

- Conduct longitudinal or intervention-based studies to establish whether the socioeconomic disparities in dietary compliance identified here are modifiable through targeted nursing or dietetic intervention
- Repeat this assessment in larger and more evenly distributed age groups, since the youngest age category in this study contained too few patients to support confident conclusions about age-related patterns.
- Test whether structured, multi-session nutrition education measurably improves dietary compliance when delivered alongside active management of chemosensory, economic, and psychosocial barriers.

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Effect of Educational Guidelines on Patients' Compliance to the Anticoagulant Medications

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Abstract

Background: Oral anticoagulant therapy (OAT) is critical for managing thromboembolic disorders, but adherence challenges significantly impact its effectiveness and patients' quality of life. **Aim:** Evaluate the effect of educational guidelines on patient compliance with anticoagulant medications. **Design:** quasi- experimental research design. **Setting:** The study was conducted at Cardiology Department at Main Tanta University and Cardiothoracic Department at the International Tanta Hospital. **Subject:** A purposive sample of 80 cardio and cardiothoracic patients. **Tools:** Two tools were used. **Tool I:** Patient's Assessment Sheet. **Tool II:** Morisky Medication Adherence Scale" (MMAS-8). **Result:** Prior to the intervention, the majority of patients exhibited poor baseline knowledge and low medication compliance. Following the implementation of the educational guidelines, the study group demonstrated significant improvements in both knowledge and adherence immediately post-intervention, with benefits sustained over a 6-month follow-up period; whereas the control group showed no significant changes. Furthermore, laboratory outcomes, particularly partial thromboplastin time (PTT), showed marked improvement in the study group. **Conclusion:** Educational guidelines significantly improve knowledge, coagulation laboratory parameters, and medication adherence of patients on anticoagulant therapy. To improve clinical outcomes, encourage compliance, and lessen complications—especially for those with lower educational levels—routine care must incorporate established educational principles. **Recommendations:** Replication of study on larger sample to examine the effect of education on bleeding complications, quality of life, and hospital readmission.

Keywords: Anticoagulant therapy, educational guidelines, Medication adherence Patient knowledge, Partial thromboplastin time.

Introduction

Anticoagulant therapy remains a cornerstone of modern medicine, primarily aimed at reducing the formation of fibrin clots to prevent and treat life-threatening thromboembolic events. As of 2025 and 2026, the clinical focus has shifted significantly toward optimizing the use of Direct Oral Anticoagulants (DOACs) while refining management strategies for high-risk populations, including those with liver cirrhosis, chronic kidney disease, and pediatric conditions (**Betensky et al., 2026).**

The therapeutic landscape of anticoagulant therapy divided into traditional agents and targeted molecular inhibitors. While Vitamin K Antagonists (VKAs) like warfarin function by inhibiting the synthesis of clotting factors II, VII, IX, and X, newer DOACs target specific proteases within the coagulation cascade—specifically Factor Xa (e.g., apixaban, rivaroxaban) or thrombin e.g., dabigatran. **(Nielsen et al., 2025 and Caruso et al., 2025)**

Direct Oral Anticoagulants Medications are now the "gold standard" for non-valvular atrial fibrillation and venous thromboembolism (VTE) due to their rapid onset and lack of need for routine INR monitoring, Factor Xa Inhibitors, agents like Apixaban, Rivaroxaban, and Edoxaban inhibit the common pathway by blocking Factor Xa. Recent guidelines emphasize their use in patients with pulmonary embolism over parenteral options when stable **(AHA/ACC, 2026).**

Moreover, New 2026 guidelines for acute pulmonary embolism recommend low molecular weight heparin (LMWH) Such as Enoxaparin and Dalteparin over unfractionated heparin (UFH) for initial parenteral therapy due to a more predictable response **(AHA/ACC, 2026).**

Whereas Penta saccharides: Fondaparinux provides pure Factor Xa inhibition by selectively binding to ATIII (**Nielsen, 2025).**

Acute Pulmonary Embolism (PE) is the first indication for anticoagulant, in 2026 AHA/ACC Guidelines introduce a shift from "anatomical clot burden" the "Acute Pulmonary Embolism Clinical Categories (A–E)." Anticoagulants is indicated for all symptomatic patients, with a strong preference for Direct Oral Anticoagulants (DOACs) over Vitamin K Antagonists (VKAs) in eligible adults to prevent recurrence **(AHA/ACC, 2026).**

Atrial Fibrillation (AF) is the second one indicated for stroke prevention in patients with paroxysmal,

persistent, or permanent AF. New 2025/2026 evidence (e.g., the OCEAN trial) suggests that in patients who have undergone successful catheter ablation and remain at low risk, long-term anticoagulants may not offer benefits over aspirin due to bleeding risks **(American College of Cardiology (ACC), 2025).**

Pre and post cardiac surgery cardiac pose an increased risk of thrombotic and hemorrhagic events. The thrombotic risk peaks in the initial months, and is even more pronounced after tricuspid valve interventions due to the low pressures in the right sections of the heart. Guidelines suggest that if a patient already has an indication for DOAC or VKA therapy, it is recommended to continue the therapy unless there is a high risk of bleeding. **(Kempers, et al., 2026)**

Compliance to anti-coagulant medications is important part in the treatment of cardiovascular diseases. In American collage of chest (ACCP) has reported the adherence assessment of atrial fibrillation, actually admitted patient and calculated that only 40.9% of patient were adherent to the integrated care management approach. Furthermore, the study demonstrated that clinical adherence to the ABC pathway was associated with a significantly lower risk of all-cause death and the composite outcome of major bleeding, and cardiovascular death**."** **(Proietti et al., 2019).**

The role of nursing in promoting adherence to anticoagulant therapy is important in preventing life-threatening complications such as strokes or major hemorrhages. Nurses act as the primary educators and monitors in the "Integrated Care" model for Atrial Fibrillation (AF). The first role is Patient Education and Health Literacy Nurses translate complex medical jargon into understandable instructions. This includes explaining the "why" behind the medication, the difference between Vitamin K Antagonists (like Warfarin) and DOACs (like Apixaban), and the necessity of strict timing. The second role, Nurses are responsible for teaching patients how to identify signs of bleeding (e.g., bruising, hematuria, or epistaxis). They also coordinate the monitoring of Lab values, such as the International Normalized Ratio (INR) for patients on Warfarin, Bleeding time and clotting time too. **(Burnier, & Egan ;2019).**

Also, Behavioral Counseling and Motivational Interviewing Using techniques like motivational interviewing, nurses identify barriers to adherence—such as cost,

forgetfulness, or fear of side effects and help patients develop strategies (e.g., using pill organizers or phone alarms). In addition to nutritional and Drug Interaction Guidance Nurses provide essential counseling on lifestyle factors, such as maintaining a consistent Vitamin K intake for Warfarin users and avoiding over-the-counter NSAIDs (like Ibuprofen) which increase bleeding risks**. (Hendriks & Fabritz, 2020).**

The significance of this study lies in addressing the high incidence of adverse cardiac events, including sudden cardiac arrest, complications during catheterization, and mortality observed in cardiology and cardiac surgery departments. Evidence indicates that poor medication adherence and non-compliance with prescribed dietary restrictions significantly contribute to disease progression and procedural complications such as atrial fibrillation, atherosclerosis, and heart failure. Therefore, this study underscores the necessity of implementing effective patient education and adherence strategies to mitigate risks, reduce complications, and improve clinical outcomes among cardiac patients.

Aim of this study was to Evaluate the effect of educational guidelines on patients' compliance to the anticoagulant medications.

Research hypothesis: -

After applying educational guidelines, the study group is expected to perform higher compliance to anticoagulant medications than control group.

Research design

A quasi- experimental design was used in this study.

Study Setting: The study was conducted at Cardiology Department at Main Tanta University Educational Hospital and Cardiothoracic Department at the International Tanta HospitalAffilated to High Ministry of Education and Scientific Research.

Study Subjects:

A purposive sampling of (80) Cardiac patients who were admitted to the above previously mentioned settings was included. The sample size was estimated based on power analysis equation according to the Tanta statistical records. Total target population size = 343 per year. Confidence level = 95 %, Expected frequency= 50 %, Accepted error = 5 %, Confidence co efficient = 0.95.

Inclusion criteria:

- PatientsAged21 to 60 years were selected, both sexes, and newly admitted, Also, Patients who started anticoagulant medications at the

cardiology department in the hospital and after a surgical or non-surgical intervention was included All types of Anticoagulant therapy were included in this study.

Exclusion Criteria:

Unconscious Patient and Mentally or Handicapped Patient was excluded. The sample was selected randomly and divided into two equal groups each group consisted of (40) patients as the following:

Control group: Comprised of 40 patients who were received anti-coagulant medications and routine hospital care. whereas Study group comprised of 40 who were received the educational guidelines regarding anticoagulant therapy and instructed by the researcher

The study tools: - Two tools were used in this study

Tool (I): Patient's Assessment Tool: this tool was developed and include four parts

Part (1): Patient's Socio demographics data:

It concerned with patients 'code, age, sex, marital status, educational level, occupation, income, residence to follow up them in the cardiology clinics, date of admission and date of discharge are included.

Part (2): Clinical Medical data: This tool was developed by the researcher based on a massive literature review (**Al-Jedai et al., 2023, Shetty et al., 2023; Kim et al., 2023)**

It was used to assess diagnosis, past medical history, previous hospitalization, Chronic condition, History of chest pain, History of bleeding, present medical history, Chief complain, Diagnosis, Current medications. Also, any clinical signs and symptoms observed during intake of anticoagulant medications such as itching, rash, nausea, vomiting and bleeding. Laboratory investigations as (International Normalize Ratio (INR), Partial Thromboplastin Time (PTT), and Prothrombin Time (PT) were included too.

Part (3): Knowledge Assessment Toward Anti-Coagulant Therapy: The researcher constructed Knowledge Assessment sheet based on recent massive literature review**.** (**Lockwood,et al.; 2018 , Proietti et al., 2019 and Emara et al., 2023)**. This tool used to assess the patient's knowledge regarding (name of medication, action, indications, side effects, contraindications, the avoidance of food or drugs that can be interacted with anti-coagulant therapy and thromboembolic complications as bleeding.

Scoring System of Knowledge:

The patients' knowledge was assessed by using multiple-choice

questions according to the following:"

- Correct and complete "scored 2,
- Correct and Incomplete "scored1, and Incorrect answer or don't know "scored zero. The total level of patients' Knowledge was calculated and classified according to the following: Low knowledge<60% of the total score, moderate knowledge 60%-75% and high knowledge 75% of the total score.

Part (4): Assessment of Laboratory Investigations Level: Based on the recent literature; **(Perez-Perez et al., 2025**) the researcher assessed the following Blood coagulation studies that include International Normalize ratio (INR Prothrombin Time (PT, PTT) Partial Thromboplastin Time in addition to incidence of bleeding.

Scoring system: The Lab Investigations assessed according to the reference value of the Labe; the total level of laboratory investigation estimated as:

A) For cardiology patient: Normal level of INR 2-3, PTT60-70 min and PT 11-13.5 second.

B) For post cardio thoracic surgery patients; Normal level of PT11 to 13.5 seconds. INR of 0.8 to 1.1.

Tool II: Morisky Medication Adherence Scale (MMAS-8): This adherence scale was developed by **Morisky et al., (2008)** and updated by **Lin et al., 2013** and modified by the researcher. It was used to assess the compliance level of patients toward intake of anti-coagulant therapy. The 8- item Morisky Medication Adherence Scale (MMAS-8) included eight questions for example; Do you sometimes forget to take your Anti-coagulant pills? People sometimes miss taking their medications for reasons other than forgetting Thinking over the past 2 weeks, were there any days when you did not take your Anti-coagulant medicine?

Scoring system. Response choices for items 1 to 7 are "Yes" or "No". The question No. 8 is a Likert-type question (5 scales) Never1, rarely2, sometimes 3, usually 4, all the time 5, The total score ranges from 1 to 8, Scores of less than 6 indicate low compliance, Scores of 6 to < 8 indicate moderate compliance, Score = 8 indicates high compliance.

An official permission was obtained to

conduct this study from the Dean of the Faculty of Nursing and was submitted to responsible authorities and the Permission of directors of the selected settings.

Ethical considerations: The study was approved from the ethical committee on Faculty of Nursing

University with code of approval (511-8-2024). Informed consent was taken from every patient after clarifying the procedures and the purpose to participate in the study. They were informed about confidentiality of data collection, their right to refuse participation and to withdraw at any time without any consequences. A code number was used instead of name.

Content validity

All the developed tools were tested for content validity by nine jury of experts in the field of Medical Surgical at the Faculty of Nursing, Cardiology and Cardiothoracic filed at Faculty of medicine to check content, validity, Clarity and applicability.

A pilot study

A pilot study was carried out on a sample (10%) eight patients of selected participants to test the applicability of the tools. Accordingly, Little modifications were done. This sample was included in the total study subjects where little changes were found.

Reliability of the tool

Test done for the study tools using (Cronbach alfa test) Cronbach's Alpha test for tool I was 0.951 for 72 items applied on 8 adult's patients. Cronbach's Alpha for tool II was 0.892 for 8 items applied on 8 adults' patients. Cronbach's Alpha for the sheet in total was 0.802 for 80 items

applied on 8 adult patients.

Data collection: Data were collected over period of 12 months. Starting from January 2025 to January 2026.

The study was conducted through four phases as follow:

-Assessment Phase: An initial assessment was carried out by the researcher for all the study subjects in both the control and study groups to assess the patients who met the inclusion criteria of this study using Tool I Part(1) Patients Sociodemographic, part (2) Patient's Clinical Medical Data ,Part (3): Knowledge Assessment toward anti-coagulant Therapy, Part (4): Assessment of Laboratory Investigations Level Tool II to assess compliance level for both groups assessment only once pre, other assessments are evaluation pre educational guidelines.

B-Planning Phase

This phase formulated based on the study subjects' assessment were formulated. Nursing Educational guidelines were given by the researcher face to face communication with study groups in shape of colored booklet that were taken about one month for development and were designed by the researcher in Arabic language.

- Nursing educational guidelines were planned according to two sessions: each session was taken duration20 - 30minutes to study groups twice weekly.
- The teaching methods were included a colored booklet which has been distributed to study groups and power point presentations with discussion and summarizing by patient.

Expected outcomes were included: Improve patients' knowledge about the anticoagulant medications effect, Types, indication, contraindications and interaction with medications and food, decrease complications, in addition to Increase compliance with anticoagulant medications.

C-Implementation Phase:

Group I (control group): Who received routine hospital care toward patient receiving anticoagulant medications, the routine patient component

Group II (Study Group)

who received the educational guidelines that implemented by the researcher through two sessions and each session started by pretest and post- test,

First Session (Theoretical) include overview of cardiac anatomy, coronary artery disease, and thrombus. Comprehensive education on anticoagulant medications including indications, actions, side effects, interactions, INR monitoring, and patient safety guidelines.

Second Session (Practical) This session focused on the practical application of anticoagulant therapy. It included a brief review of the first session, demonstration of correct medication administration, and training on assessing side effects such as bleeding, clotting time, ecchymosis, and skin rashes. The session also covered educational guidelines on maintaining medication regularity to prevent non-adherence, proper timing in relation to meals, and use of visual aids to differentiate between ecchymosis and bleeding.

D-Evaluation Phase:

The control group was assessed using Tool I and Tool II to evaluate the incidence of bleeding. The study group was assessed pre-intervention, at 3 and 6 months' post-educational guidelines. Both groups were compared to assess the effect of the educational guidelines on patients' compliance with anticoagulant medications.

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 ($\chi 2$). For comparison between means of two variables in a group, paired samples t-test was used. For comparison between means for variables during three periods of intervention in a group, or for more than two variables, the F-value of analysis of variance (ANOVA) was calculated.

Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A significance was adopted at $P<0.05$ for interpretation of results of tests of significance (). Also, a highly significance was adopted at $P<0.01$ for interpretation of results of tests of significance (*). **(Sullivan;2023).**

Results

Table (1): Illustrates the past medical history of the studied patients. The data shows a statistically significant variance between the two groups regarding a history of angina ($P<0.045$) and previous cardiac catheterization ($P<0.027$). Specifically, a history of angina was significantly higher in the study group compared to the control group (77.5% vs. 35.0%). Similarly, a significantly higher percentage of patients in the study group had undergone previous cardiac catheterization compared to their control counterparts (42.5% vs. 17.5%). Conversely, no statistically significant differences were observed through other past medical history ($P>0.05$).

Table (2): Presents the causes of previous hospitalization among the studied patients. Coronary angiography emerged as the most frequent indication for prior admission in both cohorts, accounting for 35.0% of the control group and 25.0% of the study group, followed by heart block (15.0% vs. 0.0%). Other clinical presentations, such as pleural effusion (10.0% vs. 15.0%) and dyspnea (10.0% vs. 7.5%), were less frequently distributed.

Inferential statistical evaluation yielded no statistically significant difference between the two groups regarding their historical reasons for admission ($P> 0.05$).

Table (3): Regarding baseline clinical presentation, a history of chest pain was reported by a significantly higher proportion of patients in the study group (82.5%) compared to the control group (57.5%). However, inferential statistical analysis showed no statistically significant differences between groups regarding mean duration of pain (5.76±10.97 days for the study group vs. 1.78±1.73 days for controls), onset, radiation,

severity, pain quality, or timing (P>0.05). **As** for bleeding, a baseline history of bleeding was documented in 20.0% of the study group and 10.0% of the control group. Among those with bleeding, the gum was the most frequent anatomical site (50.0% vs. 75.0%), followed by epistaxis which occurred exclusively in the study group (62.5%). Regarding severity, the majority of bleeding incidents in the control group were mild (75.0%), whereas moderate-to-severe episodes predominated in the study group (62.5% - 12.5%). Inferential statistical assessment demonstrated no statistically significant differences between the two groups across any of the bleeding parameters (P>0.05).

Table (4): Illustrates the longitudinal clinical impact of educational guidelines on signs and symptoms associated with anticoagulant therapy, comparing the control group (n=40) against the study group (n=40) across multiple follow-up intervals. Prior to the intervention, the study group experienced high symptom burdens, including nausea (90.0%), rash (85.0%), vomiting (50.0%), and bleeding (25.0%). Following the implementation of the educational guidelines, the study group demonstrated a highly significant, progressive reduction in these adverse manifestations over time.

Highly significant statistical variations were observed across the timeline intervals for rash, nausea, vomiting and bleeding episodes. Most notably, vomiting completely resolved by the 3-month and 6-month marks, while bleeding decreased from 25.0% pre-guideline to just 2.5% at the 6-month follow-up. Conversely, no significant change was noted for itching. (P>0.05).

Table (5): Illustrates the longitudinal variations in laboratory investigations among the studied patients across multiple follow-up intervals. Prior to the intervention, the study group presented with a high prevalence of abnormal coagulation and hematological indices. Following the implementation of educational guidelines, the study group demonstrated progressive and notable shifts toward normal ranges across almost all parameters, particularly in partial thromboplastin time (PTT).

Inferential statistical evaluation using the revealed a highly significant statistical improvement in PTT values (0.001) over time, where normal readings in the study group rose from 77.5% pre-intervention to 40% immediately

post-intervention, maintaining a high stability of 65.0% at the 6-month mark. Conversely, no statistically significant differences were observed across the timeline intervals for prothrombin time (PT), international normalized ratio (INR), complete blood count (CBC), hematocrit, platelets, or white blood cells (WBCs). (P>0.05).

Table (6) and figure (1): Assessment of compliance level of cardio and cardiothoracic patients toward intake of anti-coagulant therapy before and after educational guidelines: indicates that the study group demonstrated a substantial improvement in compliance immediately following the educational guidelines, with most patients shifting to high compliance, while the control group showed no notable change. Over the follow-up period, however, compliance in the study group gradually declined, with a marked increase in low compliance and a decrease in high compliance, emphasizing the need for continued support to maintain adherence.

Table (7): Evaluates patient adherence using the Morisky Medication Adherence Scale (MMAS-8), It shows statistically significant behavioral improvements in the study group compared to the control group across most items. Following the educational guidelines, the study group demonstrated highly significant reductions in unintentional non-adherence, with those denying general forgetfulness rising from 42.5% at baseline to 97.5% at 3 months. Intentional non-adherence also decreased markedly; patients refraining from cutting back or stopping medication without a doctor's advice rose to 92.5% at 6 months. Thera are a significance but minor differences were found regarding yesterday's intake and stopping when therapy felt under control. Conversely, forgetting medication while traveling showed no statistically significant difference between the groups. (p<0.05).

Table (1): Distribution of the cardio and cardiothoracic patients according to their past medical history

Past medical History	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Previous illness					
Acute angina					
No	26	65.0	9	22.5	**FE**
Yes	14	35.0	31	77.5	**0.045***
Myocardial infarction (MI)					
No	37	92.5	37	92.5	FE
Yes	3	7.5	3	7.5	1.00
Previous cardiac catheterization					
No	33	82.5	23	57.5	**FE**
Yes	7	17.5	17	42.5	**0.027***
Previous open–heart Surgery					
No	40	100.0	40	100.0	-
Previous valve repair surgery					
No	40	100.0	40	100.0	-
Previous valve replacement surgery					
No	40	100.0	38	95.0	FE
Yes	0	0.0	2	5.0	0.494
Allergy					
None	39	97.5	40	100.0	FE
Medication alphascief	1	2.5	0	0.0	1.00

FE: Fisher' Exact test

Table (2): Distribution of the cardio and cardiothoracic patients according to previous hospitalization(N=80)

Causes of previous hospitalization	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
1. DC	1	2.5	0	0.0	
2. Heart block	6	15.0	0	0.0	
3. Renal, dialysis	1	2.5	1	2.5	
4. Cordaron infusion	0	0.0	1	2.5	
5. Angina	1	2.5	0	0.0	
6. Coronary angiography	14	35.0	10	25.0	F=2.156
7. Chest pain	2	5.0	1	2.5	P=0.385
8. Pulmonary embolism	1	2.5	1	2.5	
9. Dyspnea	4	10.0	3	7.5	
10. Valve replacement	0	0.0	2	5.0	
11. Atrial fibrillation	3	7.5	2	5.0	
12. Pleural effusion	4	10.0	6	15.0	

Table (3): Distribution of the cardio and cardiothoracic patients according to history of chest pain and bleeding(N=80)

Items	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
Chest pain					
No	17	42.5	7	17.5	**FE 0.027***
Yes	**23**	**57.5**	**33**	**82.5**	
Duration (in days)					
Range Mean ± SD	(1-7) 1.78±1.731		(1-45) 5.76±10.969		t=2.953 P=0.091
Onset	**(n=23)**		**(n=33)**		
Gradual	15	65.2	29	87.9	**FE 0.054**
Sudden	8	34.8	4	12.1	
Location of pain					
Chest	23	100.0	33	100.0	-
# Radiation					
Jaw	3	13.0	3	9.1	t=3.177 P=0.529
Neck	2	8.7	7	21.2	
Left shoulder	16	69.6	24	72.7	
Back	2	8.7	2	6.1	
Upper abdomen **(Epigastric)**	17	73.9	17	51.5	
Severity					
Mild	0	0.0	3	9.1	t=4.246 P=0.374
Moderate	4	17.4	7	21.2	
Severe	13	56.5	16	48.5	
Very severe	4	17.4	6	18.2	
Worst	2	8.7	1	3.0	
# Quality (type)					
Squeezing	4	17.4	2	6.1	t=2.058 P=0.357
Crushing	0	0.0	2	6.1	
Burning	7	30.4	29	87.9	
Sharp	15	65.2	13	39.4	
Tearing	2	8.7	0	0.0	
Yes	**4**	**10.0**	**8**	**20.0**	
Onset (in days)					
Range Mean ± SD	(3-5) 4.00±1.155		(1-5) 2.63±1.188		t=3.634 P=0.086

FE: Fisher' Exact test # More than one answer was chosen

* Statistically significant at level P<0.05

Continue, Table (3): Distribution of the cardio and cardiothoracic patients according to history of chest pain and bleeding(N=80)

Items	The studied patients (n=80)				χ^2 P
	Control group (n=40)		Study group (n=40)		
	N	%	N	%	
# Site of bleeding	(n=4)		(n=8)		
Nose	0	0.0	5	62.5	t=2.850 P=0.241
Gum	2	50.0	6	75.0	
Vagina	1	25.0	2	25.0	
Urethra	0	0.0	4	50.0	
Anus	2	50.0	2	25.0	
Severity					
Mild	3	75.0	2	25.0	t=3.139 P=0.208
Moderate	1	25.0	5	62.5	
Sever	0	0.0	1	12.5	
# Time the bleeding manifested					
During activity	1	25.0	5	62.5	t=0.263 P=0.608
During Conflict	1	25.0	3	37.5	
After stress	3	75.0	3	37.5	

Table (4): Distribution of the cardio and cardiothoracic patients according to their sign and symptoms during intake of anticoagulant medications before and after educational guidelines(N=80)

Signs and symptoms	The studied patients (n=80)										
	ntrol group (n=40)		Study group (n=40)								χ^2 P
			Pre		Immediate		After 3 months		After 6 months		
	N	%	N	%	N	%	N	%	N	%	
Itching											
No	35	87.5	33	82.5	34	85.0	36	90.0	36	90.0	**t=1.474**
Yes	5	12.5	7	17.5	6	15.0	4	10.0	4	10.0	**P=0.688**
Rash											
No	20	50.0	6	15.0	7	17.5	9	22.5	21	52.5	**t=17.324**
Yes	20	50.0	34	85.0	33	82.5	31	77.5	19	47.5	**P=0.001***
Nausea											
No	21	52.5	4	10.0	5	12.5	13	32.5	19	47.5	**t=20.165**
Yes	19	47.5	36	90.0	35	87.5	27	67.5	21	52.5	**P=0.000***
Vomiting											
No	25	62.5	20	50.0	23	57.5	40	100.0	40	100.0	**t=63.050**
Yes	15	37.5	20	50.0	17	42.5	0	0.0	0	0.0	**P=0.000***
Bleeding											
No	32	80.0	30	75.0	31	77.5	37	92.5	39	97.5	**t=13.445**
Yes	8	20.0	10	25.0	9	22.5	3	7.5	1	2.5	**P=0.004***

* Statistically significant at level P<0.05

Table (5): Distribution of the cardio and cardiothoracic patients according to their laboratory investigations before and after educational guidelines

Laboratory investigations	The studied patients (n=80)										
	Control group (n=40)		Study group (n=40)								χ^2 P
			Pre		Immediate		After 3 months		After 6 months		
	N	%	N	%	N	%	N	%	N	%	
PT											
Abnormal	22	55.0	12	30.0	13	32.5	6	15.0	10	25.0	**t=3.992**
Normal	18	45.0	28	70.0	27	67.5	34	85.0	30	75.0	**P=0.262**
PTT											
Abnormal	30	75.0	9	22.5	24	60.0	9	22.5	14	35.0	**t=16.240**
Normal	10	25.0	31	77.5	16	40.0	31	77.5	26	65.0	**P=0.001***
INR											
Abnormal	24	60.0	11	27.5	13	32.5	7	17.5	10	25.0	**t=2.526**
Normal	16	40.0	29	72.5	27	67.5	33	82.5	30	75.0	**P=0.471**
CBC											
Abnormal	29	72.5	19	47.5	21	52.5	13	32.5	12	30.0	**t=6.130**
Normal	11	27.5	21	52.5	19	47.5	27	67.5	28	70.0	**P=0.105**
Hematocrits											
Abnormal	33	82.5	9	22.5	12	30.0	13	32.5	9	22.5	**t=1.622**
Normal	7	17.5	31	77.5	28	70.0	27	67.5	31	77.5	**P=0.654**
Platelets											
Abnormal	21	52.5	14	35.0	18	45.0	11	27.5	8	20.0	**t=6.363**
Normal	19	47.5	26	65.0	22	55.0	29	72.5	32	80.0	**P=0.095**
WBCs											
Abnormal	32	80.0	12	30.0	18	45.0	9	22.5	10	25.0	**t=5.581**
Normal	8	20.0	28	70.0	22	55.0	31	77.5	30	75.0	**P=0.134**

* Statistically significant at level P<0.05

Table (6): Assessment of compliance level of cardio and cardiothoracic patients toward intake of anti-coagulant therapy before and after educational guidelines

Total compliance level	The studied patients (n=80)										
	Control group (n=40)		Study group (n=40)								χ^2 P
			Pre		Immediate		After 3 months		After 6 months		
	N	%	N	%	N	%	N	%	N	%	
Low compliance	16	40.0	15	37.5	8	20.0	29	72.5	26	65.0	**F=44.437**
Moderate compliance	9	22.5	9	22.5	7	17.5	6	15.0	11	27.5	
High compliance	15	37.5	16	40.0	25	62.5	5	12.5	3	7.5	**P=0.000***
Range Mean SD	**(1-10) 6.20 2.554**		**(3-12) 6.48 2.264**		**(3-12) 7.55 2.320**		**(1-12) 4.73 2.088**		**(3-9) 4.90 1.516**		**F=16.88 P=0.000***

Low compliance <6 (6-<8 Moderate compliance 6-<8 High compliance (≥8)

* Statistically significant at level P<0.05

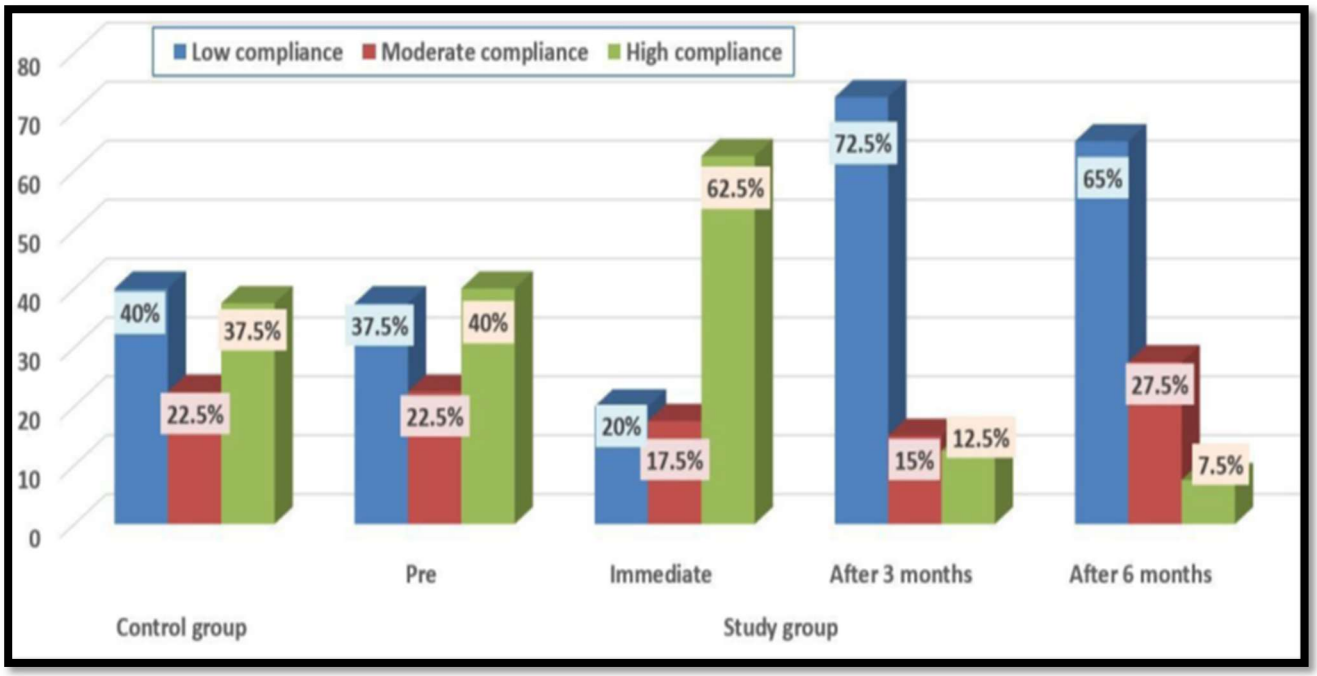

Figure 1: Assessment of compliance level of cardio and cardiothoracic patients toward intake of anti-coagulant therapy before and after educational guidelines

Table (7): Distribution of the cardio and cardiothoracic patients according to Morisky Medication Adherence Scale (MMAS-8) before and after educational guidelines

Items	The studied patients (n=80)										
	Control group (n=40)		Study group (n=40)								χ^2 P
			Pre		Immediate		After 3 months		After 6 months		
	N	%	N	%	N	%	N	%	N	%	
You sometimes forget to take anti-coagulant pills											
No	21	52.5	17	42.5	25	62.5	39	97.5	35	87.5	**F=41.246**
Yes	19	47.5	23	57.5	15	37.5	1	2.5	5	12.5	**P=0.000***
People sometimes miss taking medications for reasons other than forgetting											
No	19	47.5	17	42.5	21	52.5	34	85.0	33	82.5	**F=25.102**
Yes	21	52.5	23	57.5	19	47.5	6	15.0	7	17.5	**P=0.000***
Cut back or stopped taking medication without telling doctor											
No	20	50.0	19	47.5	26	65.0	35	87.5	37	92.5	**F=27.644**
Yes	20	50.0	21	52.5	14	35.0	5	12.5	3	7.5	**P=0.000***
When travel or leave home, you sometimes forget to bring along anti-coagulant medication											
No	31	77.5	32	80.0	31	77.5	30	75.0	35	87.5	**F=2.315**
Yes	9	22.5	8	20.0	9	22.5	10	25.0	5	12.5	**P=0.510**
Taking anti-coagulant medicine yesterday											
No	2	5.0	0	0.0	1	2.5	2	5.0	5	12.5	**F=8.149**
Yes	38	95.0	40	100.0	39	97.5	38	95.0	35	87.5	**P=0.043***
When feel like anticoagulant is under control, do sometimes stop taking medicine											
No	31	77.5	26	65.0	33	82.5	36	90.0	36	90.0	**F=10.544**
Yes	9	22.5	14	35.0	7	17.5	4	10.0	4	10.0	**P=0.014***
Taking medication every day is a real inconvenience for some people											
No	6	15.0	8	20.0	15	37.5	28	70.0	30	75.0	**F=34.969**
Yes	34	85.0	32	80.0	25	62.5	12	30.0	10	25.0	**P=0.000***
How often do you have difficulty remembering to take medication											
Never	4	10.0	0	0.0	0	0.0	0	0.0	2	5.0	**F=27.272 P=0.007***
Rarely	16	40.0	4	10.0	4	10.0	5	12.5	5	12.5	
Sometimes	18	45.0	14	35.0	22	55.0	30	75.0	25	62.5	
Usually	2	5.0	19	47.5	13	32.5	5	12.5	7	17.5	
All time	0	0.0	3	7.5	1	2.5	0	0.0	1	2.5	

* Statistically significant at level P<0.05

Discussion

Anticoagulant medications play an essential role in managing and preventing thromboembolic disorders, which include conditions like Deep Vein thrombosis (DVT), Pulmonary Embolism (PE), and Atrial Fibrillation (AF) in cardiac patients. These medications inhibit blood clot formation by targeting various steps in the coagulation cascade. Understanding their types, potential side effects, and safety considerations is essential for optimizing patient care and minimizing complications**. (Hindricks et al., 2021; Stevens et al., 2021).**

The clinical profile of the current study revealed that valvular heart disease, atrial fibrillation, and myocardial infarction were the main indications for long-term anticoagulants. This pattern is consistent with previous Egyptian study by **Hassan et al. (2022)** who reported that valvular heart disease was the primary indication for warfarin therapy more than three quarter of patients, representing more than three-fourths of the sample, followed by atrial fibrillation abut third, representing approximately one-third. Similarly, **Karem et al. (2022)** found that the majority of patients rec eiving oral anticoagulants had cardiac causes, constituting the majority, with AF representing 35% of the sample**. El-Sayed (2021)** also documented that myocardial infarction was present in 18.5% of anticoagulant patients. The high prevalence of angina and prior cardiac catheterization among anticoagulant patients in the present study aligns with global data. A history of PCI or CABG was present in 22% of patients **(Kakkar et al., 2018).** Similarly, **Lin et al. (2019)** found that 35% of patients with mechanical heart valves had a history of angina and 18% had prior catheterization. These findings confirm that ischemic heart disease and related procedures are common comorbidities in anticoagulated populations worldwide**.** To address this**, Harris (2020) and Youssef et al. (2021)** recommended use of statistical adjustment methods.

In the present study, baseline differences in ischemic burden were adjusted for the multivariate analysis to minimize bias in estimating the intervention effect. Regarding prior hospitalization, coronary angiography was the most frequent cause in both the control and study groups, followed by pleural effusion. Other causes including heart block and dyspnea were less common. This pattern is consistent with international and Egyptian studies by **Lin et al.**

(2019), El-Sayed (2021) and Hassan et al. (2022), which reported coronary procedures and respiratory complications as leading causes of admission in anticoagulated patients. No statistically significant differences were found between groups regarding reasons for prior hospitalization, indicating baseline comparability. This finding is consistent with **Allen et al. (2016) and Clarke smith et al. (2017).** Therefore, any post-intervention differences in compliance can be attributed to the educational guidelines rather than to variations in previous hospitalization history. Chest pain was the most prevalent presentation in both cohorts, representing the majority, followed by dyspnea, palpitation, and fever. This pattern aligns with **Abdallah & Fathy (2022) and Farouk et al. (2023)**. There were no significance between-group differences were found in symptom distribution, confirming baseline comparability **(Mostafa et al. 2021, Mahfouz et al. 2020)**. This was in contrary with **Raji et al. (2019), and Zhao et al. (2021)** who reported dyspnea or palpitation as predominant or identified baseline differences.

The comparable baseline symptomatic profiles support the internal validity of intervention outcomes. The implementation of structured educational guidelines resulted in a highly significant progressive reduction in anticoagulant-related symptoms in the study group. Bleeding declined dramatically at 6 months, and vomiting showed complete resolution, and dropping. Nausea and rash. It also decreased substantially, from the vast majority to just over half, and from more than three-quarters to less than half, respectively." These findings are consistent with **Reiffel et al. (2020), Fawzy et al. (2022).** There no significant change was observed in itching, which aligns with **Mostafa et al. (2021)**. This indicates that structured education effectively reduces medication side effects and improves patient safety. Educational guidelines also resulted in a highly significant improvement in PTT among the study group, with normal values "increasing from one-quarter pre-intervention to more than three-quarters immediately post-intervention, and to about two-thirds at 6 months. This finding is consistent with **Reiffel et al. (2019), Ramadan et al. (2022) and Elsayed et al. (2023).** Although PT, INR, CBC, hematocrit, platelets, and WBCs showed a clinical change toward normalization by 6 months, the differences were not statistically

significant. This pattern of PTT improvement without significant INR change aligns with **Silva et al. (2018) and Martinez et al. (2020).** It may be attributed to PTT being more sensitive to acute coagulation changes than INR (**Tawfik et al. 2021).** In contrast**, Allen et al. (2018), Clarke smith et al. (2019) and Khalil et al. (2023)** reported significant improvements in both INR and PT. Overall, the change toward normalization in all parameters suggest that structured education positively influences laboratory stability and coagulation control in cardio and cardiothoracic patients.

Baseline knowledge of anticoagulant therapy was critically deficient across both groups. The implementation of structured educational guidelines yielded highly significant improvements in total knowledge scores. Prior to intervention, the vast majority exhibited poor knowledge and no patient achieved a good level. Immediately post-education, complete conversion to good knowledge was observed in the study group, whereas controls remained unchanged. However, during follow-up, a progressive decline was evident, with retention of good knowledge in just over two-thirds at 3 months and half of the patients at 6 months. Importantly, scores remained substantially above baseline and significantly exceeded those of controls throughout. This mirrors findings by **Guo et al. (2022) and Thaler et al. (2023),** who documented similar patterns of initial mastery followed by decay in the absence of reinforcement. **Santos et al. (2021)** reported sustained retention when education was paired with digital reminders. Collectively, these data indicate that while structured guidelines are highly effective for immediate knowledge acquisition, long-term maintenance necessitates scheduled reinforcement, written action plans, and integration into routine follow-up to mitigate the risk of anticoagulant-related complications. Regarding safety and adherence, structured education significantly improved safety outcomes during anticoagulant therapy. Bleeding events declined markedly and were sustained at 6 months, reflecting better adherence. A transient increase in rash and nausea post-education is attributable to enhanced reporting. Vomiting was resolved by 3 months. These results support **Guo et al. (2022) and Thaler et al. (2023)**.

As regarding MMAS-8, educational guidelines produced significant improvements in medication

adherence. More than half of patients demonstrated improved recall and reduced intentional non-adherence immediately post-education, with the majority maintaining these benefits at 6 months. A substantial proportion also showed better adherence during travel and recent dose taking. These findings are consistent with **Guo et al. (2022) and Thaler et al. (2023)**. In addition, educational guidelines significantly improved overall compliance with anticoagulant therapy. More than half of patients in the study group achieved high compliance levels immediately post-education, a benefit sustained at 6 months. In contrast, the majority of control patients demonstrated low compliance. Mean compliance scores were significantly higher in the study group. Findings align with **Lane et al. (2022) and Wang et al. (2023).**

Conclusion

The sustained effects observed in this study highlight the importance of continuous educational support for patients on anticoagulant therapy to maintain improvements in knowledge, laboratory parameters, adherence, and overall compliance.

Recommendations

A- Recommendations for Patients

Adhere strictly to medication schedule and follow-up: Take anticoagulants at the same time daily, in relation to meals as instructed.

-Attend regular follow-up visits and laboratory monitoring, especially INR and PTT testing, to ensure therapeutic levels and prevent bleeding or clotting complications.

-Do not stop or change the dose without consulting your physician. Follow dietary guidelines and report any side effects early

-Avoid sudden dietary changes. Inform healthcare provider immediately about any signs of bleeding, bruising, rash, nausea, or vomiting, and report all other medications, supplements, or herbal products to prevent drug-food and drug-drug interactions**.**

B-Recommendations for further research studies:

-Replication of the current study with a larger sample of patients in different settings is required for generalizing the results.

-Conduct long-term follow-up studies: Future studies should include longer follow-up periods beyond 6 months to evaluate the sustainability of educational interventions on knowledge, adherence, laboratory control, and clinical outcomes in patients on anticoagulant therapy.

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Mental Health Literacy: Its Association with Help Seeking Behavior and Mental Wellbeing among Undergraduate Nursing Students

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Abstract

Background

Undergraduate nursing students experience a substantial mental health burden compromising their daily functioning, academic performance, and overall quality of life**.** Timely and accurate recognition of mental health problems is considered the first critical step toward appropriate professional intervention. However, inadequate mental health literacy may delay help-seeking behavior, ultimately resulting in poorer psychological well-being. **Aim:** This study aimed to assess mental health literacy, help-seeking behavior, and mental wellbeing among undergraduate nursing students, and to examine the associations among these three constructs. **Design:** A descriptive correlational research design was employed. **Setting:** The study was conducted at the Faculty of Nursing, Tanta University **Subjects:** The stratified random sampling method was applied to select undergraduate nursing students enrolled during the academic year 2024–2025. **Tools:** Data were collected using three tools. **Tool I:** The Mental Health Literacy Scale (MHLS), Tool **II:** The General Help-Seeking Questionnaire (GHSQ), **Tool III:** The Warwick–Edinburgh Mental Well-being Scale (WEMWBS). **Results:** the study revealed that near half of the studied students had low level of mental health literacy and majority of them had moderate to low level of help seeking behavior as well as mental wellbeing. **Conclusion:** It shows that help-seeking behavior and mental wellbeing are significant positive predictors of mental health literacy among the studied students. **Recommendations:** Nursing education stakeholders should review curricula and teaching strategies to ensure that MHL is effectively reinforced throughout training.

***Keywords*:** Help-seeking behavior, Mental health literacy, Mental wellbeing, Undergraduate nursing students

Introduction

Mental health is a fundamental aspect of overall well-being, referring to an individual's capacity to handle the demands of daily life, perform productively in occupational or academic settings, and contribute meaningfully to their community **(Fusar-Poli et al., 2020)**. A Closely related construct is mental health literacy (MHL), which encompasses a range of competencies, including the ability to identify specific mental health condition*s* and diverse manifestations of psychological distress, knowledge of how to prevent mental health problems, familiarity with available treatments and sources of mental health information **(Jorm et al, 1997).** Subsequently, this definition was progressively broadened to entails the capacity of individuals to access, comprehend, and apply health information and services to promote and sustain positive mental health, decrease stigma related to mental disorders, and enhance help-seeking behaviors **(Jorm, 2012; Jorm, 2015 & Kutcher, Wei, &Coniglio, 2016)**

Within the academic context, undergraduate nursing students constitute a particularly vulnerable population. The transition to university life exposes this group to a distinctive and compounding constellation of stressors, encompassing academic pressure, financial strain, challenges of social adjustment, and disrupted sleep patterns, each of which significantly elevates the risk of psychological distress (**Amr, El-Gilany, El-Moafee, Salama & Jimenez, 2011)**. This vulnerability is further compounded by the concurrent demands of clinical training environment, which expose nursing students to emotionally and psychologically challenging experiences including patient suffering, death, ethical dilemmas, and professional responsibility, placing considerable burden upon students, with demonstrable consequences for their mental health and overall well-being (**McCabe, Byrne, Gullifer & Cornish ,2024; Pedrelli, Nyer, Yeung, Zulauf, &Wilens, 2015)**

Collectively, these experiences elevate the risk of developing clinically significant mental health difficulties across the training years, most notably anxiety, depression, burnout, and compassion fatigue **(Seshabela & Shakwane, 2024).** Despite this heightened prevalence, a considerable proportion of nursing students remain undiagnosed and untreated **(Adams, Gringart & Strobel, 2022)**. An outcome attributable to a

limited understanding of mental health disorders and insufficient awareness of the treatment options available to them. This knowledge deficit, a central dimension of mental health literacy (MHL), functions as a structural barrier to timely recognition and appropriate help-seeking behaviors which underscoring the central role of mental health literacy (MHL) in shaping student responses to psychological distress **(Barry, Ward& Walter, 2025).**

Mental health literacy plays a central and well-evidenced role in shaping help-seeking which is broadly conceptualized as the deliberate and goal-directed effort individuals make to obtain external assistance in managing psychological difficulties, encompassing both formal professional mental health services and informal sources of assistance such as family members, close friends, and peer support networks **(Aguirre Velasco, Silva Santa Cruz, Billings, Jimenez, & Rowe, 2025)**. The process of help-seeking is typically initiated when an individual develops awareness of a problem that exceeds their capacity for self-management, prompting them first to seek guidance and support from trusted social contacts. Professional help-seeking tends to emerge only at a later stage, when informal support strategies have proven insufficient **(McLaren et al., 2023).**

Nursing students experiencing psychological stress are more likely to seek support from informal sources such as family members and close friends than to pursue professional counseling, reflecting a broader reluctance to engage with formal mental health services **(Galbraith, Brown & Clifton, 2014)**. Consequently, help-seeking behavior provides a critical framework for examining why some people act promptly while others delay or avoid seeking care altogether (**Cornally & McCarthy, 2011)**. Collectively, insufficient kn owledge about mental health conditions, their symptoms, and available services constitutes significant obstacle of help-seeking behaviors **(Liang, Zhang, & Chen, 2025; Shi, & Tian, 2025; Sprague, 2025)**. Conversely fostering adequate MHL among nursing students can improve attitudes toward seeking help and increase help-seeking intentions, and facilitating the utilization of help-seeking services and finally managing mental well-being **(Baklola et al., 2024).**

Mental wellbeing among undergraduate nursing students has emerged as a matter of considerable

academic and professional concern. As the positive dimension of mental health encompassing life satisfaction, sense of purpose, emotional regulation, and psychological flourishing beyond the mere absence of illness **(Keyes, 2002)**. Unlike the diagnostic framework that defines clinical mental disorder, wellbeing reflects the degree to which individuals are thriving cognitively, emotionally, and socially **(WHO, 2004)**

Adequate mental wellbeing among nursing students is not simply a matter of personal welfare but a functional prerequisite for safe and effective clinical practice **(Deasy et al., 2014).** Students with compromised wellbeing are more likely to experience impaired academic performance, reduced empathy, and difficulties in clinical placements, with consequences for patient safety and care quality (**Majerová & Sokolová, 2025).**

Crucially nursing students represent the future nursing workforce upon whom the quality, compassion, and effectiveness of mental health care delivery will substantially depend. Their wellbeing is therefore not a peripheral concern but a central determinant of both individual and professional outcomes (**Stuhlmiller & Tolchard, 2019).**

Significance of the study

Mental wellbeing, mental health literacy (MHL), and help-seeking behaviour constitute three deeply interconnected constructs that collectively shape the psychological health trajectory of undergraduate nursing students **(Wei, McGrath, Hayden & Kutcher,2015).** MHL functions as a foundational enabler allowing students to identify signs of psychological distress early, respond with constructive coping strategies, managing the psychological burden, and making the step of seeking professional support feel more accessible and less stigmatized. As a result, timely help-seeking serves as a direct protective mechanism for mental wellbeing **(Gorczynski, Sims-schouten, Hill, Wilson, 2017)**. More specifically, students successfully obtain appropriate professional support consistently report improved psychological functioning, a meaningful reduction in symptom burden, and greater capacity to sustain engagement with the concurrent demands of academic study and clinical training **(Özparlak, Karakaya & Ozer, 2023)**.

Aim of the study

This study aimed to assess mental health literacy, help-seeking behavior, and mental wellbeing among undergraduate nursing

students, and to examine the associations among these three constructs.

Research question

-What are the levels of mental health literacy, help-seeking behavior, and mental wellbeing among undergraduate nursing students?

-What are the correlations between mental health literacy, help-seeking behavior, and mental wellbeing among undergraduate nursing students?

Subjects and Method

Research design

This study used a descriptive correlational research design.

Setting:

The study was conducted at Faculty of Nursing Tanta University that affiliated to Ministry of Higher Education and Scientific Research in Egypt.

Subjects:

The stratified random sampling method was applied to select the study students. Students were stratified according to their academic year (first, second, third, and fourth years). The total sample was proportionally allocated based on the number of students in each stratum. Subsequently, students within each stratum were selected using a simple random sampling technique. The total representative study student sample consisted of 520 undergraduate nursing students.

Total population size were 4431students

Confidence level was 95%

Population proportion: 50%

Margin of error: 5 %

Sample size was 484 increased to 520 due to student readiness to participate in the study.

Tools of the study: -

The data of this study was collected by the following tools

Tool I: The Mental Health Literacy Scale (MHLS):

It consists of two parts:

Part I: Socio-demographic and clinical data:

It was constructed by the researcher which encompassed age, sex, academic year, marital status, place of residence, family income and numbers of family members. The clinical component captured data on student's prior diagnosis of any mental health condition.

Part II: - The Mental Health Literacy Scale (MHLS):

It was developed by **O'Connor, & Casey (2015)** and was subsequently adopted by the researcher in the present study. The MHLS was specifically constructed to provide a multidimensional assessment of mental health literacy at the individual level, encompassing both cognitive knowledge and attitudinal

components. The scale is composed of 35 items organized across six distinct domains, outlined as follows:

1. **Ability to Recognize Mental Health Disorders (8 items)** Assesses participants' capacity to correctly identify signs and symptoms indicative of specific mental health conditions.
2. **Knowledge of Help-Seeking Information (4 items)** Evaluates awareness of and confidence in accessing credible mental health resources and information pathways.
3. **Knowledge of Risk Factors and Causes (2 items)** Examines understanding of the biological, psychological, and social factors contributing to the onset of mental health disorders.
4. **Knowledge of Self-Directed Treatment Strategies (2 items)** Measures awareness of evidence-informed self-help approaches to managing mental health difficulties.
5. **Knowledge of Available Professional Treatments (3 items)** Assess familiarity with established evidence-based professional interventions, including pharmacological and psychological therapies.
6. **Attitudes Toward Mental Health Recognition and Help-Seeking (16 items)** evaluates beliefs and dispositions that may either facilitate or impede recognition of mental health problems and engagement with appropriate support services.

The MHLS employs two distinct Likert-type response formats. Items 1 through 15 are rated on a four-point scale anchored at 1 (Very unlikely/unhelpful) and 4 (Very likely/helpful). Items 16 through 35 are rated on a five-point scale; items 16 through 28 range from 1 (Strongly disagree) to 5 (Strongly agree), while items 29 through 35 range from 1 (Definitely unwilling) to 5 (Definitely willing), capturing attitudinal and behavioral intentions toward help-seeking.

Designated items — specifically items 10, 12, 15, and 20 through 28 — are reverse-scored prior to summation to ensure directional consistency. The total score is derived by summing all 35 items following reverse coding, yielding a possible score range of 35 to 160, with higher scores reflecting greater levels of mental health literacy.

Raw total scores were converted to percentage scores for ease of interpretation and categorized according to the following criteria:

- Less than 50% low level of mental health literacy.

- 50% -75% moderate level of mental health literacy.
- More than 75% high level of mental health literacy.

Tool II: The General Help-Seeking Questionnaire (GHSQ).

It was developed by (**Wilson, Deane, Ciarrochi, & Rickwood., 2007)** and used to assess intentions to seek help from different sources. The self-reported questionnaire includes assess help-seeking intentions for personal or emotional problems and for suicidal ideation from different sources. The question used was: "If you were having a personal or emotional problem, how likely is it that you would seek help from the following people?"

Participants indicated their level of intention to seek help from a number of individuals (e.g., intimate partner, friend, mental health care professional, religious leaders) on a scale of 1 (extremely unlikely) to 7 (extremely likely). A higher score indicated a higher intention to seek help for mental health problems. The total help-seeking scores range from 10–70.

The total score of each item was summed then was converted into percentage scores as the following:

- Less than 50% low level of help-seeking.
- 50% -75% moderate level of help-seeking.
- More than 75% high level of help-seeking.

Tool III: The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS). It was developed by **Tennant et al., 2007.** The WEMWBS is a

14-item measure of mental well-being. Participants indicated how often they feel aspects of positive mental health on a scale of 1 (none of the time) to 5 (all of the time), where higher scores indicated higher levels of mental well-being. Scores for the WEMWBS range from 14 to 70.

The total score of each item was summed then was converted into percentage scores as the following:

- Less than 50% low level of mental well-being.
- 50% -75% moderate level of mental well-being.
- More than 75% high level of mental well-being.

Method

1-Official administrative approval to conduct the study was obtained from the Dean of the Faculty of Nursing, Tanta University.

2-Ethical considerations:

- Ethical approval was subsequently secured from the Scientific Research Ethical Committee of the

Faculty of Nursing, under ethical approval code No (372-1-2024)

- Participants were comprehensively informed regarding the study's objectives and were provided with explicit assurances concerning the confidentiality and anonymity of all data obtained.
- -Furthermore, participants were made fully aware of their right to refuse participation or to discontinue involvement at any stage of the study without any academic or personal implications.
- Five psychiatric nursing experts reviewed the study tools and assessed their content validity prior to administration.
- -A pilot study was conducted on 52 nursing students (10% of the total study sample), to examine the applicability, relevance, and clarity of the study tools
- The reliability of the tools tested by using the Cronbach's alpha for the Arabic version of tool. It was 0.87, 0.83,0.80 for tool I, tool II, tool III respectively.
- Prior to data collection, the researcher coordinated with the instructors responsible for each academic year to determine the most appropriate and convenient timeframes for administering the electronic tools.
- A preliminary virtual meeting was subsequently held via Microsoft Teams, during which the study's purpose was clearly explained to participating students and comprehensive guidance was provided on the completion of the electronic tools.
- Data were collected during the first term of academic year 2024–2025 through a structured electronic link developed by the researcher and disseminated to studied nursing students via Microsoft Teams.
- The electronic link incorporated a welcoming message, a clear statement of the study's purpose, and all relevant study tools.
- To ensure data quality and participant comprehension, a follow-up virtual meeting was conducted to address any queries or clarifications arising from the questionnaire.
- The total data collection period encompassed three months from October through December 2024.

Statistical analysis

Data were analyzed using SPSS version 27. Continuous variables were described using means and standard deviations, while categorical variables were summarized through frequency tables and cross-tabulations. All tests were two tailed with a significance threshold of $p \leq 0.05$. Pearson's correlation coefficient was used to assess the direction and

strength of relationships between quantitative and ordinal variables, with values below 0.25 indicating weak and values between 0.25 and 0.74 indicating intermediate correlations. Linear regression analysis was conducted to examine the predictive relationships between independent and dependent variables.

Results

Table (1) illustrates the socio-demographic characteristics of the studied students. Regarding age distribution, less than half of the studied students (41.7%) were aged between 20 to 21 years, with a mean age of 21.08±1.49years. Regarding sex, females represented the majority of the sample (61.2%), whereas males accounted for 38.8%. Concerning marital status, majority of the studied students were single (87.1%), while only (12.9%) were married and no one of them were widow or divorced. In relation to residence, urban residents constituted more than half (56.9%) compared to rural residents (43.1%). Regarding family income, nearly two-thirds of the studied students (66.5%) reported not having enough income, whereas 33.5% having enough income. Regarding numbers of family members, (45.2%) were three to four members, followed by (34.8%) more than four members, while only (20%) ranged from one to two members. Finally, regarding previous diagnosis of mental disorder, majority of the studied samples (92.5%) not diagnosed with mental disorder. **Table (2):** Represent mean score of mental health literacy subscales (MHLS) among studied students. The table shows that the studied students had a moderate overall level of mental health literacy, with a mean total MHLS score of 86.73 ± 32.25 out of a possible 160. Among the subscales, the highest mean score was observed for ability to recognize mental disorders (17.27 ± 7.02). The lowest mean scores were found in knowledge of self-treatment (4.55 ± 1.75) and knowledge of risk factors and causes (4.60 ± 2.06), which points to weaker understanding of preventive and self-management aspects of mental health literacy. Scores for professional help available (7.25 ± 2.84) and seeking mental health information (9.04 ± 3.48) were also only moderate. The relatively high score for attitude promoting recognition and help-seeking (44.02 ± 16.21).

Figure (1): Illustrates distribution of the studied students regarding total level of mental health literacy. It was found that 45.2% of the studied students had low level mental health literacy while only

18.3% of them had high level of mental health literacy with Mean ± SD equal to 86.73±32.253.

Figure (2): Illustrates distribution of the studied students regarding total level of mental wellbeing. It was found that 45.4% of the studied students had moderate level mental wellbeing while only 26.5% of them had high level of mental wellbeing with Mean ± SD equal to 46.80±11.876. Figure (3) Illustrates distribution of the studied students regarding help seeking behavior. It was found that 40.8% of the studied students had moderate level help seeking behavior while only 25.4% of them had high level of help seeking behavior with Mean ± SD equal to 37.66±11.517.

Table (3): Presents correlation matrix among the studied variables. It illustrates that there is statistically significant positive correlation between mental health literacy and help seeking behavior as r = (0.737**), P-value = (0.000). Also, there was a statistically significant positive correlation between mental health literacy and mental wellbeing as r = (0.479**), P-value = (0.000). Regarding the correlation between help seeking behavior and mental wellbeing there was a statistically significant positive correlation as r = (0.562**), P-value = (0.000).

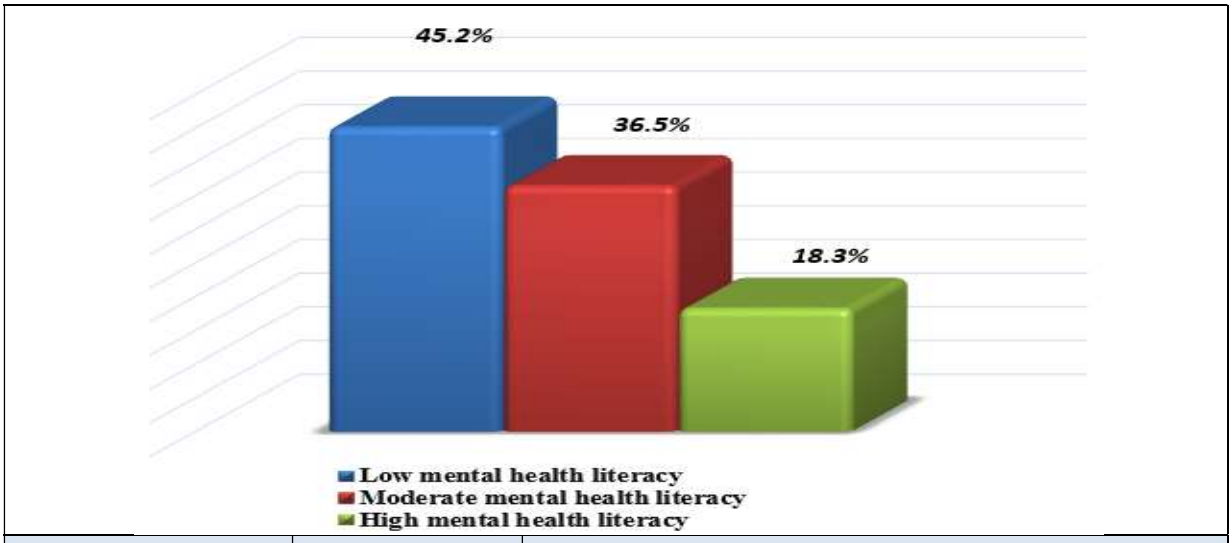
Table (4): Linear regression analysis among the studied variables. It shows that help-seeking behavior and mental wellbeing are significant positive predictors of mental health literacy among the studied participants as the regression model was statistically significant, with a high model fit ($R = 0.741$, $R^2 = 0.549$, adjusted $R^2 = 0.547$), meaning that the two predictors together explained about 54.9% of the variance in mental health literacy. Help-seeking behavior was the strongest predictor, showing a large positive standardized effect ($\beta = 0.683$, $t = 19.118$, $p < 0.001$), which suggests that students with better help-seeking behavior tended to have higher mental health literacy scores. Mental wellbeing also contributed significantly, although with a smaller effect size ($\beta = 0.095$, $t = 2.669$, $p = 0.008$), indicating a modest but meaningful association with mental health literacy. The very high F value (314.3) further supports the overall statistical significance of the model.

Table (1): Distribution of the studied students regarding their socio-demographic and clinical characteristics N (520)

Socio-demographic characteristics	The studied students (n=520)	
	N	%
Age (in years) (<20) years (20-21) years (>21) years	 87 217 216	 16.7 41.7 41.5
Range **Mean ± SD**	**(19-24)** **21.08±1.49**	
Academic Years First Second Third Fourth	 174 44 130 172	 33.5 8.5 25.0 33.1
Sex Male Female	 202 318	 38.8 61.2
Marital status Single Married Divorced / widow	 453 67 0	 87.1 12.9 0
Residence Rural Urban	 224 296	 43.1 56.9
Family income Enough Not Enough	 174 346	 33.5 66.5
Numbers of family members 1-2 3-4 >4	 104 235 181	 20 45.2 34.8
Previous diagnosis of mental disorder Yes No	 39 481	 7.5 92.5

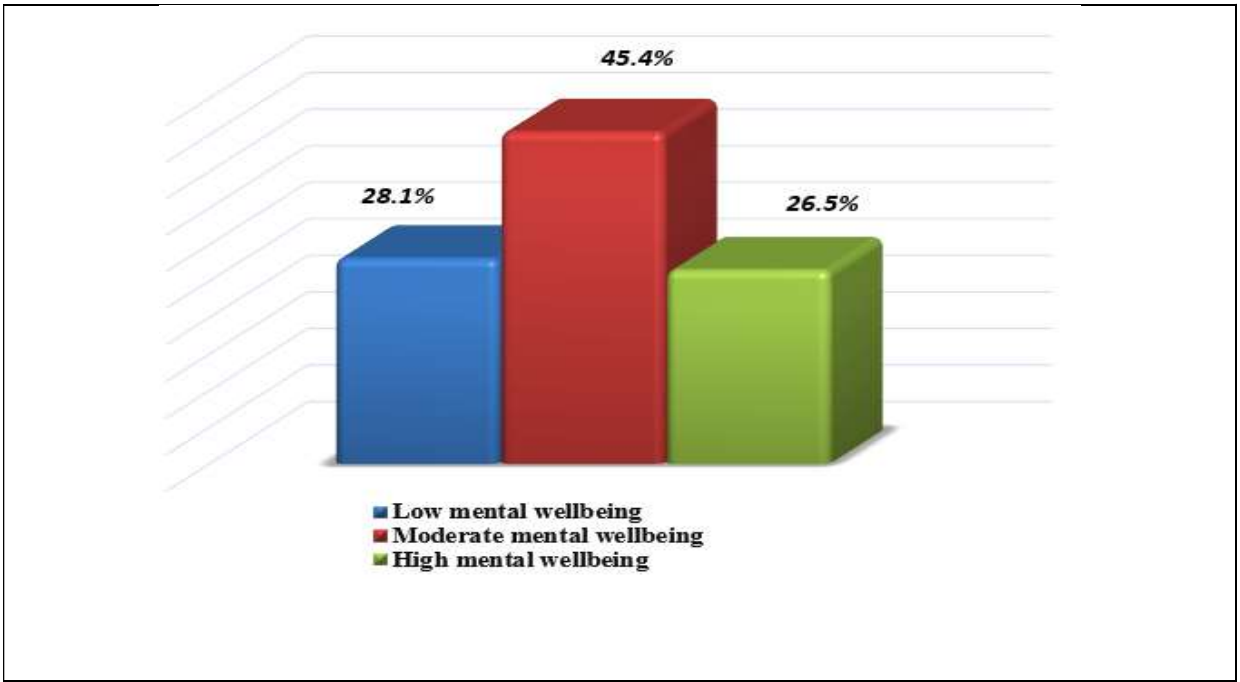
Table (2): Mean score of mental health literacy subscales (MHLS) among studied students. (No= 520)

Mental health literacy	Score Range	Total score		
		Min. – Max.	Mean ± SD	Median
Ability to recognize mental disorders	(8-32)	(8-28)	17.27±7.024	16.00
Knowledge of risk factors and causes	(2-8)	(2-8)	4.60±2.068	4
Knowledge of self-treatment	(2-8)	(2-8)	4.55±1.758	4
Professional help available	(3 -12)	(3 -12)	7.25±2.843	7
Seeking mental health information	(4-20)	(4-15)	9.04±3.478	9
Attitude promoting recognition & help seeking	(16-80)	(21-71)	44.02±16.217	45
Total score MHLS	(35-160)	(43-139)	86.73±32.253	89



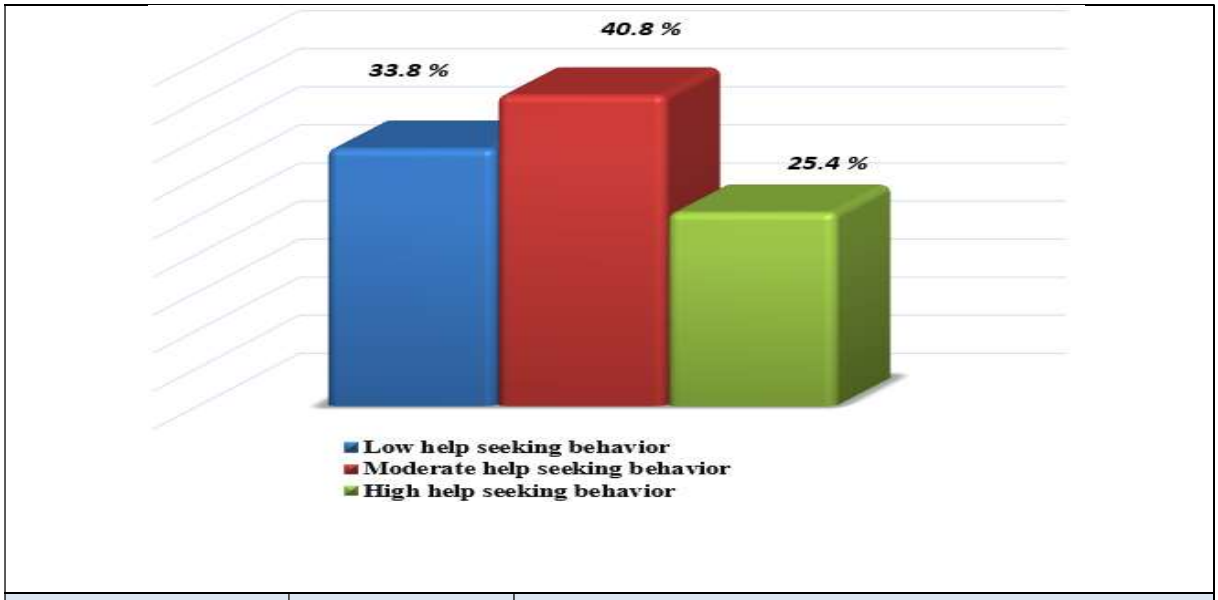
	Score range	Total score		
		Min. – Max.	Mean ± SD	Median
Total mental health literacy	(35-160)	(43-139)	86.73±32.253	89

Figure (1): Distribution of the studied students according to level of total mental health literacy scale (No= 520)



	Score range	Total score		
		Min. – Max.	Mean ± SD	Median
Mental wellbeing	(14-70)	31-65	46.80±11.876	47

Figure (2): Distribution of the studied students regarding total level of mental wellbeing (No= 520)



	Score range	Total score		
		Min. – Max.	Mean ± SD	Median
Help seeking behavior	(10-70)	23-56	37.66±11.517	36

Figure (3) Distributions of the studied students regarding help seeking behavior scale (No= 520)

Table (3): Correlation matrix among the studied variables (N= 520)

		Help Seeking Behavior	Mental Wellbeing
Mental Health Literacy	R	0.737**	0.479**
	P	0.000	0.000
Help Seeking Behavior	R	----	0.562**
	P		0.000

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

Table (4): Linear regression analysis among the studied variables (N= 520)

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	R	R^2	Adjusted R^2	F
	B	Std. Error	Beta						
(Constant)	2.579	4.060		.635	.526	0.741	0.549	0.547	314.3
Mental Wellbeing	.259	.097	.095	2.669	0.008				
Help Seeking Behavior	1.913	.100	.683	19.118	0.000				
Dependent Variable: Mental Health Literacy Predictors: (Constant), Help Seeking Behavior, Mental Wellbeing									

Discussion

Mental health literacy (MHL) and help-seeking behaviors are pivotal in managing mental well-being, especially among undergraduate nursing students. MHL shapes the attitudes and clinical behaviors that undergraduate nursing students bring to their future practice **(Baklola et al., 2024).** These competencies will directly influence the quality, compassion, and effectiveness of the
mental health care that those future nurses will provide to patients throughout their working lives **(Shi & Tian, 2025).** Hence, the present study aimed to assess the association between mental health literacy, help seeking behavior and mental wellbeing among nursing students.

According to the current study, it was found that nearly half of the studied students had low level of MHL as well as, majority of them had moderate to low level of help seeking behavior, these findings might be attributed to students who are exposed to public stigma surrounding mental illness are less likely to view professional help-seeking as a socially acceptable course of action, less willing to openly acknowledge their psychological difficulties, and more predisposed to concealing their psychological distress as a coping strategy rather than recognizing their need for and pursuing timely professional intervention. In addition, fear of the social consequences of being labelled or judged by others **(Villatoro, DuPont-Reyes, Phelan, Link, 2022)**.

Supporting this explanation, studies conducted by a study conducted by **Farooq et al. (2021)** demonstrated that stigma was a significant barrier to help-seeking among undergraduate nursing students, and that despite professional training in mental health care, nursing students remained reluctant to seek help for their own psychological difficulties.

Furthermore, **Corrigan, Watson, & Barr (2006)** reported that internalization of negative societal stereotypes about mental illness diminishes help-seeking behavior through its damaging effects on self-worth and identity. In the same line, **Clement et al. 2014,** confirmed that stigma is one of the most significant and consistent barriers to mental health help-seeking across populations. More recently **Uguz, Gulcan & Keskin (2024)** and **Wang et al. (2026)** reported moderate to high levels of stigma among nursing students and emphasize that stigmatization towards mental illnesses is important

determinant of mental health literacy.

Another attribution, nursing students' belief that mental distress will resolve on its own without intervention so students underestimate the persistence and severity of mental health difficulties. Furthermore, viewing them as self-limiting conditions that do not warrant professional attention. Such a perception may discourage engagement with available mental health services **(McCabe, Byrne, Gullifer, & Cornish, 2024).**

Supporting this explanation **Czyz, Horwitz, Eisenberg, Kramer, & King (2013)**. reported that that the majority of college students believed that time by itself would solve their mental health problem. Furthermore**, Chen & Dang (2026)** reported that students who viewed mental health as fixed or self-resolving were significantly less likely to seek help, with help-seeking self-stigma serving as a mediating pathway.

Moreover, the excessive academic and clinical demands of nursing education not only elevate the risk of developing or exacerbating mental health difficulties throughout training years but further compromise students' willingness to recognize and address their own psychological distress **(Xu, Morales, Biangone, Hoffmann, & Leung, 2026)**. Supporting this explanation **Amer et al. (2011)** reported high stress level among baccalaureate Mansoura nursing students with academic pressures were the most frequent stressors. In addition to the current study revealed a statistically significant positive correlation between mental health literacy and help-seeking behavior among the studied students, which is supported with a study by **Yang et al. (2024)** found that mental health literacy was a significant positive predictor of professional psychological help-seeking behavior among college students.

This goes in accordance with a study conducted by, **Seboka et al. (2022)** found that MHL level was low and inadequate then suggests the need to improve students' digital health competencies by designing MHL programs with collaboration of different stakeholders. In the same direction, **Loureiro, Simões, & Rosa (2025)** reported low recognition of depression and limited mental health first aid knowledge among nursing students, with first-year students demonstrating significantly less adequate MHL than fourth-year peers.

In this context **Al-Yateem, Rossiter, Robb, Slewa-Younan (2018)**

reported low levels of mental health literacy amongst nursing students in combination with potential religious and cultural factors, highlight the need for curriculum enhancements for future health professionals and a targeted program of culturally appropriate professional development focused on mental health promotion for those in clinical practice.

In contrast to the current results regarding MHL levels, a study conducted by **Chaudhuri, Paul, & Saha (2022)** reported higher mental health literacy among health profession students, highlighting the influence of curriculum differences and cultural factors in shaping mental health knowledge. Furthermore, **Blommetjies & Deacon (2026)** reported satisfactory overall MHL levels among undergraduate nursing students,

Regarding levels of help seeking behavior, a study by **Yousaf, Popat, & Hunter (2015)** demonstrated that low help-seeking behavior was prevalent among university students. In the same line, **Broglia, Millings, & Barkham (2021)** found that the majority of students experiencing mental health difficulties did not seek help, with the most common reason being uncertainty about whether their problems were serious enough to warrant professional support.

Furthermore, **Hardy et al. (2025)** identified four consistent barriers: culturally-specific stigma, faith influences, gender role expectations, and deep-seated mistrust of healthcare systems all contributing to persistently low rates of professional help-seeking in university students. Additionally, **Al-Johani et al. (2025)** found that Saudi professional health male students demonstrating notably lower help-seeking intentions than their female counterparts.

The current study illustrates that majority of studied students had moderate to low level of mental wellbeing; this may be attributed high levels psychological stress among nursing students and demanding nature of academic life. Furthermore, students who perceive their academic demands as exceeding their personal coping resources are less likely to maintain adequate levels of mental well-being **(Majerová & Sokolová,2025)**. Supporting this explanation **Pascoe et al. (2020)** demonstrated that academic stress was one of the strongest and most consistent predictors of poor mental well-being among university students, with those reporting higher academic demands showing significantly

lower levels of psychological well-being.

Similarly, **Ahmed et al. (2019)** found that Egyptian baccalaureate nursing students who are exposed to higher academic and clinical stressors are less likely to report adequate levels of psychological well-being. Furthermore, **Ghazawy et al. (2020)** underscored the extent to which Egyptian students' mental well-being is vulnerable to disruptions in their academic environment.

Another assumption for moderate to low mental well-being observed among the studied students may be inadequate or maladaptive coping strategies. Students who rely predominantly on avoidant, emotion-suppressive, or maladaptive coping mechanisms such as substance use, rumination, or social withdrawal in response to stressors are less likely to resolve their distress, and more prone to the progressive erosion of mental well-being over time. This is supported by a study conducted by **Grøtan et al. (2019)** found that students who employed avoidant coping strategies reported significantly lower levels of mental well-being and higher rates of anxiety and depression, whereas those utilizing active, problem-focused coping demonstrated comparatively better psychological outcomes.

A further explanation for the moderate to low levels of mental well-being observed in the present study may be attributed to financial hardship and socioeconomic stress. Notably, nearly two-thirds of the studied students reported having insufficient family income. A finding that likely renders them less able to meet their basic needs adequately, less capable of fully engaging with their academic and social environments, and more inclined to experience diminished mental well-being **(Kirkbride et al., 2024)**.

Insufficient social support represents significant contributors to poor mental well-being among studied students. As students are less likely to experience the buffering effects of social support against psychological distress, less capable of regulating negative emotions effectively, and more vulnerable to developing symptoms of depression, anxiety, and diminished well-being. **Hefner & Eisenberg (2009)** demonstrated that low social support was one of the strongest predictors of poor mental wellbeing outcomes among college students, with socially isolated students showing significantly lower levels of overall well-being compared to their

socially connected peers. These findings are further corroborated by **Sabry (2024),** confirming that economic vulnerability amplifies psychological distress across multiple dimensions of mental well-being among Egyptian university students.

In this context **Alshehri (2021)** found that nursing students reported the lowest mental well-being scores compared to pharmacy and other health science peers. This is further supported by **Uddin & Fariha (2024)**, reported that the majority of nursing students are less able to maintain adequate mental well-being and more inclined to experience clinically significant psychological distress under the demands of their training. Within the Egyptian context, **El-gabry et al. (2022)** confirming that Egyptian nursing students are less likely to maintain adequate mental well-being, less capable of sustaining healthy psychological functioning under the dual burden of academic and clinical demands.

In contrast to the current results regarding mental wellbeing, two studies **Berdida et al. (2023)** and **Sahebi et al. (2022)** found that the majority of nursing students are capable of maintaining adequate levels of mental well-being despite significant academic stress.

The results of this study showed a statistically significant positive correlation between mental health literacy and help-seeking behavior among the studied students, This may be attributed to nursing students with higher levels of mental health literacy are more likely to hold favorable attitudes toward professional help-seeking, more capable of making informed decisions about when and where to access mental health services, and more inclined to actively utilize available support resources when psychological difficulties arise **(Jorm et al., 1997)**.

These findings are empirically corroborated by a growing body of evidence demonstrating a consistent positive association between mental health literacy and help-seeking behavior. **Yang et al. (2024)** established that mental health literacy was a significant positive predictor of professional help-seeking behavior. Consistent with these findings, **Kaçan & Yeyit (2025)**; **Wardana & Widiana (2025)** each reported a statistically significant positive Pearson correlation between mental health literacy and help-seeking behavior.

Further supporting this evidence, **Baklola et al. (2024)** identified positive correlations between total mental health literacy and

professional help-seeking intention, Within the Egyptian nursing student context specifically, **Abdelmonaem et al. (2024)** demonstrated that attitudes toward seeking professional psychological help were significantly associated with mental health literacy, and self-stigma emerging as key moderating factors in the literacy–help-seeking relationship. Conversely, a study conducted by **Samar & Perveen (2021)** revealed a weak negative correlation between mental health literacy and help seeking behavior.

A statistically significant positive correlation between mental health literacy and mental wellbeing. From the researcher point of view, nursing students who know more about recognizing, managing, and preventing mental health problems, and who have more accurate beliefs and help-seeking attitudes, generally report better mental wellbeing. These finding was consistent with a study conducted by **Haeri-Mehrizi et al. (2024)** interpret these finding as cognitive and social skills in processing health information could positively affect mental health and subsequently mental wellbeing. Similarly, **Zhang**, **Yue, Hao, Liu, &Bao (2023)** clarify his finding as mental health literacy affects adolescents' psychological distress by influencing their psychological resilience. Moreover, **Pan, Xu, & Li, (2024)** found that there is a significant positive relation between MHL and mental wellbeing and emphasize that mental wellbeing serves as a moderator for social well-being. In contrary to these finding a study conducted by **Özparlak, Karakaya, & Özer (2023)** found that there is no correlation between mental health literacy and mental well-being. Also, **Gorczynski, Sims-schouten, Hill, & Wilson (2017)**, reported mental health literacy was not significantly correlated with distress or mental well-being.

A statistically significant positive correlation was found between help seeking behavior and mental wellbeing. A plausible explanation for this finding is that elevated levels of psychological well-being enhance individuals' sense of being supported and valued, which in turn cultivates more favorable attitudes toward professional help-seeking behavior. These finding was in agree with **Yonemoto & Kawashima (2023)** interpret their finding as engaging with professional or informal help is associated with reduced functional impairment, better coping, and improved long-term outcomes, especially when stigma and barriers are low. Also, emphasize that emotion regulation and social

support are key predictors of whether individuals to seek help. Moreover **Adams, Gringart, & Strobel (2022)** found that help-seeking serve as a marker of mental wellbeing. As people with better mental health have more adaptive emotion regulation, and stronger social support that make them more likely to seek help when needed.

Help-seeking functions as a fundamentally adaptive behavior that enables students to mobilize professional resources and maintain well-being **Rickwood et al. (2005).** It is supported by **Labouliere et al., (2015)** established that the absence of help-seeking behavior actively and progressively undermines mental well-being. This result was consistent with two studies **Iswanto & Ayubi (2023) & Abd El Salam, AbdAllah, & El Maghawry (2023)** demonstrated that recognition of mental illness had significant positive effects on help-seeking efficacy. Consequently, establishing help-seeking efficacy as the critical mechanistic link through which mental health knowledge translates into sustained psychological well-being. Additionally, **Baklola et al. (2024)**, confirmed the interdependent relationship between help-seeking orientation and mental well-being in the Egyptian student context.

Conclusion: The study shows that help-seeking behavior and mental wellbeing are significant positive predictors of mental health literacy among undergraduate nursing students. The findings demonstrate that higher mental health literacy scores are significantly associated with higher levels of help-seeking behavior as well as mental wellbeing. **Recommendations**: Based on the findings of this study, the following recommendations are proposed:

-Integrate comprehensive mental health literacy content throughout undergraduate nursing curricula using evidence-based educational strategies. `

-Incorporate innovative teaching approaches, including simulation-based learning, case-based learning, problem-based learning, and reflective practice, to enhance students' knowledge, attitudes, and confidence in managing mental health issues.

-Establish routine mental health screening and early intervention programs for nursing students to identify psychological distress and facilitate timely referral to appropriate support services.

-Strengthen university-based counseling and psychological

support services by ensuring accessibility, confidentiality, and student-centered care.

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Assessment of Mothers' Awareness and Practices regarding the Attention Deficit Hyperactivity Disorder among their Children

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Abstract

Background: Attention-Deficit/Hyperactivity Disorder (ADHD) is widely conceptualized as a chronic neurodevelopmental condition that may persist across the lifespan and is associated with clinically meaningful functional impairment in educational, occupational, and social domains. **Aim of the study:** was to assess mothers' awareness and practices regarding the attention deficit hyperactivity disorder among their children. **Design:** A descriptive cross-sectional design was used. **Setting:** The study was conducted at Tanta University Hospital outpatient clinics, Egypt, and Eradah Mental Health Hospital, Saudi Arabia. **Subjects:** A convenience sample of 220 school-aged children diagnosed with ADHD and their mothers (110 from Egypt and 110 from Saudi Arabia) were participated. **Tools:** Two tools were used. **Tool I**: Mothers' Knowledge regarding ADHD questionnaire, consisting of maternal socio-demographics, child medical history, knowledge of mothers about ADHD, and their reported practices. **Tool II**: Mothers' attitudes about ADHD scale containing 18 statements. **Results:** The vast majority of mothers had low total knowledge levels (88.6%) and overall negative attitudes (84.1%) toward ADHD, while exactly 70.0% demonstrated a satisfactory total practice level. Highly significant positive correlations were found between mothers' total knowledge scores and both their reported practices ($r = 0.197$, $P = 0.003$) and attitude scores ($r = 0.222$, $P = 0.001$). **Conclusion:** Most participating mothers exhibit insufficient knowledge and negative attitudes but they had satisfactory practices. Higher maternal knowledge consistently aligns with superior practices and improved attitudes. **Recommendations:** Continuous improvement of community-based and school health services specifically for early screening, routine follow-up, and chronic neurodevelopmental condition management.

Keywords: Awareness, Attention Deficit Hyperactivity Disorder, Mothers, Knowledge, Practices, Attitudes, children

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder that affects children and often persists into adolescence and adulthood **(Lola, Belete, & Gebeyehu, 2019).** It is characterized by pervasive patterns of inattention, hyperactivity, and impulsivity, which can significantly interfere with academic performance, social interactions, and emotional well-being. The exact causes of ADHD remain complex, involving genetic predispositions, neurobiological factors, and environmental influences **(Younis, Shalaby, & Abdo, 2023).**

The symptoms of ADHD typically fall into two main categories: inattention and hyperactivity-impulsivity. Children with inattention may struggle with maintaining focus, completing tasks, or following instructions, while those with hyperactivity may exhibit excessive energy, fidgeting, or an inability to remain seated. Impulsivity, on the other hand, leads to rapid actions without considering consequences. Understanding these symptoms is crucial for early identification and intervention, which can help mitigate the disorder's impact on development **(Danielson, Bitsko, & Ghandour, 2018).**

Globally, the prevalence of ADHD is estimated to affect around 8.0% of the total child population, with higher rates observed in boys (10% of the male child population) compared to girls (5% of the female child population) **(WHO, 2022).** In Egypt, studies have reported varying prevalence rates of ADHD among children and adolescents **(El-Tallawy, Farghaly, Shehata, & Rageh, 2022).** Another study conducted in Fayoum City found a prevalence rate of 20.5% among the surveyed children, with a higher occurrence in boys (33.8% of the boys in the sample) compared to girls (6.8% of the girls in the sample) **(Elbermawy & Almosalami, 2020).** Mothers play a vital role to identify and treat ADHD symptoms which their children exhibit during their early development. People must learn about ADHD because it requires knowing its symptoms and understanding its possible causes and recognizing the need for early treatment. Mothers who observe difficulties with concentration and constant movement and impulsive actions should contact professionals for assessment **(Balagan & Tarroja, 2020).**

Community health nurses help mothers learn about Attention-Deficit/Hyperactivity Disorder (ADHD) through their educational

work. The nurses' function as main teachers by teaching mothers essential ADHD knowledge which helps them identifies symptoms early for early medical help. The nurses share information with mothers, but their main job is to teach mothers effective parenting methods which will help mothers handle their children's behavior problems while building better family relationships **(Moen, Hedelin, & Hall-Lord, 2020)**.

Significance of the study

The study's significance centers on the fact that attention deficit hyperactivity disorder exists widely, yet people fail to comprehend its impact on children's development and their ability to live normally **(Lola, Belete, & Gebeyehu, 2019).** Mothers need to understand about ADHD because it helps them to recognize symptoms early which lead to better treatment results. The assessment of their disorder comprehension enables health professionals to establish better treatment for children who require help with their condition **(Kazda et al., 2021)**.

Aim of the study: The study aimed to assess mothers' awareness and practices regarding the attention deficit hyperactivity disorder among their children.

Research Question

What are the levels of mothers' knowledge, attitudes and practices towards their children with attention deficit hyperactivity disorder?

Study Design:

Descriptive a cross-sectional study design was used in this study.

Setting:

The study was conducted at two locations. The first setting at Psychiatry Neurology and Neurosurgery center outpatient's clinics of at Tanta University Hospital, affiliated to Ministry of Higher Education and Scientific Research, Egypt, and Eradah Mental Health Hospital, which are affiliated to Ministry of Health, Saudi Arabia.

Subjects:

Convenience sample of school aged children diagnosed with (ADHD) who were present at the study settings during the time of data collection was included in this study. A total number of the sample was increase to 220 mothers (110 from Egypt and 110 from Saudi Arabia). The sample size was calculated using a standard sample size formula to ensure the representation of the target population.

Tools of Data Collection:

Two tools were used by the researcher to collect the necessary data for this study as follow:

Tool (I): Mothers' Knowledge regarding Attention Deficit Hyperactivity Disorder questionnaire:

This tool was developed by the researcher after reviewing related literatures **(Al-Mohsin, Al-Saffar, & Al-Shehri, 2020; Alseraty, Abdullhameed, & Alenezi, 2024; El-Tallawy et al., 2022).** It was consisting of four parts as follows:

Part (1): Socio-demographic characteristics of the mothers:

This part was included data about the mothers' age, educational level, occupation of the mother, residence, marital status, family members, in come, type of family consanguinity, and family history of ADHD.

Part (2): Characteristics and medical history of the child

This part should include two sections:

a-Socio-demographic characteristics of the child, including age, sex, educational grade, and type of school; and

b-Medical history of the child, including developmental history, pregnancy history, delivery history, growth and development, type of ADHD, degree of ADHD, problems associated with ADHD, treatment, and its effects.

Part (3): Mothers' Knowledge Regarding Attention Deficit Hyperactivity Disorder

This part was developed by the researcher based on recent literatures review **(Al-Mohsin et al., 2020; Alseraty et al., 2024; El-Tallawy et al., 2022)**. It contained 12 questions in the form of true/false items and multiple-choice questions (MCQs).

Each correct answer was assigned a score of one (1), whereas an incorrect answer or a "do not know" response was assigned a score of zero (0). The total score of knowledge was classified as follows:

- Low knowledge level < 60% of the total score
- Moderate knowledge level 60 <70% of the total score
- High knowledge level ≥ 70% of the total score

Part (4): Reported Practices of Mothers toward Attention Deficit Hyperactivity Disorder.

This tool was developed by the researcher based on **(Hussein, 2024),** to assess mothers' reported practices in caring for children with attention-deficit/hyperactivity disorder (ADHD). It includes 15 practices, such as physical exercise, medication administration, communication with the child, and activities of daily living. The tool included a series of statements, and mothers were evaluated based on the frequency of their reported practices. The response to each item was categorized as done or not done.

Items reported as done were assigned a score of one (1), whereas items reported as not done were assigned a score of zero (0). Practices were classified as follows:

- Unsatisfactory practices: < 60% of the total score.
- Satisfactory practices: ≥ 60% of the total score.

Tool II: Mothers' Attitudes about Attention-Deficit/Hyperactivity Disorder

This tool was adapted by the researcher based on **Alseraty, Abdullhameed, and Alenezi (2024),** to assess mothers' attitudes toward children with ADHD. It consisted of 18 statements. This part was rated on a 3-point Likert scale: Disagree, 1 = Neutral, and 2 = = 0 Agree. The total score ranged from 0 to 36 point. The total score ,was as follows:

- Negative attitude: <60% of the total score (<22 points).
- Positive attitude: ≥60% of the total score (≥ 22 points).

Method

1. Obtaining approvals: An official permission letter to conduct the study was obtained from the Dean of the Faculty of Nursing, Tanta University, and directed to the directors of the selected study settings. Official approval was obtained from the directors of the Psychiatry, Neurology, and Neurosurgery Center outpatient clinics at Tanta University Hospital, Egypt, to collect the required data. Another official permission was obtained from the managers of Eradah Mental Health Hospital in Hail, Saudi Arabia, to conduct the study.

2. Ethical considerations: Approval of the Scientific Research Ethical Committee of the Faculty of Nursing, Tanta University, was obtained before conducting the study, with code No. (628-4-2026). An informed consent was obtained from all selected mothers after providing an appropriate explanation about the purpose, nature, and expected benefits of the study. Each woman was informed that she had the right to withdraw from the study at any time without any consequences. The nature of the study did not cause any harm or discomfort to the women. Confidentiality of data and privacy of the women were maintained throughout the study. No personal identifiers were recorded or disclosed in any study-related documents.

3. Developing the study tools: Tool I was developed by the researcher after reviewing the related literature concerning mothers' awareness and practices regarding attention-deficit/hyperactivity disorder among

their children. Tool II was adapted from **Alseraty, et al., & Alenezi, (2024).** The study tools were modified and translated into Arabic language to suit the study participants.

4. Validity of the study tools: The study tools were tested for face and content validity by a jury of experts in the field of Community Health Nursing, Faculty of Nursing, Tanta University, before conducting the study. The necessary modifications were done according to the opinions of the jury committee.

5. Pilot study: A pilot study was carried out by the researcher on 10% of the study sample to test the clarity, readability, and applicability of the study tools, as well as to identify any logistical obstacles that might be encountered during actual data collection. Based on the feedback and results from this pilot phase, the necessary modifications were successfully implemented to improve tool comprehension.

6. Reliability of the study tools:

The reliability of the study tools was assessed and it was found to be (0.810) for all study tool. For knowledge part, it was found to be (0.851), for reported practices part (0.764) and for attitude part, it was found to be (0.710).

7. Actual study: The researcher met the mothers accompanying their children with ADHD in the previously mentioned study settings and explained the aim of the study at the beginning of the interview. The study tools were administered individually to each mother. The data were collected over a period of six months. After the mothers completed the study tools, the researcher reviewed each sheet to ensure that all questions were answered completely.

Egypt: The professional engagement in Egypt spanned three months, specifically throughout October, November, and December. The schedule consisted of three working days per week—Sunday, Tuesday, and Thursday—totaling 12 days a month and 36 days for the entire period. During these shifts, the workload ranged from two to four cases per day. Each session was conducted with duration of 30 to 45 minutes per case.

Saudi Arabia: the work period covered the first three months of the year: January, February, and March. The schedule was organized into two working days per week, specifically Monday and Thursday, resulting in 8 working days per month and a total of 24 days over the three-month duration. Daily operations involved handling between three to five cases. The

time allocated for each individual case ranged from 30 to 45 minutes.

8. Statistical analysis:

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

Results

Table (1): Distribution of the studied mothers according to their socio-demographic characteristics. Slightly less than half (49.1%) of the studied mothers were aged 30 to less than 40 years, with a mean age of 33.123 ± 6.872 years. The majority (75.0%) were married, while more than half were housewives (53.6%), lived in urban areas (55.9%), and reported having enough income (60.0%). Exactly half (50.4%) held a university education, and 60.9% lived in extended families. Finally, 22.3% had relatives suffering from ADHD, with cousins making up the largest portion (40.8%) of these affected relatives, and nearly all (96.8%) reporting 1 to 2 affected individuals within the family.

Table (2): Distribution of the studied children according to their socio-demographic characteristics. The studied children had a mean current age of 7.73 ± 3.101 years. Regarding ADHD diagnosis, nearly two-thirds (62.3%) were diagnosed between 4 to less than 7 years of age, with a mean diagnosis age of 4.83 ± 1.899 years. More than half (58.6%) of the children were male, and less than two-thirds (61.8%) were in the primary educational stage. Additionally, over two-thirds (67.3%) attended governmental schools. In terms of birth order among siblings, the largest group (38.2%) ranked second, followed by nearly one-third (30.0%) who were the first-born child.

Table (3): Distribution of the studied mothers of affected children according to their medical history. About one-third (33.2%) of the studied mothers experienced difficulty in childbirth, closely followed by another third (31.8%) who faced problems during pregnancy, and nearly one-quarter

(24.1%) who had chronic diseases. Only a small minority (10.9%) experienced no medical problems. Finally, nearly two-thirds (63.6%) of studied mothers delivered via cesarean section, while natural birth accounted for the remaining 36.4%.

Table (4): Distribution of the studied affected children according to their medical history. The majority (70.9%) of the children did not experience growth and development delays, while 29.1% did. The core ADHD presentations were evenly split, with 27.7% suffering from hyperactivity only, 27.7% from combined inattention and hyperactivity, and 26.4% from inattention only. More than half (58.2%) presented with a moderate level of severity. The most common associated complications were learning and speech disorders (31.8%), followed by anxiety (26.8%). Remarkably, all (100.0%) children were receiving treatment, with more than two-thirds (67.3%) undergoing behavioral treatment alone. Ultimately, the treatment yielded positive performance outcomes for more than half (57.7%) of the studied children.

Figure (1): Illustrates the sources of the studied mothers' knowledge about attention deficit hyperactivity disorder (ADHD). The findings revealed that over half (51.4%) of the studied mothers gained their information from medical staff, followed closely by more than two-fifths (43.2%) of them who identified family members as a source. On the other hand, 28.2%, 26.8% and 24.1% of them reported social media, official websites on the internet and friends and colleagues, respectively. Conversely, the minority of the studied mothers mentioned television (9.1%) and books and magazines (7.7%) as sources of their knowledge.

Table (5): Mean and standard deviation of knowledge items of attention deficit hyperactivity disorder (ADHD) for the studied mothers. Regarding specific ADHD knowledge domains, the mothers achieved their highest mean scores in general knowledge (3.268 ± 1.626) and child care methods (3.140 ± 2.292). These were followed by knowledge regarding prevention and treatment methods (2.845 ± 1.834), signs of the disorder (2.572 ± 1.510), and complications (2.372 ± 1.476). Conversely, knowledge regarding the causes of ADHD represented the lowest performance area, with a mean score of only 1.368 ± 0.808.

Figure (2): Distribution of the studied mother according to their levels of knowledge about

attention deficit hyperactivity disorder (ADHD). Regarding the levels of knowledge, the findings showed that the majority (88.6%) of the studied mothers had a low knowledge level, followed by 5.9% of them with a moderate knowledge level, and 5.5% of them with a high knowledge level. The mean total knowledge score for the studied mothers was 15.568 ± 7.386, ranging from 4 to 41.

Table (6): Distribution of the studied mother according to their reported practices toward attention deficit hyperactivity disorder (ADHD). The studied mothers reported utilizing several practices toward ADHD, including 81.8%, 80.9%, and 80.5% for using positive reinforcement, encouraging children to complete tasks one at a time, and regularly monitoring schoolwork, respectively. Furthermore, 76.4%, 75.9%, 75.0%, and 74.1% of them reported modifying the home environment to reduce distractions, providing a regular daily routine, speaking calmly and clearly, and reducing screen time, respectively. Finally, 69.1%, 63.2%, and 60.9% reported having regular follow-ups with healthcare providers, giving ADHD medication as directed, and educating other family members about the disorder, respectively.

Figure (3): Distribution of the studied mother according to their levels of reported practices toward attention deficit hyperactivity disorder (ADHD). Regarding the levels of reported practices, the findings showed that less than three quarters (70.0%) of the studied mothers had a satisfactory practice level, while more than one quarter (30.0%) of them of them had an unsatisfactory practice level. The mean score of reported practices for the studied mothers was 10.536 ± 3.635, ranging from 0 to 15.

Figure (4): Represent that the distribution of the studied mother according to their levels of attitude toward attention deficit hyperactivity disorder (ADHD). Regarding the levels of attitude, the findings showed that the majority (84.1%) of the studied mothers had a negative attitude, while slightly less than one fifth (15.9%) of them had a positive attitude. The mean attitude score for the studied mothers was 21.590 ± 5.096, ranging from 4 to 36.

Table (7): Correlation between total knowledge score, practices, and total attitude scores, among the studied mothers of affected children with attention deficit hyperactivity disorder. The findings showed a highly statistically significant positive correlation between the total

knowledge score of the studied mothers and their total reported practice score (r = 0.197, P = 0.003). Similarly, there was a highly statistically significant positive correlation between the total knowledge score and the total attitude score (r = 0.222, P = 0.001). Furthermore, a statistically significant positive correlation was observed between the total reported practice score and the total attitude score of the studied mothers (r = 0.154, P = 0.022).

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

Socio-demographic characteristics of the studied mothers	The studied mothers (n=220)	
	No	%
Age of the studied mothers / years		
-21-	73	33.2
-30-	108	49.1
-40-	39	17.7
Range	21 - 55	
Mean ± SD	33.123 ± 6.872	
Mother's educational level		
-Illiterate	7	3.2
-Basic education	38	17.3
-Secondary education	64	29.1
-University education	111	50.4
Marital status		
-Married	165	75.0
-Divorced	38	17.3
-Widow	17	7.7
Mother's job		
-Housewife	118	53.6
-Employee	102	46.4
Place of residence		
-Urban	123	55.9
-Rural	97	44.1
Family income		
-Enough and saves	33	15.0
-Enough	132	60.0
-Not Enough	55	25.0

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

Socio-demographic characteristics of the studied mothers	The studied mothers (n=220)	
	No	%
Number of children in the family level		
1-3	137	62.3
4-6	73	33.2
> 6	10	4.5
Range	1 – 9	
Mean ± SD	3.30 ± 1.736	
Family type		
Nuclear family	72	32.7
Extended family	134	60.9
Single parent family	14	6.4
Blood relationship between the father and mother		
Yes	72	32.7
No	148	67.3
Relatives suffer from attention deficit hyperactivity disorder (ADHD) or hyperactivity disorder (HD)		
Yes	49	22.3
No	171	77.7
If yes, kinship ties	**(n= 49)**	
Nephew	9	18.4
Cousin	20	40.8
Paternal aunt	4	8.2
Brother/sister	16	32.6
Number of individuals with attention deficit disorder		
1 – 2	213	96.8
3 – 4	7	3.2

Table (2): distribution of the studied children according to their socio-demographic characteristics

Socio-demographic characteristics of the studied children	The studied children (n=220)	
	No	%
The child's current age/ years		
-≤ 5	46	20.9
-≤ 10	146	66.4
-≤ 15	22	10.0
-≤ 20	6	2.7
-Range	**2 – 19**	
-Mean ± SD	**7.73 ± 3.101**	
Childs age at diagnosis of attention deficit hyperactivity disorder (ADHD) / years		
-1-	45	20.4
-4 -	137	62.3
-7 -	38	17.3
-Range	**1 – 9**	
-Mean ± SD	**4.83 ± 1.899**	
Sex		
-Male	129	58.6
-Female	91	41.4
Child's educational stage		
-Kindergarten	69	31.4
-Primary	136	61.8
-Preparatory	15	6.8
Type of school		
-Governmental	148	67.3
-Private	72	32.7
The position of the affected child among his siblings		
-The first	66	30.0
-The second	84	38.2
-The third	62	28.2
-Fourth	4	1.8
-Fifth	4	1.8

Table (3): Distribution of the studied mothers of affected children according to their medical history

cal history of the studied mothers of affected children	The studied mothers (n=220)	
	No	%
Mother's medical history		
-Do not suffer	24	10.9
-Exposure to problems during pregnancy	70	31.8
-Chronic diseases (Hypertension, diabetes, cardiac diseases, …)	53	24.1
-Difficulty in childbirth	73	33.2
Type of childbirth		
-Natural birth	80	36.4
-Cesarean section	140	63.6

Table (4): Distribution of the studied affected children according to their medical history

dical history of the studied affected children	studied children (n=220)	
	No	%
Delay in the child's growth and development		
-Yes	64	29.1
-No	156	70.9
Types of problems the child suffers from		
-Hyperactivity only	61	27.7
-Don't know the diagnosis	40	18.2
-Inattention only	58	26.4
-Inattention only and Hyperactivity only	61	27.7
Severity of attention deficit hyperactivity disorder (ADHD)		
-Simple	69	31.4
-Middle	128	58.2
-Strong	23	10.4
Problems and injuries associated with attention deficit hyperactivity disorder (ADHD)		
-Nothing	60	27.3
-Anxiety	59	26.8
-Learning and speech disorders	70	31.8
-Autism	31	14.1
Children receiving treatment		
-All	220	100.0
The type of treatment		
-Behavioral treatment	148	67.3
-Medical treatment	20	9.1
-Behavioral and medical	52	23.6
The effect of the treatment on the child		
-Positive performance of the child	127	57.7
-Increased confidence and self-esteem	23	10.5
-Better behavior	57	25.9
-Negative impact on the child	3	1.4
-No change	10	4.5

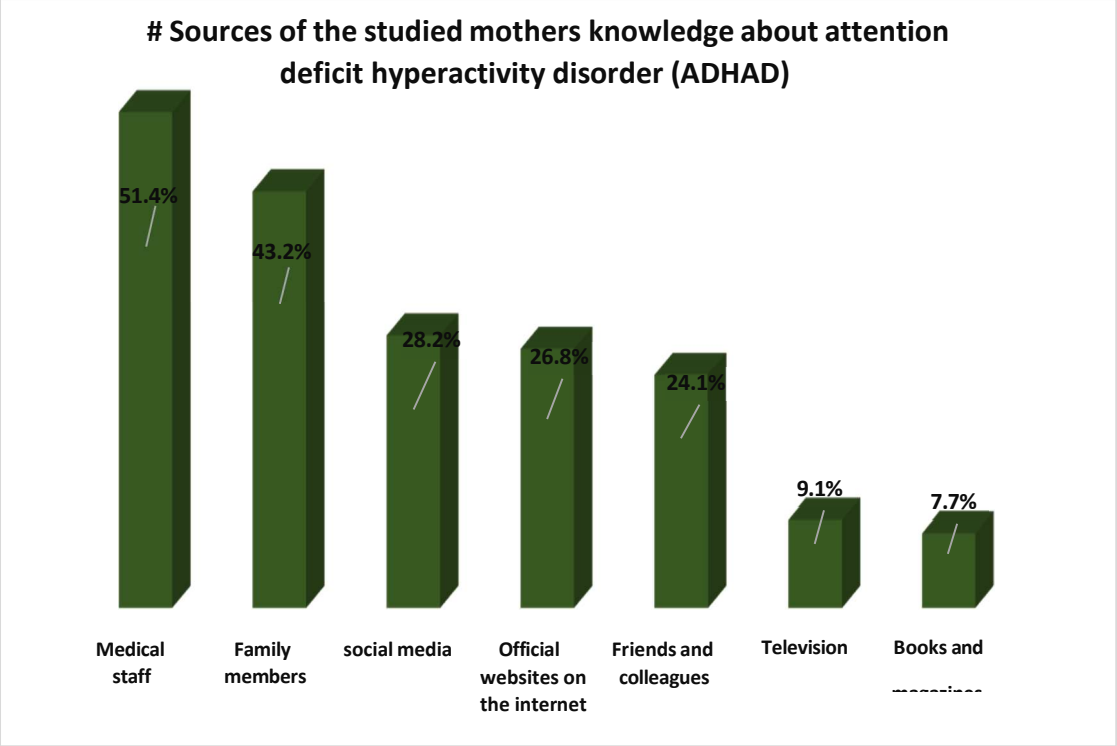

Figure (1): Sources of the studied mothers' knowledge about attention deficit hyperactivity disorder (ADHD)

Table (5): Mean and standard deviation of knowledge items of attention deficit hyperactivity disorder (ADHD) for the studied mothers

Knowledge items total scores	The studied mothers (n=220)	
	Mean ± SD	Range
-General knowledge about attention deficit hyperactivity disorder	3.268 ±1.626	0 – 6
-Causes of attention deficit hyperactivity disorder	1.368 ± 0.808	1 – 5
-Signs of attention deficit hyperactivity disorder	2.572 ± 1.510	0 – 7
-Caring of child with attention deficit hyperactivity disorder	3.140 ± 2.292	1 – 9
-Prevention and treatment methods	2.845 ± 1.834	1 – 8
-Complication of attention deficit hyperactivity disorder	2.372 ± 1.476	0 – 7

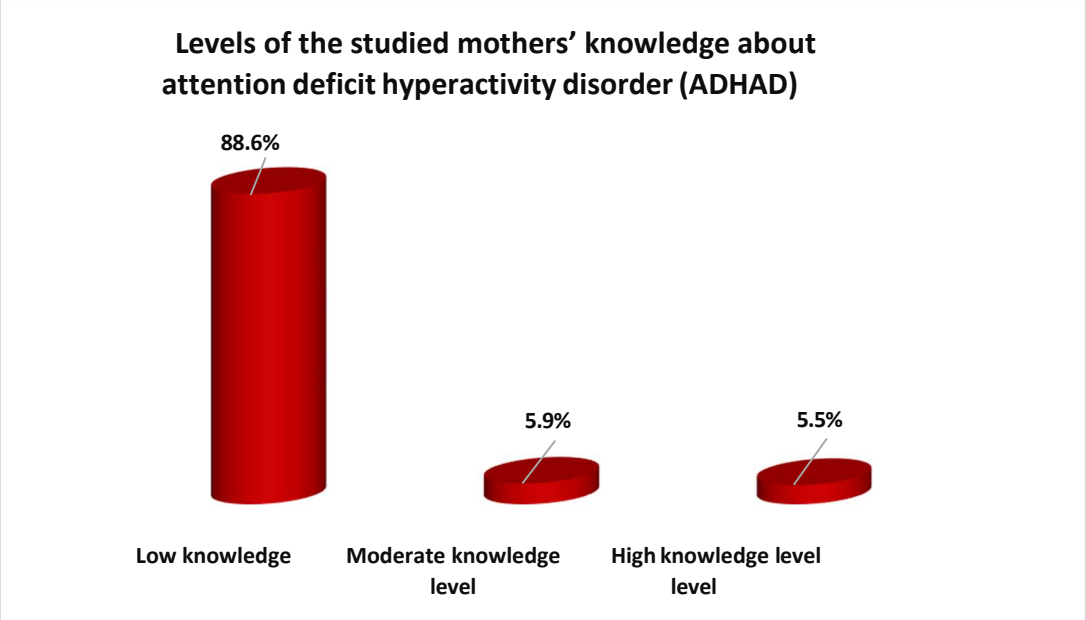

Figure (2): Distribution of the studied mother according to their levels of knowledge about attention deficit hyperactivity disorder (ADHD)

Table (6): Distribution of the studied mother according to their reported practices toward ADHD

Reported practices of the studied mother	The studied mothers (n=220)			
	Not done		Done	
	No	%	No	%
-Providing a regular daily routine for the child.	53	24.1	167	75.9
-Providing the child with daily opportunities for physical activity.	62	28.2	158	71.8
-Giving the child ADHD medication.	81	36.8	139	63.2
-Speaking to the child calmly and clearly.	55	25.0	165	75.0
-Encouraging the child to complete tasks one at a time.	42	19.1	178	80.9
-Using positive reinforcement.	40	18.2	180	81.8
-Reducing screen time and monitor the content.	57	25.9	163	74.1
-Having regular follow-ups with the child's healthcare providers.	68	30.9	152	69.1
-Educating other family members about (ADHD).	86	39.1	134	60.9
-Modifying the home environment to reduce distractions for the child.	52	23.6	168	76.4
-Regularly monitoring the child's schoolwork.	43	19.5	177	80.5
-Communicating with the teacher about the child's academic progress.	61	27.7	159	72.3
-Seeking professional help when needed.	65	29.5	155	70.5
-Attending awareness sessions related to (ADHD).	97	44.1	123	55.9
-Taking advantage of the health services provided by the government for children with (ADHD).	120	54.5	100	45.5

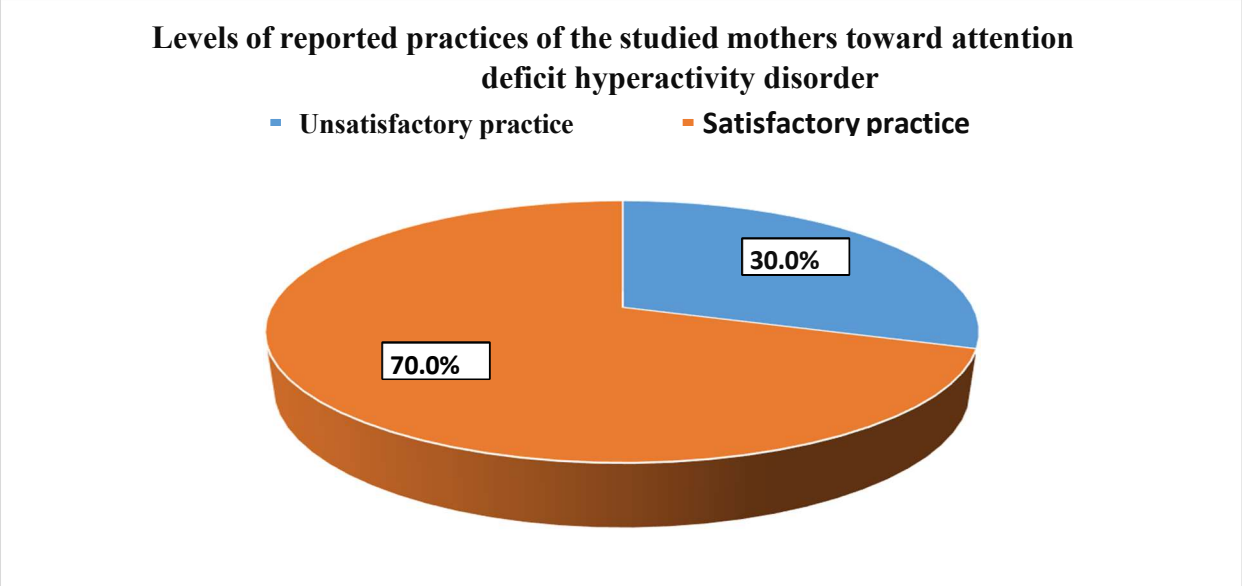

Figure (3): Distribution of the studied mother according to their levels of reported practices toward attention deficit hyperactivity disorder (ADHD)

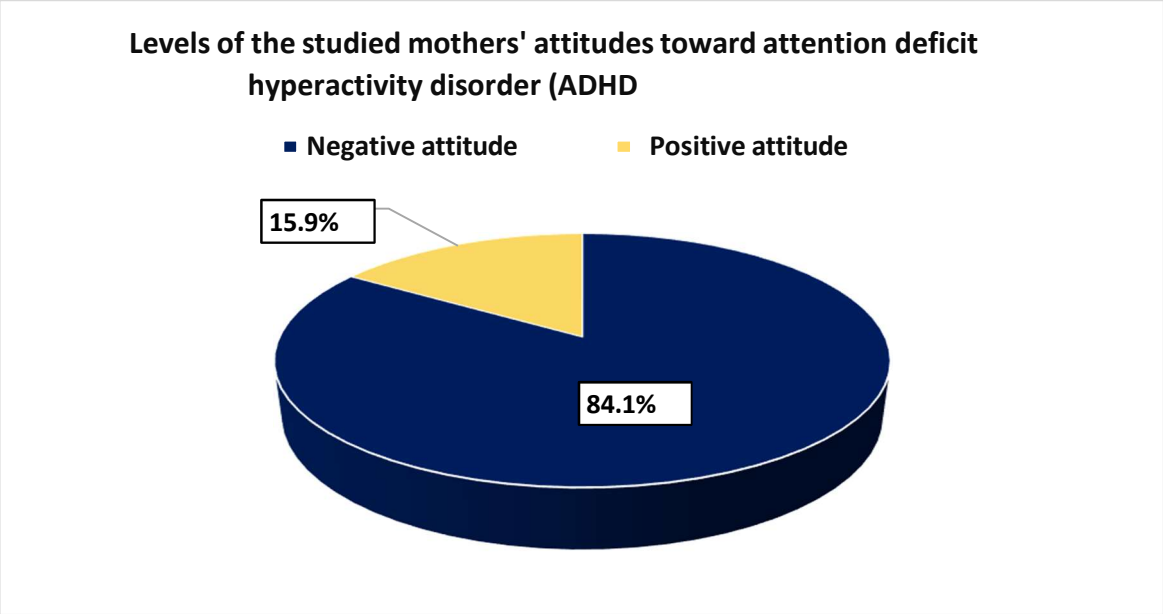

Figure (4): Distribution of the studied mother according to their levels of attitudes toward attention deficit hyperactivity disorder (ADHD)

Table (7): Correlation between total knowledge score, total reported practices, and total attitude sore of the studied mothers of affected children with attention deficit hyperactivity disorder

Variables	Total knowledge score	Total reported practices score
	r P	r P
Total reported practice score	0.197 0.003**	-
Total attitude score	0.222 0.001**	0.154 0.022*

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

* Correlation is significant at the 0.05 level (2-tailed).

Discussion

Attention Deficit Hyperactivity Disorder (ADHD) remains a prevalent neurodevelopmental condition among school-age children that significantly impairs their academic performance, emotional stability, social interactions, and active behavioral participation. To mitigate these challenges, comprehensive maternal care encompassing early assessment, structured behavioral interventions, consistent daily routines, and informed home-based management is essential for maintaining a safe and supportive developmental environment. Effective home-based interventions led by mothers and primary caregivers play a vital role in minimizing ADHD-related functional impairments, stabilizing behavioral symptoms, and reducing avoidable secondary complications, thereby improving children's overall well-being **(Ogundele & Ayyash, 2023).** Consequently, the current study was conducted to assess mothers' awareness and practices regarding attention deficit hyperactivity disorder among their children.

Regarding the sources of the studied mothers' knowledge about attention deficit hyperactivity disorder (ADHD), over half of the studied mothers gained their information from medical staff, followed closely by more than two-fifths of them who identified family members as a source. On the other hand, a substantial portion of them reported social media, official websites on the internet, and friends and colleagues, respectively. This result is supported by the findings of a study conducted by **Dhivya et al. (2023),** entitled "A Study to Assess the Knowledge and Attitude Regarding Attention Deficit Hyperactivity Disorder Among Mother Having Under Five Children in Selected Community Area,

Puducherry," who concluded that a vast majority of mothers (80%) had inadequate knowledge, demonstrating why they rely heavily on formal health staff and personal networks for information.

In contrast to these findings, the present results vary from those of **Rasmussen et al. (2021),** who study "Mothers of Children Diagnosed with ADHD: A Descriptive Study of Maternal Experience during the First Three Years of Treatment," who reported a different pattern where 48% of the mothers noted that maternal psychoeducation regarding the diagnosis had little or no influence on their journey, highlighting instances where institutional medical guidance was perceived as insufficient or less impactful during their child's treatment.

As regards to the total mean knowledge scores of the studied mothers across different ADHD dimensions, the results showed that the general knowledge mean score was 3.268 ± 1.626 (ranged 0–6). For specific dimensions, the mean score for causes was 1.368 ± 0.808 (ranged 1–5), signs of the disease were 2.572 ± 1.510 (ranged 0–7), child care routines were 3.140 ± 2.292 (ranged 1–9), prevention and treatment methods was 2.845 ± 1.834 (ranged 1–8), and complications was 2.372 ± 1.476 (ranged 0–7). This result is supported by the findings of a study conducted by **Abouammoh et al. (2023)**, who entitled "Knowledge about Attention Deficit Hyperactivity Disorder among Primary School Teachers in Riyadh, Saudi Arabia," who concluded that there is limited awareness of the biological and genetic causes of ADHD, with a relatively low mean etiological knowledge score of 1.42 ± 0.75, indicating inadequate understanding of the disorder's underlying mechanisms. Similarly, with respect to knowledge of ADHD complications, the present findings stand in parallel to those of **Magnus et al. (2026)**, entitled "Attention Deficit Hyperactivity Disorder," who reported a matching pattern where parents and caregivers generally have limited awareness of the long-term psychiatric, academic, and social consequences associated with ADHD, with a mean complications' knowledge score of approximately 2.41 ± 1.35.

In this study, the results revealed that regarding the overall levels of knowledge about ADHD among the studied mothers, the findings showed that the overwhelming majority possessed a low knowledge level, while the mean total knowledge score was 15.568 ±

7.386, with scores ranging from 4 to 41. This finding is congruent with the data reported by a clinical study conducted in Iran by **Dodangi et al. (2017)**, who showed in their "Evaluation of Knowledge and Attitude of Parents of Attention Deficit/Hyperactivity Disorder Children towards Attention Deficit/Hyperactivity Disorder in Clinical Samples," who observed that parents often possess an inadequate understanding of the condition, reporting that 79.2% of the parents in their sample demonstrated a similarly low and insufficient level of general ADHD knowledge.

Conversely, focusing on the mean total knowledge score, the current study is in contrast to the trends outlined in Finland by **Volotinen et al. (2026)**, in their study "Parental education level and ADHD diagnosis in childhood and adolescence: the moderating roles of gender, age, and family history of ADHD," who documented a completely different pattern where caregivers achieved a significantly elevated and satisfactory mean total knowledge score of approximately 28.45 ± 4.12. From the researcher's perspective, the high rate of low knowledge among mothers is due to weak public health campaigns, which explains the agreement with the Iranian study due to a mutual lack of sustainable educational support.

Additionally, this consistency suggests that inadequate knowledge regarding the long-term outcomes of ADHD remains a common issue across different populations and settings. From the researcher's perspective, the variation and trends within these findings take place because mothers have a selective understanding of the condition, focusing on daily experience rather than medical theory. The higher scores in daily care and symptom identification make sense because these areas rely on mothers' efforts and visible, everyday behaviors.

Regarding the reported practices of mothers toward caring for a child with ADHD, the results revealed that, the majority of them reported using positive reinforcement, encouraging children to complete tasks one at a time, and regularly monitoring schoolwork. This high level of maternal engagement closely mirrors the findings of **Chau et al. (2024)**, who stated in their study "The distribution of parent-reported attention-deficit/hyperactivity disorder and subclinical autistic traits in children with and without an ADHD diagnosis," who reported that 81.4% of caregivers actively execute

structured academic monitoring and positive domestic changes. Conversely, regarding these localized domestic efforts, our mothers' practices stand in contrast to another dimension of the same study by **Chau et al. (2024)**, who their entitled "The distribution of parent-reported attention-deficit/hyperactivity disorder and subclinical autistic traits in children with and without an ADHD diagnosis," which demonstrated a completely different pattern where isolated parental routines without formal therapeutic metrics failed to sustain target behavioral stability in up to 64.2% of settings. From the researcher's perspective, the divergence between these findings occurs because mothers in the current study rely entirely on independent maternal intuition and daily domestic routines to manage behaviors. Conversely, advanced healthcare frameworks achieve superior outcomes by integrating these domestic efforts with continuous clinical oversight and structured institutional pathways that are currently lacking in our community.

The results of the current study revealed that regarding the overall levels of reported practices toward ADHD among the studied mothers, less than three-quarters of the mothers maintained a satisfactory practices level, while the total mean score for the reported management practices was 10.536 ± 3.635, with scores spanning a range from 0 to 15. This high rate of functional management closely mirrors the findings of **Al-Mohsin et al., (2020)**, entitled "Saudi mothers' perception of their children with attention-deficit hyperactivity disorder in Dammam, Al-Qatif, and Al-Khobar cities, Saudi Arabia," who reported that 71.8% of the surveyed mothers demonstrated a satisfactory level of daily care practices and behavioral management strategies. Conversely, focusing on the total mean score, our quantitative findings stand in contrast to the trends outlined in international behavioral care tracks, which reported a completely different pattern where experiential maternal adaptation without professional oversight yielded a significantly lower baseline practice mean score of around 5.14 ± 1.20.

Additionally, regarding the remaining outcomes of present study, more than one quarter of the studied mothers exhibited an unsatisfactory practices level. Furthermore, national longitudinal study in Australia by **Sciberras et al. (2020),** who study "Predictors of parent-reported attention-deficit/hyperactivity disorder in

children aged 6-7 years: a national longitudinal study," who argued that without continuous therapeutic training, domestic execution scores remain severely limited. From the researcher's perspective, the high rate of satisfactory practices aligns with regional findings because mothers develop strong adaptive coping mechanisms driven by daily trial-and-error. Conversely, our outcomes surpass international baselines because of the deep-rooted cultural and emotional dedication in our local environment, which drives mothers to prioritize care giving as an absolute moral obligation despite lacking formal clinical training.

Regarding the overall levels of attitude toward ADHD among the studied mothers, this study that the majority of the them had a negative attitude, while the total mean attitude score was 21.590 ± 5.096, with scores spanning a range from 4 to 36. This finding is consistent with a study conducted by **Zhang et al. (2025)**, entitled "Differential Associations of Parents' ADHD Tendencies, Boredom Proneness, and Parenting Styles with Children's ADHD Tendencies and Boredom Proneness," who suggested that the continuous demands and psychological stress of managing behavioral symptoms negatively influence parents' perceptions and psychological responses. Conversely, the predominance of negative attitudes observed among the studied mothers' contrasts with the findings of **Shailly et al. (2025)**, in India, entitled "A Cross-Sectional Comparative Study to Assess Maternal Attitude and Self-esteem between Children Diagnosed with Attention Deficit Hyperactivity Disorder and Their Unaffected Siblings," who reported a completely different pattern with significantly more favorable maternal attitudes among their participants.

Regarding the remaining outcomes of the study, less than one fifth of the studied mothers maintained a positive attitude toward ADHD. Furthermore, **Shailly et al., (2025)**, who stud "A Cross-Sectional Comparative Study to Assess Maternal Attitude and Self-esteem between Children Diagnosed with Attention Deficit Hyperactivity Disorder and Their Unaffected Siblings," who attributed variations in maternal outlooks to differences in educational levels, access to healthcare services, cultural background, and the availability of formal psychological and social support networks for caregivers.

From the researcher's perspective, the high rate of negative attitudes matches broader findings due to prolonged psychological exhaustion

and a total lack of specialized support networks in our community.

In this study, the results revealed that regarding the correlation between total knowledge, reported practices, and total attitudes scores among the studied mothers, the findings demonstrated a highly statistically significant positive correlation between the total knowledge score, the total reported practice score, and the total attitude score. This unified linear reinforcement was in agreement with the findings of a study conducted in Iran by **Tahririan et al. (2023)**, who study "Investigating the relationship between DMFT and mothers' knowledge and attitude about oral health and dmft of 6-12-year-old children with attention-deficit/hyperactivity disorder," which suggested that parental cognitive literacy, constructive mindsets, and direct functional home management practices maintain a strong, cohesive linear connection. These researchers reported that structural improvements in foundational maternal knowledge directly translated into an active **38.5%** positive shift across both daily care implementation quality and supportive household psychological configurations, thereby confirming a fully integrated positive correlation between maternal knowledge, attitude, and practice. From the researcher's perspective, the strong mutual positive correlation among a mother's knowledge, attitude, and practices is highly logical because her care-giving journey operates as an integrated cognitive chain. When a mother acquires accurate, evidence-based knowledge regarding ADHD, it naturally deconstructs misleading social stigmas, allowing her to develop a patient, empathetic, and positive psychological attitude.

Conclusion

The study concluded that the majority of the studied mothers had a low knowledge level regarding attention deficit hyperactivity disorder (ADHD). Conversely, a satisfactory practice level was reported by most mothers, while the majority paradoxically exhibited a negative attitude toward the condition. There were highly statistically significant positive correlations between the mothers' total knowledge scores and both their reported practices and attitude scores. A significant positive correlation was also found between reported practices and attitudes, indicating that higher knowledge aligns with better practices and improved attitudes.

Recommendations

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

- Continuous improvement of community-based and school health services specifically for early screening, routine follow-up, and chronic neuro-developmental condition management.
- Organize regular health education programs for mothers, teachers, and caregivers regarding early behavioral markers, neurobiological causes, and multi-modal interventions to reduce stigma of ADHD.
- Provide psychological and academic support for children with high symptom severity, learning difficulties, or associated emotional dysregulation to improve social maturity.
- Strengthen home-school coordination to establish predictable daily routines, structured physical environments, and clear behavioral management plans at home.
- Develop and implement specialized national public health awareness policies and structured clinical nursing guidelines within Egypt and Saudi Arabia to unify early referral protocols and effectively manage pediatric mental health burdens.
- Conduct future longitudinal studies to evaluate the long-term effect of structured educational interventions on maternal coping strategies and child developmental outcomes.

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Effect of Healthy Lifestyle Program on Relapse Prevention among Patients with Substance Use Disorders

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Abstract

Background: Substance used disorder (SUD) is a complicated illness that affects one's emotional, social, behavioral, and physical wellbeing. It is characterized by the uncontrolled substance usage that has negative effect on the individual. A healthy lifestyle can help people with SUD avoid relapses, improve their physical and emotional wellbeing, and enhance their quality of life. **Aim:** evaluate the effect of a healthy lifestyle program on relapse prevention among patients with substance use disorders. **Design:** a quasi-experimental research design was used in the present study. **Setting:** the study was conducted at two clinical settings: the Psychiatric, Neurology, and Neurosurgery Center affiliated with Ministry of Education and scientific Research, and El-Maamoura Hospital for Psychiatric Medicine in Alexandria. **Subject:** A convenience sampling design was used to select 60 patients with SUDs. Participants were randomly divided into a study and a control group, thirty for each. **Tools:** Three tools were utilized: Tool one: Drug Abuse Screening Test (DAST), which attached with socio-demographic and clinical data; Tool two: Brief Substance Craving Scale (BSCS); and Tool three: Simple Lifestyle Indicator Questionnaire. **Results:** the healthy lifestyle program had a highly statistically significant decrease substance craving among the study group at immediately after the program and after three-month follow-up. **Conclusion:** This finding indicates that a sustained improvement in a healthy lifestyle was strongly associated with a marked reduction in craving levels for substances used over time. This highlighting the role of healthy lifestyle modification as a key mechanism in relapse prevention. **Recommendations:** support and trained patients to engage in daily health life style to reduce craving toward substance used disorders.

Keywords: Healthy Lifestyle Program, Substance Use Disorders, and Relapse Prevention

Introduction

Substance Use Disorders (SUDs) are a long-standing issue of significant social concern, drawing attention due to their deep-rooted impacts on individuals and society alike. Recent research highlights the complexity of SUDs, frequently coexist with mental health conditions as anxiety, depression, and trauma, alongside negative social determinants like poverty and limited access to healthcare (**Volkow & Blanco, 2023**), these intertwined factors complicate recovery and contribute to the persistence of addiction. For individuals, SUDs result in a range of detrimental outcomes, such as declining physical and mental health, financial instability, and strained interpersonal relationships. However, the societal implications are equally profound, with SUDs leading to increased healthcare costs, a rise in unemployment and reduced productivity, and increased pressure on the legal and justice systems (**Ghimire et al.,2026).**

SUDs remain a major public health challenge worldwide. According to the World Drug Report, approximately 5.8% of the of the global population aged 15 - 64 years used illicit drugs in 2021, reflecting a 23% increase compared with previous decade (**United Nations Office on Drugs and Crime [UNODC], 2023**). Adolescents and young adults remain particularly vulnerable population, as substance use typically peaks during these critical developmental stages. SUD continues to pose a significant threat to public health in Egypt, with recent data indicating that nearly 6.7% of the population is affected (**Kabbash et al., 2022**). Although the disorder affects individuals across all segments of society, its impact is particularly severe among adolescents and young adults. SUD is widely acknowledged as a persistent and relapsing condition, defined by uncontrollable urges to seek and consume substances, along with repeated use despite adverse outcomes. A major obstacle in managing SUDs is the high likelihood of relapse, as individuals often remain susceptible to returning to substance use even after extended periods of abstinence (**American Psychiatric Association [APA], 2022**).

In Egypt, commonly misused substances include alcohol, cannabis products such as hashish and bango, prescription drugs including sedatives and hypnotics, and non-prescription medications like cough syrups, as well as heroin, cocaine, tobacco (**WHO, 2023**). SUDs often begin

with seemingly harmless recreational use, but frequent and habitual use develops as the brain adapts to the substances, diminishing their effects and prompting increased consumption to achieve the same results (**Koob, 2021**). This cycle of habituation and escalation often results to addiction, where substance use becomes compulsive, significantly impairing a person's ability to function without it. Addressing these early stages of use is critical, as interventions aimed to breaking this cycle that can prevent the long-term consequences of addiction (**Koob et al., 2023**).

SUD is recognized as a chronic brain disorder marked by compulsive substance use in spite of negative consequences. Contemporary research has revealed that prolonged substance uses causes significant changes in brain function, particularly in areas responsible for memory, learning, motivation, and self-regulation. These changes can persist long after substance use has ceased, contributing to the high risk of relapse (**Volkow & Blanco, 2023**).

Relapse of SUD is a common and challenging of recovery, it is described as a return to problematic substance use following a period of abstinence or a resumption of behaviors that were modified during treatment. Despite significant advancements in addiction treatment, relapse remains a major hurdle the relapse rates after the treatment often exceeding 60%. Evidence from international studies indicate that approximately 40% and 60% of patients experience relapse within the first year after treatment. Research suggests that the highest likelihood of relapse occurs during the initial months after treatment, often triggered by psychological distress, environmental cues, or insufficient coping mechanisms (**National Institute on Drug Abuse [NIDA], 2020. McLellan et al., 2000**). SUDs if untreated, can lead to increased mortality, not only from overdose but also from related mental and physical health disorders such as mental health issues, cardiovascular illness, and liver damage (**Minhas et al., 2024**).

Menon and Kandasamy (2018) highlighted that relapse among individuals with substance use disorders is influenced by multiple interacting factors, including emotional, cognitive, social, and environmental determinants. Difficulties in managing negative emotions, life stressors, low motivation, poor self-confidence, peer pressure, social norms, and exposure to substance-related cues all

increase the risk of relapse. Therefore, effective relapse prevention requires interventions that enhance emotional regulation, strengthen motivation and self-efficacy, promote healthy lifestyles, and provide supportive environments that minimize exposure to relapse triggers (**Menon & Kandasamy, 2018**).

Lifestyle management is considered one of the most effective interventions for promoting recovery and preventing relapse among individuals with SUD. A patient's daily habits and routines significantly influence their ability to avoid high-risk behaviors that may lead to substance use or relapse (**Naren et al., 2022**).

The study by **Kabisa et al. (2021)** has shown that without meaningful lifestyle modifications following detoxification, individuals with SUD remain vulnerable to returning to substance use, given the chronic and relapsing nature of addiction.

Establishing healthier routines and adopting positive behavioral patterns have been shown to prolong periods of abstinence and lower the risk of relapse. Adopting a healthy lifestyle has been shown to significantly improve recovery among individuals struggling with addiction **(Theodorakis et al., 2024)**. Lifestyle modifications, including regular physical exercise, a healthy diet, enough sleep, and effective stress management, play a vital role in promoting both physical and mental health in this population (**Zullig & Divin, 2022**). Moreover, maintaining structured daily routines and engaging in purposeful activities such as work, education, or volunteering those fosters a sense of stability and reduces exposure to high-risk situations (**Rezapour et al., 2019**).

A healthy lifestyle refers to a set of daily behaviors and habits that promote physical, mental, and social well-being while reducing the risk of illness, early mortality, and psychological distress (**World Health Organization [WHO], 2023**). It encompasses various dimensions, including balanced nutrition, regular exercise, enough sleep, stress management, avoidance of harmful substances (as tobacco, alcohol, and illicit drugs), and maintaining positive social relationships (**Schwingshackl et al., 2018**). Engaging in a healthy lifestyle has been consistently linked to improved quality of life, increased longevity, better mental health, and the prevention of chronic diseases, including cardiovascular illnesses, diabetes, and mental health disorders (**Li et al., 2018**). Regarding mental

health, incorporating healthy habits has been demonstrated to reduce psychological distress, anxiety, and depressive symptoms while also enhancing cognitive performance and emotional resilience (**Firth et al., 2019; Wang et al., 2021**).

Specifically, for individuals with SUD, adopting a healthy lifestyle not only supports physical recovery but also improves psychological stability (**Linke & Ussher, 2015**). Evidence also suggests that adopting healthy lifestyle practices strengthens self-efficacy, enhances coping mechanisms, and promotes long term psychological resilience, all of which are essential for sustaining recovery from SUD. Furthermore, promoting lifestyle modifications during recovery equips individuals with the tools to replace harmful behaviors with constructive ones by reshaping beliefs and daily routines that contribute to sustained health improvements (**Kitzinger et al., 2023**). Thus, integrating lifestyle interventions into addiction treatment programs offers a holistic and effective approach to improving health outcomes and minimizing the risk of relapse (**Linke & Ussher, 2015**).

Significant of the study: -

Substance related disorder is a complex condition that impacts physical, social, behavioral, and emotional wellbeing. It is characterized by the uncontrolled use of substances that has harmful consequences for that individual. When a substance becomes the center of a person's life, it can have drastic impacts on their wellbeing and ability to participate in daily life functions. Those who suffer from addiction will often continue to use the substance despite knowing that it's causing or will cause problems in the future. Despite being aware of the negative consequences, individuals with addiction may continue to use the substance or engage in the behavior because of the intense cravings and withdrawal symptoms that occur when they try to stop. Healthy lifestyle can play a part in the interventions for people with SUD and relapse prevention as well as improving physical and mental health and quality of life. Psychiatric mental health nursing is in the best position to learn those patients how improve their life style to coping effectively with their overwhelming addict substance and resistance for future relapse.

Aim of the study

Evaluate the effect of healthy lifestyle program on relapse prevention among patients with substance use disorders.

Research hypotheses:

Relapse rate is expected to be reduced among patients with substance use disorders after implementing healthy lifestyle program.

Operational definition of healthy lifestyle program: -

It is designed program focusses on educating patients about the main domains of health life such as: healthy diet, exercise, good sleeping, social and communication skills, self-awareness dealing effectively with their illness, stressful live events, acquired hope, future plan, and self-set realistic goal.

Subjects and method:

Study design:

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

Setting:

The current study was carried out at two settings:

a. The Psychiatric, Neurology and Neurosurgery Center affiliated to Tanta University, Ministry of high education and scientific research.

b. El-Maamoura Hospital for Psychiatric Medicine in Alexandria. The hospital is affiliated to the Ministry of Health and Population.

Both hospitals include specialized detoxification and rehabilitation inpatient units for patients with SUDs and provide services seven days a week, twenty-four hours a day.

Subjects:

The design of convenience sampling was employed to select a sample of 60 patients diagnosed with SUDs from a total population of 480 patients admitted over a 12-month period in two settings. The study sample consisted of 60 participants were divided equally into a study group (n = 30) and a control group (n = 30).

The criteria used for sample size calculation were as follows:

-95% confidence limit

-The estimated power of healthy lifestyle on relapse prevention for individuals with substance use disorders showing satisfactory effect is at 85% after intervention.

-The power of the study is 85%.

-The sample size based on the previously mentioned criteria was found at n = 60

The two groups were matched as much as possible and was fulfill the following inclusion criteria:

1. Adult patients, both sex.
2. No comorbidity with other psychiatric disorders.
3. Able to communicate appropriately and engaged in conversation.
4. Free from acute withdrawal symptoms.

Three tools were used to accomplish the aim of this study including:

Tool I: Drug Abuse Screening Test

This tool was consisted of two parts:

Part 1: Socio-demographic data and clinical data questionnaire.

It was developed by the researcher and divided into:

a- **Socio-demographic data** regarding to personal characteristics, it involves sex, age, residence, marital status, education, number of family members, cohabitation, patient`s order among family members, and monthly income.

b- **clinical data includes:** patients' age at the first drug use, number of substances use, types of substances, reasons for initiating substance use, patients and family history about substance use, number of relapses, reason for seeking treatment and rehabilitation services.

Part 2: Drug Abuse Screening Test

It was developed by **Skinner (1982)**, to measure the level of drug abuse. It was adopted by researcher. This tool was consisted of ten (10) items about uses of the drugs such as hallucinogens (e.g., LSD). The questions do not include alcoholic beverages. Each item responds on yes (1) or no (zero), except for one question for which "No response" receives (1) point, this item (Are you always able to stop using drugs when you want to?), the total score ranged from (0 to 10) which was categorize as the following:

Scoring system

0 No problems reported

1-2 Low level of drug abuse

3-5 Moderate level of drug abuse

6-8 High level of drug abuse

9-10 Very high level of drug abuse

Tool II: Brief Substance Craving Scale

It was originally developed by **Somoza et al., (1995)**. It was adapted by the researcher to assess craving among patient with substances related disorder. It consists of eight items that measure situations of intensity and frequency of craving, e.g., "The intensity of my craving, that is, how much I desired this drug in the past 24 hours was ". Each item consists of 5-point Likert scale ranged from (1) None, (2) Mild, (3) Moderate, (4) Sever, to (5) Extreme.

Patient responses were rated on a five-point likert scale ranging from none (1) to extreme (5). the total score ranged from 8 to 40 where a higher score reflects high craving, and a lower score reflects low craving and categorized the levels of craving by cut of point by statistician as the following:

Scoring system:

< 50 % = Lower level of craving.

50-75% = Moderate level of craving.

>75-100% = Higher level of

craving.

Tool III: Simple Lifestyle Indicator Questionnaire:

It was developed by **Godwin et al. (2008)** and was modified by the researcher to measure the lifestyle of patient with substance related disorder. It consisted of five sub-scales to evaluate five domains of life:

Healthy diet: - This subscale involves three items and researcher added one item to become four items after tested inter validity by jury of experts and applied pilot study. This item was assessed the regular consumption of high-fiber foods (e.g., vegetables and fruits). This item was introduced to enhance the comprehensiveness of dietary assessment, as fiber intake is strongly associated with metabolic regulation, gastrointestinal health, and mood stabilization. This subscale arranged on five Likert scale (1-5). This category was summated, and total score ranged from (4 - 20) and the higher level means high healthy diet.

Exercise: - This subscale consisted of 12 items on 4 Likert scale (0 - 3). The exercise subscale covering light, moderate, and vigorous physical activities (four items each). In the current study, it was reduced to 10 items by decreasing two items to improve feasibility and reduce participant burden. The total score was summated and ranged from 0 -30; the higher score means more healthy activities.

Alcohol or other substance use: - This scale consisted of 3 items on 3 Likert scale (1-3), the level of drinking was summated ranged from (3-9), and the high score mean heavy drinking, this subscale has reverse score.

Smoking: This scale consisted of 3 items categorized 5 Likert scale (0-4). This score was summated and ranged from (0 - 12). The high score means higher smoking; this subscale has reverse score.

Life stress: - This subscale is continuum ranged from (1) very stressful to (6) not at all stressful. Although the original scale ranged from 1 (very stressful) to 6 (not at all stressful), descriptive statements were formulated by the researcher according to opinion of experts who tested internal validity of tool and applied pilot study to enhance clarity and response accuracy among participants. These modifications did not alter the conceptual structure of the tool. The bench of life stress categorized as the following:

1 - 2 very stressful.
3 - 4 stressful.
5 - 6 not at all stressful.

The total score of healthy life style and its' subscales was

summated and categorized by statistical experts as the follows: -

- < 50%. poor or unhealthy life style.
- 50 - 75% Moderate level of healthy life style.
- > 75% -100% Higher level of healthy life style.

Method

1. Written permissions were done from Dean of the Faculty of Nursing to the head of two previous studied setting to request their permission and cooperation for data collection.
2. Ethical considerations:

-Ethical approval was obtained from scientific research ethical committee in Faculty of Nursing (Code No. 361 - 1-2024).

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

-The participants were reassured about confidentiality of their information.

A code of numbers was used instead of person's name on questionnaire sheets.

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

-The study was not caused harm for patients.

3. The study tools translated into Arabic language by the researcher and tested for internal validity by a jury composed of five experts in psychiatric nursing to ascertain the appropriateness of items for measuring what they are supposed to measure, and the necessary modification were made according to their recommendation.
4. Before embarking the actual study, a pilot was carried out on 10% of the study subjects (6 patients) to ascertain the clarity and applicability of the study tools and to identify obstacles that might be faced during data collection. Those subjects were excluded from the study sample, because the necessary modification were required.
5. The study tools were tested for reliability by testing them on 6 patients and re-test by using Cronbach's alpha test. The reliability statistics of tool (1) were 0.810, tool (2) were 0.890 and tool (3) were 0.763.

The actual study was divided into four phases:

A) Assessment phase: Tools of the study were distributed on the study subjects on individual basis and the subjects was asked to fill the questionnaire in the presence of researcher for provide any clarification. The estimated time required for each patient to finish the answered of research tools was approximately 25 - 30 minutes.

B) Planning phase: Based on the findings of assessment phase, the

needs of study participants were identified, and a psycho-educational program was developed after a review of the recent related literature **(Magill et al., 2021; Naren et al., 2022; Sugden et al., 2024; Velten et al., 2018; American Psychiatric Association, 2000)**. In addition, colored educational booklet was developed and distribution to patients as a reference.

C) Implementation phase: Healthy lifestyle program was conducted on study group while control group didn't receive this program and remain under routine intervention. Program was developed and was applied on twelve sessions for the study group (30 patients).

The study group (n=30) was divided into five sub groups; each sub group was composed of six patients. The sessions of the program were delivered over three weeks, with four sessions conducted per week. Each session lasted approximately 45-60 minutes. The sessions were implemented in the training room of the study setting, which was equipped with the educational materials required for program delivery.

The teaching methods and aids that used during the sessions:

Teaching strategies:

The psychoeducational program was delivered using interactive teaching methods, including lectures, group discussion, brainstorming, role play, demonstration and re-demonstration.

Educational materials:

The program was supported by Power Point presentation, brochures and educational videos and hand book covering substance use disorders, withdrawal symptoms, healthy lifestyle practices and relapse prevention. Each patients received booklet as a reference throughout the training.

Healthy lifestyle program was implemented by covering the following twelve sessions:

Session (1): Introductory session.

This session aimed to orient patients about purpose, importance of the program, its' schedule, content, in addition to established therapeutic relationship, rapport, building trust and promoting a supportive group environment.

Session (2): Nature of substance use disorders and its' manifestation.

This session aimed to provide study group with knowledge about substance use disorders, including definition, classification, its' symptoms and adverse side effects, intoxication, and withdrawal symptoms. The

researcher used handout, brochures. At the end of the session, patients were assigned a therapeutic homework task entitled "*Losses and Gains*" which they reflected on the physical, social, financial, emotional, and personal consequences of substance use.

Session (3): Causes and predisposing factor of relapse.

During this session study group recognized concept of substance use relapse, its' predisposing factors, stages of this relapse, and diagnostic criteria with emphasize on common triggers and high-risk situations for relapse. In addition, the researcher assigned a therapeutic homework task to identify their potential relapse triggers and high-risk situations.

Session (4): Relapse Prevention and its' strategies.

This session aimed to help participants to recognize the concept and importance of relapse prevention in sustaining long term

recovery. It focused on recognizing the early warning signs of relapse, including emotional, cognitive, and behavioral indicators. In addition, provide information about effective coping strategies to manage high risk situations, and encouraged patients to develop a relapse prevention plan, each patient was guided to identify their early signs of their relapse.

Session (5): The concept of lifestyle and factors affecting on healthy lifestyle.

This session aimed to enhance the patient's understanding of the concept of lifestyle and to identify the factors that may hinder them from adopting a healthy lifestyle. The researcher was given presentation by using power point about components of healthy lifestyle followed by taken feedback from patients.

Session (6): Awareness of daily lifestyle.

This session aimed to improve patient awareness of their daily lifestyle. It will help patients to recognize their daily habits and routines. This includes their diet, exercise, sleep patterns, stress management, and other lifestyle factors that can impact their overall health and well-being. By increasing their awareness of these factors, clients can make more informed decisions about their lifestyle choices and take steps to improve their health and prevent relapse. The patient was assigned a homework task to record daily habits, including nutrition, physical activity.

Session (7): Nutrition and Exercise.

This session aimed to raise patients' awareness of the role of healthy nutrition and regular physical activity in the addiction

recovery process. In this session, the researcher explained the impact of nutrition and exercise on addiction recovery. Discuss how a balanced diet supports physical and mental well-being, helps stabilize mood, and reduces cravings, and engaging them in regular physical activity for overall recovery and well-being.

Session (8): Stress, coping and stress Management.

This session aimed to equipped the patient with the ability to identify the stressors they face, understand their types, and learn simple and effective strategies for managing daily stress and tension. Through this session, educated study group about the relationship between stress and addiction and explain stress management techniques included deep breathing, and progressive muscle relaxation to help participants develop healthier ways of managing stress and reducing the risk of relapse.

Session (9): Sleep Hygiene.

This session aimed to educate patients about the importance of healthy sleep in addiction recovery process and to teach them healthy strategies to improve their sleep quality. During this session, the researcher discussed the importance of sleep-in recovery, patients learned how substance use can disrupt sleep patterns and affect overall well-being. Patients will educate about the principles of sleep hygiene, including maintaining a regular sleep schedule, establishing a relaxed bedtime routine, and enhancing the sleep environment. Patients were assigned to practice healthy sleep habits and recorded their experiences in a sleep diary.

Session (10): Social support and healthy relationships.

This session aimed to help patients understand the importance of social support and healthy relationships in addiction recovery. Through this session the researcher discussed the importance of social support for patients in recovery. Educate participants about healthy communication skills through role-play scenarios, and recognized the characteristics of healthy and unhealthy relationships. The researcher emphasized the importance of effective communication within a relationship and provided guidance on how to achieve, and educate patients how building new healthy relationships, this can offer the necessary support and encouragement to continue the journey of recovery.

Session (11): Time management.

During this session, the researcher taught patients the importance of planning and

organization for effective time management, encouraging them to establish a daily routine by plan specific times for various activities to maintain stability and sobriety. Patients were assigned to apply time management skills in their daily lives and track their progress. They were encouraged to prioritize tasks related to their recovery, such as attending therapy sessions, participating in support group meetings, engaging in self-care activities, and pursuing healthy hobbies. This homework aimed to help patients develop practical routines that support their treatment adherence and overall recovery journey.

Session (12): Hope and future planning.

This session aimed to instill hope in patients and help them develop future plans that support their long-term recovery. During this session, the researcher encouraged patient to acquire hope for recovery and try to put short-term goal, and long-term goal, during journey of recovery way. These goals were involved avoid trigger situations or things, or people, or place of substance abuse, managing withdrawal symptoms, and provide ongoing support from other to prevent relapse, engaging in new relationship, having planning in emergency situation, having healthy diet and having routinely physical exercises, time management, having healthy sleeping, planning for work, and maintaining health care through resources that available from a supportive community services.

D) Evaluation phase:

Evaluation of the training program was done by reapplying study tools on the study and control group twice as follows :

-Immediately after implementation of the program at twelve sessions

-Three months later after implementation of the healthy Lifestyle program.

-The duration of data collection was around one years.

The tests were used are the following:

1 - Chi-square test

For categorical variables, to compare between different groups

2 - Monte Carlo correction

Correction for chi-square when more than 20% of the cells have expected countless than5

3 - Student t-test

For normally distributed quantitative variables, to compare between two studied groups

4-ANOVA with repeated measures

For normally distributed quantitative variables, to compare between more than two periods or

stages.

5-Partial Eta Squire:

To determine effect size of the program as a Small/ Medium/ Large effect.

Results

Table (1) shows the distribution of the studied groups according to their sex. it illustrates that the most of participants in both study and control groups were males, (93.3% ,86.7% respectively). Statistical analysis revealed no significant difference between the two groups regarding sex distribution ($\chi 2$ = 0.741, P = 0.671). Regarding to the age both most of study and control group aged in between 30 to < 50, and there is a similarity in distribution of age in the study and control group, with no statistically difference (P = 0.308). Regarding residence, rural residents constituted the highest proportion in both the study and control groups (90.0%, 76.7%, respectively). No statistically significant difference was detected between the two groups (P = 0.166).

Concerning marital status, the around half of both study and control group were single (46.7%, 40% respectively), and 36.7% of study group and 43.3% of control group were married, and few percentages of both were divorced and widowed, there are no statistically difference was found between them (p = 0.135). With regard to educational level, the secondary education represented the half and more percentage in both groups (50.0% in the study group and 56.7% in the control group), while illiteracy was the least frequent category. No statistically significant difference was found between the two groups (p = 0.505). Regarding family size, the patients who have family members between 2-3 represents more than half of study group (53.4%), and one third of control group (30%), and the patients who have 4 to 5 of family members represented 40% of the study group and half of the control group. These are no statistically difference between both groups (p = 0.303).

Concerning with cohabitation, the around half percentage of patients in the study group lived with parents and siblings (46.7%), whereas living alone represented the lowest percentage (13.3%). Similar findings were observed in the control group, with no statistically significant difference (p = 0.777). Regarding patients' birth order no statistically significant difference was detected between the study and control groups (p = 0.604).

In terms of monthly income, patients reporting insufficient income constituted the highest percentage in both groups,

whereas those reporting sufficient income represented the lowest percentage, with no statistically significant difference between the groups (P = 0.405).

Table (2) compares the study and control groups regarding clinical characteristics. Concerning age of patients at first usage of drugs, more than three quarter of the study group was started using substances before the age of 20 years (76.7%). In the control group, the around half (46.7%) was started before the age of 20 years. However, no statistically significant difference was detected between both groups (Monte Carlo P = 0.067).

Regarding the number of substances used, 40% of both study and control groups were using four substances, while the lowest percentage was among those using two substances in both two group. The difference between both groups was not statistically significant (P = 0.062). With regard to types of substances used, the cigarette smoking represented the most commonly used substance in both groups (83.3%) in the study group and 90.0% in the control group), followed by Heroin, Hashish, Alcohol. With no statistically significant differences were found between the two groups. Concerning with reasons for substance use, curiosity represented the most frequently reported reason in both groups (83.3% in the study group and 90.0% in the control group), followed by to increase self-confidence, forget painful memories and experience. No statistically significant difference was observed between the two groups for the reported reasons, although pressure from friends showed a borderline non-significant difference (P = 0.052).

Additionally, the majority of patients in both groups reported a positive history of substance use (83.3% in the study group and 76.7% in the control group), with no statistically significant difference between the groups (P = 0.748). With respect to the number of relapses, the highest percentage in both groups was among patients reporting 1-5 relapses. The difference between both groups was not statistically significant (P = 0.907). Concerning family history of substance use disorder, the majority of patients in both groups reported a positive family history, with no statistically significant difference between the study and control groups (p = 0.405). Regarding reasons for seeking treatment, the need for change represented the most frequently followed by pressure from family, feeling of reject, reported reason in both groups.

No statistically significant differences were observed between the study and control groups. Finally, concerning rehabilitation meetings outside the hospital, the same proportion of patients in both groups reported attending such meetings (76.7%), with no statistically significant difference (p = 1.000).

Table (3) demonstrates the comparison between the study and control groups regarding levels of drug abuse as measured by the Drug Abuse Screening Test at different phases of the program. Before program implementation, the highest percentage of patients in both the study and control groups exhibited a high level of drug abuse (66.7% and 76.7%, respectively), with no statistically significant difference was observed between the two groups. (P = 0.390, 0.087)

Immediately after program implementation, the more than half (53.3%) of patients in the study group shifted to a moderate level of drug abuse, whereas the more than half in the control group (56.7%) remained at the high level. Notably, none of patients in study group demonstrated a very high level of drug abuse, compared to 26.7% in the control group. A statistically significant difference was detected between the two groups regarding (p < 0.001). In addition, the study group showed a significantly lower mean percent score compared to the control group (57.0 ± 9.15 vs.76.67 ± 17.29; P < 0.001).

After three months of program implementation, the two third of the patients (70.0%) in the study group continued to demonstrate a moderate level of drug abuse, while 63.3% of the control group showed a high level of drug abuse. The difference between the two groups remained statistically significant (P < 0.001). Moreover, the mean percent score of drug abuse was significantly lower in the study group compared to the control group (53.0 ± 4.66 vs. 74.0±16.10; P < 0.001), that reflecting sustained improvement over time.

Table (4) presents the comparison between the study and control groups regarding levels of substance craving at different assessment periods of the study.

Before program implementation, the highest percentage of patients in both the study and control groups demonstrated a moderate level of craving (86.7% and 83.3%, respectively), with no statistically significant difference was observed between the two groups regarding craving levels

(P = 0.550) or mean scores at baseline (P = 0.167).

Immediately after program implementation, the highest percentage of patients in the study group (80%) shifted to a lower level of craving, whereas the two third of the control group (70%) remained at the moderate level, with a highly statistically significant difference was detected between the two groups regarding craving levels (p < 0.001). In addition, the study group showed a significantly lower mean percentage score of craving compared to the control group (29.17 ± 26.58 vs. 62.71 ± 21.94) respectively with high significant difference (P < 0.001).

At follow-up (three months after program implementation), the highest percentage of patients (90.0%) in the study group continued to demonstrate a lower level of craving, while more than half of (60.0%) the control group demonstrated a moderate level of craving. Notably, no patients in the study group exhibited a higher level of craving, whereas this level slightly increased among the control group 13.3%. The difference between the two groups remained highly statistically significant (P < 0.001), with significantly lower mean percent of craving scores observed in the study group compared to the control group (25.94±12.15 vs. 61.77±22.66 respectively).

Table (5) shows that comparison between study group and control group regarding to lifestyle. Before program implementation, both the study and control groups exhibited a poor or unhealthy lifestyle, with no statistically significant difference between them (p = 0.692). Immediately after program implementation, the study group showed a marked improvement in lifestyle, where the majority (86.7%) shifted to a moderate healthy lifestyle level with mean score 40.73±8.58 and mean percent 61.55±10.56, while almost of the control group (90%) remained at a poor or unhealthy level, with mean score 24.50±6.76 and mean percent 34.12±8.41. This difference was statistically significant (P <0.001). After three months of follow-up, the improvement in lifestyle among the study group was sustained, with the majority of them (80%) maintaining a moderate healthy lifestyle and the emergence of a high healthy lifestyle level with mean score 42.10±9.0 and mean percent 63.27±10.40, whereas the control group predominantly continued to demonstrate a poor or unhealthy lifestyle. The difference between both groups remained highly

statistically significant (P < 0.001).

Overall, repeated measures analysis revealed a highly significant improvement in lifestyle over time among the study group with a large effect size ($\eta^2 = 0.915$), compared to a modest but significant change in the control group ($\eta^2 = 0.542$), that indicating the strong and sustained impact of the implemented program on lifestyle modification.

Table (6) shows the correlation between healthy lifestyle domains and craving toward substance use among the study group. Immediately after implementation of the healthy lifestyle program, clear and highly statistically significant negative correlations were observed between healthy lifestyle and craving (r = - 0.464, P <0.001). In addition, statistically significant negative correlation between all domains of healthy life style and craving toward used substance.

At the three-months follow-up, the negative correlations between healthy lifestyle and craving were largely maintained, demonstrating the sustained effect of the program over time (r = - 0.758, P = 0.001). Moreover, the statistically significant negative correlation between all domains of healthy life style and craving was maintained.

These results provide strong statistical support for the effectiveness of the healthy lifestyle program in reducing craving, particularly through enhancements in dietary practices, physical activity, and stress management, (r = - 0.464, r = - 0.758) thereby contributing to relapse prevention among individuals with substance use disorders.

Table (7) shows that healthy lifestyle had a statistically significant negative effect on craving among the study group immediately after program implementation ($\beta = -0.464$, P = 0.010). This indicates that higher healthy lifestyle scores were associated with lower levels of substance craving.

The regression model was statistically significant (F = 7.688, P = 0.010) and explained 21.5% of the variance in craving levels ($R^2 = 0.215$), reflecting a moderate explanatory power. The confidence interval for the regression coefficient did not cross zero (95% CI: -0.661 to -0.099), supporting the robustness of the observed relationship. Overall, these results demonstrate that adopting a healthier lifestyle had a moderate and meaningful effect in reducing substance craving immediately after the implementation of the program among the study group.

The healthy lifestyle had a highly statistically significant negative effect on substance craving among the study group at three months follow-up (β = -0.758, P < 0.001). This finding indicates that sustained improvement in healthy lifestyle was strongly associated with a marked reduction in craving levels over time. The regression model was highly significant (F = 37.827, P <0.001) and explained 57.5% of the variance in craving (R^2 = 0.575), indicating a strong predictive effect of healthy lifestyle on craving reduction during the follow-up period. The confidence interval did not include zero (95% CI: -0.798 to -0.399), confirming the stability and strength of this relationship. Overall, these results indicate that adopting a healthy lifestyle plays a crucial role in reducing substance craving and maintaining its improvement over time among the studygroup.

Table (1): Distribution of patients with substance use disorder according to their socio-demographic characteristics in both study and control groups

Socio-demographic data	Study (n = 30)		Control (n = 30)		χ^2	P value
	No.	%	No.	%		
Sex						
Male	28	93.3%	26	86.7%	0.741	0.671
Female	2	6.7%	4	13.3%		
Age (years)						
< 20 < 30	6	20 %	5	16.7%	5.687	0.308
30 < 40	14	46.7%	9	30.0%		
40 < 50	8	26.7%	12	40.0%		
50 ≤ 60	2	6.6%	4	13.3%		
Residence						
Rural	27	90.0%	23	76.7%	1.920	0.166
Urban	3	10.0%	7	23.3%		
Marital status						
Single	14	46.7%	12	40.0%	6.987	0.135
Married	11	36.7%	13	43.3%		
Divorced	5	16.7%	1	3.3%		
Widowed	0	0.0%	4	13.4%		
Education						
Illiterate	1	3.3%	3	10.0%	2.470	0.505
Basic education	5	16.7%	2	6.7%		
Secondary education	15	50.0%	17	56.7%		
University education	9	30.0%	8	26.7%		
Number of family members						
2-3	16	53.4%	9	30.0%	5.857	0.303
4-5	12	40 %	15	50 %		
6-7	2	6.6 %	6	20 %		
Cohabitation						
Lives alone	4	13.3%	5	16.7%	0.625	0.777
With husband or wife	12	40.0%	14	46.7%		
With father, mother, and brothers	14	46.7%	11	36.7%		
Patient`s order among family members						
First	7	23.3 %	8	26.7 %	3.863	0.604
Second	7	23.3 %	7	23.3%		
Third	10	33.4 %	9	30 %		
Fourth and more	6	20 %	6	20 %		
Monthly income						
Not enough	22	73.3%	19	63.3%	0.693	0.405
Enough	8	26.7%	11	36.7%		

χ^2: Chi square test statistically significant at p = ≤ 0.05

Table (2): Distribution of patients with substance use disorder according to their clinical data in both study and control groups

Clinical data	Study (n = 30)		Control (n = 30)		χ^2	P Value
	No.	%	No.	%		
Age of patients at first usage of drugs						
< 20 years	23	76.7%	14	46.7%	5.989	0.067
20 < 30	6	20.0%	12	40.0%		
30 < 40	1	3.3%	4	13.3%		
Number of substances you used to take						
One	9	30.0%	3	10.0%	8.880	0.062
Two	2	6.7%	0	0.0%		
Three	4	13.3%	5	16.7%		
Four	12	40.0%	12	40.0%		
Five	3	10.0%	10	33.3%		
Types of substances do you use						
Cigarettes	25	83.3%	27	90.0%	0.577	0.488
Heroin	20	66.7%	22	73.3%	3.269	0.765
Hashish	19	63.3%	19	63.3%	0.000	1.000
Bango	0	0.0%	0	0.0%	-	-
Marijuana	0	0.0%	0	0.0%	-	-
Alcohol	12	40.0%	9	30.0%	0.659	0.417
Ice (crystal meth)	9	30.0%	4	13.3%	2.455	0.117
Tramadol	9	30.0%	10	33.3%	0.077	0.781
Strox (synthetic cannabis)	3	10.0%	1	3.3%	1.071	0.612
The reason for drug used						
Feeling of Curiosity	25	83.3%	27	90.0%	1.176	0.472
To increase my self-confidence	22	73.3%	24	80.0%	0.373	0.542
Pressure from my friends	17	56.7%	24	80.0%	3.774	0.052
To forget painful memories and experiences	12	40.0%	14	46.7%	0.271	0.602
To improve social relationships	11	36.7%	13	43.3%	0.278	0.598
Feeling of loneliness	6	20.0%	8	26.7%	0.373	0.542

χ^2: Chi square test

The responses not mutually exclusive

statistically significant at p = ≤ 0.05

Continue, Table (2): Distribution of patients with substance use disorder according to their clinical data in both study and control groups

Clinical data	Study (n = 30)		Control (n = 30)		χ^2	P Value
	No.	%	No.	%		
History of substance use						
present	25	83.3%	23	76.7%	0.417	0.748
Absent	5	16.7%	7	23.3%		
Number of relapses						
None	2	6.7%	2	6.7%	1.265	0.907
1 - 5	20	66.7%	22	73.3%		
6 - 11	8	26.6%	6	20.0%		
History of family for substance use disorder						
present	19	63.3%	22	73.3%	0.693	0.405
Absent	11	36.7%	8	26.7%		
Reasons for attempt to seek treatment						
Encouragement and pressure from family	21	70.0%	27	90.0%	3.750	0.053
Need for change	24	80.0%	28	93.3%	2.308	0.254
To avoid further losses	14	46.7%	21	70.0%	3.360	0.067
Feeling of regret	17	56.7%	21	70.0%	1.148	0.284
Loss of health	9	30 %	14	46.7 %	1.763	0.184
Rehabilitation meetings outside the hospital						
present	23	76.7%	23	76.7%	0.000	1.000
Absent	7	23.3%	7	23.3%		

χ^2: Chi square test **The responses not mutually exclusive** statistically significant at $p = \leq 0.05$

Table (3): Comparison between drug abuse screening test in before, immediate and after three months of implementation the program among study and control group

Drug Abuse Screening Test	Study (n = 30)		Control (n = 30)		Test of sig χ^2	P Value
	No.	%	No.	%		
Before the program implementation						
High level of drug abuse	20	66.7%	23	76.7%	**x^2= 0.739**	**0.390**
Very high level of drug abuse	10	33.3%	7	23.3%		
Mean score	**8.30±1.02**		**7.87±0.90**		**t= 1.743**	**0.087**
Mean percent score	**83.0±10.22**		**78.67±9.0**			
Immediately after the program implementation						
Moderate level of drug abuse	16	53.3%	5	16.7%	**χ^2= 14.623***	**<0.001***
High level of drug abuse	14	46.7%	17	56.7%		
Very high level of drug abuse	0	0.0%	8	26.7%		
Mean score	**5.70±0.92**		**7.67±1.73**		**t=5.507***	**<0.001***
Mean percent score	**57.0±9.15**		**76.67±17.29**			
After 3 months of program implementation						
Moderate level of drug abuse	21	70.0%	6	20.0%	**χ^2= 16885***	**<0.001***
High level of drug abuse	9	30.0%	19	63.3%		
Very high level of drug abuse	0	0.0%	5	16.7%		
Mean score	**5.30±0.0.47**		**7.40±1.61**		**t=6.861***	**<0.001***
Mean percent score	**53.0±4.66**		**74.0±16.10**			
F (p)	**100.075* (<0.001*)**		**1.416 (0.251)**			
η^2	**0.850**		**0.162**			

F: ANOVA with repeated measures test comparing the three periods in each group

η^2: Partial Eta Squire

χ^2: Chi square test * Statistically significant P-value at ≤ 0.05

t: independent t- test * highly Statistically significant P-value at ≤ 0.001

Table (4): Comparison between craving for using substance between before, immediate and after 3 months of implementation of the program among study and control group

craving substance use	Study (n = 30)		Control (n = 30)		Test of sig	P Value
	No.	%	No.	%		
Before the program						
Lower level of craving	0	0.0%	2	6.7%	χ^2= 1.844	0.550
Moderate level of craving	26	86.7%	25	83.3%		
Higher level of craving	4	13.3%	3	10.0%		
Mean score	30.40±2.50		29.10±2.88		t= 1.188	0.167
Mean percent score	70.01±7.81		68.94±9.0			
Immediately						
Lower level of craving	24	80.0%	6	20.0%	χ^2= 22.220*	<0.001*
Moderate level of craving	5	16.7%	21	70.0%		
Higher level of craving	1	3.3%	3	10.0%		
Mean score	17.33±8.51		28.07±7.02		t=5.330*	<0.001*
Mean percent score	29.17±26.58		62.71±21.94			
Follow up After 3 months						
Lower level of craving	27	90.0%	8	26.7%	χ^2= 25.949*	<0.001*
Moderate level of craving	3	10.0%	18	60.0%		
Higher level of craving	0	0.0%	4	13.3%		
Mean score	16.30±7.09		27.77±7.25		t=6.194*	<0.001*
Mean percent score	25.94±12.15		61.77±22.66			
F (p)	67.321* (<0.001*)		0.942 (0.396)			
η^2	0.802		0.074			

F: ANOVA with repeated measures test comparing the three periods in each group

η^2: Partial Eta Squire χ^2: Chi square test

* Statistically significant P-value at ≤ 0.05

t: independent t- test * highly Statistically significant P-value at ≤ 0.001

Table (5): Comparison between healthy lifestyle in before, immediate and after 3 months of implementation of the program among study and control group

Healthy life style	Study (n = 30)		Control (n = 30)		Test of sig	P
	No.	%	No.	%		
Before the program						
Poor or unhealthy	30	100.0%	30	100.0%		
Moderate level of healthy	0	0.0%	0	0.0%		**0.692**
High level of healthy	0	0.0%	0	0.0%		
Mean score	**15.90±6.03**		**16.53±6.28**		**t= 0.398**	**0.692**
Mean percent score	**16.42±9.30**		**17.29±9.37**			
Immediately After						
Poor or unhealthy	4	13.3%	27	90.0%		
Moderate level of healthy	26	86.7%	3	10.0%	χ^2= **35.306***	**<0.001***
High level of healthy	0	0.0%	0	0.0%		
Mean score	**40.73±8.58**		**24.50±6.76**		**t=11.128***	**<0.001***
Mean percent score	**61.55±10.56**		**34.12±8.41**			
After 3 months						
Poor or unhealthy	2	6.7%	23	76.7%		
Moderate level of healthy	24	80.0%	7	23.3%	χ^2= **32.803***	**<0.001***
High level of healthy	4	13.3%	0	0.0%		
Mean score	**42.10±9.0**		**25.0±8.59**		**t=10.991***	**<0.001***
Mean percent score	**63.27±10.40**		**34.68±9.74**			
F (p)	**284717* (<0.001*)**		**10.734* (0.047*)**			
η^2	**0.915**		**0.542**			

χ^2: Chi square test t: independent t- test

F: ANOVA with repeated measures test comparing the three periods in each group

η^2: Partial Eta Squire * Statistically significant P-value at ≤ 0.05

*Highly Statistically significant P-value at ≤ 0.001

Table (6): Correlation between healthy lifestyle and craving to used substance among study group before, immediate and after 3 months of implementation of the program

Healthy lifestyle		Craving toward used substances	
		Immediately After	After 3 months
		Study (n = 30)	Study (n = 30)
Healthy diet	r	- 0.383	- 0.456
	p	0.037*	0.011*
Exercise	r	- 0.479	- 0.516
	p	0.007*	0.003*
Alcohol or other substance use	r	- 0.448	- 0.410
	p	0.013*	0.024*
Smoking	r	- 0.371	- 0.042
	p	0.044*	0.825
Life stress	r	- 0.735	- 0.436
	p	< 0.001*	0.016*
Healthy lifestyle among studied patients	r	- 0.464	- 0.758
	p	0.001*	< 0.001*

r: Pearson coefficient *: Statistically significant at P ≤ 0.05

Table (7): Linear Regression of effect of healthy lifestyle on craving in the study group Immediately After program and After Follow up of three months of the program

Healthy lifestyle	Craving									
	B	Beta	t	P	95% CI		R^2	Adjusted R^2	F	p
					LL	UL				
Immediately After program	-0.380	-0.464	-2.773*	0.010*	-0.661	-0.099	0.215	0.187	7.688*	0.010*
After 3 months of the program	-0.599	-0.758	-6.150*	<0.001*	-0.798	-0.399	0.575	0.559	37.827*	<0.001*

B: Unstandardized Coefficients t: t-test of significance LL: Lower limit

R^2: Coefficient of determination

Beta: Standardized Coefficients *: Statistically significant at P ≤ 0.05 UL: Upper Limit

F, p: F and P values for the model

Discussion

Substance use disorders are characterized by their chronic and relapsing which sustained recovery requires more than abstinence alone **(National Institute on Drug Abuse, 2020)**. Relapse is commonly driven by chronic stress, insufficient coping strategies, lack of social support, and interrupted daily routines. Accordingly, relapse prevention strategies that target healthy lifestyle are becoming more important for long term recovery **(Sinha, 2024)**. In light of these approaches, the current study aimed to evaluate the effect of a healthy lifestyle program on relapse prevention among patients with substance use disorders.

The healthy lifestyle program was applied in the present study involved a structured, multidimensional intervention that integrates psychoeducation with practical training. Also, the program addressed the behavioral, psychological, and lifestyle determinants associated with relapse vulnerability. The effective size of the program was measured and explored a large effect ($\eta^2 = 0.915$) on reduced craving for substance used among participants that supported research hypothesis on the present study.

This aligns with the perspective of **Del Palacio et al. (2024),** in their study under title ″Psychological Factors Predicting Patients' Risk of Relapse After Enrollment in Drug Use Treatment: A Systematic Review". They suggested that while environmental stressors exert significant pressure on recovery, the cultivation of internal lifestyle barriers serves as the most potent statistical predictor of reduced craving and successful relapse prevention. The Current study findings confirm that by empowering participants with a structured daily routine, through effectively built these internal barriers, providing them with the necessary tools to navigate high-risk environments without returning to substance use. By internalizing these lifestyle shifts, the participants in the current study transform their daily habits into a proactive defense mechanism. According to **Kwasnicka et al., (2016**) this process shifts the locus of control from external triggers toward enhanced internal self-regulation. In doing so, structured habits may contribute to greater resilience when patients encountering high-risk situations. It is important to mention that, the present study monitored three key variables: severity of drug abuse, levels of craving toward substance use, and patients' lifestyle

to determine the influence of the program.

Regarding the first variable (severity of drug abuse), the findings of the present study revealed that the majority of participants in both the study and control groups exhibited higher to very high levels of drug abuse, with no statistically significant differences observed between the two groups prior to the implementation of the program. This baseline similarity between both groups strengthens the internal validity of the study, suggesting that the observed improvements in the study group following the intervention can be attributed to the effect of the healthy lifestyle program rather than to pre-existing personal or clinical differences.

In addition to, the finding of the present study reveals that the gradual improvement of the study group in their abstaining from drug use immediately and after three months of the program compared with before, with statistically significant difference ($P < 0.001$), this improvement was absent in the control group whereby their levels of drug abuse are the same with no statistically difference. This meaning that the effective of the life style program on strengths the abilities of patients to decrease relapse of substance use.

The finding of the present study is consistent with the narrative review conducted by **Mahboub et al. (2021)**, they applied that nutritional stabilization during recovery period, and found that training supports physiological repair and promotes emotional stability, that reduces the intensity of usings drugs over time among their participants. This aligns with the neurobiological perspective proposed by **Blum et al. (2021)**, who demonstrated that chronic substance use disrupts dopaminergic reward pathways, and that a healthy lifestyle facilitates the repair of reward pathways disrupted by chronic substance use.

Several studies have demonstrated that structured lifestyle interventions incorporating exercise, proper nutrition, and sleep regulation can substitute addictive behavioral patterns and reduce the clinical severity of substance use disorder **(Li et al., 2023; Whatnall et al., 2021; Huhn et al., 2022)**. In the same line, **Theodorakis et al. (2024)**, in their comprehensive review of integrated physical activity and behavioral interventions in SUD recovery, reported that combining exercise with broader lifestyle program led to reductions in substance cravings, improvements in sleep quality, and positive shifts in overall lifestyle patterns.

In the same line **Boness et al. (2023)**, in their work titled 'An Evaluation of Cognitive Behavioral Therapy for Substance Use Disorders: A Systematic Review'. They stated that empowering patients with behavioral alternatives such as the healthy habits and self-regulation they supported that healthy lifestyle are the most effective strategy for replacing the habitual urge to use substances. This meaning that a structured healthy life style encompassing exercise, nutrition, and sleep weakens the hold of drug dependency and led to reduction in severity of substance use over time.

Shifting the focus to the second variable in the present study, it is craving to used substance, the findings of the present study revealed a remarkable and sustained reduction in craving levels among the study group compared to the control group after implantation of the program ($t = 5.330$, $P < 0.001$). At the baseline, the vast majority of participants in both groups reported moderate levels of craving, with no statistically significant differences ($t = 1.188$, $P = 0.167$), it was reflecting the craving to used substance is a common challenge during the early stages of addiction treatment, it characterized by intense physiological urges and a high risk of immediate relapse. This is consistent with the findings of study by **Naren et al. (2022)**, they noted that craving to use substance is a universal challenge during the early stages of addiction treatment, this driven by strong physiological urges that significantly elevate the risk of relapse.

Therefore, this baseline equivalence in the current study confirms that the significant improvements that observed later were purely due to the result of the healthy lifestyle program, that was applied on study group. Whereby, the finding of the present study show that a highly statistically significant difference was detected between both group (study and control) immediately after the program, with the vast majority of the study group successfully transitioned to lower craving levels, whereas the control group remained largely at moderate levels. This immediate success can be directly attributed to the early phases of the healthy lifestyle program, which emphasized identifying of personal triggers and developing proactive relapse prevention strategies among participants specially stress management strategies. Therefore, equipping patients with those practical tools to regulate cravings in real time, lead to reducing the

intensity and frequency of substance-seeking urges.

Moreover, by follow up of study group after three months of the program, the vast majority of the study group maintained their progress at low craving levels, with a total absence of severe cases with statistically significant improvement (F= 67.321, P<0.001).

Shifting the focus to the third and final variable in the present study, the lifestyle domains, it represents the structural framework of a patient's daily life within the recovery process. At the baseline, the data revealed a universal pattern of poor or unhealthy lifestyles among all participants across both groups (study and control groups), with no statistically significant difference observed between them before program implementation (t=0.398, P=0.692). This pattern aligns with the observations of **Volkow and Blanco (2023)**, who argued that substance use disorders are frequently associated with a disruption of routine, role functioning, and self-regulatory behaviors, decision-making, and the capacity to resist craving. This meaning that, addiction extends beyond physiological dependence and gradually displaces structured health-oriented routines with disorganized patterns centered around substance seeking behaviors.

Moreover, it is noted that immediately after the program, the study group demonstrated a significant and systematic transition toward a moderate healthy lifestyle. Whereas, the control group remained stagnant at an unhealthy baseline level, with the statistical analysis revealing a highly significant statistically difference between the two groups (t= 11.128, p = < 0.001). This result directly attributed to the healthy life style program.

It is worth mentioning, the finding of the present study explores that negative correlation between healthy life style of the study patients who attended healthy life style program and their craving to used substance (r = - 0464, P = 0.001, r = - 0.758, P = < 0.001 respectively). This means that healthy lifestyle affects exactly on patient's life and improved their healthy condition and reducing their craving towards substance use. This improvement may be due to the program's integrated components, particularly those addressing sleep hygiene, nutritional awareness, time management, stress modulation, and future planning. By targeting these foundational behavioral systems, the program appears to have contributed to restoring routine stability and

enhancing self-directed structure, which are considered essential pillars of sustained recovery.

The current study's findings consisted with the research of **Kitzinger et al. (2023)**, they studied the habits and routines of adults in early recovery from substance use disorders, and explored that rebuilding a structured daily life is a fundamental step in reversing the chaotic lifestyle caused by addiction. This is directly reflected in results of the present study.

It is important to mention that the following up three months of studied patients in the present study reveal that improvements in nutritional hygiene, physical activity, and stress management it means this lifestyle changes became protective factors for long term recovery. Furthermore, the work of **Karaagac & Küçükerdönmez. (2024)**, regarding Nutritional status changes in the treatment of substance use disorder: Relationship with substance craving, demonstrated that improving nutritional quality reduces the neuro-inflammation associated with heightened craving states. This explains why the dietary reorganization within the healthy life style program served as a foundational pillar for stabilization.

Furthermore, **Mahboub et al. (2021)**, in their narrative review of the nutritional status and eating habits of people undergoing treatment for recovery, suggested that adequate nutritional intake supports behavior change during the recovery process and contributes to improved treatment outcomes.

In this context, **Zhang & Liu. (2022)** studied relapse prevention in the treatment of addictive behaviors and clinical self-regulation. They stated that physical wellness and healthy nutrition help stabilize the brain's reward system. By stimulating natural dopamine production through structured physical activity and dietary balance, these behavioral modifications appear to physiologically suppress the neurobiological drive for substances.

Regarding the role of physical activity, the results of the present study showed a sustained inverse correlation between exercise and craving throughout the follow-up period after the program ($P = 0.007$, $P= 0.003$ respectively). This aligns with the findings of **Tyler et al. (2023)**, in study under title "High Intensity Interval Training Exercise Increases Dopamine D2 Levels and Modulates Brain Dopamine Signaling", who established that regular exercise facilitates a neurobiological recalibration of the dopamine system.

Furthermore, **Campbell et al. (2023)**, studied lifestyle interventions in addiction treatment for patients with SUD, they found that sleep hygiene and nutritional awareness, are essential dimensions for restoring self-regulatory functions in recovering individuals. It is important to noted that result of current study strongly supports this perspective, whereby the finding show that improvement of lifestyle among study group, and reached a mean percent of 61.55±10.56 and 63.27±10.40 immediately after the intervention and followed three months, and the sharp contrast between the study group and the stagnant control group ($p < 0.001$).

Moreover, the current study's finding appears a very strong negative correlation between stress management and craving immediately and after of three months of the program ($P = <0.001$, $P = 0.016$) this consistent with **Sinha (2024),** study titled "Stress and substance use disorders: risk, relapse, and treatment outcomes", they concluded that emotional regulation during stress is the most significant psychological barrier against acute craving. This supports finding of the present study where the stress-modulation techniques within the health life style program were the primary drivers for the rapid reduction in craving intensity among the study group.

Furthermore, **Magill et al. (2022),** in their study titled "Goal Setting and Monitoring with Alcohol and Other Drug Use Disorders: Principles and Practices", demonstrated that interventions incorporating time management and future-oriented goals are more likely to produce sustained clinical outcomes. The current study reinforces Magill et al.'s conclusion whereby a healthy lifestyle framework acts as a long-term shield, preventing the stagnation that observed in the control group and ensuring that the recovery process that observed in the study group remains stable over time.

It is very important to noted that the finding of the current study explored smoking was no longer significantly Pcorrelated with craving after three months of the program, that suggests a dissociation between general recovery progress and nicotine dependence. Patients may continue to use smoking as a maladaptive coping mechanism to manage psychological distress, this is consistent with **Choi et al. (2021)** who presented that nicotine dependence is a chronic relapsing disease, and that individualized treatment must account for the severity of dependence and the

probability of withdrawal and relapse. They argued that smoking functions as ingrained habit that may requires specialized, prolonged cessation interventions beyond a general lifestyle program.

Consequently, nicotine dependence appears to operate through a more tenacious behavioral pathway. In fact, the tobacco use often persists as a deeply embedded habit, potentially requiring a more specialized and targeted therapeutic intervention focus to be effectively decoupled from the recovery process.

Finally, the findings of this study show that recovery from substance dependence extends beyond mere cessation of drug use and involves broader biological, psychological, and behavioral change. The build healthy lifestyle habits such as nutritional regulation, physical activity, and self-regulatory skills and enhancing stress management, contributing to more stable patterns of recovery rather than temporary abstinence. That supports the hypothesis of the current study, the healthy lifestyle program empowered participants to gain better control over their daily lives, moving them beyond mere abstinence of substance abuse toward functional health. While certain behaviors, such as nicotine use, may require additional targeted intervention.

Conclusion

The findings of present study concluded that the healthy lifestyle program had a highly statistically significant decrease the craving for used substance among the study group at immediately after the program and after three months' follow-up. This finding indicates that sustained improvement in healthy lifestyle was strongly associated with a marked reduction in craving levels over time. This highlighting the role of healthy lifestyle modification as a key mechanism in relapse prevention.

Recommendations

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

1. Healthcare providers should be shift from a purely pharmacological approach to an integrated lifestyle medicine model that treats physical wellness as a core recovery pillar.
2. Staff should prioritize the stabilization of the patient's biological clock (circadian rhythm) through structured ward activities and regulated light-dark cycles.
3. Patients should be trained in self-monitoring techniques (using journals or apps) to the reduction of craving intensity.
4. Patients should be trained with

stress-modulation strategies that function as internal barriers to protect themselves from high-risk environmental triggers.

5. Outpatient clinics should be providing lifestyle coaching sessions as part of the follow-up process to ensure the continuity of healthy habits.

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Effect of a Gestalt Therapy–Based Nursing Approach on Self-Efficacy and Relapse Prevention among Outpatients Recovering from Substance Use Disorders: A Quasi-Experimental Study

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Abstract

Substance use disorders (SUDs) are persistent, relapsing conditions that obstruct outpatient recovery. Preventing relapse and enhancing self-efficacy are critical for fostering long-term recovery; yet traditional psychotherapy may fall short. Gestalt therapy–based nursing approach has shown potential in improving self-efficacy across various groups. Conversely, its effectiveness in improving self-efficacy and preventing relapse from substance use disorders requires further exploration. **Aim** This study aimed to evaluate the effect of a gestalt therapy–based nursing approach on self-efficacy and relapse prevention among outpatients recovering from SUDs. **Method** A quasi-experimental pretest posttest control group design was employed. A purposive sample of 68 diagnosed patients in recovery stage was recruited from Meet-khalif psychiatric and addiction treatment hospital, Menoufia, Egypt. Measures within the study included a structured interviewing questionnaire, advance warning of relapse questionnaire, & general self-efficacy scale. **Results** a gestalt-based group showed significant reductions in all Advance Warning of Relapse Questionnaire subscale mean scores compared to the control group (all $p \leq 0.001$) both immediately following the intervention and at the two-month follow-up assessment. Additionally, there was a marked shift in self-efficacy levels observed in the gestalt-based group across the assessment points. Gestalt based group initially demonstrated mild or low self-efficacy, moderate and high levels increased substantially immediately post-intervention and were largely sustained at the two-month follow-up. In contrast, the control group showed minimal changes over time, with mild self-efficacy remaining predominant ($p < 0.001$). **Conclusion:** Gestalt therapy–based nursing approach effectively enhanced self-efficacy and relapse awareness, leading to a decreased relapse risk among outpatients. **Recommendations**: Integrating gestalt-based nursing approach into outpatient rehabilitation programs may support long-term recovery and relapse prevention.

***Keywords*:** Gestalt Therapy, Nursing Approach, Self-Efficacy, Relapse Prevention, Outpatients, Recovery, Substance Use Disorders

Introduction:

Substance use disorders are serious public health problems around the world. Adversely influencing people's health, relationships, jobs, and the economy. In Egypt, substance abuse disorders, particularly their treatment, have emerged as a primary challenge within the healthcare system, particularly in recent years (Central Agency for Public Mobilization and Statistics **(CAPMAS, 2025)**. Divorce, homelessness, societal distrust, exclusion, panhandling, deviations in sexual behavior, theft, coercion, suicide attempts, and joblessness are consequences associated with addiction. The proliferation of addiction has the potential to undermine the moral, economic, and social pillars of a society, inducing internal corruption and ultimately resulting in societal decay **(Hussein et al., 2024).**

One of the often-overlooked consequences is the highest rate of relapse **(Manurung, 2024)**. Despite advances in treatment and rehabilitation programs, the relapse rates remain high, with approximately 40-70% of individuals relapsing within three weeks to six months of recovery **(Abdelmouttelb et al., 2026).** Relapse refers to a return to substance use after a period of abstinence or improvement **(Schepis et al., 2025)**. It recognizes a common aspect of the recovery process rather than failure. A single episode or a return to regular use are two possible outcomes of relapse **(Plante et al., 2024).** Early relapse (short-term abstinence) is frequently associated with weak social support, frustration, depression, and unemployment. However, late relapse (after prolonged abstinence) is more associated with inadequate coping skills, lack of insight into substance use problems and reduced self-efficacy **(Sinha, 2024).**

In this respect, self-efficacy is a crucial psychological factor in the recovery process from substance use disorders **(Abdelaal & El-Ashry, 2024; Moniz-Lewis et al., 2022)**. It is defined as an individual's ability to control their behavior and perform the activities necessary to achieve specific goals **(Mohamed et al., 2022).** Studies have shown that higher levels of self-efficacy are associated with improved coping strategies and adherence to treatment plans. It also enhances individuals' ability to resist cravings and resist potential relapse triggers **(Moniz-Lewis et al., 2022)**. Conversely, low self-efficacy is associated with increased feelings of helplessness in the face of daily stressors, which can increase the likelihood of relapsing **(Zhang & Zeng, 2021).** Therefore,

enhancing self-efficacy in individuals during recovery is a primary objective of any nursing intervention or treatment program aimed at reducing relapses and improving long-term stability.

In this context, gestalt therapy has emerged as an effective approach for treating a wide range of psychological disorders due to its role in promoting emotional growth, developing self-awareness, and improving the quality of relationship. Gestalt therapy focuses on present experience and experiential awareness of the moment, which contributes to enhancing individuals' ability to understand their own experiences and deal effectively with emotional and relational challenges **(Kaisler et al., 2023)**. This therapeutic approach views individuals as integrated beings whose physical, mental, and cognitive components interact within their social and environmental contexts (**ALIs & CERKEZ, 2020)**. Recent research indicated that Gestalt group therapy has led to a significant improvement in participants' self-efficacy levels, reflecting the ability of awareness-based and direct experience-based therapeutic processes to enhance individuals' confidence in their personal abilities and improve their ability to cope **(Farahbakhsh et al., 2022).**

Psychiatric nurses play a pivotal role in supporting individuals with substance use disorders, particularly during the recovery phase following acute treatment. This role extends beyond medication and clinical follow-up to include ongoing psychological support, counseling, fostering self-awareness, and cultivating a sense of personal responsibility for healthy behavior, all essential elements for reducing the likelihood of relapse and achieving long-term stability **(Dashtgard et al., 2023)**.

These nursing roles align closely with the core principles of gestalt therapy. Through an interactive therapeutic relationship, this approach empowers psychiatric nurses to help patients recognize their feelings, thoughts, and behaviors in the present moment **(Mohamed et al., 2022),** understand maladaptive response patterns associated with relapse triggers, and develop more conscious and effective coping strategies. Gestalt therapy is particularly well-suited for application in psychiatric nursing practice due to its adaptability and the ease with which its techniques can be integrated into daily nursing interventions in various clinical

settings, especially outpatient clinics and community care centers.

Significance of the study

Recent studies indicate that most nursing and psychological interventions for substance use disorders have focused primarily on life skill training, cognitive behavioral therapy (CBT), or mindfulness-based interventions **(Boness et al., 2022)** with relatively limited attention given to the application of Gestalt therapy as a structured and guided nursing approach, particularly in outpatient settings. While the principles of Gestalt therapy align with core roles of psychiatric nursing, empirical evidence exploring its effectiveness in improving self-efficacy and preventing relapse in individuals recovering from substance use disorders remains limited. This research gap highlights the urgent need for studies evaluating the effectiveness of Gestalt-based nursing approaches in supporting sustained recovery and improving the psychological and behavioral outcomes of patients at various stages of recovery.

Accordingly, this study aimed to evaluate the effect of a gestalt therapy–based nursing approach on self-efficacy and relapse prevention among outpatients in recovery from substance use disorders.

Subjects and Method:

Aim of the study

This study investigated the effect of a gestalt therapy–based nursing approach on self-efficacy and relapse prevention among outpatients recovering from substance use disorders.

Research hypotheses

H1: Patients with substance use disorders who engage in a gestalt therapy-based nursing approach (intervention group) are expected to show a significant reduction in relapse tendency (as measured by the Advance Warning of Relapse Scale) after a twelve-week group intervention compared to patients who will not engage in the approach (control group).

H2: Patients with substance use disorders who engage in a gestalt therapy-based nursing approach (intervention group) are expected to show a significant increase in self-efficacy score (as measured by the General Self-Efficacy Scale) after a twelve-week group intervention compared to patients who will not engage in the approach (control group).

Research design:

A quasi-experimental pretest-posttest control group design was employed to implement a gestalt therapy-based nursing approach through a structured nursing

intervention compromising twelve sessions.

Research setting:

The psychiatric outpatient clinic of the psychiatric and addiction treatment hospital situated in Meet-khalif, Shebin Elkom, Menoufia, Egypt, served as the site of this study. It belongs to the General Secretariat of Mental Health and Addiction Treatment (GSMHAT), Ministry of Health and Population, Cairo, Egypt. The hospital includes psychiatric wards for men and women, an addiction treatment ward for men, and outpatient clinics. These clinics include morning and evening addiction clinics, smoking cessation programs, and daytime psychiatric programs. Participants in this study were selected from the morning and evening addiction treatment clinics.

Sample size and sampling technique:

The required sample size was determined using a priori power analysis conducted with G*Power. For a two-group comparison (independent samples t-test), assuming a medium effect size (Cohen's d = 0.5), a two-tailed significance level of α = 0.05, statistical power of 80%, and an allocation ratio of 1:1, the total required size was calculated to be 128 participants. A total of 128 patients were initially approached and screened for eligibility. Thirty patients did not meet the inclusion criteria and were excluded. During the study implementation, 15 participants did not complete the pretest assessment, and 15 participants missed outpatient appointments. Therefore, the final sample consisted of 68 participants who completed all study procedures. The 68 participants were assigned to two groups: The Gestalt therapy–based nursing approach group (n = 34) and the control group (routine care, n = 34) using a sequential or alternating allocation methods based on the order of enrollment.

Minimize contamination between groups (the control group and gestalt therapy-based group):

There are various measures that were taken to minimize incidental transfer of intervention content:

-Initially, morning outpatient clinic appointments were allocated to the gestalt therapy intervention group, while evening appointments on another day were assigned to the control group.

-Second measure: the researcher coordinated with the hospital management, and the head nurse in charge of the outpatient clinic assigned the same nurses for the gestalt therapy-based group during the morning sessions throughout the data collection period and this was

documented in the nurses' attendance records.

-Third measure: All participants in a gestalt therapy-based group were also instructed not to share any details of their interventions with patients in the other group.

Subjects:

A purposive sample of 68 patients diagnosed with substance use disorders and currently in the recovery stage was recruited from morning & evening addiction treatment clinics of the previously mentioned setting. Participants were selected based on the following inclusion and exclusion criteria.

Inclusion criteria:

Patients who were diagnosed with a substance use disorder according to DSM-5 criteria, in the recovery phase, and experienced at least one previous relapse episode as determined by (a psychiatrist through clinical evaluation and review of medical record) , who were aged between 18 and 60 years were selected to ensure participant safety and suitability for group-based Gestalt therapy sessions. Individuals below 18 years require interventions tailored to children or adolescents, while participants above 60 years may present with additional medical or cognitive conditions that could affect participation and outcomes. Patients who regularly attended the outpatient addiction treatment clinics at the previous hospital tended to relapse and low levels of self-efficacy .These criteria were confirmed using validated instruments such as the General Self-Efficacy Scale and the Advance Warning of Relapse Scale. Patients had completed detoxification and were in a stable condition suitable for engagement in session, acknowledging the purpose of the study and agreeing to participate.

Exclusion criteria:

Patients who take part in another structured psychotherapy program or who were currently suffering acute withdrawal symptoms were not eligible for inclusion. Additionally, patients with severe cognitive impairment or comorbid psychiatric disorders (e.g., psychosis, severe depression, schizophrenia) that could interfere with participation or the intervention’s effectiveness were excluded.

Instruments of Data Collection:

To fulfill the objectives of the study, four instruments were employed.

Instrument (1): A structured interviewing sheet or schedule; Adapted from **Abdelmouttelb et al (2026)** and was administered in Arabic. It was split into two distinct sections:

Section 1: Sociodemographic details of the participants, such as their age,

sex, education, region of residence, occupation, and marital status

Section II: Clinical details of the participants, including type of substances use, duration of substance use, current recovery period, presence of chronic disease, reason for treatment seeking, family history of drug abuse, and number of previous treatment attempts.

Instrument (2): Advance Warning of Relapse Questionnaire (AWARE – Version 3.0)

This scale which was created by **Miller and Harris (2015),** was employed to appraise early warning signs predictive of relapse, which are the key to relapse prevention planning among patients recovering from substance use disorders. The scale was translated into the Arabic language by three bilingual translators who are fluent in the two languages and familiar with the content of the scale. It is composed of 28 statements classified into four subscales that represent bunches of relapse warning signs: emotional disturbance (10 items), cognitive dysfunction / poor thinking control (6 items, social withdrawal and denial (6 items) and reduced coping competence (5 items). The patients' responses were ranked on a 5-point Likert scale ranging from 1 = Never, to 5 = Always except for five statements (8,14,20,24,26), which were reversed. The overall score ranged from 28 to 140. For relapse prevention purposes, scores are interpreted as follows: mild relapse risk (28–65), moderate relapse risk (66–103), high relapse risk (104–140). The AWARE scale has demonstrated adequate construct validity and acceptable test–retest reliability, with an intraclass correlation coefficient (ICC) of 0.70. High internal consistency has also been reported, with Cronbach's alpha coefficient of 0.92 **(Sahar & Naqvi, 2021).** however, in the current study it was 0.881

Instrument (3): General Self-Efficacy Scale (GSE)

It was originally designed by **Schwarzer and Jerusalem (1995).** to evaluate individuals' belief in their ability to cope effectively with a wide range of challenging situations. We employed a validated Arabic scale translated by **El-Gilany et al. (2012)** which had a reliability coefficient of 0.78, and the internal consistency (Cronbach coefficient alpha) of the GSE was 0.87. In the current study, the scale demonstrated excellent internal consistency, with a Cronbach's alpha coefficient of 0.924. GSE consists of just ten questions, with subjects' responses graded on a 4-point Likert scale ranging from 1 (not at all true) to 4 (very true). A total score between 10

and 40, with scores below 14 denoting low self-efficacy, scores from 14-24 denoting mild self-efficacy, scores from 25-34 denoting moderate self-efficacy and scores above 35 denoting a high self-efficacy. The overall validity of the instruments was confirmed through validation by a 5-member expert in psychiatric mental health nursing and psychiatric medicine from Menoufia University, Egypt to appraise cultural relevance, content validity, and linguistic appropriateness. Necessary modifications were made based on their feedback to ensure that the items were contextually suitable for subjects.

Ethical Considerations:

The Declaration of Helsinki prerequisites for an ethics committee clearance were met by this study. Prior to collecting data, ethics approval and consent to participate were attained from the general secretariat of mental health hospitals' research ethics committee and the Research Ethics Committee (REC) at the Faculty of Nursing, Deanship of Scientific Research, Menoufia University, Egypt (Approval No. ERCNMA1000/2/6/104/25). Every patient granted their written consent. Participants' informed consent was gained after they were made aware of the study's goals, procedures, possible risks, and advantages. The secrecy and anonymity of the subjects' data (patient names were coded, all data was kept in a secure location, and only authorized staff were given access). Additionally, the participants were made aware that their participation in this study is completely optional and they can cancel their participation at any point in time.

A pilot study

To evaluate the instruments' precision, accuracy, usefulness, and clarity, as well as the time needed to complete them, a pilot study was conducted on 10% of the total participants were involved. Participants in the pilot study were chosen by the researcher according to inclusion criteria, and they were subsequently eliminated from the actualized study sample. The modifications needed were made as revealed from a pilot study. As no participant expressed any confusion, the results showed that every question was understandable, unambiguous, and clear.

The procedure for data collection:

The study was conducted over a five-month period, from June 2025 to October 2025. Data collection and intervention implementation were carried out in three planned phases:

1st phase: Preparatory arrangements phase:

After official permission and ethical approval relevant to the study were obtained, eligible patients were initially identified by the physician based on inclusion criteria. They were informed about the study and invited to participate, and written informed consent was obtained. Informal group discussions and individual conversations were held in a supportive environment to explore patients' attitudes toward substance abuse and perceived causes of relapse. Some patients reported utilizing substances to escape emotional distress and overwhelming thoughts or due to perceived social stigma and negative societal attitudes. This exploratory discussion was employed to design a gestalt therapy–based nursing approach. In addition, an extensive review of previous literature(21–24) guided the approach, focusing on enhancing self-efficacy and preventing relapse in patients recovering from substance use disorders. The content of this approach was reviewed by a panel of psychiatry and psychiatric mental health nursing experts to ensure its feasibility and appropriateness, leading to necessary modifications before final implementation.

2nd phase: Pre nursing approach assessment phase:

Eligible patients were identified and chosen after review by the clinic physician and a check of the clinic records. After obtaining written informed consent, in-person interviews of approximately 40 minutes were performed in a dedicated room on the first floor, equipped with chairs arranged in a circular format and a data show. The three instruments were administered, and baseline data were collected.

3rd phase: gestalt-based nursing approach implementation phase:

Participants in the study were employed at the morning addiction treatment clinics, where they attended between 9:00 a.m. and 1:00 p.m., while the control group attended in the afternoon from 2:00 p.m. to 4:00 p.m. on another day. The control group consisted of 34 participants that received only outpatient services. However, the gestalt intervention group was further divided into smaller groups, each comprising five to six participants. Sessions were held on Sundays for subgroups 1, 2, and 3 and on Wednesdays for subgroups 4, 5, and 6. Each subgroup attended one session per week in a special room on the first floor, furnished with circular chairs and a data show. Each session lasted 90 minutes for 12

weeks from the second half of June 2025 to the second half of October 2025.

The approach comprised twelve organized sessions: eight intervention sessions engrossed gestalt-based techniques and hands-on activities, and three sessions dedicated to skill consolidation, future planning, and final evaluation, in addition to one introductory session. Sessions were created to facilitate active participation, increase awareness of internal experiences (here & now), explore conflicting internal voices, identify craving triggers, and strengthen participants' ability to consciously regulate their responses to urges. Top Dog/Underdog Dialogue, Empty Chair, Role Reversal, sentence completion, Ride the Craving Wave, Reframing, Amplification, Play the Tape to the End, and conscious delay with sensory anchoring are gestalt techniques applied in the current study as mentioned in **Table 1**. To enhance self-efficacy, responsibility, and relapse prevention, each session included interactive exercises, reflective discussions, and practical activities.

Table 1: Contents of the gestalt-based intervention session

Sessions	Purposes	Content
Session 1: Orientation and building psychological safety	- Setting the rules ➢ Foster group cohesion	Name and strength exercise A brief introduction to the nursing approach structure, techniques of the future sessions, participant's roles, and responsibilities Building the groups. Preparing for implementing a gestalt-based nursing approach
Session 2: Understanding substance uses disorders	- Provide basic knowledge of substance use disorder - increased awareness of causes and consequences to enhanced motivation for change and relapse prevention.	Psychoeducational overview of substance use disorder Implementation of a guided group-sharing activity entitled "My Path to Addiction" Reflection Exercise, in which participants voluntarily identified perceived personal causes of their substance use. a structured discussion titled "The Impact on My Life'', to explore the personal consequences of addiction in a supportive and non-judgmental environment.
Session 3: Relapse, lapse and early warning signs	- Identifying meaning of relapse and addiction indicators - Recognize early signs of relapse	Start with a 10-minute relaxation technique. and deep breathing exercises. Feature interactive questions about relapse signs. A simplified visual explanation clarifies the difference between a lapse and a relapse and outlines the three stages of relapse. An interactive "Relapse Ladder" activity \, "My Warning Signs," allows participants to record their personal warning signs. Discussion of the first step when an early warning sign appears.
Session 4, 5: Revealing the internal conflict and awareness of automatic thoughts	- Increase awareness of automatic thoughts. - Discover personal relapse triggers - Makes conscious decisions.	Recognize internal and external craving triggers using trigger mapping, Mindful Self-Check. Explore the internal conflict using the Top Dog/Underdog technique Reenacted a triggering situation using Empty Chair technique All participants were encouraged to practice.

Table 1 (continued)

Sessions	Purposes	Content
Session 6: Problem-Solving Skills and refuse offer	- Practice saying "No" to offers	Mindfulness awareness and body scanning Explore steps of problem-solving (define, brainstorm, evaluate, choose, apply) with **Here-and-Now Awareness dialogue**: patient focuses on current thoughts, emotions, and body sensations while planning solutions Role-play refusal techniques using Empty Chair
Session 7,8: Controlling craving	- Strengthening participants' ability to consciously regulate their response to urges -	Reframe negative statements into self-responsible statements. Practice the Ride the Craving Wave" exercise The amplification approach was employed (tensing muscles, speaking louder, or repeating a word related to desire. Implement the "Play the Tape to the End" technique Practice the conscious delay strategy) STOP, Breathe, Observe, Proceed, imagine negative outcome, self-talk).
Session 9: Patient- led practical activity	- Empower patients to take an active role in recovery. - Create mastery experience through successful task completion.	-Perform a task aligned with patients' skills and interests, such as repairing chairs, performing minor electrical work, drawing or a small wooden activity. They actively performed the task by themselves and received direct feedback and verbal reinforcement on their capabilities.
Session 10: Future Self Dialogue	- Creating a realistic and positive vision of the future enhances the sense of control over the present.	➢ Visualize future self after recovery while observing feelings, thoughts, and body language in the present moment. -Using the empty chair technique for a dialogue with the future self that offers advice & support. -Use role reversal to bring out the internal conflict between the present and the future and foster a sense of control.
Session 11: Positive	- Promote commitment to	➢ Express positive statements that reflect commitment to recovery and belief in one's ability to change while encouraging eye contact and honesty.

Table 1 (continued)

Sessions	Purposes	Content
Affirmation and personal plan	Recovery and increase confidence in the ability to change	-Develop 3–5 steps daily plan to address the urge using sentence completion: "Today I will do… because I want to…"and share at least one step in
		-In front of the group. Participants who implement their daily plans are rewarded with positive reinforcement in front of the group.
Session 12: closure of sessions	Evaluate the impact of a gestalt therapy–based nursing approach on self-efficacy and relapse prevention	A comprehensive program review: A summary of all sessions and techniques used. Each participant shares their most important learnings and the program's impact on their daily life. Post-test instruments are distributed to compare results with the initial results. Tips are provided for maintaining recovery, adhering to daily plans, and managing cravings or challenging situations.

The implementation phase extended over two months of follow-up after completion of the g therapy-based program. Ongoing support was maintained through a structured WhatsApp group, where advice and motivational messages were regularly shared. Participants were encouraged to report any challenges and early warning signs, while researchers provided timely feedback and guidance. Monthly clinical follow-up was conducted through scheduled outpatient visits and consultations with the treating physician to monitor for relapse indicators.

Statistical Analysis:

An IBM personal computer running the Statistical Package of Social Science (SPSS) version 25 (SPSS, Inc., Chicago, Illinois, USA) was used to gather, tabulate, and statistically analyze the data. The following statistics were used: In descriptive statistics, qualitative data was represented by numbers and percentages, whereas quantitative data was displayed using the mean (X) and standard deviation (SD). To ascertain whether there is a relationship between the research parameters and the desired variables, analytical statistics are utilized. The Chi squared test ($\chi 2$) is a meaningful test for comparing two groups with qualitative characteristics. When comparing two groups using quantitative data, the t-test is a test of significance. The Pearson correlation

is a metric used to quantify the relationship between two quantitative variables. The level of

Results

Table (1) demonstrates the personal data of the control and gestalt-based groups. All participants were males with mean age of the gestalt-based group was 37.70±6.82, while that of the control group was 37.06±7.78. Concerning the level of education, 64.7% of the gestalt-based group and 70.6% of the control group graduated from secondary school. In terms of marital status, 58.8% of the gestalt-based group and 52.9% of the control group were single, while 23.5% of the gestalt-based group and 32.4% of the control group were married. Regarding occupation, it was clear that 70.6% of the gestalt-based group and 58.8% of the control group were not working. In terms of residence, 67.6% of the gestalt-based group and 79.4% of the control group were from rural areas. There were no significant differences between gestalt-based and control groups regarding personal data.

Table (2) presents that there is no statistically significant difference between the gestalt based and control groups regarding their clinical data (types of substances use, duration of substance use, current recovery period, presence of chronic disease, reason for treatment seeking, family history of drug abuse, number of previous treatment attempts).

Table (3) presents a comparison of AWARE subscale scores between the gestalt and control groups. At baseline, there were no statistically significant differences between the gestalt-based group and control group through all subscales at $p>0.05$, confirming group equivalence before intervention. Immediately following the intervention, the gestalt-based group presented significant reductions in all subscales mean scores, indicating significant improvement compared to the control group (all $p \leq 0.001$). These improvements were largely maintained at the two-month follow-up, demonstrating the sustained effectiveness of the intervention on participants' advance warning signs of relapse.

Figure (1) displays the distribution of relapse warning signs categories (mild, moderate, high) among the gestalt-based group and control group across three time points: pre-intervention, immediately post-intervention, and two months' follow-up. In the gestalt-based group, at pre-intervention, high risk predominated (55.9%), with no reports of the mild-risk category. Moderate risk accounted for 44.1%. Immediately post-intervention, mild risk markedly increased to 76.5%,

while moderate risk decreased to 23.5%. After two months of follow-up, mild risk remained high at 71.3% and moderate risk at 28.7%. In contrast, the control group demonstrated at pre-intervention that high risk dominated (64.7%) and moderate risk accounted for 35.3%. Immediately post-intervention, high risk slightly decreased to 61.29%, while moderate risk slightly rose to 38.7%. After two months of follow-up, high risk decreased to 58.75%, and moderate risk increased to 41.3%, indicating a persistent elevated relapse risk in the absence of the intervention.

Table (4) presents a comparison of mean self-efficacy scores between the gestalt-based group and control group at three diverse time points. Prior to the intervention, both groups began at similar levels of self-efficacy (gestalt-based group: M = 16.94, SD = 2.88; control: M = 15.97, SD = 3.57; t = 1.233, p > 0.05), with no significant difference observed. Following the intervention, the gestalt group's self-efficacy significantly increased (M = 33.26, SD = 3.04), while the control group's scores remained unchanged (M = 16.11, SD = 3.67). This disparity was highly significant ($p \leq 0.001$). Even two months later, the gestalt group continued to exhibit significantly higher self-efficacy compared to the control group ($p \leq 0.001$).

Figure (2) illustrates the distribution of self-efficacy levels among the gestalt-based group and control group at three time points: pre-intervention, immediately post-intervention, and two months' follow-up. In the gestalt-based group, before the intervention, the majority of participants had mild self-efficacy (82.7%), with a small proportion at a low level (17.6%), and none at moderate or high levels. Immediately post-intervention, moderate (68%) and high (32.4%) self-efficacy levels increased significantly. At the two-month follow-up, moderate (56%) and high (29.5%) self-efficacy levels remained high, while low and mild levels decreased (14.22%), indicating sustained improvement. On the other hand, in the control group, before the intervention, most participants had mild self-efficacy (76.5%) with low levels at 24%. Immediately post-intervention, minimal change occurred, with mild self-efficacy still present at 73% and low at 27%. At the two-month follow-up, mild self-efficacy remained high (69%), showing little improvement over time without intervention.

Table (5) demonstrates that in the gestalt-based group, self-efficacy was strongly and negatively correlated with advance warning of relapse

immediately following intervention ($r = -0.620$, $p \leq .001$) and two months after the gestalt therapy–based intervention ($r = -0.581$, $p \leq .001$). No significant correlations were observed prior to the intervention ($r = 0.252$, $p > .05$).

Table (6) shows that no statistically significant relationships found between sociodemographic characteristics (age, educational level, marital status, occupation, or residence) and both self-efficacy scores and advance warning signs of relapse immediately following the gestalt therapy–based intervention in either the gestalt based or control groups (all $p > 0.05$).

Table 1. Baseline Sociodemographic Characteristics of the Studied group (n=68)

Sociodemographic Characteristics	Gestalt based group n=34		Control group n=34		Chi-square χ^2	P – value
	No.	%	No.	%		
Age (Years)						
29-40	24	70.6%	26	76.5%	0.972	>0.05ns
>40-52	8	23.5%	5	14.7%		
>52-64	2	5.9%	3	8.8%		
Mean ± SD	37.70±6.820		37.06±7.780		t=0.359	>0.05ns
Sex						
Male	34	100%	34	100%	-	-
Female	0		0			
Educational level						
Basic education	2	5.9%	4	11.8%	1.754	>0.05ns
Secondary education	22	64.7%	24	70.6%		
University education	10	29.4%	6	17.6%		
Marital status						
Married	8	23.5%	11	32.4%	0.670	>0.05ns
Divorced	0	0%	0	0%		
Widowed	6	17.6%	5	14.7%		
Single	20	58.8%	18	52.9%		
Occupation						
Work	11	29.4%	14	41.2%	0.310	>0.05ns
Not work	24	70.6%	20	58.8%		
Residence						
Rural	23	67.6%	27	79.4%	0.531	>0.05ns
Urban	11	32.4%	7	20.6%		

N.B. ns means non statistically significant. $\chi 2$ Chi-Square t: independent sample t test

Table 2. Baseline Clinical Characteristics of Substance data in the Studied group (n=68)

Variables	Gestalt based group n=34		Control n=34		Chi-square χ^2	P –value
	No.	%	No.	%		
Type of substances use						
Marijuana	5	14.7%	7	20.6%	4.781	>0.05ns
Tramadol	22	64.7%	15	44.1%		
Heroin	4	11.8%	9	26.5%		
Alcohol	0	0%	1	2.9%		
Other	3	8.8%	2	5.9%		
Duration of substance use						
less than 1year	7	20.6%	9	26.5%	2.516	>0.05ns
1 to 5 years	24	70.6%	21	61.8%		
more than 5 years	3	8.8%	4	11.8%		
Current recovery period						
less than 6 months	21	61.8%	18	52.9%	0.541	>0.05ns
6 months or more	13	38.2%	16	47.1%		
Presence of chronic disease						
Yes	11	32.4%	13	32.4%	2.186	>0.05ns
No	23	67.6%	21	67.6%		
Reason for treatment seeking						
Social pressure	6	17.6%	11	32.4%	7.947	>0.05ns
Personal motivation	4	11.8%	8	23.5%		
Health problems	15	44.1%	13	38.2%		
Legal issues	2	5.9%	1	2.9%		
Employment problems	5	14.7%	1	2.9%		
Financial problems	2	5.9%	0	0.0%		
Family history of drug abuse						
Yes	14	41.2%	13	38.2%	0.061	>0.05ns
No	20	58.8%	21	61.8%		
Number of previous treatment attempts						
None	5	14.7%	4	11.8%	4.312	>0.05ns
1 attempt	15	44.1%	14	41.2%		
2 attempts	9	26.5%	15	44.1%		
More than 3 attempts	5	14.7%	1	2.9%		

N.B. ns means non statistically significant. $\chi 2$ Chi-Square

Table 3. Advanced Warning Signs of Relapse (AWARE) among Substance Use Disorder Outpatients in the Studied Groups (n=68)

Advance Warning Signs of Relapse (AWARE) Subscales		Studied participants (n=68)			
		Gestalt based group (n=34)	Control group (n=34)	t- test	P value
		Mean± SD	Mean± SD		
Emotional Disturbance	Prior intervention	38.20±3.92	38.35±3.28	0.167	>0.05ns
	Immediately following intervention	19.64±3.70	38.41±3.31	22.04	≤0.001**
	2months following intervention	24.45±3.81	39.01±4.12	23.12	≤0.001**
Cognitive Dysfunction /Poor Thinking Control	Prior intervention	22.02±2.76	23.20±2.83	1.731	>0.05ns
	Immediately following intervention	12.14±2.27	23.26±2.83	17.858	≤0.001**
	2months following intervention	15.32±2.35	23.8±2.96	17.564	≤0.001**
Social Withdrawal and Denial	Prior intervention	24.82±2.67	25.05±3.07	0.336	>0.05ns
	Immediately following intervention	15.00±3.24	25.02±3.10	13.08	≤0.001**
	2months following intervention	17.27±3.01	25.12±3.30	13.32	≤0.001**
Reduced Coping Competence	Prior intervention	17.79±2.28	17.47±1.94	0.630	>0.05ns
	Immediately following intervention	11.44±3.21	17.44±1.93	9.322	≤0.001**
	2months following intervention	14.32±2.87	18.12±2.01	10.124	≤0.001**

t= independent t-test **highly significant at P ‹ 0.01

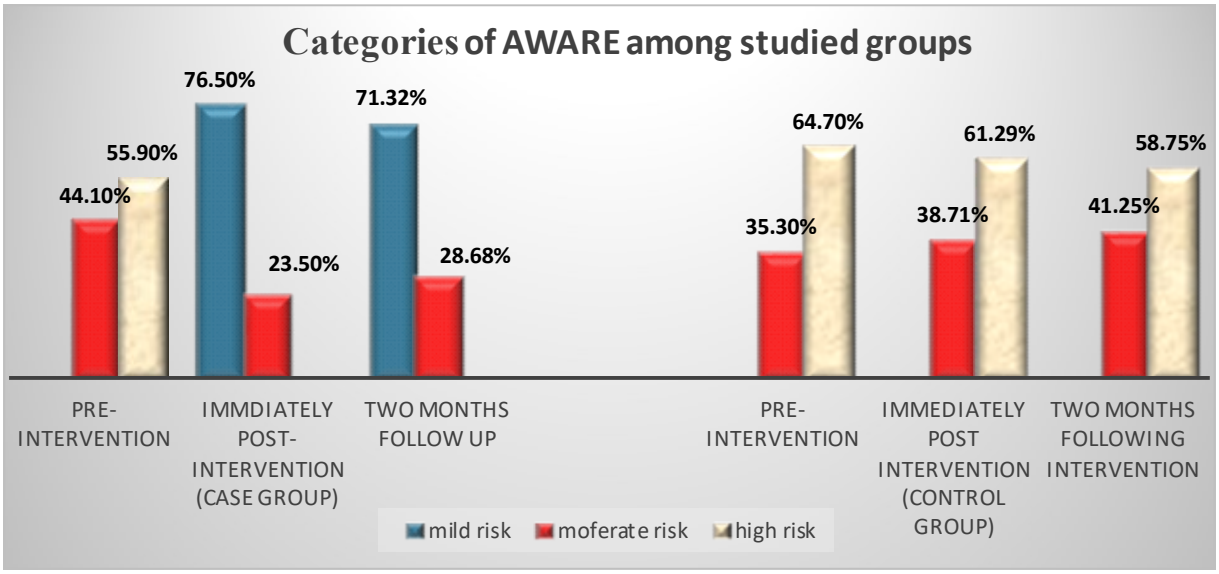

Figure 1: Categories of Advanced Warning Signs of Relapse among Substance Use Disorder Outpatients in the Studied Groups (n=68)

Table 4. Mean Score and Standard Deviation of Self-Efficiency among Substance Use Disorder Outpatients in the Studied groups (n=68)

Self-Efficiency		Studied participants (n=68)			
		Gestalt based group (n=34)	Control group (n=34)	T- test	P value
		Mean± SD	Mean± SD		
Self-Efficiency	Prior intervention	16.94±2.88	15.97±3.57	1.233	>0.05ns
	Immediately following intervention	33.26±3.04	16.11±3.67	20.943	≤0.001**
	Two months Following intervention	29.78±3.01	16.45±3.78	20.874	≤0.001**

t= independent t-test

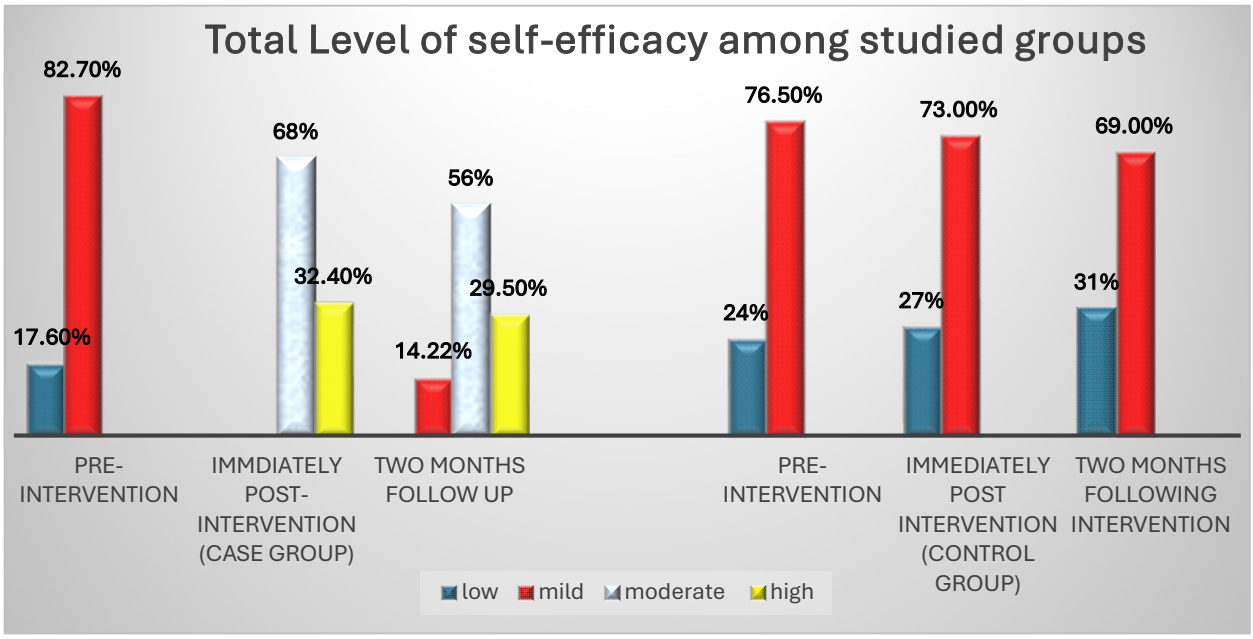

Figure 2: Total levels of self-efficacy Among Studied Groups (n=68)

Table 5. Correlation Between Relapse tendency and self-efficacy Among Studied Groups (n=68)

Advance Warning of Relapse	Self-efficacy			
	Gestalt based group (n=34)		Control group (n=34)	
	r	P value	r	P value
Prior intervention	0.252	>0.05ns	0.160	>0.05ns
Immediately following intervention	-0.620	≤0.001**	-0.192	>0.05ns
2 months following intervention	-0.581	≤0.001**	-0.223	>0.05ns

Note. r= coefficient correlation test. No significant at p > 0.05. . **highly significant at p ‹ 0.01

Table 6. Relation Between Socio-demographic Characteristics and both self- efficacy and Advance Warning signs of Relapse among Studied Groups (n=68)

Sociodemographic Characteristics	Self- efficacy Gestalt based group (n=34) Immediately after intervention				Self- efficacy Control group (n=34) Immediately after intervention				Advance Warning of Relapse Immediately after intervention Gestalt based group (n=34)				Advance Warning of Relapse Immediately after intervention Control group (n=34)			
	Self-efficacy (n=34)		Test of Sig	P value	Self- efficacy (n=34)		Test of Sig	P value	Advance Warning of Relapse (n=34)		*Test of Sig*	P value	Advance Warning of Relapse (n=34)		*Test of Sig*	P value
	Mean	*SD*			*Mean*	*SD*			$\bar{X}$	*SD*			$\bar{X}$	*SD*		
Age																
29-40	33.12	3.08			16.26	3.87			60.20	8.61			104.65	6.76		
>40-52	34.12	3.18		>0.05	15.80	3.49		>0.05	52.87	7.33		>0.05	103.85	3.48		>0.05
>52-64	31.50	2.12	F=0.665	ns	15.33	3.05	F=0.103	ns	56.01	8.48	F=2.395	ns	100.42	13.74	F=0.568	ns
Educational level										8.66						
Basic education	32.50	3.07			16.50	1.73			58.45	8.35			105.04	10.61		
Secondary education	32.90	3.08		>0.05	16.12	3.68		>0.05	58.15	8.58		>0.05	103.88	7.52		>0.05
University education	34.20	3.22	F=0.670	ns	15.80	4.95	F=0.037	ns	57.72		F=0.010	ns	105.06	10.12	F=0.032	ns
Marital status																
Married	33.50	1.85			16.63	3.66			55.31	7.12			104.71	5.69		
Widowed	32.50	4.87		>0.05	15.00	3.12		>0.05	59.74	8.59		>0.05	100.72	13.57		>0.05
Single	33.40	2.90	F=0.221	ns	16.11	4.19	F=0.327	ns	58.62	9.48	F=0.532	ns	10518	5.33	F=1.209	ns
Occupation																
Work	34.60	2.67		>0.05	16.00	2.63		>0.05	55.84	8.91		>0.05	102.12	8.31		>0.05
Not work	32.70	3.07	t=1.695	ns	16.20	4.32	t=0.154	ns	58.96	8.68	t=0.946	ns	105.70	5.90	t=1.470	ns
Residence																
Rural	32.14	3.12		>0.05	16.24	3.75		>0.05	56.10	8.85		>0.05	103.12	8.10		>0.05
Urban	34.61	2.65	t=1.212	ns	15.77	4.65	t=0.124	ns	58.40	8.70	t=1.02	ns	105.40	6.20	t=1.550	ns

N.B. ns**:** means non statistically significant t: independent sample t test F: one way ANOVA test

Discussion

Substance abuse disorders are a dangerous problem that can significantly impact the quality of life of individuals, families, and society as a whole. They have negative effects on socio-economic, cultural aspects, and the overall organization of our community. In Egypt, substance abuse disorders have been on the rise among the population and have become a major health issue, with high incidence rates in mental health hospitals **(Okasha et al., 2022)**. Developing effective measures to prevent relapse among patients with substance abuse disorders is a primary focus for psychiatric mental health professionals. The significance of the current study lies in its potential to provide psychological interventions for patients with substance abuse issues. These interventions can aid to improve their self-efficacy, ability to control negative emotions and impulsivity, and attain effective coping strategies to deal with life events without resorting to substance abuse **(Volkow & Blanco, 2023).**

Regarding the socio-demographic characteristics, the results showed that there were no statistically significant differences between the case and control groups in terms of age, level of education, marital status, occupation, and place of residence. This showed that both groups were comparable in terms of socio-demographic factors. The mean age of the case group was 37.70 ± 6.82 years, while that of the control group was 37.06 ± 7.78 years. All participants in this study were male. The age group of this study faces multiple life stressors, including career development, financial commitments, and future uncertainty.

The predominance of males in the present study may be attributed to social and cultural stigma surrounding female substance use, particularly within Egyptian society, where female addiction is less socially accepted. This explanation is supported by previous research, including **Rainisch et al. (2022)**, who reported higher rates of substance use among males. Consequently, female substance users may conceal their condition or avoid seeking formal treatment. These findings are consistent with those of **Vo et al. (2023)** and **Feyisa (2021),** both of whom reported a higher prevalence of substance use among males in their study samples.

The study found that there were no statistically significant differences between the intervention group and

the control group because they had identical clinical characteristics which included their substance usage patterns and duration of their substance abuse and their current recovery status and their chronic medical conditions and their treatment assessment reasons and their family drug abuse history and their past treatment successes. The study results demonstrate that initial study matching between the case and control groups resulted in better internal study validity because this matching decreased the risk that these variables would act as study confounding factors. In substance use disorder treatment clinical assessment identifies three patient characteristics which include substance misuse duration and substance choice and past treatment history as key factors that determine treatment success.

These findings are consistent with previous research emphasizing the importance of baseline equivalence in case-control or experimental designs **(Magill et al., 2025)**. Ensuring that the case and control groups are comparable allows for a more accurate assessment of intervention efficacy and reduces the possibility that differences in clinical history would bias the results. Moreover, the matching of important demographic and clinical characteristics aligns with best practices in addiction research, where heterogeneity in substance use patterns can substantially affect outcomes.

The comparison of AWARE subscale scores between the case and control groups indicated that both groups were comparable prior to the intervention, reflecting similar baseline levels of advance warning of relapse. After the intervention implementation, case group participants showed better results on all AWARE subscales when compared to the control group. The results demonstrate that participants demonstrated improved awareness of early relapse warning signs and they also learned to understand the cognitive and emotional and behavioral factors that lead to relapse **Feyisa (2021)** found that structured programs which taught participants how to identify early relapse signs through effective high-risk situation responses became more successful after they received special training. These findings collectively highlight the importance of targeted interventions in strengthening advance warning of relapse and supporting sustained recovery.

The current study indicated that following the Gestalt therapy-based nursing approach, participants in the

intervention group showed a significant relationship between advance warning of relapse and factors such as the duration of substance use, the current recovery period, and the reason for seeking treatment, whereas other clinical variables did not have a significant effect. In contrast, the control group only showed a relationship between advance warning of relapse and two factors which included family history of drug abuse and type of substance used. **Noormohamadi et al. (2021)** found that structured counseling programs improved participants' self-regulation and awareness because these programs successfully delivered specific outcomes which helped participants develop better coping methods and psychological understanding. The research results show two types of interventions which help people predict upcoming relapses while they maintain their recovery progress. (30)found that people who stay in recovery longer with fewer treatment failures achieve better self-efficacy while our study observed that participants who had more consistent recovery times made better progress.

The study demonstrated that participants from the intervention group showed evidence of falling into relapse when treatment factors included their period of substance use recovery and their substance use treatment motivation and their entire treatment record. The control group showed that only family history of drug abuse and type of substance used showed connection to advance warning of relapse. **Lee and Park (2024)** found that people who better understand early warning signs of relapse have superior recovery results which supports the results of the present study. The Gestalt therapy-based nursing approach led to direct post-intervention results which increased participants' mild-risk status at the two-month follow-up.

The current study showed that self-efficacy in the intervention group showed a strong negative relationship with relapse tendency after the participants received Gestalt therapy-based nursing approach which continued until the two-month follow-up period because no relationship existed between the two variables before treatment started. The findings of this study support the results established by **Noormohamadi et al. (2021)** because they demonstrated that self-efficacy together with coping profiles functions as essential indicators of relapse risk. The present results demonstrate that gestalt therapy-based nursing

increases self-efficacy together with relapse awareness while it also causes recovery factors to change from permanent clinical elements to adaptable psychological and behavioral components. The research by **(Smith Slep et al.,2023)** proved that integrated psychotherapy methods improve both relapse detection and coping skills which shows that Gestalt therapy functions as an effective recovery prevention method that helps people maintain their recovery process.

The research study demonstrated through its findings that gestalt therapy-based treatment methods have the ability to empower individuals with self-efficacy skills while they learn to identify warning signs of potential relapses and maintain their recovery process. The treatment produced positive results for all participants because substance use and family history factors did not limit its effectiveness in treating them. The research study demonstrated how clinical elements determine psychological outcomes which need custom structured treatment solutions for effective substance use disorder recovery.

The current study indicated that sociodemographic characteristics, including age, educational level, marital status, occupation, and place of residence, were not significantly associated with advance warning of relapse following the Gestalt therapy-based nursing approach in either the case or control groups. The research shows that demographic elements did not impact how the intervention affected participants' ability to detect relapses, which demonstrates that Gestalt therapy- based nursing approach can help various population segments. Psychological interventions provide consistent advantages to participants from diverse sociodemographic backgrounds, which previous research studies have established as a pattern. Age and educational attainment did not affect relapse awareness advancements after structured psychosocial treatment, according to (**Mao et al., 2024**), showing the treatment method works for all different age groups.

Limitation of the study

The study presented important results for assessment but needs to acknowledge multiple existing limitations. The first limitation of this research project stems from its small sample size which consisted of participants from one location. The second limitation of this research study arises from its use of self-reported data for both relapse warning indicators and self-efficacy

assessment which can lead to social desirability and recall bias errors. The study results were affected because the research team did not control two critical elements which included participants' mental health conditions and their available support networks. The study investigated the effects of a Gestalt therapy-based nursing approach but researchers did not measure therapist variation together with session quality and participant engagement which could have affected the study results.

Conclusion

The current study showed that a Gestalt therapy-based nursing approach successfully helps individuals in recovery by providing advance relapse warning while building their self-efficacy and decreasing their relapse risk. The intervention produced significant improvements in relapse awareness which maintained at follow-up and its effects showed consistency across different sociodemographic groups. The results demonstrated that using behavioral and psychological factors which can be changed through treatment, including coping skills and self-regulation, is essential to maintaining recovery. Gestalt therapy functions as a practical and flexible relapse prevention method which rehabilitation programs should implement to boost long-term recovery results for substance use disorder patients.

Recommendations

Based on the findings of the current study, it is recommended that Gestalt therapy-based nursing approach be incorporated into substance use rehabilitation programs to improve relapse awareness, self-efficacy, and coping skills among individuals in recovery. Clinicians should adapt interventions to individual recovery histories, substance use patterns, and psychological profiles, as these factors were associated with variations in relapse warning awareness. Given the sustained improvements observed and the effectiveness across diverse sociodemographic groups, such interventions could be applied in a variety of clinical and community settings. Future research should involve bigger, more diverse samples, longer follow-up periods, and comparative studies with other psychotherapeutic approaches to further validate and expand the applicability of Gestalt therapy-based nursing approach.

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Assessment of Nutritional Challenges of Cancer Patients Undergoing Chemotherapy

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Abstract

Background: Cancer treatment, particularly chemotherapy, commonly causes adverse effects that impair nutritional intake, resulting in a high prevalence of malnutrition **Aim of the study:** To assess the nutritional status and dietary challenges of cancer patients undergoing chemotherapy **Study design:** A cross-sectional descriptive study. **Study setting:** The study was conducted at the Tanta University Oncology Hospital. **Study Subjects:** A purposive sample of 200 adult patients (aged 21–60 years) diagnosed with solid tumors or hematological malignancies and currently undergoing chemotherapy was recruited, excluding patients with pre-existing gastrointestinal disorders unrelated to cancer, as well as Metastatic Cancer Patients, and Patients who undergone GI Surgeries before starting chemotherapy. **Tools of data collection:** Two tools were used. **Tool I**, Nutritional Assessment Questionnaire, and **Tool II,** Patient-Generated Subjective Global Assessment (PG-SGA) v4.3.20. **Results:** The sample was predominantly aged 46–60 years (36%), female (60%), diagnosed with breast cancer (44%), and had Stage II disease (54%). Overall, 27% were underweight, with significant weight loss over time ($p < 0.001$), and 60% reported recent weight loss. Severely reduced appetite and frequent meal skipping were each reported by 32.5%, while severe nausea (37%), chewing/swallowing difficulties (30%), metallic taste (26.5%), and tube feeding (38%) were common. Most patients (68.5%) had not received dietary counseling. PG-SGA identified 41.5% as moderately malnourished, 58.5% as severely malnourished, and none as well-nourished, with 93.5% requiring urgent nutritional intervention. Malnutrition was not significantly associated with cancer type, stage, chemotherapy duration, or most clinical symptoms ($p > 0.05$). **Conclusion:** Malnutrition is highly prevalent among chemotherapy patients, highlighting deficiencies in nutritional screening and dietary counseling. **Recommendations:** Routine nutritional screening using validated tools should be integrated into standard oncology care.

Keywords: Cancer patients, Chemotherapy, Nutritional Challenges.

Introduction

Cancer remains one of the most significant public health challenges globally, with a rapidly increasing burden in both developed and developing countries. In 2022, Egypt reported approximately 150,578 new cancer cases and 95,275 cancer-related deaths, reflecting the significant and growing burden of cancer on both individuals and the healthcare system **(Abdelrahman et al., 2024).** Chemotherapy, a common modality for treating various cancers, has significantly improved patient survival but often leads to adverse side effects that impair nutritional intake, appetite, and gastrointestinal function**.** Chemotherapy can exacerbate malnutrition by inducing nausea, vomiting, mucositis, and diarrhea, thereby impairing nutrient intake and absorption, malnutrition is estimated to affect 40-80% of cancer patients **(Ravasco, 2020).** Therefore, early and accurate nutritional screening is crucial to identify at-risk patients and initiate timely interventions **(Arends et al., 2021)**. Malnutrition, in turn, contributes to poor clinical outcomes, including reduced treatment response, increased toxicity, prolonged hospital stays, and lower survival rates **(Lis., Gupta., Lammersfeld., Markman., & Vashi, (2022)**. Therefore, understanding and assessing the nutritional status of cancer patients undergoing chemotherapy is imperative to optimize their clinical outcomes and overall well-being **(Caccialanza et al., 2023).**

Evidence has shown that patients with poor nutritional status are more likely to experience dose-limiting toxicities, interruptions in chemotherapy, and reduced survival **(Silva, de Oliveira, Souza, 2022)** In contrast, patients who receive individualized nutritional support demonstrate improved functional status, better treatment adherence, and enhanced quality of life. These findings underscore the importance of routinely evaluating patients' nutritional conditions and addressing the specific dietary issues that arise during treatment **(Lis et al., 2022).**

Dietary challenges among cancer patients are highly individualized and often extend beyond the clinical symptoms of treatment. Taste changes, aversions to previously enjoyed foods, and shifts in eating patterns are commonly reported during chemotherapy (**Gavin., Lavorgna., Galasso., Donati., & Bagnasco (2019).** Furthermore, dietary restrictions imposed by medical advice or cultural beliefs may further complicate nutritional intake. Understanding these personal and culturally specific challenges is

crucial for delivering effective dietary interventions tailored to each patient's needs (**Kim., Lee, & Jung 2021).**

Many patients do not receive timely or adequate dietary counseling, and nutritional support interventions are often introduced late in the course of treatment which limit effectiveness and worsen outcomes. There is a growing consensus among international oncology and nutrition societies that nutritional care should be integrated as a fundamental component of cancer treatment protocols (**Khalid, S., Khalid, R., & Ahmed. 2020)**

Conducting a comprehensive assessment of the nutritional status and dietary challenges of cancer patients undergoing chemotherapy supports health policy development tailored to cancer patients' needs **Peixoto., Santos., Lima., & Oliveira, (2022).** Many healthcare institutions lack structured nutrition screening protocols, resulting in missed opportunities for early detection of malnutrition **(Khalid et al., 2020).** The Patient-Generated Subjective Global Assessment (PG-SGA) is a comprehensive, patient-centered tool specifically designed for the oncology population that evaluates nutritional status based on weight history, dietary intake, symptoms affecting intake, and physical function **(Jager-Wittenaar., & Ottery, (2022).**

The PG-SGA, combined with a structured dietary challenges questionnaire, offers a holistic framework for understanding the multifaceted nutritional burdens of chemotherapy patients aimed at mitigating side effects, enhancing treatment adherence, and improving clinical outcomes **Mick., Lee., & Singh. (2020)**.

Significance of the study

This study will provide valuable insights into the nutritional challenges faced by cancer patients undergoing chemotherapy, so it can guide healthcare providers in developing nutritional interventions, enhancing patient quality of life, and improving treatment outcomes.

Integrating nutritional assessment into routine nursing care supports a holistic, patient-centered approach, addressing both physical and psychosocial aspects of cancer treatment.

Furthermore, the study encourages interdisciplinary collaboration, enabling nurses to work closely with dietitians and oncologists to develop individualized care plans. It also strengthens the nurse's role in patient and family education, equipping them to manage dietary side effects and maintain adequate nutritional intake during chemotherapy.

Aim of the study: the aim of the study was to assess the nutritional status and dietary challenges of cancer patients undergoing chemotherapy.

Research Questions:

1- What is the nutritional status of cancer patients undergoing chemotherapy?
2- What are the major dietary challenges of cancer patients undergoing chemotherapy?
3- What is the impact of chemotherapy-induced side effects on dietary intake and nutritional well-being of cancer patients?

Subjects and Method:

Study design: A cross-sectional descriptive study.

Study setting: Tanta University Oncology Hospital.

Subjects: A purposive sample of 200 adult patients (aged 21–60 years) diagnosed with solid tumors or hematological malignancies undergoing chemotherapy.

Tools for Data Collection:

Two tools were used in the study

Tool (I): Nutritional Assessment for Cancer Patients Undergoing Chemotherapy Questionnaire:

This tool was developed by the researcher using the Short Nutritional Assessment Questionnaire (SNAQ) **(Kruizenga et al., 2005)** in addition to the Short Nutritional Assessment Questionnaire (SNAQ) revised version **(Neelemaat et al., 2021)**. It consisted of three parts as follow:

Part (I): Socio-Demographics and Clinical Information

This included age, sex, marital status, cancer type, stage of cancer, duration of chemotherapy treatment, and pre-existing chronic conditions.

Part (II): Patients' Dietary Profile Assessment which comprise 3 parts:

Part (a): Patients' Anthropometric Measurements: such as the patient's current weight, height & BMI.

Part (b): Dietary intake & Appetite Assessment: which covers; appetite during chemotherapy, unintentional weight loss over the past month, frequency of skipping meals, and dietary changes since starting chemotherapy.

Part(c): Chemotherapy-Related Dietary Challenges Assessment:

This section included; Nausea and Vomiting, Taste and Smell Changes, Difficulty Chewing or Swallowing and Gastrointestinal Symptoms.

Part (III): Nutritional Support and Coping Strategies:

Which includes whether the patient received any dietary counseling or nutritional support, using of supplements and strategies used to manage dietary challenges

Rating interpretation for the Questionnaire:

The questionnaire includes ten questions which assess dietary intake, appetite changes, chemotherapy-related symptoms, and coping strategies, with responses rated on a four-point scale (Never, Occasionally, Frequently, and Always). An additional six questions are evaluated using a binary scale, where a 'Yes' response indicates the presence of a dietary issue or coping behavior, and a 'No' response indicates its absence. Furthermore, eleven questions collect demographic and clinical information.

Tool (II) The patient-generated subjective assessment tool (PG-SGA) This tool was adopted by the researcher it is a specialized nutritional assessment tool originally developed by Dr. Rebecca J. Ottery in the 1990s, to assess nutritional status for oncology patients. It is an adaptation of the original Subjective Global Assessment (SGA) **(Detsky et al 1987),** modified to include patient-reported symptoms and intake information **(Ottery, 2000**).

Method:

Obtaining Approval:

An official permission was obtained from the Oncology University Hospital Manger which is affiliated to Tanta Main University Hospital and submitted to responsible authorities of the selected settings.

Ethical Considerations

- An approval from the Scientific Research Ethics Committee of the Faculty of Nursing was obtained. Code no: 666-5-2025
- Written consent obtained from patients included in the study.
- Confidentiality and privacy were taken into consideration regarding data collection.
- The nature of the study didn't cause pain to the patients and they are informed about their right to withdraw from study at any time.

Development of the study tools:

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

Tool (II) was adopted by the researcher.

Content validity

The studied tools were tested for face and content validity by a jury of seven professors' expertise in the field of medical surgical nursing, Oncology and Nuclear Medicine specialist, simple modifications were done.

Pilot Study

Pilot study was conducted on 20 Cancer patients undergoing Chemotherapy to test the clarity, feasibility, relevance of the tool. Accordingly, minor modifications were done.

Reliability of the tool:

Internal consistency was assessed using Cronbach's alpha coefficient. For **Tool (I)** the nutritional assessment questionnaire demonstrated good internal consistency (α = 0.84), while **Tool (II)** the PG-SGA showed excellent internal consistency (α = 0.88).

Statistical Analysis:

The collected data were organized, coded, and fed into a computer for analysis using the IBM SPSS software package version 27.0 **(Armonk, NY: IBM Corp, released 2020)**. Chi-square Test was used to examine the relationship between categorical variables. The significance of the results was judged at the 5% level ($P \leq 0.05$), where any P-value equal to or less than 0.05 was considered statistically significant.

Results:

Table (1): Presents that the largest age group was 46–60 years (36%), followed closely by the 36–45 age groups (34.5%) and females represented (60%) of the sample. Breast cancer was the most prevalent type among participants (44%) and the majority of patients were in Stage II of the disease (54%). Less than third (30 %) of patients were receiving treatment for more than 6 months. Additionally, hypertension was the most common pre-existing condition, affecting (26%) of the sample.

Table (2): Shows that the mean height was (**170.01 cm)**, and **the mean** weight was (**69 kg)**. The average BMI was **23.86**, with (**43.5%)** of patients falling into the "Normal weight" category. Notably, **(27%)** were classified as underweight and (**12.5 %)** classified as grade **II** obesity.

Table (3): Reveals a clear shift toward reduced appetite among patients with only small percent (**4%)** reported a normal appetite while the largest group, **(32.5%)** experienced severely reduced appetite with only (**2.5%)** of the studied patients never skip meals while the majority tends to skipping meals 1-2 times weekly **(35 %)** or almost always **(32.5 %). In addition;** largest group**, (32%)** avoided certain foods, (**28.5%)** started eating smaller portions and (**17%)** followed a special diet

Table (4): Outlines that Nausea was a frequent issue, with one third of the studied patients (**33%)** experiencing it "frequently" and **(37%)** of them describing it as "severe", Vomiting reported by (35%) of the patients who experiencing it “Occasionally “and (33%) experiencing it “frequently. Changes in taste were reported by **(77%)**, with **(26.5%)** experiencing a metallic taste. Bloating or excessive gas was not an

issue for three quarters **(75%)** of the sample.

Table (5): reveals that assessments of recent weight changes during the preceding two weeks showed that more than half of the studied patients **(60.0%)** reported weight loss, whereas **(31.5%)** indicated that their weight had remained unchanged, and only small percent **(8.5%)** reported weight gain. The distribution of weight changes was statistically significant **(p < 0.001).**

Table (6): Shows that (42.0%) of patients reported eating "less than usual" over the past month. Currently, more than half (60.5%) are limited to normal food but in smaller amounts. The mean symptoms score was 2.44; same table represented a highly statistical significance ($p < 0.001$) in all items of the PG-SGA.

Table (7): Shows that about fifth (**21.0%)** of patients felt their activity was normal while the largest group **(46.5%)** felt they were "not their normal self" but still able to be up and about with fairly normal activities. A vast majority **(79.0%)** experienced a **3-4.9%** weight loss in one month. **The mean score of** metabolic demand score was **1.78**, and the physical exam mean score was **1.33** with statistical significance difference since the P value <0.001.

Figure (1) categorizes the overall nutritional status of the patients using the PG-SGA scoring system. The results show that **none of the patients** were classified as Stage A (well-nourished) while **(58.5%)** were "severely malnourished" (Stage C), and **(41.5%)** were "moderately malnourished" (Stage B). This distribution was statistically significant **(p = 0.016).**

Figure (2) shows that the majority of the patients **(93.5%)** were in "critical need" of improved symptom management or nutritional interventions **(score ≥ 9),** while small percent (**6.5%)** required nutritional intervention by a dietitian in conjunction with a nurse or physician **(score 4-8**).

Table (1): Distribution of patients studied regarding their socio-demographic and clinical data (N=200)

Patient's bio-socio-demographic data	No.	%
Age		
18-25	12	6.0
26-35	47	23.5
36-45	69	34.5
46-60	72	36.0
Gender		
Male	80	40.0
Female	120	60.0
Cancer Type		
Bladder	14	7.0
breast	88	44.0
ovary	14	7.0
prostate	23	11.5
lung	32	16.0
leukemia	15	7.5
lymphoma	13	6.5
cervix	1	5.0
Stage of cancer		
I	10	5.0
II	108	54.0
III	82	41.0
Duration of chemotherapy treatment		
> 1 month	44	22.0
1-3 months	41	20.5
4-6 months	55	27.5
>6 months	60	30.0
Pre-existing disease*		
Diabetes	43	21.5
Hypertension	52	26.0
Kidney disease	19	9.5
Other	48	24.0
None	59	29.5

*More than one disease

Table (2): Distribution of studied patients regarding their Anthropometric measurement (N=200)

A. Anthropometric measurement		
Current Height Min-Max 150.2 -189.6 Mean ± SD 170.013±11.4643	**Current Weight** Min - Max 32.4-142.4 Mean ± SD 69.0±22.4632	**BMI** Min- Max 14.1- 40.0 Mean ± SD 23.865±7.4107
BMI	**No**	**%**
Under weight	54	27.0
Normal weight	87	43.5
Over weight	13	6.5
Obese I	20	10.0
Obese II	25	12.5
Obese III	1	0.5

Table (3): Distribution of patients studied regarding their Dietary Intake (N=200)

Dietary intake & appetite	No	%
How would you rate your appetite during chemotherapy?		
Normal appetite	8	4.0
Slightly reduced	45	22.5
Moderately reduced	42	21.0
Severely reduced	65	32.5
No appetite	40	20.0
How often do you skip meals due to chemotherapy-related symptoms?		
Never	5	2.5
Occasionally (1-2 times/week)	70	35.0
Frequently (3-4 times/week)	60	30.0
Almost always	65	32.5
Have you made any dietary changes since starting chemotherapy?		
No changes	45	22.5
Eating smaller portions	57	28.5
Avoiding certain foods	64	32.0
Following a special diet	34	17.0

Table (4): Distribution of studied patients regarding their Chemotherapy-related dietary challenges (N=200)

Chemotherapy-related dietary challenges	No	%
Nausea and vomiting		
Experiencing nausea during or after chemotherapy		
Never	15	7.5
Occasionally	61	30.5
Frequently	66	33.0
Always	58	29.0
Severity of your nausea		
Mild	61	30.5
Moderate	65	32.5
Severe	74	37.0
Vomiting after meals		
No	64	32.0
Occasionally	70	35.0
Frequently	66	33.0
Taste and smell changes		
Noticing changes in taste perception		
No	46	23.0
tasteless	52	26.0
Metallic taste	53	26.5
Other	49	24.5
Avoiding certain foods due to taste or smell changes		
No	142	71
Yes	58	29.0
Difficulty chewing or swallowing		
Having difficulty chewing or swallowing		
No	51	25.5
sometimes	44	22.0
often	60	30.0
always	45	22.5
Contributing to your difficulty?		
Mouth sore	42	21
Dry mouth	34	17.0
Pain while swallowing	35	17.5
Other	38	19.0
N/A	51	25.5
Using tube feeding		
No	124	62.0
Yes	76	38.0

Table (5): Distribution of studied patients according to Generated Subjective Global Assessment (PG-SGA) (N=200)

Weight/Height			
Current height Min- Max Mean ± SD	150.2- 189.6 cm 170.013±11.4643		
Current weight Min- Max Mean ± SD	32.4-142.4kg 68.999 ±22.4632	t 43.440	**P <0.001***
Weight I month age Min- Max Mean ± SD	29-148 72.11±23.382	t43.614	**P <0.001***
Weight 6 months age Min- Max Mean ± SD	38-162 77.81±24.770	t44.424	**P <0.001***
Weight during the past 2 weeks	**No**	**%**	
Decreased Increased Not changed	120 17 63	60.0 8.5 31.5	**P <0.001***

*Statistically significant at p≤ 0.05 t: student t-test SD: standard deviation

Table (6): Distribution of studied patients according to Generated Subjective Global Assessment (PG-SGA), (N=200)

PG-SGA sub-items	**No**	**%**	**t**	**P**
Food intake during the past month				
Unchanged More than usual Less than usual	115 1 84	57.5 0.5 42.0	26.413	**<0.001***
Food intake now				
-Normal food but less than normal amount	121	60.5	39.989	**<0.001***
-Little solid food	64	32.0		
-Only liquids	15	7.5		
-Only nutritional supplements	0.0	0.0		
-Very little of anything	0.0	0.0		
-Only tube feeding or only nutrition by vein	0.0	0.0		
Symptoms score				
Min- Max Mean ± SD	1-5 2.44±1.239		27.912	**<0.001***

*Statistically significant at p≤ 0.05 t: student t-test SD: standard deviation.

Table (7): Distribution of studied patients according to Generated Subjective Global Assessment (PG-SGA) (N=200)

PG-SGA sub-items	No	%	t	P
Activity and function				
-Over the past month, my activity rated normal with no limitations	42	21.0	34.394	**<0.001***
-Not my normal self, but able to be up and about with fairly normal activities	93	46.5		
-Not feeling up to most things, but in bed or chair less than half the day	65	32.5		
-Able to do little activity and spend most of the day in bed or chair	0.0	0.0		
-Pretty much bedridden, rarely out of bed	0.0	0.0		
Weight loss in one month				
-0-1.9%	4	2.0	87.380	**<0.001***
-2-2.9%	2	1.0		
-3-4.9%	158	79.0		
-5-9.9%	32	16.0		
-10% or greater	4	2.0		
Disease and its relation to nutritional requirements				
-Cancer	200	100	0.00	0.00
-AIDS	0.0	0.0		
-Pulmonary or cardiac cachexia	0.0	0.0		
-Chronic renal insufficiency	0.0	0.0		
-Presence of decubitus, open wound, or fistula	0.0	0.0		
-Presence of trauma	0.0	0.0		
-Age greater than 65	0.0	0.0		
Metabolic demand scores				
Min- Max Mean ± SD	0-9 1.78±2.125		11.848	**<0.001***
Physical exam scores				
Min- Max Mean ± SD	0-3 1.33±0.869		21.649	**<0.001***

*Statistically significant at p≤ 0.05 t: student t-test

SD: standard deviation

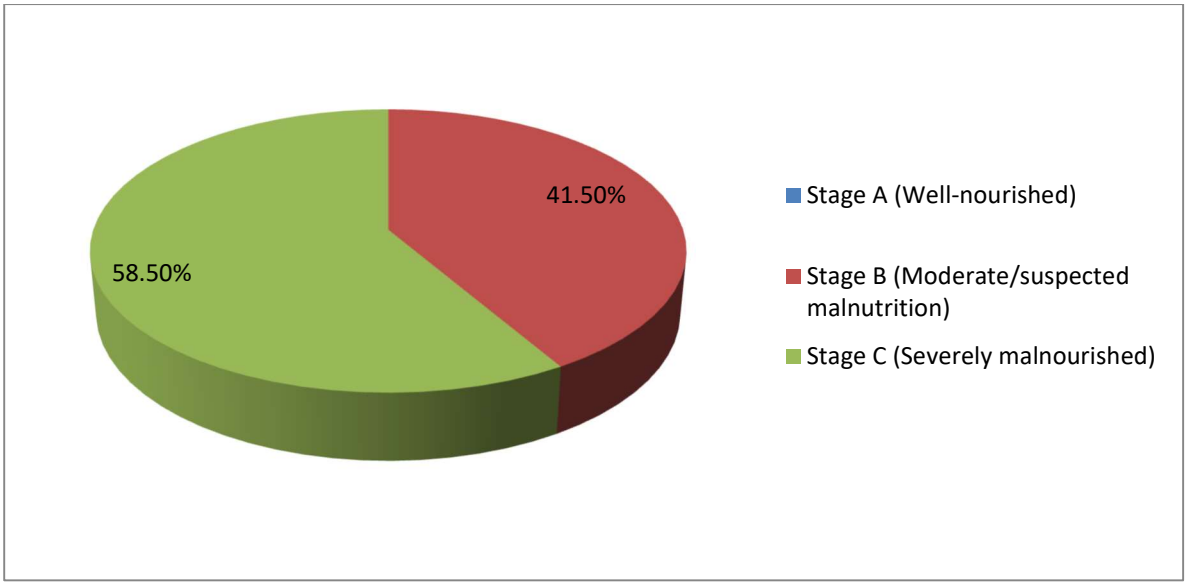

Figure (1): Distribution of studied patients according to (PG-SGA) Global Assessment categories (N=200)

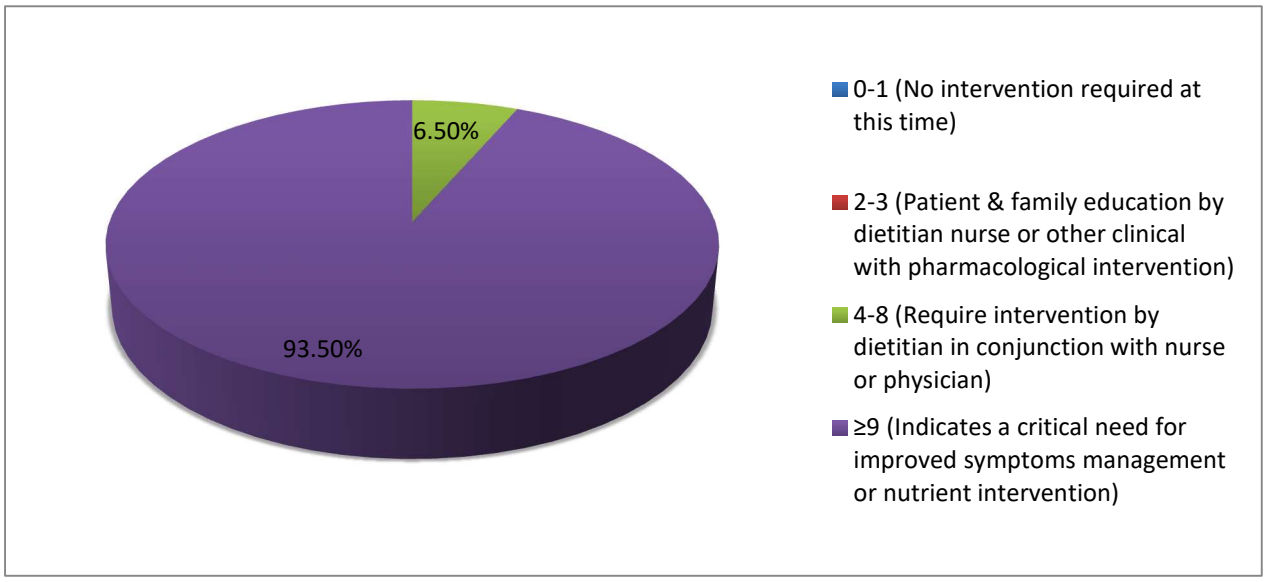

Figure (2): Distribution of studied patients according to Nutritional Triage Recommendations, (N=200)

Discussion:

The result of the present study proved that; more than one-third of participants were aged between 46 and 60 years, while approximately one-third were between 36 and 45 years. This finding is consistent with global evidence indicating that cancer incidence increases with advancing age due to the cumulative effects of carcinogenic exposure, genetic mutations, and age-related physiological changes **(National Cancer Institute, 2022; World Health Organization, 2024).** Female participants constituted about two third of the study sample. This gender distribution appears closely linked to the predominance of breast cancer cases, which accounted for more than third of all diagnosed malignancies. Similar observations were reported by **Zhang et al. (2025),** who noted that female patients often represent a substantial proportion of oncology nutrition studies because of the high prevalence of breast cancer and the prolonged treatment trajectories associated with it. International and national epidemiological reports, noted that breast cancer emerged as the most common cancer type, followed by lung and prostate cancers **(International Agency for Research on Cancer, 2024; Abdelrahman et al., 2024).** The majority of participants were diagnosed with Stage II cancer, while more than two-fifths had Stage III disease. These findings suggest that most patients were receiving treatment during intermediate or advanced stages of disease progression. This observation aligns with reports indicating that delayed diagnosis remains a challenge in many developing countries, where limited access to screening and early detection programs often contributes to later-stage presentations **(World Health Organization, 2024)**. Regarding treatment exposure, nearly one-third of participants had been receiving chemotherapy for more than six months. Prolonged chemotherapy exposure is often associated with cumulative toxicities that may negatively affect appetite, gastrointestinal function, and overall nutritional status **(Arends et al., 2021).** Furthermore, hypertension was identified as the most prevalent comorbidity among participants, a finding consistent with **Silva et al. (2022),** who reported hypertension and diabetes mellitus as common coexisting conditions among oncology patients.

Although the mean Body Mass Index (BMI) of participants fell within the normal range, a closer examination revealed that more than one-quarter of patients were

classified as underweight. This finding illustrates a well-recognized challenge in oncology nutrition: BMI alone may fail to accurately reflect nutritional deterioration. According to **Jager-Wittenaar and Ottery (2022)**, cancer patients may experience significant muscle wasting and weight loss while maintaining a seemingly normal BMI. The dietary profile of participants further highlighted the magnitude of nutritional compromise (**Zhang et al., 2025)**. Appetite reduction was remarkably prevalent, with only small percent **4%** of participants reporting a normal appetite, while more than half experienced severe appetite reduction or complete loss of appetite. This finding supports existing evidence identifying chemotherapy-induced anorexia as a major contributor to cancer-related malnutrition **(World Health Organization, 2023; Zhang et al., 2025).** This decline in appetite was reflected in patients' eating behaviors. Meal skipping was highly prevalent, with only small percent of participants reporting that they never skipped meals. Likewise, many participants reported modifying their dietary habits after initiating chemotherapy, most commonly through consuming smaller meal portions and avoiding specific foods. These findings are consistent with previous studies demonstrating that chemotherapy-related symptoms frequently disrupt normal eating patterns and encourage adaptive dietary behaviors aimed at minimizing discomfort **(Gavin et al., 2019; Kim et al., 2021).** The findings related to chemotherapy-associated dietary challenges showed that Nausea emerged as one of the most common symptoms, affecting approximately two-thirds of participants, with more than one-third reporting severe nausea. These findings are consistent with reports from the **National Cancer Institute (2024), the American Cancer Society (2024), and ESPEN (2021),** all of which identify nausea as one of the most distressing treatment-related toxicities affecting nutritional intake.

Similarly, approximately one-third of participants experienced frequent vomiting following meals. **(National Cancer Institute, 2024)**. Metallic taste and tastelessness were reported by approximately one-quarter of participants each. Such findings mirror those reported by the **American Cancer Society (2024) and Kim et al. (2021),** who identified taste disturbances as common chemotherapy side effects that frequently lead to food aversions, particularly toward

protein-rich foods. Many participants also reported difficulties chewing and swallowing, findings that support previous evidence linking chemotherapy-induced mucositis and oral complications with impaired oral intake as previously highlighted by **European Society for Clinical Nutrition and Metabolism, 2021; National Cancer Institute, 2024).** This may explain by more than one-third of participants required tube feeding, a proportion that appears higher than that reported in many international studies **(Zhang., Edwards., & Malhotra. (2023).** Gastrointestinal symptoms were common, with constipation occurring more frequently than diarrhea. This finding is consistent with the **American Cancer Society (2024)**, which attributes constipation in oncology patients to chemotherapy effects, opioid use, reduced mobility, and inadequate fluid intake.

More than two-thirds of participants reported receiving no dietary counseling or nutritional support, while only a minority had consulted a dietitian or used nutritional supplements. These findings are supported by **(Khalid et al., 2020) and Peixoto et al. (2022),** who highlighted the underutilization of nutritional services in oncology care despite strong international recommendations supporting routine nutritional assessment and intervention.

Moreover; Participants experienced substantial weight loss, with mean body weight declining significantly after chemotherapy treatment. Furthermore; about two third of the studied patients reported recent weight loss during the previous two weeks. These findings align with previous literature identifying involuntary weight loss as one of the hallmark indicators of cancer-related malnutrition **(Ravasco, 2020; Zhang et al., 2025).** Nearly half of participants reported consuming less food than usual during the preceding month, while only one-fifth maintained normal activity levels. Reduced food intake and impaired functional status are well-established indicators of nutritional decline and have been associated with poorer treatment outcomes, increased complications, and reduced quality of life as previously highlighted by **Berriche, Salma., Rym., Hajer., Houyem., Henda., & Amel. (2024).** According to the PG-SGA, more than half of the studied patients were severely malnourished and more than one third of them were moderately malnourished, while none were classified as well nourished. These findings are consistent with reports indicating

that malnutrition affects between 40% and 80% of oncology patients **(Ravasco, 2020),** although the severity observed in the current study appears particularly pronounced.

The finding of the present study was further supported by the finding that majority of participants required urgent nutritional intervention according to PG-SGA triage (PG-SGA score ≥9) recommendations yet more than two third of them had not received professional dietary counseling highlighting gap in supportive care Similar findings were reported by **Silva et al. (2022),** who demonstrated strong associations between elevated PG-SGA scores, treatment complications, and diminished quality of life.

When examining relationships among study variables, the present study found no statistically significant associations between nutritional status and cancer type, cancer stage, or chemotherapy duration. This finding suggests that malnutrition was pervasive across the sample and affected patients irrespective of diagnosis or treatment duration. Similar findings were reported by **World Cancer Research Fund (2020),** which emphasized that nutritional decline often results from treatment-related factors that transcend specific cancer diagnoses.

However, these findings differ from those reported by **Zhang et al. (2025),** who identified advanced cancer stage as a predictor of malnutrition. One possible explanation is that the prevalence of malnutrition in the current study was uniformly high, limiting variability and reducing the ability to detect subgroup differences. Likewise, the absence of a relationship between chemotherapy duration and nutritional status may suggest that nutritional deterioration develops early during treatment and remains persistent rather than progressively worsening over time.

No significant associations were found between cancer type and presence of nausea, nausea severity, or vomiting explained by the notion that many gastrointestinal symptoms are primarily treatment-related rather than disease-specific which was similar **to Basar,., Mohammed, Qoronfleh., & Acar, (2024).** Likewise, chemotherapy duration was not significantly associated with any dietary challenge examined, suggesting that these symptoms may persist throughout treatment regardless of duration.

Unexpectedly, the present study results proved that most chemotherapy-related dietary

challenges did not demonstrate significant correlations with nutritional status which is differ from many previous studies that identified such symptoms as major contributors to malnutrition **(ESPEN, 2021; National Cancer Institute, 2024; Zhang et al., 2025).**

Several explanations may account for these findings. First, because nearly all participants were already classified as malnourished, variability in nutritional status was limited. Second, nutritional status among cancer patients is influenced by multiple factors beyond symptom burden alone, including metabolic alterations, systemic inflammation, disease characteristics, socioeconomic factors, and access to nutritional support **(Schmidt., Süß., Schulte., Letsch., & Jensen, (2022).**

Conclusion:

Overall, the study confirms that malnutrition remains a major clinical concern among patients undergoing chemotherapy and underscores the importance of early nutritional screening, comprehensive assessment, and multidisciplinary nutritional management to improve treatment outcomes, functional status, and quality of life.

Recommendations:

The following recommendations are proposed:

A. Recommendations for Nursing Practice

- Routine nutritional screening using PG-SGA for all patients undergoing chemotherapy.

  -Regular monitoring of patients' weight, appetite, dietary intake, and chemotherapy-related symptoms throughout treatment.

  -Provide individualized nutritional education regarding management of dietary challenges.

  -Early identification and referral of patients at nutritional risk to dietitians

  -Nurses should actively participate in multidisciplinary nutritional care planning to ensure comprehensive management of patients' nutritional needs.

B. Recommendations for Clinical Practice

- Establish structured nutritional assessment protocols to ensure early detection of malnourished patients.
- Implement routine nutritional triage systems utilizing validated tools.

C. Recommendations for Nursing Education

- Incorporate oncology nutrition and nutritional screening training into nursing curricula.
- Conduct continuing education programs for oncology nurses

regarding nutritional assessment and management of treatment-related dietary challenges.

- Enhance nurses' competencies in the use of standardized nutritional assessment tools such as PG-SGA.

D. Recommendations for Healthcare Administration and Policy

- Develop institutional policies mandating routine nutritional screening for all oncology patients.
- Integrate nutritional indicators into quality assurance and patient outcome monitoring systems.

E. Recommendations for Future Research

- Investigate the effectiveness of nutritional intervention programs in improving treatment outcomes and quality of life among chemotherapy patients.
- Explore the impact of socioeconomic, psychological, and cultural factors on nutritional status and dietary behaviors among cancer patients.
- Evaluate the relationship between biochemical nutritional markers and PG-SGA scores among oncology patients.

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Functional Disability and Chronic Pain in Older Adults: The Mediating Role of Self-Compassion, Mindfulness, and Emotion Regulation

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Abstract

Background: Older adults' independence and quality of life are severely hampered by functional disability and chronic pain. Self-compassion, mindfulness, and emotion regulation play a crucial role in mitigating these impacts in late-life health outcomes. **Aim of the study**: Assess the relation between chronic pain and functional disability in older adults and whether self-compassion, mindfulness, and emotion regulation difficulties mediated this relation. **Design:** A descriptive design was utilized. **Setting**: The study was conducted at pain clinic in Zagazig University Hospitals. **Sample:** A purposive sample of 147 older adults aged 60 years and above who were suffered from chronic pain was included. **Tools of data collection:** Six tools were utilized to collect data: A structure interview sheet, Pain Numerical Rating Scale (NRS), Self-Compassion Scale (SCS), Five Facet Mindfulness Questionnaire - 15 (FFMQ-15), Difficulties in Emotion Regulation Scale (DERS), and World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0). **Results:** Older adults who suffer from severe chronic pain were more likely to have more functional disability ($r = 0.745$, $p = <0.001$). The Analysis of Moment Structures (SPSS-AMOS) tests confirmed that this relation was partially mediated by self-compassion ($\beta = 0.674$, $p < .001$, 95% CI = 0.309 to 1.145), mindfulness ($\beta = 0.756$, $p < .001$, 95% CI = 0.289 to 1.337), and difficulties in emotion regulation ($\beta = 2.225$, $p < .001$, 95% CI = 1.784 to 2.777). **Conclusion:** Pain severity, self-compassion, mindfulness, and emotion regulation difficulties are important factors for functional disability among the older adults suffered from chronic pain. **Recommendations:** Developing community-based programs that teach mindfulness and emotion regulation skills to suit physical and cognitive needs of older adult cohorts who struggled with chronic pain. ***Keywords*:** Aged, Chronic Pain, Mindfulness, Self-Compassion, Functional Disability.

Introduction

The rising incidence of chronic pain (CP) and the dilemma surrounding its efficient treatment have a widespread concern in the older adults **(Domenichiello & Ramsden, 2019)**. More than 80% of nursing home residents and 50% of older persons living in the community reported chronic pain. These percentages are expected to rise as the senior population grows at an exponential rate over the next few decades. The most common types of pain are osteoarthritis, persistent neuropathic pain caused by diabetes and herpes zoster, spinal compression fractures, pain associated with cancer and its treatments, and pain associated with other chronic illnesses **(Miaskowski et al., 2020)**. CP is often more intricate in older individuals, with 60–70% indicating pain in several areas **(Butera, Roff, Buford, & Cruz-Almeida, 2019; Rundell et al., 2019; Thapa, Shmerling, Bean, Cai, & Leveille, 2019)**.

Chronic pain poses considerable issues for older adults, leading to notable suffering, social isolation, increased costs, and burdens on health care systems. CP is also a significant risk factor for early mortality and hastened cognitive deterioration **(Domenichiello & Ramsden, 2019)**. In this context, chronic pain is characterized as moderate to severe discomfort that persists for over three months, regardless of its occurrence in one or multiple anatomical areas. Even with advancements in pain management, chronic pain continues to be a major contributor to disability worldwide, impairing older people's independence and quality of life **(Treede et al., 2019)**.

Functional disability (FD) refers to limitation in performing any or a combination of activities, that assist individuals in managing their everyday tasks. These activities in later life are crucial, as indicating health status and offering insights into health care and social services via policy initiatives **(Malik, 2022)**. Older adults encounter physiological constraints as a result of aging, especially in terms of functional health limitations, which culminate in various physical and mental health issues, ultimately resulting in disability and mortality **Aguiar, Silva, Vieira, Costa, & Carneiro, 2019)**.

Psychological factors like self-compassion (SC), mindfulness, and emotion regulation have gained attention as protective mechanisms, offering a holistic perspective on managing chronic pain and its effects on functional health

(Dagnino & Campos, 2022). Paying attention in a certain way—on purpose, in the present, and without passing judgment—is known as mindfulness. Mindfulness has been simultaneously conceptualized as a state, disposition, practice and intervention **(Hanley & Garland, 2017)**. SC is characterized as self-kindness, a sense of common humanity, and awareness of negative ideas and feelings without excessive identification. SC is connected with a variety of positive outcomes in older persons, including motivation, health-promoting behaviours, life satisfaction, and optimism **(D'elia et al., 2024)**.

Emotion regulation is the process of shifting person's emotional state or path in a preferred direction. It is beneficial to concentrate on how individuals with CP regulate pain-specific emotions. For instance pain-specific forms of ER that are strongly linked to CP outcomes include, for example, chronic pain acceptance, which allows a person to be open to experiencing pain without avoiding activities, pain gloominess, which implies an exaggerated negative intellectual and emotional reaction to pain, and promoting engagement in worthwhile activities in spite of the pain **(Aaron et al., 2023)**.

From nursing perspective, it is critical to develop an evidence-based multimodal approach that, based on the needs of older population experiencing CP, incorporates pharmacological, restorative, interventional, behavioural, integrative, and/or self-management strategies. Though medications may be necessary, but it is not enough to manage pain and enhance functionality and quality of life on its own **(Arnstein, Shade, Herr, Young, & Fishman, 2023)**.

Significance of the study

Existing research has primarily focused on the biological and physical dimensions of pain, such as its relationship to cognitive function **(Chen, Wang, & Xu, 2023)**, quality of life **(Moreno-Ligero, Moral-Munoz, Salazar, & Failde, 2023)**, anxiety, and depression **(Mullins, Yong, & Bhattacharyya, 2023)**. Despite increased interest in mindfulness **(Trammel, Park, & Karlsson, 2021)**, self-compassion **(Yeshua, Zohar, & Berkovich., 2019; Herriot, 2021)**, and emotion regulation **(Guendelman, Medeiros, & Rampes, 2017)**, research on the mediating role of these psychological processes in the effects of CP on FD in older persons is sparse. This study's findings

aimed to contribute to the current body of research on the effects of SC, mindfulness, and ERD on CP and FD in Egyptian older individuals.

Aim

This study aimed to assess the relation between CP and FD in older adults and whether SC, mindfulness, and ERD mediated this relationship.

Research questions

Question (1): What is the relation between chronic pain and functional disability in older adults?

Question (2): Does SC, mindfulness, and ERD have a mediating role on the relation between CP and FD in older adults?

Subjects and Method

Study design

A descriptive design was used over three months, starting in September 2024 and ended in November 2024.

Study setting

The study was conducted in pain clinic at Zagazig University Hospitals.

Study subjects

Older adults were recruited using purposive sample technique. The inclusion criteria were as follows: (1) patients aged 60 years and above, (2) those who suffered from chronic pain (pain duration >3 months), (3) those who reported one or more chronic illnesses, and (4) consent to be participated. The exclusion criteria included: (1) patients who have recently undergone major surgery, (2) patients with a prognosis of terminal illness, (3) those with serious speech problems, like stuttering or extreme hypophonia, (4) those having severe cognitive decline (Mini-Mental State Exam score<10) **(Folstein, Folstein, & McHugh, 1975)**, besides those having depressive symptoms according to Patient Health Questionnaire-2 **(Li, Friedman, Conwell, & Fiscella, 2007)**.

Sample size calculation

Direct association between describe subscale of mindfulness and SC score was 0.24 **(Sedighimornani, Rimes, & Verplanken., 2019)**, with power of test 80% and confidence level 95%, the sample size calculated to be 134 older adults., the sample size was expanded to 147 for the non-response rate during data collection. The sample size was calculated based on the following equation:

Sample size = $[(Z\alpha+Z\beta)/C]2 + 3$

The standard normal deviate for $\alpha = Z\alpha$

The standard normal deviate for $\beta = Z\beta$

$C = 0.5 * \ln[(1+r)/(1-r)]$

Data collection tools

Tool I: A structure interview sheet This sheet developed by

researcher and encompassed of two parts:

First part included age, sex, marital status, residence, educational level, income, current work, and smoking.

Second part involved pain characteristics, duration, nature, rhythmicity, aggravating factors, and alleviating measures of pain were also collected.

Tool II: Pain Numerical Rating Scale (NRS)

NRS was designed by Ferreira-Valente, Pais-Ribeiro, & Jensen (2011). It is a self-report measure that employs a horizontal line to subjectively rate the average pain severity over the previous 7 days on a numerical scale of 0 (no pain) to 10 (worst). Participants selected a number that most accurately represented their degree of pain. The NRS is a popular generic pain measure as it is easy to use and can be used to a wide variety of people and situations. A score between 1 and 3 indicated mild pain (pricking, pinking, aching), a score between 4 and 6 indicated moderate pain (pressing, cramping, acute burning), and a score between 7 and 10 indicated severe pain (cutting, killing, smothering).

Tool III: Self-Compassion Scale (SCS)

The SCS is a 26-item scale that developed by Neff (2003). It was a representation of the attitudes, feelings, and behaviors associated with the six dimensions of SC. The subscales were self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. The phrase "how I typically act towards myself in difficult times" was given to the respondents as instruction. A 5-point rating system is used for responses, with 1 denoting "nearly never" and 5 denoting "almost always." The subscale scores were determined by taking the mean of the responses to the subscale items. Reverse scores of the isolation, self-judgement, and over-identification subscales were added to self-kindness, common humanity, and mindfulness subscales to determine the overall SCS score. In this research, the participants were categorized as possessing low (SC 26-61), moderate (SC 62–96), or high (SC ≥ 97) levels of self-compassion.

Tool IV: Five Facet Mindfulness Questionnaire - 15 (FFMQ-15)

The FFMQ-15 was designed by Baer, Smith, Hopkins, Krietemeyer, & Toney (2006) to assess the five facets of mindfulness; observing, describing, non-judgment, non-reactivity, and acting with awareness, with three items for each facet. Responses were rated on a

five-point Likert scale, with 1 denoting “never or extremely rarely true” and 5 denoting “very often or always true”. There are seven reverse-scored items. A total mindfulness score was computed by summing the scores from the various facets; higher scores indicated better mindfulness. Older adults were stratified as either having low (15-35), moderate (36-55), or high (≥56) mindfulness. This scale revealed a Cronbach's alpha of.863.

Tool V: Difficulties in Emotion Regulation Scale (DERS)

Gratz and Roemer (2004) developed the DERS, a 36-item measure that assesses difficulties in emotion regulation. The items were evaluated across six subscales: lack of emotional awareness, absence of emotional clarity, trouble managing impulsive actions when upset, difficulty pursuing goal-oriented behaviors while distressed, refusal to accept negative emotional reactions, and restricted access to efficient emotional regulation strategies. Items were rated on a five-point Likert scale, with 1 indicating "almost never" and 5 indicating "almost always". A greater overall score signified more considerable challenges in managing emotions. In this study, older adults were categorized as experiencing low (36-84), moderate (85-132), or high (133-180) levels of difficulties in regulating their emotions.

Tool VI: World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0)

The WHODAS 2.0 consists of 12 self-report items developed by Üstün et al. (2010) based on the conceptual structure of the International Classification of Functioning, Disability and Health (ICF) (World-Health-Organization, 2001). The classification system assessed functioning level across six key life aspects; cognition, getting along, self-care skills, mobility, life activities, and social participation. Each item's response having a 5-point rating scale, with 1 denoting “none” and 5 denoting “extreme/can’t do”. The participants were divided into three groups based on their FD: low (12–28), moderate (29–44), and high (>45).

Method

1. **Obtained approval**

   Permission to conduct the study was obtained from the executive director of Zagazig University Hospital.

2. **Ethical considerations**

   The Faculty of Nursing's Research Ethics Committee (Institutional Review Board=ID/ZU.NUR.REC#:0165/11/

8/2024) at Zagazig University approved the study. All older adults provide written informed consent before participating in the study. They were informed that their participation was completely voluntary, and that they could withdraw at any time without any adverse consequences. All collected information was strictly confidential.

3. **Tools validity**

A panel of three experts in psychiatric and gerontological nursing evaluated the face validity of the SCS, FFMQ-15, DERS, and WHODAS 2.0, which had been translated into Arabic. The measurements' relevance, accuracy, and applicability were ensured.

4. **Pilot study**

Twenty older people participated in a pilot study to examine the feasibility and clarity of the research measures, and the results revealed that no changes were required. Each participant underwent a 20–25-minute structured interview. These interviews were conducted face-to-face in a comfortable and private setting to build rapport and establish the study's purpose. These interviews were implemented by a qualified nurse, who considered each participant's concentration and comprehension skills when administering the questionnaires.

5. **Tool's reliability**

Scores	Cronbach's Alpha	Number of Items
Self-compassion	0.713	26
Mindfulness	0.863	15
Emotion regulation	0.861	36
Functional disability	0.874	12

Data analysis

The data analysis and tabulation were conducted using IBM SPSS Statistics for Windows (Version 25; IBM Corp., Armonk, NY, USA, 2017). Quantitative data was expressed as mean ± SD, whereas qualitative data was expressed using absolute frequencies (numbers) and relative frequencies (percentages). The ANOVA test was used to compare multiple groups of quantitative data. The mean of two distinct sets of quantitative data was compared using the student "t" test. To assess the relationship between the research variables, the Pearson correlation coefficient was calculated; a value near 1 indicates strong correlation, a value near 0 shows weak correlation, a (+) sign indicates direct correlation, and a (-) sign indicates inverse correlation. The standardized error (SE) and critical ratio (CR) were calculated using SPSS-AMOS to explore the direct and indirect effects of CP on

FD mediated by SC, mindfulness, and DER, respectively. The Cronbach alpha coefficient was calculated to assess the scales' internal consistency and reliability. P-values < 0.01 were regarded highly statistically significant, whereas those ≥ 0.05 were judged non-significant**.**

Results

Table 1 illustrates the distribution of participants' demographic characteristics. The table presents that most of older adults were aged from 60 to 70 years and rural residents (74.1% and 68%, respectively). Highest percent of participants were female and married, 53.7% and 55.8%, respectively. According to educational level, majority of the studied clients were educated (90.5%). While most of the studied client didn't work and were not smoking, 61.9% and 89.8%, respectively.

The participants' pain characteristics are shown in **Table 2**. More than half of the older adults suffered from pain for more than five years, especially tingling and dull aching, 44.2% and 40.8%, respectively. The pain was intermittent in 81.6% of participants. The most factors increasing pain were work overload (45.6%) and anxiety and stress (31.3%). The pain was relieved by analgesics and anti-inflammatory drugs and rest and relaxation in 62.6% and 25.9% of participants respectively. According to pain level, more than half of participants suffered from moderate pain compared to 29.3% and 19.7% had mild and severe pain, respectively.

Table 3 shows distribution of the studied older adults regarding SC, mindfulness, ERD and FD. It was found that highest percent of participants had moderate total score of mindfulness (85.7%), SC (91.8%), and ERD (85%). However, less than half of them had low (46.3%) and moderate (45.6%) score of FD.

Table 4 presents the correlation between mindfulness, SC, ERD, and FD. The table presents a highly negative statistical correlation between SC, mindfulness, and FD (r = -0.584, p = <0.001, and r = -0.616, p = <0.001, respectively). The table also shows a highly positive statistical correlation between ERD, pain severity, and FD (r = 0.807, p = <0.001, and r = 0.745, p = <0.001, respectively). This means that participants who had lower mean score of FD had higher mean score of SC, and mindfulness, and lower level of ERD and pain severity.

Table 5 and Figure 1 show that SC mediated the relationship between

CP and FD. It was found that Chi-square test equals 0.00, goodness of fit index (GFI) equals 0.99, comparative fit index (CFI) equals 0.99. This indicated a good fit model in evaluating factors affecting FD. SC partially mediated relationship between CP and FD. This means that increased SC (β = 0.674, p < .001, 95% CI = 0.309 to 1.145), was associated with lower FD.

Table 6 and Figure 2 show that mindfulness mediated the relationship between CP and FD. It was found that Chi-square test equals 0.00, GFI equals 0.99, CFI equals 0.99. This indicated a good fit model in evaluating factors affecting FD. Mindfulness partially mediated relationship between CP, and FD. This means that increased mindfulness (β = 0.756, p < .001, 95% CI = 0.289 to 1.337), was associated with lower FD.

Table 7 and Figure 3 show that ERD mediated the relationship between CP and FD. It was found that Chi-square test equals 0.00, GFI equals 0.99, CFI equals 0.99. This indicated a good fit model in evaluating factors affecting FD. ERD partially mediated relationship between CP, and FD. This means that increased emotion regulation difficulties (β = 2.225, p < .001, 95% CI = 1.784 to 2.777), was associated with higher FD.

Table 1. Demographic characteristics of studied older adults

Characteristic		Total Number =147	
		No.	%
Age	60-70	109	74.1
	>70	38	25.9
Sex	Male	65	44.2
	Female	82	55.8
Residence	Urban	47	32.0
	Rural	100	68.0
Marital status	Married	79	53.7
	Single	51	34.7
	Widow	17	11.6
Educational level	Educated	133	90.5
	Not educated	14	9.5
Income	Sufficient and save	20	13.6
	Sufficient	84	57.1
	Insufficient	43	29.3
Current work	Work	56	38.1
	Not work	91	61.9
Smoking	No	132	89.8
	Yes	15	10.2

Table 2. Distribution of pain characteristics of studied older adults

Characteristic		Total Number =147	
		No.	%
Duration of pain	6 months	9	6.1
	1 year	18	12.2
	1-5 years	34	23.1
	>5 years	86	58.5
Pain nature	Dull aching	60	40.8
	Burning	22	15.0
	Tingling	65	44.2
Pain rhythmicity	Continuous	27	18.4
	Intermittent	120	81.6
Aggravating factors	No enough sleeping	14	9.5
	Anxiety and stress	46	31.3
	Work overload	67	45.6
	Extreme emotions	20	13.6
Alleviating factors	Rest and relaxation	38	25.9
	Analgesics and anti-inflammatory drugs	92	62.6
	Decreasing weight	17	11.6
Pain severity	Mild	43	29.3
	Moderate	75	51.0
	Severe	29	19.7
	Mean± SD	4.60 ± 2.34	

Table 3. Distribution of participants regarding SC, mindfulness, ERD and FD

Variables	Low		Moderate		High		Mean ± SD
	No.	%	No.	%	No.	%	
Mindfulness	14	9.5	126	85.7	7	4.8	44.22 ± 6.52
SC	6	4.1	135	91.8	6	4.1	82.03 ± 10.62
ERD	3	2.0	125	85.0	19	12.9	114.99 ± 16.88
FD	68	46.3	67	45.6	12	8.2	30.7 ± 9.65

Table 4. Correlation matrix between study variables

Variables	Self-compassion		Mindfulness		ERD		Functional disability	
	r	P	r	p	r	p	r	P
Self-compassion								
Mindfulness	0.498	<0.001**						
ERD	0.483	<0.001**	0.551	<0.001**				
Functional disability	-0.249	<0.001**	-0.274	<0.001**	-0.404	<0.001**		
Pain severity	0.002	0.982	0.005	0.953	0.009	0.916	0.187	0.023*

** statistically highly significant (p<0.01)
r: correlation coefficient

Table 5. A path analysis of effects (direct and indirect) of CP on FD mediated by SC

Variable 1	Direction	Variable 2	Path type	B	C.R	*P* value
CP	→	SC	Direct	-2.848	-8.946	0.001**
SC	→	FD	Direct	-.237	-3.275	0.001**
CP	→	FD	Direct	3.216	9.301	0.001**
CP	→	FD	Indirect	0.674	N/A	0.001**
95% Confidence interval of bootstrap method of indirect path was 0.309 to 1.145						

**Statistically highly significant (p<0.01).
Indices of good model fit: $\chi 2$= 0.00, DF=0.0, GFI= 0.99, CFI= 0.99, Root Mean Square Error of Approximation can't be calculated.

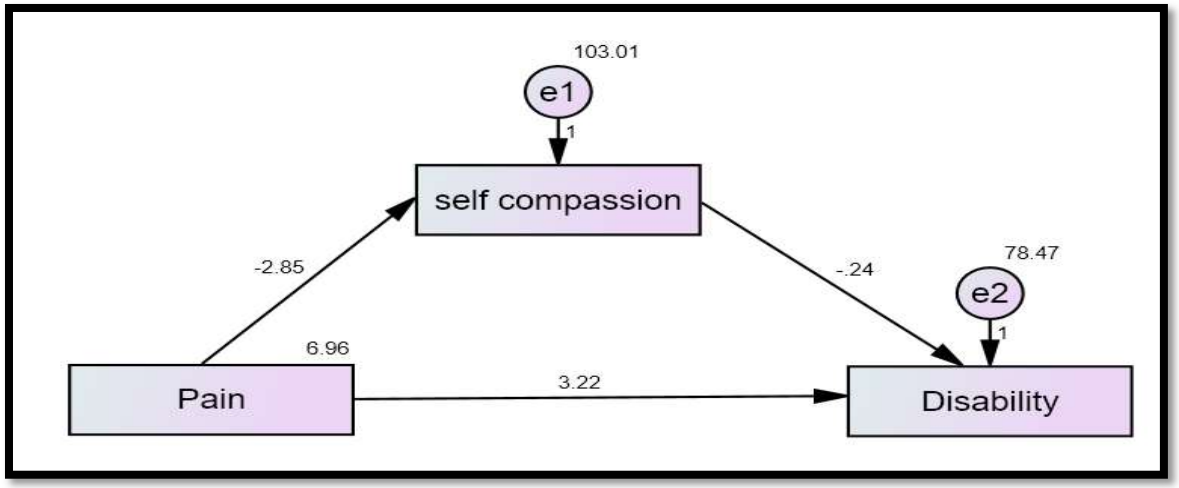

Figure. 1. The path analysis of the Beta coefficients evaluated pain' effects (direct and indirect) on FD, with SC as a mediating factor

Table 6. A path analysis of effects (direct and indirect) of CP on FD mediated by mindfulness

Variable 1	Direction	Variable 2	Path type	β	C.R	P value
CP	→	Mindfulness	Direct	-2.862	-10.633	0.001**
Mindfulness	→	FD	Direct	-0.264	-3.079	0.001**
CP	→	FD	Direct	3.134	8.432	0.001**
CP	→	FD	Indirect	0.756	N/A	0.001**
95% Confidence interval of bootstrap method of indirect path was 0.289 to 1.337						

**Statistically highly significant (p<0.01).
Indices of good model fit: χ2= 0.00, DF=0.0, GFI= 0.99, CFI= 0.99, Root Mean Square Error of Approximation can't be calculated.

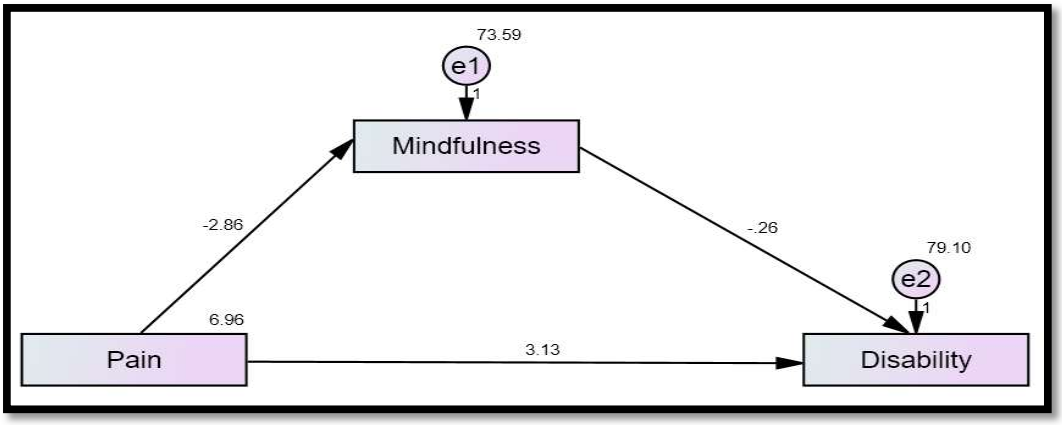

Figure. 2. The path analysis of the Beta coefficients evaluated pain' effects (direct and indirect) on FD, with mindfulness as a mediating fact

Table 7. A path analysis of effects (direct and indirect) of CP on FD mediated by ERD

Variable 1	Direction	Variable 2	Path type	β	C.R	P
CP	→	ERD	Direct	7.720	13.733	0.001**
ERD	→	FD	Direct	0.288	8.226	0.001**
CP	→	FD	Direct	1.665	4.620	0.001**
CP	→	FD	Indirect	2.225	N/A	0.001**
95% Confidence interval of bootstrap method of indirect path was 1.784 to 2.777						

**Statistically highly significant (p<0.01).
Indices of good model fit: χ2= 0.00, DF=0.0, GFI= 0.99, CFI= 0.99, Root Mean Square Error of Approximation can't be calculated.

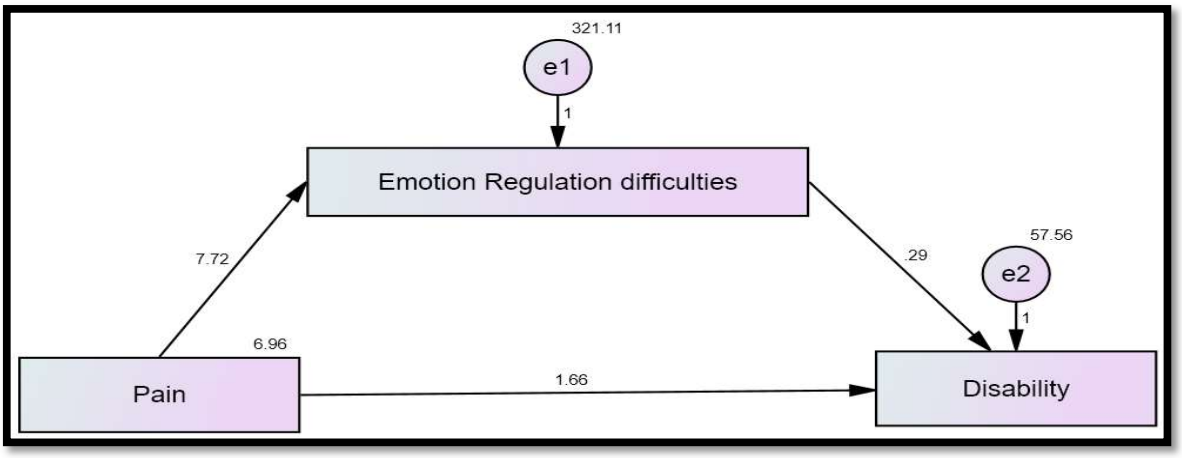

Figure. 3. The path analysis of the Beta coefficients evaluated pain' effects (direct and indirect) on FD, with ERD as a mediating factor

Discussion

This study explored the associations between CP and FD and whether mindfulness, SC, and ERD mediated these associations. We found that both low SC, mindfulness, severe pain, and DER increased the odds of FD among the older adults in Egypt; the relationships remained significant after controlling for potential covariates. Furthermore, the relationship was found to be partially mediated by SC, mindfulness, and ERD. To our knowledge, this study is the first that analyze the relationship between CP and FD, as well as the role of mindfulness, SC, and ERD in mediating this relationship.

In our population, more than two thirds of older individuals experienced moderate to severe pain, with participants experiencing more pain reporting higher FD. One possible explanation is age-related changes in cerebral pain processing, as areas responsible for processing pain (e.g., the cingulate, insula, and striatum) decline with age. Additionally, cognitive disabilities, such as dementia and the inability to express pain, may exacerbate the relationship between pain and FD **(Wong, Karppinen, & Samartzis, 2017)**. This trend aligns with previous research conducted in Japan **(Makino et al., 2019)**, South Africa **(Kamerman et al., 2020; Pandelani, Nyalunga, Mogotsi, & Mkhatshwa, 2023)**, and Finland **(Marttinen et al.,**

2019), which showed older age as a predictor of CP.

The study findings revealed that most of participants demonstrated moderate levels of SC, mindfulness, and DER, indicating strong adaptive emotional and cognitive strategies. However, nearly half exhibited FD, suggesting that while psychological resources are relatively well-developed, functional challenges remain significant. These results highlight the need for targeted interventions to address FD while leveraging strengths in mindfulness, SC, and emotion regulation.

Guendelman et al. (2017) demonstrated the relationship between mindfulness and emotion regulation, suggesting that changes in emotion regulation drive the beneficial effects of mindfulness-based interventions. Additionally, path analyses by **Murfield, Moyle, O'Donovan, & Ware (2024)** concluded that higher levels of SC and mindfulness were associated with improvements mediated by a decline in ERD. The prevalence of FD remains a major concern, as fewer than half of the participants showed low or moderate disability levels, highlighting an essential area for intervention of older populations.

A significant relationship was found between older adults' health status, duration of pain, pain rhythmicity, pain intensity, and FD. CP can contribute to depression, anxiety, and other mental health issues, impacting physical, emotional, and psychological health. While mindfulness, SC, and emotion regulation enhance coping and resilience, FD appears to be more influenced by pain severity, duration, and type. These findings highlight the need of integrating psychological factors into pain management strategies in order to address the complicated interaction between CP and functional outcomes.

This result is consistent with a recent mediation analysis by **Bernardes, Brandão, de Matos, & Ferreira-Valente (2024)**, which indicated that patients with chronic pain report difficulties with everyday life activities and physical functioning. A systematic review by **Greff Ballejos, Calvetti, Schaab, & Reppold (2023)** also demonstrated a significant relationship between functional disability scores, health status, and various pain factors as duration, nature, and severity. Participants with higher functional disability were more likely to report severe and continuous chronic pain lasting over five years.

In this study, older persons with a high degree of FD had poor

mindfulness, SC, and difficulty regulating their emotions. Psychological strategies significantly enhance emotional resilience and overall functional abilities. SC fosters kindness during challenges, mindfulness encourages present-moment awareness, and effective emotion regulation reduces distress, mitigating functional disabilities. **Murfield et al. (2024)** found that greater SC and mindfulness were linked to lower psychological distress, with ERD acting as a mediator. These findings align with **Pickering, Weiss, Yildiz, & Sullivan (2024)**, who highlighted the inverse relationship between SC and emotion dysregulation, demonstrating that self-compassionate patients are less prone to suffer from distress and maladaptive coping strategies, which can contribute to FD in older adults.

Stepwise multiple linear regression analysis revealed that mindfulness and ERD significantly predicted SC, while SC, emotion regulation, and educational level influenced mindfulness. Additionally, SC and mindfulness positively impacted ERD, but functional disability had a significant negative effect. These findings suggest that enhancing mindfulness, self-compassion, and emotion regulation, along with addressing modifiable risk factors like pain, could improve psychological well-being and reduce functional disability.

Previous studies support these findings. **Biehler and Naragon (2022)** confirmed that self-compassion and mindfulness positively influence emotion regulation, particularly in moments of negative affect **Wang, Chu, & Dai (2022)** in China suggested that education plays a role in reducing disability's effects on emotional well-being by enhancing coping strategies. **Murfield et al. (2024)** also confirmed that emotion regulation scores and education level were adversely related to disability, although pain severity and smoking had a positive correlation with FD levels. **Pickering et al. (2024)** revealed that disability significantly negatively affects emotion regulation scores, as older adults with advanced FD report greater difficulties managing emotions.

The mediation analysis found that SC, mindfulness, ERD acts as potential mediators of the relationship between CP and FD. Therefore, these factors may be partially mediating the effect of CP on FD. Previous studies support these findings **(Hilton et al., 2017; Mistretta, Davis, Bartsch, & Olah,**

2023). A Chinese study by **Wang et al. (2022)** confirmed that mindfulness meditation enhances pain, depression, and quality of life outcomes. Furthermore, **Alinajimi, Deldar, Dehghani, & Khatibi (2023)** underlined the relevance of ERD as a mediator in the link between pain and coping mechanisms, emphasizing the necessity of regulating emotions in controlling CP and its accompanying FD.

To sum up, this study is extremely valuable since it sheds insight on the complex processes that can lessen the suffering brought on by functional disability and chronic pain in older persons. As a result, the current study suggests that rehabilitation strategies for older persons with chronic pain incorporate psychological intervention programs based on self-compassion and mindfulness. Additionally, it motivates future research endeavors to create useful guidance programs that enable healthcare professionals and caregivers to fully address the psychological and physical needs of older adults.

Conclusion and recommendations

This study demonstrated that chronic pain and functional disability were positively associated and that the association were partially mediated by the effects of SC, mindfulness, and ERD. We suggest that appropriate SC and good mindfulness are beneficial to improve functioning of older population. Meanwhile, reducing the difficulties of emotion regulation, an additional goal of maintaining good coping strategies, could also improve overall functioning among older adults.

To effectively translate these findings into practice, healthcare professionals should regularly screen for emotional functioning in addition to physical symptoms and incorporate self-compassion, mindfulness, and emotion regulation strategies into standard geriatric pain management and rehabilitation programs. Furthermore, researchers need to conduct clinical trials and longitudinal studies to identify causal pathways and improve current interventions tailored to older populations.

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Relation between Head Nurses' Authentic Leadership and Nurses' Career Aspiration

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Abstract

Background: Authentic leadership has been emerged as a key factor for influencing nurses' motivation, job satisfaction, and career aspiration which act a prominent role in developing long term nurses' career development, particularly in complex healthcare environments. **Aim:** To assess the relation between head nurses' authentic leadership and nurses' career aspiration. **Design:** A descriptive – correlational research design was used to conduct this study. **Setting and Subject:** All (n= 568) nurses working at El Menshawy General Hospital. **Tools:** Two tools were utilized; Authentic leadership Questionnaire and Nurses' Career Aspiration Questionnaire. **Results:** High percent (64.4%) of nurses perceived a high level of head nurses' authentic leadership. Majority (84.9 %) of nurses had a high level of career aspiration. **Conclusion:** A positive statistically significant correlation was found between head nurses' authentic leadership and nurses' career aspiration. **Recommendations:** Head nurses should foster a transparent and supportive work environment characterized by trust, ethical conduct, and open communication. Also, provide nurses with opportunities for leadership development and participation in decision-making processes to support their professional advancement and career aspirations.

***Keywords*:** Authentic Leadership, Career Aspiration, Head nurses, Nurses.

Introduction

Nursing is a profession provides both independent and team-based care in all healthcare settings, guided by ethical principles and scientific knowledge to ensure safe and effective care in today's changing healthcare system, delivered by skilled nurses **(Gonzalez-Garcia et al., 2025)**.The complex nature of healthcare requires nurses to have a wide range of skills, such as problem-solving, decision-making, critical thinking, emotional intelligence, and good communication skills, all of which are essential for effective practice. The continuous development of nurses' skills can be supported through relational nursing leadership, which increases nurses' independence and motivation, creates a positive work environment, and improves nurses' performance and outcomes, including the development of authentic leadership) Ayed **et al., 2025)**.

Authentic leadership has been identified as an effective leadership style that promotes transparency, trust, and empowerment, which enhances nurses' performance, confidence, and job satisfaction **(Almutairi, Timmins, Wise, Stokes & Alharbi, 2025)**. Authentic leadership is a value-based leadership approach grounded in ethical behavior, self-awareness, and integrity. Head nurses who practice authentic leadership align their actions with internal moral principles, demonstrate transparency in their interactions, and promote balanced decision-making. By fostering psychological safety, openness, collaboration, and trusting relationships, authentic head nurses empower staff nurses, strengthen team effectiveness, support professional growth, and ultimately improve the quality of patient care. **(Kelly & Hashemi, 2022)**.

Authentic leadership includes four core dimensions: self-awareness, internalized moral perspective, relational transparency, and balanced processing. Self-awareness refers to the leader's ability to understand their strengths, limitations, emotions, and the impact of their behavior on others, which contributes to more reflective and responsible leadership practice. Internalized moral perspective reflects a strong internal ethical framework that guides decision-making based on personal values rather than external pressures, ensuring consistency and integrity in professional conduct **(Zhu, 2025)**.

Relational transparency involves open, honest, and appropriate sharing

of information and feelings with team members, which fosters trust, openness, and stronger interpersonal relationships within nursing teams. Balanced processing refers to the leader's ability to objectively analyze all relevant information before making decisions, including considering different viewpoints and evidence in a fair and unbiased manner. This leadership style can be associated with higher nurses' engagement, job satisfaction, career aspiration and professional development **(Teo, Lux & Pick, 2023)**.

Career aspiration in nursing refers to long-term professional goals that nurses aim to achieve, such as leadership positions, higher education, and professional excellence. These aspirations reflect nurses' perception of their future career paths and motivation to improve skills and advance within the healthcare system. Career aspirations are shaped in multiple ways including internal factors such as motivation, self-confidence, and personal goals, as well as external factors like the work environment and leadership style **(Zhang et al., 2025)**. In this regard, authentic leadership plays an important role in strengthening nurses' self-efficacy, enhancing their confidence, and creating a supportive work environment that promotes continuous learning and career development **(AbuAlRub, Mrayyan, & Bani-Younes, 2026)**.

Career aspiration among nurses can be categorized into three main dimensions: leadership aspiration, educational aspiration, and achievement aspiration. Leadership aspiration reflects the desire to occupy managerial or supervisory roles and contribute to decision-making processes within healthcare organizations. Educational aspiration refers to the pursuit of higher academic qualifications and ongoing professional learning to improve knowledge and clinical competence. Achievement aspiration, focuses on attaining excellence in performance, meeting professional standards, and achieving recognition within the nursing profession **(Salama, Abd El Rahman, & Ali, 2025)**.

Significance of study

Nursing faces major challenges such as workforce shortages, increased workload, and complex patient needs, which affect performance and quality of care **(Elmi & Abdi, 2025)**. Authentic leadership is increasingly important in addressing these challenges by promoting integrity, trust, and supportive communication

It is regarded as a key concept in nursing, as it has been shown to influence nurses' outcomes and suitable for managing complex clinical situations **Leclerc, Kennedy & Campis, 2021)** .

Establishing strong and positive relationships between leaders and nurses is essential to build a supportive and motivating work environment, which, in turn, enhance nurses' motivation, autonomy, decision-making and career aspiration.

Supporting nurses' career aspirations is essential in modern healthcare systems focused on innovation and improvement **(Wille, Opheim, Princeton, Kisa & Hjerpaasen, 2025)**. Therefore, this study aimed to assess relation between head nurses' authentic leadership and nurses' career aspiration.

Aim of the study

Assess relation between head nurses' authentic leadership and nurses' career aspiration.

Research questions

- What are the levels of head nurses' authentic leadership as perceived by nurses?
- What are the levels of nurses' career aspiration?
- What is the relation between head nurses' authentic leadership and nurses' career aspiration?

Subjects and Method

Research design: A descriptive correlational research design was used in the present study.

Setting:

The study was conducted in all departments of El Menshawy General Hospital, including the Pediatric, Medical, Surgical, Orthopedic, Kidney Dialysis, Gynecology, and Emergency departments, as well as the Medical, Cardiology, Pediatric, Neurology, and Neonatal Intensive Care Units (ICUs).

Subjects:

Included all (568) nurses working in the previously mentioned setting at time of data collection.

Tools of data collection:

Two tools were used data collection.

Tool I: Authentic Leadership Questionnaire. It consisted of two parts: **Part 1:** Nurses' personal data included age, sex, marital status, level of education, department and years of experience. **Part 2:** Authentic Leadership Questionnaire. It was developed by **Walumbwa, Avolio, Gardner, Wernsing, & Peterson, (2008)** and was modified by the investigator based on relevant literature reviews **(Aboelenein & Mostafa, 2023; Kleynhans, Heyns, & Stander, 2021)** to assess levels of

head nurses' authentic leadership as perceived by nurses. It contained 24 items, categorized in-to four dimensions: self-awareness (6 items), relational transparency (6 items), internalized moral perspective (6 items) and balanced processing (6 items).

Nurses' responses were measured on five points Likert Scale ranged from 1-5, where (1) strongly disagree (2) disagree (3) neutral, (4) agree and (5) strongly agree. The total scores were summed up and represented at varying levels based on cut off points as follows: High level ≥75%, moderate level 60 %< 75%, low level of authentic leadership < 60%.

Tool II: Nurse' Career Aspiration Questionnaire. It was developed by **Gregor & O'Brien (2015)** and modified by the investigator based on relevant literature reviews **(Mohamed, Zayed & Ahmed, 2022**; **Mohamed & Diab, 2021)** to assess levels of career aspiration among nurses. It contained14 items categorized in-to three dimensions: leadership aspiration: (4 items), education aspiration: (5 items) and achievement aspiration: (5 items).

Nurses' responses were measured on a five points Likert Scale ranging from 0 to 4 as following (0) not at all true, (1) slightly true, (2) moderately true, (3) quite a bit true and (4) very true. The total scores were summed up and represented at varying levels based on cutoff points as follows: High level ≥75%, moderate level 60 %< 75%, low level of career aspiration <60%.

Method:

- **An official permission** was obtained from the Dean of Faculty of Nursing and the authoritative personnel of El Menshawy General Hospital
- **An approval** from the Scientific Research and Ethical Committee at Faculty of Nursing was obtained with code (461-5-2024).
- **Informed consent** was obtained from nursing staff after explanation of the study aim. Confidentiality and privacy were maintained regarding data collection and participants had right to withdrawal from the study at any time.
- **Tools I and II** were translated to Arabic that presented to a jury of five experts in the area of specialty to check content validity of its items. The face validity value of tool (I) was **90%** and for tool (II) **89.3%**
- **A pilot study** was carried out on 10% (n=57) to test the sequence of items, clarity, applicability and relevance of question. The sample of the pilot study were not excluded

from the total study subjects because no modifications were done.

- **Reliability of tools** was tested using Cronbach Alpha Coefficient test. The reliability value of tool (I) was **0.930** and for tool (II) was **0.890.**
- **Data collection phase:** the researcher distributed tools on nurses individually at their work setting during the morning and afternoon shifts. The researcher met nurses in the waiting area of their department to explain the aim of the study and distribute the questionnaire sheet for them. The subjects recorded the answer in the presence of the researcher to clarify any questions needed. The time needed to complete the questionnaires was 15 – 20 minutes and data was collected over a period of six months, starting from (September 2024 to February 2025).

Results

Table (1): Illustrates distribution of nurses' personal characteristic. The table reveals that more than half (51.6 %) of nurses were in the age group 30-40 with mean score 30.76 ± 5.50. High percent (71.8%) of nurses were female and 74.6% of them were married. around half (46.1%) of nurses had Bachelor degree of nursing science. 12.9% of nurses worked in emergency department and only (7.7%) of them worked in gynecology department. High percent (47.7%) of nurses had from 5-10 years of experience with mean score 8.52 ± 5.75.

Figure (1): Highlights overall levels of head nurses' authentic leadership as perceived by nurses. It shows that high percent (64.4%) of nurses perceived high level of head nurses' authentic leadership, while nearly one quarter (23.6%) of them perceived a moderate level and 12.0% perceived low level of head nurses' authentic leadership.

Table (2): Represents levels of authentic leadership dimensions as perceived by nurses. As noticed, high percent (76.8%, 68.0%, 64.8%. 64.6%) of nurses perceived that head nurses had high levels of balanced processing, self-awareness, relational transparency and internalized moral perspectives, respectively

Figure (2): Show levels of overall nurses' career aspiration. The figure shows majority (84.9 %) of nurses had a high level of career aspiration, while low percent (9.2%) of them had a moderate level and only (6%) of them had a low level of career aspiration.

Table (3): Represents levels of nurses' career aspiration dimensions. The table reveals that majority (89.6%, 85.6%) of nurses

had high levels of achievement and education aspiration dimensions of career aspiration, respectively. Moreover, more than three-quarters (78.0%) of nurses had high levels of leadership aspiration,

Figure (3): **Illustrates correlation between head nurses' authentic leadership and nurses' career aspiration.** The figure shows that a positive statistically significant correlation between head nurses' authentic leadership as perceived by nurses and nurses' career aspiration at p=< 0.001*

Table (1): Distribution of nurses' personal characteristic (n = 568)

Personal data	No.	%
Age (years)		
<30	252	44.4
30 - 40	293	51.6
>40	23	4.0
Median	30.0	
Mean ± SD.	30.76 ± 5.50	
Sex		
Female	408	71.8
Male	160	28.2
Marital status		
Married	424	74.6
Un married	144	25.4
Level of education		
Secondary nursing diploma	61	10.7
Nursing technical institute	166	29.2
Bachelor of nursing sciences	262	46.1
Post graduate studies	79	13.9
Department		
Pediatric department	53	9.3
Medical department	50	8.8
Surgical department	55	9.7
Orthopedic department	47	8.3
Kidney Dialysis department	46	8.1
Gynecology department	44	7.7
Emergency department	73	12.9
Cardiology care unit	47	8.3
Pediatric intensive care unit	45	7.9
Neonate intensive care	56	9.9
Medical intensive care unit	52	9.2
Years of experience		
<5	146	25.7
5 – 10	271	47.7
>10	151	26.6
Min. – Max.	0.0 – 26.0	
Median	8.0	
Mean ± SD.	8.52 ± 5.75	

SD: **Standard deviation**

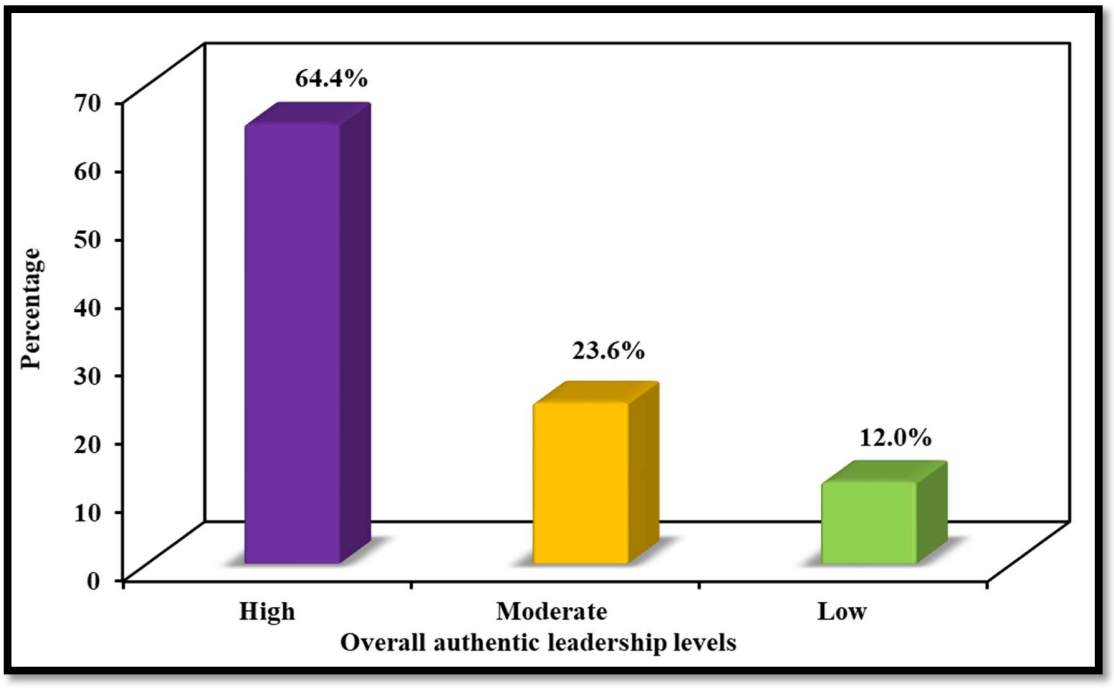

Figure (1): Overall levels of head nurses' authentic leadership as perceived by nurses (n = 568)

Table (2): Levels of authentic leadership dimensions as perceived by nurses (n = 568)

Authentic Leadership Dimensions	Levels of Authentic Leadership					
	High (>75%)		Moderate (60 – 75%)		Low (<60%)	
	No.	%	No.	%	No.	%
Self-awareness	386	68.0	109	19.2	73	12.8
Relational transparency	368	64.8	106	18.7	94	16.5
Internalized moral perspectives	367	64.6	108	19.0	93	16.4
Balanced processing	436	76.8	59	10.4	73	12.8

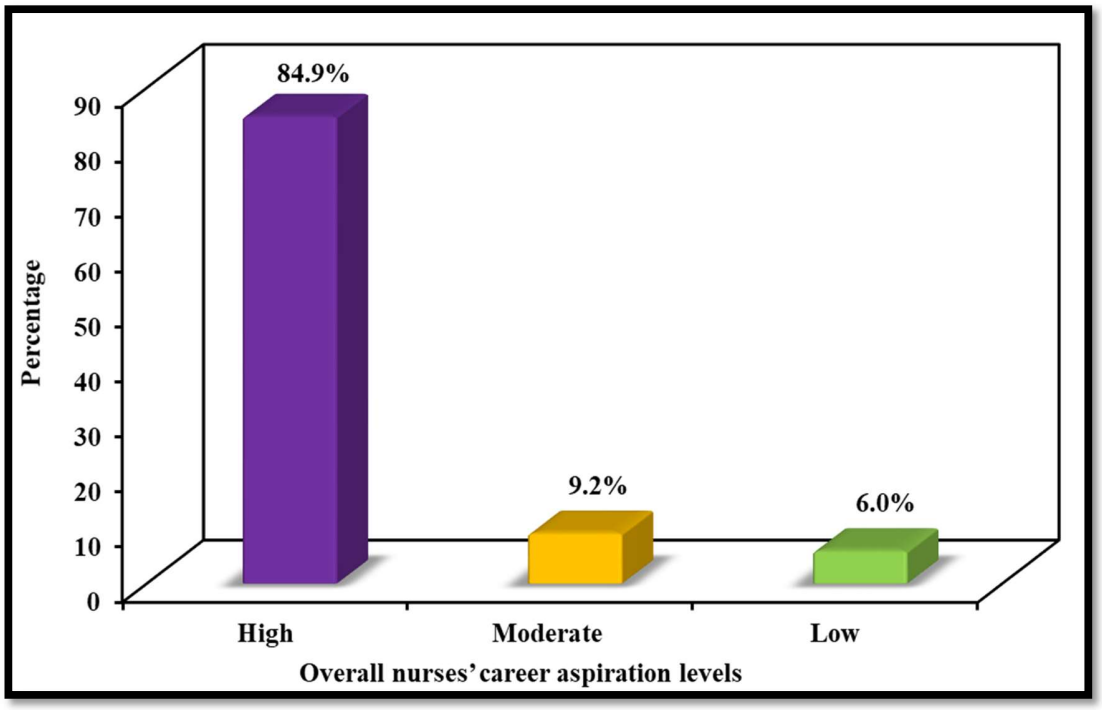

Figure (2): Levels of overall nurses' career aspiration (n = 568)

Table (3): Levels of nurses' career aspiration dimensions (n = 568)

Career aspiration dimensions	**Levels of nurses' career aspiration dimensions**					
	High (>75%)		**Moderate (60 – 75%)**		**Low (<60%)**	
	No.	**%**	**No.**	**%**	**No.**	**%**
- **Leadership aspiration**	443	78.0	65	11.4	60	10.6
- **Education aspiration**	486	85.6	36	6.3	46	8.1
- **Achievement aspiration**	509	89.6	49	8.6	10	1.8

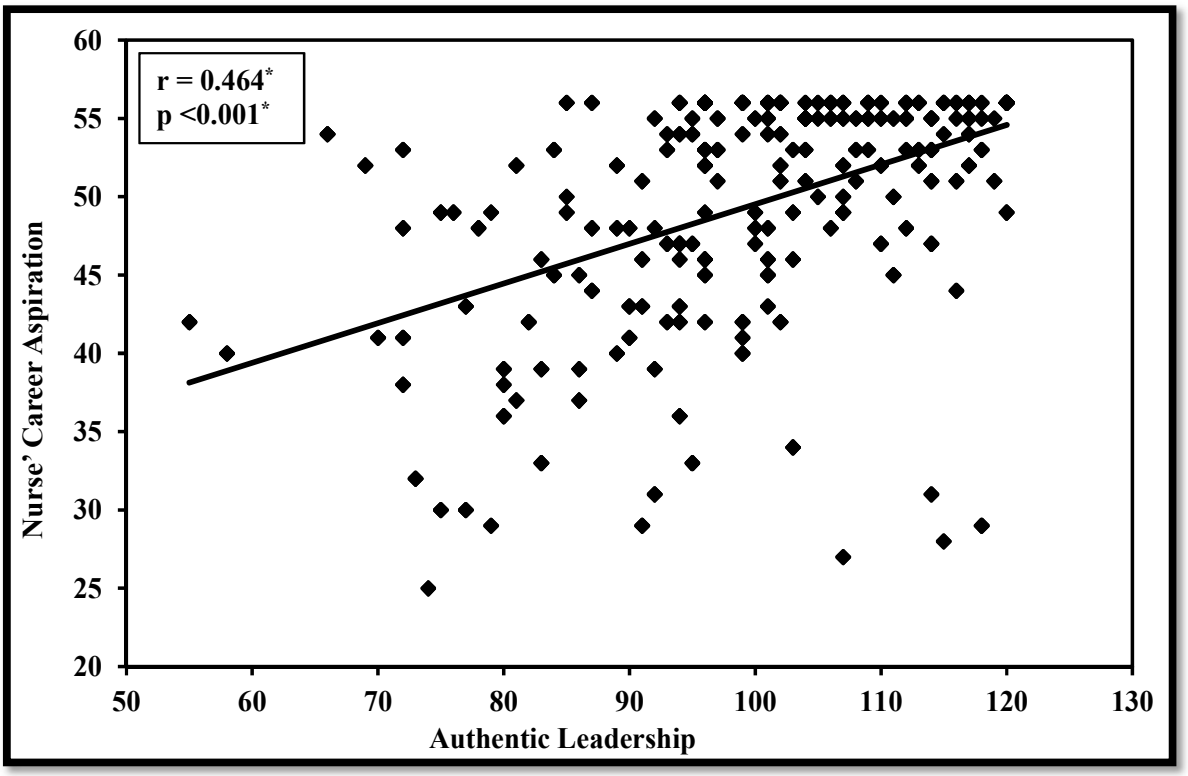

Figure (3): Correlation between head nurses' authentic leadership and nurses' career aspiration (n = 568)

Discussion

Current healthcare challenges necessitate leadership strategies that effectively support nursing staff and reduce turnover. Authentic leaderships characterized by self-awareness, relational transparency, and ethical integrity. It has been emerged as a vital catalyst for creating positive work environments. By fostering trust and psychological empowerment, authentic leaders significantly influence their nurses' career aspirations, encouraging long-term professional growth rather than exit intentions **Almutairi et al.(2025)**. Therefore, the present study was conducted to assess the relation between head nurses' authentic leadership and nurses' career aspiration.

Head nurses' authentic leadership. The present study results revealed that a high percent of nurses perceived a high level of overall head nurses' authentic leadership, while nearly one quarter of them perceived a moderate level. From the researcher's viewpoint, the high level of overall authentic leadership among head

nurses as perceived by nurses may be attributed to the demanding health care environment and challenges that requires leaders to demonstrate transparency, ethical conduct and supportive relationships with nursing staff. Furthermore, head nurses adopt authentic leadership behaviors to maintain team cohesion, built trust and improve staff morale resulting in higher perceived level of authentic leadership.

These results are supported by **Ibrahim (2025)** reported that more than two-thirds of head nurses had a high level of authentic leadership. In contrast, **Almudhaybiri, Vasquez, Soriano, Alrasheadi, & Albougami (2026)** revealed that nurses rated their supervisors' authentic leadership at a critically low level.

Regarding head nurses' authentic leadership dimensions present study results revealed that two thirds of the nurses perceived that head nurses had high level of self-awareness. This may be due to the fact that, the majority of nurses agreed that their head nurses aware clearly of the impact he/she has on others, as have limits in dealing with others at work and exploit their strengths to enhance work environment, respectively. Also, from the researcher view point this is may be attributed to their extensive clinical and managerial experience, which enables them to better understand their strengths, weaknesses, values, and the impact of their behaviors on others. In addition, their leadership roles require continuous self-reflection, effective communication, evaluation of their decisions and actions.

These results are supported by **Shurab, Ibrahim, Abdelaalem, Gabal, & Abdelhady (2024)** who reported that head nurses demonstrated a high level of self-awareness. In contrast, **Ibrahim (2025)** found that self-awareness levels among head nurses varied, with some demonstrating moderate to low levels and inconsistent application in their daily practice.

Regarding to the relational transparency dimension of authentic leadership, the present study showed that over sixty percent of nurses perceived a high level of relational transparency among head nurses. This can be explained by the majority of nurses agreed that their head nurses' tendency to clearly express their thoughts, share information openly with others, and communicate their ideas effectively as perceived by the majority of nurses. Adding to that, the result indicated the supportive leadership adopted by head nurses

along with their clinical and managerial experience which contribute to creating a psychologically safe work environment where nurses feel comfortable expressing concerns and opinions that enhance transparent relationships between nurses and head nurses

These results are supported by **Almahdali, Alharbi, & Al-Amri (2024)**, whose study demonstrated that nursing managers achieved high levels of relational transparency of authentic leadership following a specialized educational program. Conversely, **Farg et al. (2024)** found that relational transparency at a low-level dimension of authentic leadership among head nurses.

According to the internalized moral perspective dimension of authentic leadership, the current study revealed that over sixty percent of nurses perceived a high level among head nurses. This may be due to the fact that majority of nurses agreed that their head nurses leads nursing staff in accordance with professional core values and acts with their internal moral standards. As well, from the researcher view point this result may be due to the leadership responsibilities, head nurses are often expected to act fairly, honesty and consistently when prioritizing patient care and staff welfare that strength ethical judgment and accountability in work place practices that contribute to higher level of internalized moral perspective among head nurses.

These findings are supported by **Ahmed, Mahmoud, & Helaly (2025)**which reported that internalized moral/ethical perspective dimension of head nurses' authentic leadership was perceived at a high level. Conversely, **Alkhatib & Alhusami (2024)** reported that the moral/ethical perspective was perceived at a moderate level.

In relation to balanced processing dimension of authentic leadership, the current study revealed that more than three quarters of nurses perceived that head nurses had high level of balanced processing. This can be explained by the vast majority of nurses agreed that head nurses search for that challenging ideas and the majority of them agreed that the head nurses analyze objectively relevant data before making a decision, listen carefully to alternative viewpoints from nurses before reaching a conclusion and give and receives feedback effective and constructive to other.

As well, from the researcher's perspective this result may be

attributed to head nurses' critical role in making clinical and administrative decisions that require careful evaluation of different viewpoints and available information. Adding to that head nurses often consider staff opinions, patient need and organization policies before making decisions promote objective and balanced judgment

These findings are supported by **Mohamed, Seada, & Ali (2024)** who reported that balanced processing was at high level. Conversely, **Tawfik & Mahgoub (2024)** reported that balanced processing was the lowest-rated authentic leadership dimension.

Nurses' career aspiration

The present results study revealed that the majority of nurses had a high level of career aspiration. From the researcher's viewpoint, suggests the presence of a supportive organizational environment and effective leadership practices that foster professional growth. When nurses perceive that their leaders value their contributions and provide various forms of support, they are more likely to set ambitious professional goals and actively pursue advancement. High career aspiration level reflects nurses' belief in the organization's ability to reward competence and high performance, which further reinforces their commitment to continued growth and development.

These findings are consistent with **Salama et al. (2025)** found that staff nurses demonstrated high levels of career aspiration at Kidney and Urology Minia University Hospital. In contrast, **Kotp, Aly, Ismail, Elmoaty, & Basyouny (2025)** who found that the majority of nursing graduates reported a moderate perception of their future career advancement.

The current study results revealed that high percent of nurses had high level of leadership aspiration. This result due to the fact that vast majority of nurses reported very true that they hope to become leaders in their nursing field and the majority of them reported very true that they seek to getting promoted to a leadership position in the hospital, have responsibility for the future direction of hospital and like to manage other nurses at hospital officially. Also, this result from the researcher's perspective may be due to the fact that nearly around half of nurses had bachelor degree of nursing sciences that make them had strong perception of their professional role that make them more likely to seek leadership opportunities, strength their

confidence and readiness for leadership responsibilities. Additionally, more than one quarter of nurses had more than ten years of experience that can inspire them to pursue leadership position.

These findings are consistent with **Labrague, Al Sabei, Al Rawajfah, Burney, & Abu AlRub (2024)** found that high percent of nurses intended to pursue formal leadership roles, indicating a high aspiration toward leadership positions.

In contrast, **Salama et al. (2025)** reported that moderate level of leadership aspiration indicate that nurses are less inclined to pursue leadership positions despite having high overall career aspirations. This could be attributed to the increased responsibilities, workload, and challenges associated with managerial roles.

According to educational aspiration dimension of career aspirations, the current results revealed that the majority of nurses demonstrated a high level of educational aspiration. This can have explained by vast majority of nurses reported very true that they plan to reach the highest level of education in nursing field, follow pursue additional training in their occupational area of interest and work always to remain current about recent advances in their nursing field. Adding to that, evidenced in the study results nearly to one seventh of the nurses were post graduate studies that make them more qualified and better prepared for advanced professional roles and may positively influence their clinical competence, decision-making abilities, and commitment to continuous professional development. They are also committed to keep themselves updated with the latest advancements in nursing practice and engaging in continuing education courses to further enhance their knowledge and competencies. Furthermore, the hospital's training department at Elmenshawy General Hospital supports the finding by providing regular updates, organizing training courses and lectures, and consistently monitoring nurses' performance level.

These findings supported by **Wang, Ge, Chu, & Xu (2024)** who reported that nurses were highly motivated to pursue postgraduate education to improve their academic qualifications, develop professional skills, and enhance future career opportunities.

In contrast ,**Robinson et al. (2026)** found that lower educational aspiration due to difficulties in balancing work, study, and family

demands has been reported among working nurses. Lack of shift flexibility and work–schedule conflicts are key barriers to higher nursing education among working nurses, particularly those who are married or older.

Regarding to achievement aspiration dimension of career aspirations, the vast majority of nurses had a high level of achievement aspiration. This can be due to the fact that the vast majority of nurses reported very true that they want to be among the best in their field, want their efforts to have a lasting impact on their field, aspire to have their contributions at work recognized by team work, aspire to outstanding at what their do at work is very important and plan to obtain many promotions in their hospital. Also, from the researcher's perspective, this can be rationalized by due to nursing inherently demands continuous professional development, accountability for critical patient outcomes, and a strong intrinsic motivation to deliver high-quality care. Achievement motivation acts as an internal psychological driver that encourages healthcare professionals to pursue challenging goals, enhance their competencies, and continuously update their clinical expertise in response to evolving healthcare demands.

These findings align with **Młynarska-Antochów et al. (2025**) revealed that nurses demonstrated high levels of achievement motivation, with prominent positive characteristics such as independence, confidence in success, eagerness to learn, and persistence. Conversely, **Salama et al. (2025)** reported that low level of achievement aspiration related to the other dimensions of all career aspiration.

Correlation between head nurses' authentic leadership and nurses' career aspiration.

The current study results revealed a positive statistically significant correlation between head nurses' authentic leadership as perceived by nurses and nurses' career aspiration. This finding can be interpreted by the notion that authentic leadership promotes trust, transparency, and empowerment, which motivate nurses to seek higher achievements, pursue further education, and aspire to leadership roles. Leaders who demonstrate ethical behavior, self-awareness, and balanced decision-making create supportive work environments that nurture professional growth and ambition.

This finding supported by **Farg et al. (2024)** who found that authentic leadership fostered career advancement intentions by enhancing nurses' willingness to pursue leadership roles. As well, **Mohammad, Abou Hashish, & Elliethey (2023**) reported that authentic leadership exhibited by nurse managers significantly enhanced nurses' self-efficacy to increased confidence and professional motivation

In contrast, **Alilyyani et al. (2024)** reported that there no statistically significant relationship between authentic leadership and professional outcomes. These findings suggest that authentic leadership may not directly influence all nurses' career development.

Recommendations

For Nursing Management:

- Implement authentic leadership development programs specifically designed for nurse managers and supervisors to strengthen self-awareness, ethical decision-making.
- Establish structured mentorship and career advancement pathways to support the development of future nursing leaders.
- Establish clear and transparent organizational communication channels between management and nursing staff to strengthen trust, collaboration, and support for nurses' career aspirations.

For Head Nurses:

- Participate in leadership development programs to enhance the practical application of authentic leadership principles in daily nursing management.
- Foster a supportive and healthy work environment through ethical practices, open communication, trust, and teamwork.
- Act as positive role models by providing individualized guidance, constructive feedback, and professional support to enhance nurses' performance and development.

For Nurses:

- Participate actively in leadership development, continuing education, and professional development programs to enhance career growth and advancement.
- Seek guidance and mentorship from authentic leaders to strengthen professional confidence and career planning.
- Take responsibility for personal and professional development by actively utilizing available opportunities to achieve career aspirations.

For Future Research:

- Examine the mediating and moderating effects of variables such as self-efficacy, resilience, work engagement, organizational support, and motivation on the relationship between authentic leadership and career aspirations.

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Effect of Emotional Regulation Training Program on Psychological Well-being of Nurses at Psychiatric and Mental Health Hospital

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Abstract

Background: Structured emotional regulation training programs are essential in supporting Nurses at psychiatric and mental health hospital in managing emotional challenges, thereby improving their psychological well-being. **Aim:** To evaluate the effect of an emotional regulation training program on the psychological well-being of nurses at a psychiatric and mental health hospital. **Subjects & Setting:** The study was conducted on a convenience sample of 50 nurses working at a psychiatric and mental health hospital. **Design:** A quasi-experimental research design with pre intervention, post intervention and follow-up assessment was utilized. **Tools of the Study: Three tools were used; Tool I:** Socio-demographic and professional data questionnaire developed by the researcher. **Tool II:** The Difficulties in Emotion Regulation Scale (DERS). **Tool III:** The Psychological Well-Being Scale. **Results:** The emotional regulation training program led to significant improvements in both emotion regulation and psychological well-being. A statistically significant negative correlation was found between emotion regulation difficulties and psychological well-being across all study phases. **Conclusion:** The program effectively enhanced emotional regulation and psychological well-being among psychiatric nurses. **Recommendation:** Continuous emotional regulation training program should be implemented for Psychiatric Nurses to enhance their emotion regulation skills, and promote their psychological well-being.

Keywords: Emotional Regulation, Psychological Well-being, Nurses at Psychiatric and Mental Health Hospital

Introduction

Psychiatric and mental health nurses often work in challenging environments with demanding job requirements, and they encounter a variety of emotional and professional challenges. Some of these challenges include providing care to individuals with severe and complex psychiatric disorders, managing aggression and challenging or violent behaviours, responding to episodes of violence in the workplace, ethical dilemmas, and working in high-pressure environments with a shortage of personnel and resources. Psychiatric nurses commonly face these demands and might suffer extensive emotional distress, ethical conflict, and increased risk of burnout **(Lamoureux et al., 2024; Li et al., 2025).** In their regular work, mental health nurses (MHNs) are susceptible to emotional stress, which may impact and worsen their psychological well-being and lead to mental health problems **(Zhang et al., 2024)**.

High degrees of psychological distress have been reported by mental health nurses worldwide. In a recent cross-sectional study of psychiatric nurses in Ghana, about one-fifth of the sample had symptoms of depression, 27% had symptoms of anxiety, and 42% had moderate to high levels of stress **(Opoku Agyemang et al., 2022)**. According to **Delgado et al. (2021)**, 7.8% of Australian mental health nurses had severe to very severe depression, 8.7% had severe anxiety, and 7.3% had severe stress.

In an Egyptian study conducted by **Mohamed et al. (2023)**, investigated how psychiatric nurses in Egypt handle their emotions and how this impacts their psychological well-being at work. They reported that psychiatric nurses had high levels of emotional stress, primarily because of the emotional strain of providing care for patients with mental health problems. Together, these findings demonstrate the significant psychological difficulties that mental health nurses face and emphasize the need for creating specific support systems, training programs, and intervention strategies **(Tran et al., 2019)**.

Recently, more attention has been paid globally to the strong correlation between nurses' psychological health and the quality of their care. Research indicates that nurses who are in optimal psychological well-being are more likely to be more productive, have better biopsychosocial health, be more satisfied with their jobs, and

perform better professionally **(Zhang et al., 2024)**. Psychological well-being is recognized as a complex state of optimal functioning that enables individuals to overcome and cope effectively with life's challenges, realize their full potential, and discover meaning and purpose in their lives **(Ryff, 2024)**. It reflects positive emotions, vitality, resilience, life satisfaction, and continuous personal development **(VanderWeele & Johnson, 2025)**.

Psychiatric nursing researchers proposed that emotions may be helpful personal resources that assist nurses in adjusting and recovering psychologically **(Lee & Jang, 2019)**. Emotions are essential to day-to-day existence because they influence how people view themselves, shaping their self-concept and engagement with others. On the other hand, excessive or poorly managed emotions can negatively affect mental health and interfere with daily activities. MHNs must therefore acquire effective emotion regulation techniques and implement effective strategies for managing their emotions to preserve both their psychological well-being and their ability to deliver superior patient care **(Gross, 2015; Bui et al., 2023)**.

Emotion regulation is the term used to describe the behavioural and cognitive processes that people employ to influence how they experience, express, and manage their emotions. It is now widely acknowledged as a goal-directed form of self-regulation that governs the emotions that are felt, when they occur, and how they are expressed, even though it was formerly believed to be a means of controlling both positive and negative emotional states **(Petrova & Gross, 2023)**. Consequently, healthy interpersonal relationships and positive psychological well-being are greatly enhanced by effective emotion regulation **(Gross, 2024)**.

Emotions are important for human functioning, influencing social interaction, self-esteem, and self-worth. However, poorly regulated emotions may interfere with daily functioning and reduce psychological well-being. MHNs are expected to use evidence-based emotion regulation strategies to preserve their own psychological health. Recent research has identified two major types of emotion regulation mechanisms that foster emotional control in stressful healthcare settings: cognitive reappraisal and expressive suppression. Cognitive reappraisal is a

deliberate change in one's evaluation of an emotional situation before the emotional response has been fully generated, therefore altering the emotional consequence of the situation. In contrast, expressive suppression is the deliberate blocking of outward emotional expressions once an emotion has been activated **(Erkayiran & Demirkiran, 2024; Entrata & Nicomedes, 2024)**.

A growing body of research has examined the relationship between emotion regulation strategies and the psychological well-being of MHNs. Overall, findings demonstrate that greater use of cognitive reappraisal is associated with improved psychological well-being and less psychological distress. Conversely, expressive suppression is generally connected with decreased psychological well-being and increased psychological symptoms **(Bagnara et al., 2025)**. Therefore, when the emotional regulation ability of MHNs is improved, they are abler to meet their emotional requirements. Effective emotion regulation is essential to sustain and improve overall psychological well-being **(Hasan & Alsulami, 2024)**.

Significance of the Study:

Psychiatric nursing is regarded as one of the most emotionally demanding health care specialties. Mental health nurses often encounter emotionally exhausting situations, which may harm their own psychological well-being. Thus, the ability to cope well with these emotional demands is essential. Training in emotion regulation may improve the psychological well-being of psychiatric nurses to a large degree. Nurses may decrease the intensity and frequency of painful emotional experiences by recognizing, understanding, accepting, and appropriately expressing their emotions. This, in turn, leads to improved emotional regulation and overall psychological health.

Therefore, it is highly recommended to implement systematic training programs focusing on emotion regulation approaches. These programs may help support and enhance MHNs' psychological well-being by providing them with the skills to cope with the emotional challenges of their work.

Aim of the Study

This study aimed to:

Evaluate the effect of emotional regulation training program on psychological wellbeing of nurses at psychiatric and mental health hospital.

Research Hypothesis

Psychological wellbeing of nurses at psychiatric and mental health hospital is expected to be improved after implementing the emotional regulation training program.

Subjects & Method

A-Subjects

I-Research design:

A quasi-experimental design was used for this study (one group pre-posttest)

II-Settings:

The study was conducted at the inpatient wards at the following settings:

-Psychiatry Department of Tanta University Hospital. Its capacity is (42 beds), divided into two wards for men (26 beds) and two wards for women (16 beds)

-Psychiatry department at the Psychiatry, Neurology and Neurosurgery Center, Tanta University. Its capacity is (77 beds)

Both previous settings are affiliated to the Ministry of High Education and Scientific Research.

III-Subjects:

A convenience sample of 50 nurses working in aforementioned study settings and providing direct nursing care for patients was recruited for the present study.

The sample size was 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
- 80% power of the study with a 5% margin of error
- The expected effectiveness of emotional regulation training program on psychological well-being among psychiatry nurses is to increase the level of emotional regulation to 85% or more after intervention. The sample size based on the previously mentioned criteria was found at N=45. The researcher increased the sample size to 50 nurses to compensate for incomplete results and default rate; the total number of target population of nurses is 90.

IV-Tools:

Two tools were used to collect the data for the present study:

Tool I: **Difficulties in Emotion Regulation Scale (DERS).**

This tool was divided into two parts: -

Part 1: Socio-Demographics and Professional Data Structured Questionnaire:

The tool was developed by the researcher to elicit data regarding the

socio-demographic characteristics of the studied nurses. It contained 7 questions that included age, sex, marital status, income, and professional characteristics, which incorporated educational qualifications, years of experience, and training courses in the field of mental health.

Part 2: Difficulties in Emotion Regulation Scale (DERS):

This scale was developed by Gratz & Roemer (2004) and adopted by the researcher. It measures difficulties in emotions regulation with particular emphasis on negative emotions. The scale is a 36 items self-report scored on six subscales:

-Non-acceptance of emotional responses: (6 items) 11, 12, 21, 23, 25, 29 like statement (When I'm upset, I become angry with myself for feeling that way)

-Difficulty engaging in goal-directed behavior: (5items) 13, 18, 20, 26, 33 such as (When I'm upset, I have difficulty getting work done)

-Impulse control difficulties: (6 items) 3, 14, 19, 24, 27, 32 e.g. (I experience my emotions as overwhelming and out of control)

-Lack of emotional awareness: (6 items) 2, 6, 8, 10, 17, 34 as (I pay attention to how I feel)

-Limited access to emotion regulation strategies: (8items) 15, 16, 22, 28, 30, 31,35, 36 like (When I'm upset, I believe that I will remain that way for a long time)

- Lack of emotional clarity: (5items) 1, 4, 5, 7, 9 like (I am clear about my feeling)

The items of the scale were scored on a 5 - point Likert scale that ranged from 1 (almost never) to 5 (almost always). The negative items had reverse score. Reverse items numbers (1, 2, 6, 7, 8, 10, 17, 20, 22, 24, 34)

The total score ranged from 36 to 180. The score of the participants was obtained by summing the corresponding items. Higher scores suggested greater difficulties with emotion regulation.

Scoring systems: calculated in the following way:

- Less than 50% referred to a low level of emotional regulation difficulties.
- 50 -75% indicated a moderate level of emotional regulation difficulties.
- More than 75% denoted **a high level** of emotional regulation difficulties.

Tool II: The Psychological Well-Being:

It was developed by Ryff (1995) and adopted by the researcher. It has 18 items and is composed of six

subscales; each subscale contains three items.

-Self-acceptance: (3 items) are Q1, Q2, and Q5. Like statement "I like most parts of my personality".

-Purpose in life: (3 items) are Q3, Q7, Q10. such as "Some people wander aimlessly through life, but I am not one of them"**.**

-Personal growth: (3 items) are Q11, Q12, Q14. like "For me, life has been a continuous process of learning, changing, and growth"**.**

-Positive relations with others: (3 items) are Q6, Q13, Q16, as "Maintaining close relationships has been difficult and frustrating for me"**.**

-Environmental mastery: (3 items) are Q4, Q8, Q9. for example, "The demands of everyday life often get me down"**.**

-Autonomy: (3 items) are Q15, Q17, Q18. like "I tend to be influenced by people with strong opinions"**.**

Reverse-items numbers (1, 2, 3, 8, 9, 11, 12, 13, 17, 18) are worded in the opposite direction of what the scale is measuring.

The scale is scored based on a 7-point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree). Total score ranged from 18-126, and higher scores mean higher levels of psychological well-being.

Scoring systems: calculated in the following way:

-Less than 50% referred to a low level of psychological well-being.

-50 -75% indicated a moderate level of psychological well-being.

-More than 75% denoted a high level of psychological well-being

B-Methods

1. Official Permission to carry out the study was obtained from the Faculty of Nursing and submitted to the responsible authorities of the study setting for permission to carry out the study**.**
2. **Ethical considerations:**

- The approval was obtained from the Faculty of Nursing, Scientific Research Ethical Committee (Code No. 362).
- The nature of the study did not cause any harm or pain to the subjects.
- Informed consent was obtained from the subjects of the study to participate in the study after explaining the purpose of the study.
- Confidentiality and privacy were taken into consideration regarding data collection.
- Every participant was informed about having the right to refuse participation or withdraw from the study at any time.

3. The tools of the study were tested for content validity by a jury of five

experts in the field of psychiatric and mental health nursing to assert relevance, completeness, and translation of the study tools (Appendix No.). Modifications were made accordingly.

4. Before embarking on the actual study, a pilot study was conducted on 10% (n=5) of the studied sample, who were selected randomly, to assess the clarity, applicability of the study tools, and subjects were excluded later from the actual study. The time needed to complete the study tools was 20-30 minutes, and there were no modifications made.
5. The reliability of the study tools, namely Difficulties in Emotion Regulation Scale (DERS), and Psychological Well-Being, was assessed on 5 nurses using the Cronbach alpha test to assess internal consistency. They proved to be reliable where $\alpha = 0.843$, and 0.810, respectively.
6. **Actual study**:

   The actual study was divided into four phases.

   Phase one: Assessment phase (pretest): The researcher greeted the studied subjects, explained the aim of the study, and distributed tools of the study on the subjects on an individual basis, with the presence of the researcher for any clarification if needed. This phase aimed at determining the study subjects' needs as a baseline for the training program.

   Phase two: Planning phase

   - The emotional regulation training program was developed by the researcher based on the results of pretest, and reviewing recent related literature **(Linehan & Wilks, 2015; Linehan, 2025; Vogl et al., 2025).**
   - The general objective of the training program was to improve emotional regulation strategies and psychological well-being among psychiatric nurses.
   - The training program was composed of theoretical and practical sessions, and it was presented through lectures, group discussion, visual aids, role play, demonstration, handout used as needed.
   - The educational program was implemented in 9 sessions, the first one is introductory session, 2 sessions for theoretical part, and 5 sessions for practical part, and final session will be for summary of the content and conduct evaluation (posttest) for program. Each session had a set of specific objectives.
   - The program was conducted on a small group basis; the studied subjects were classified into 8 subgroups. Each subgroup is composed of 6-7 nurses. The sessions were scheduled as 2

sessions per week for durations of 4-5 weeks. The time for each session was around 30-45 minutes. The data collection lasted about one year, from 10-1-2025 to 25-11-2025. The program took place at the nursing station during the morning shift, during breaks.

Phase three: Implementation phase

During the implementation of the training program, the researcher acted as the program provider, coordinator, and facilitator of the study, facilitating subject participation and comfort levels. Each session started with a funny ice breaker and a summary of the previous session's content and the aims for the current one to make sure the subjects understood the program's content. At the end of the session, the researcher provided a summary.

When implementing the program, PowerPoint presentations, visual aids as pictures, videos, and handout papers were used as instructional tools. Lectures linked with group discussion, sharing experiences, role play, and demonstration were used as teaching and training methods. All study subjects received the program handout. It was supplemented with Images and pictures to make the Information clearer for the subjects to understand.

The researcher used feedback during the training session, and nurses were asked to repeat the knowledge they had gained in their own terms. Brochures were distributed to support the assessment.

Sessions of Emotional Regulation Training Program were scheduled as following:

- **Session one (introductory session):** At this session, the researcher was acquainted with the studied subjects, and they shared their expectations or goals for the program. The researcher explained the aim, outline, contents, and schedule of the training program, and a pretest was conducted.
- **Theoretical sessions (2 sessions) (2-3):**

  Session two: In session two, the researcher introduced nurses to the concepts of emotional regulation, emotional dysregulation, and the goals of emotion regulation. The session used lectures to explain key ideas, group discussions to connect concepts to clinical experiences, and visual aids such as pictures and PowerPoint slides to enhance understanding. A brochure was provided for further review, and the researcher assessed learning through feedback and questions to ensure nurses comprehended the essential principles.

Session three: In this session, the researcher aimed to provide the participating nurses with comprehensive knowledge about psychological well-being, its main components, the influence of emotional regulation on psychological well-being, and the interrelationship between the two concepts. To achieve these objectives, the researcher used a combination of lectures to explain theoretical foundations and clarify key ideas, along with group discussions that encouraged nurses to share experiences and reflect on how emotional regulation affects their own psychological well-being in clinical settings. Various educational media, including pictures and a structured PowerPoint presentation, were employed to visually illustrate concepts, enhance understanding, and maintain learners' engagement. A brochure summarizing the core content of the session was also distributed to support retention and provide a reference for later review. Evaluation of learning was conducted through feedback by asking questions, allowing the researcher to assess comprehension, reinforce essential points, and correct any misconceptions throughout the session.

-Practical sessions (5 sessions) (4-8): These sessions aimed to equip studied subjects with skills about emotional regulation.

Session four: **Noticing and Awareness of Emotions skills.**

Session Four focused on helping nurses develop skills in noticing and becoming aware of their emotions. The researcher used lectures, group discussions, demonstrations, and role-play to teach nurses how to observe, recognize, and monitor their emotional states. Pictures, videos, PowerPoint slides, handouts, a guidance leaflet, and a brochure supported the learning process. Evaluation was carried out through questions and redemonstration to ensure that nurses could effectively apply emotional awareness skills.

Session five: Describing and Naming of Emotions skills.

After the skill of noticing and awareness of emotions, the ability of the studied subjects to observe, describe, and name their experienced emotions is the second skill that helped them get control of what is happening. Session Five aimed to help nurses develop skills in describing and naming their emotions. The researcher used lectures, group discussions, role-play, and demonstrations to teach nurses how to

understand and differentiate between various emotions. Learning was supported with pictures, videos, PowerPoint slides, handouts, a guidance leaflet, and a brochure. Evaluation was conducted through questioning and redemonstration to ensure nurses could accurately identify and describe, and name their emotional experiences.

Session six: Task switching skills (Changing Emotional Responses)

Session Six focused on teaching nurses' task-switching skills to change emotional responses through cognitive reappraisal. The session covered thought replacement, situational role reversals, and problem-solving skills to help nurses turn negative emotional reactions into positive ones. Lectures, group discussions, role-play, and demonstrations were used to apply these skills, supported by pictures, videos, PowerPoint slides, handouts, and brochures. Evaluation was carried out through questioning to ensure nurses could correctly apply cognitive reappraisal techniques

Session seven: Radical Acceptance skills (Distress tolerance skills)

In Session Seven, the researcher focused on developing the nurses' Radical Acceptance and distress tolerance skills, which help prevent negative emotions from escalating into emotional suffering. The session taught nurses to accept the reality of difficult emotions and to cope effectively with feelings such as helplessness and hopelessness. Key techniques included distraction, self-soothing, and mindfulness, all designed to enhance emotional resilience. To support learning, the researcher used lectures to explain concepts and group discussions to encourage reflection on personal experiences with distress. Role-play and demonstrations allowed nurses to practice applying Radical Acceptance skills in realistic scenarios. A range of educational media, including pictures, videos, PowerPoint slides, handouts, and a brochure, helped reinforce understanding. Evaluation was conducted through feedback by asking questions, enabling the researcher to assess comprehension and ensure proper application of distress tolerance techniques.

Session eight: Building a Life worth Living (PLEASE skills)

In Session Eight, the researcher focused on teaching the nurses the PLEASE skills, which support building a life worth living by encouraging healthy habits that reduce emotional vulnerability. The session emphasized the importance of

treating physical illness, eating a balanced diet, avoiding mood-altering substances, getting sufficient sleep, and engaging in regular exercise. To deliver this content, the researcher used lectures to explain the purpose of PLEASE skills and their impact on emotional stability, while group discussions allowed nurses to relate these practices to their personal routines and clinical experiences. Role plays and demonstrations provided opportunities for nurses to practice applying these skills in realistic situations. A variety of educational media, including pictures**,** videos, PowerPoint slides, handouts, a guidance leaflet, and a brochure, reinforced learning and supported different learning styles. Evaluation was conducted through feedback by asking questions to ensure that nurses understood the skills and could apply them to make healthier decisions, reduce emotional vulnerability, and cope effectively with emotional challenges.

Session nine: Provided a summary of the content and reviewed the skills of emotion regulation.

Phase four: Evaluation phase (Post-test): Evaluation of the training program was done by reapplying the study's tools twice:

- First evaluation: Conducted immediately after implementation of the program.
- Second evaluation: Conducted after 3 months.

Statistical analysis

The collected data were organized, presented in the form of tables and figures, and statistically analyzed using the Statistical Package for Social Sciences version 25 (SPSS). For quantitative data, the range, mean, and standard deviation were calculated. Qualitative variables were compared using chi square test(x^2). Correlation coefficient test (r) was used to test the correlation between the studied variables. Reliability of the study tools was assessed using Cronbach's Alpha.

The P-value was considered significant as follows: -

Highly Significant (HS)** $P < 0.001$

Significant (S)* $P < 0.05$

No Significant (NS)** $P > 0.005$

Results

Table (1) presents the socio-demographic characteristics and professional data of the studied subjects of 50 nurses. The majority of them were female; nearly half of the participants (48.0%) were aged 30 to<40 years, and most participants were married (82.0%). 54.0% of the participants reported having sufficient

income. The largest proportion held a bachelor's degree in nursing (38.0%), followed by nursing institute graduates (36.0%). 30.0% of them had 10 to <15 years of experience in psychiatric nursing, followed by 28.0% had 15 to ≥20 years of experience. Finally, 60.0% of the participants reported having attended previous training courses in psychiatric nursing.

Figure (1) illustrates significant improvement in levels of DERS, where in the pre-intervention period, the majority of nurses (88%) had a moderate level of DERS, and only 12.0% of them had a low level of DERS, while post-intervention, the majority of nurses (92.0%) had a low level of DERS, which remained high at follow-up (86.0% of them) had a low level of DERS. These changes indicate a large and sustained effect of the intervention on the Difficulties in Emotion Regulation Scale (DERS).

Table (2) demonstrates statistically significant differences across all DERS subscales through program implementation. **Non-acceptance of emotional responses** decreased from 16.24 at pre-intervention to 13.86 post-intervention and remained low at follow-up (M = 14.00), indicating significance (F = 9.707, p < 0.001). **Difficulties engaging in goal-directed behaviour** showed a significant reduction, with mean scores declining from 14.12 to 13.64 and further to 13.18 at follow-up (F = 3.441, p = 0.036).

Impulse control difficulties also improved significantly, as mean scores decreased from 17.84 pre-intervention to 16.40 post-intervention and were maintained at follow-up (M = 16.90) (F = 6.400, p = 0.015). The largest improvement was observed in the **lack of emotional awareness**, where mean scores markedly declined from 26.06 at baseline to 20.24 post-intervention and remained stable at follow-up (M = 20.46), reflecting a highly significant effect (F = 55.038, p < 0.001).

Similarly, **limited access to emotion regulation strategies** showed significant improvement, with mean scores decreasing from 23.74 to 20.00 post-intervention and remaining lower at follow-up (M = 20.62) (F = 25.645, p < 0.001). Finally, **lack of emotional clarity** demonstrated a significant reduction from pre-intervention (M = 15.84) to post-intervention (M = 13.40), with improvements sustained at follow-up (M = 14.00) (F = 30.372, p < 0.001).

Overall, Table 2 indicates that the intervention was effective in

significantly reducing difficulties in emotion regulation, with effects largely maintained at follow-up.

Table (3) illustrates the total score in the Difficulties in Emotion Regulation Scale (DERS) among The Studied Subjects through Program Implementation; results revealed the intervention led to a significant difference in total mean scores of the difficulties in emotion regulation scale. Whereas the total mean scores decreased from 113.8 ± 8.1 pre-intervention to 97.6 ± 7.4 post-intervention, with a slight increase at follow-up (99.6 ± 9.1). These changes were statistically significant ($F = 77.696$, $p < 0.001$, $\eta^2 = 0.897$), indicating a large and sustained improvement effect of the intervention on overall emotion regulation.

Figure (2) illustrates psychological well-being levels among the studied subjects through program implementation. It was observed that pre-intervention, 50.0% of participants had low psychological well-being, 44.0% moderate, and 6.0% high. Following the intervention, a substantial improvement was observed: only 10.0% remained in the low category, while 66.0% were moderate and 24.0% were high. At follow-up, these improvements were largely maintained, with 12.0% low, 70.0% moderate, and 18.0% high.

Table (4) shows the total mean score of Psychological Wellbeing Subscales among Studied Subjects through Program Implementation, which revealed significant differences across pre-intervention, post-intervention, and follow-up assessments. **Self-Acceptance** showed a significant increase, with mean scores rising from 13.12 ± 4.8 pre-intervention to 16.62 ± 1.74 post-intervention and slightly maintained at follow-up (16.36 ± 1.86), ($F = 37.942$, $p < 0.001$, $\eta^2 = 0.525$). **Purpose in Life** demonstrated the largest improvement, increasing from 7.64 ± 3.54 pre-intervention to 13.40 ± 2.1 post-intervention, with a slight decrease at follow-up (12.86 ± 2.62). were statistically significant ($F = 110.345$, $p < 0.001$, $\eta^2 = 0.748$).

Environmental Mastery significantly improved from 13.2 ± 3.7 to 16.5 ± 3.6 post-intervention, with partial maintenance at follow-up (13.62 ± 2.25), ($F = 16.77$, $p < 0.001$, $\eta^2 = 0.576$). **Positive Relations with Others** increased from 13.2 ± 2.8 to 14.84 ± 2.11 post-intervention and slightly decreased at follow-up (14.48 ± 2.22), ($F = 16.882$, $p < 0.001$, $\eta^2 = 0.596$). **Personal Growth** showed

significant gains, with total scores rising from 12.44 ± 2.33 pre-intervention to 14.64 ± 0.69 post-intervention and further improving at follow-up (16.32 ± 3.47). ($F = 61.353$, $p < 0.001$, $\eta^2 = 0.663$).

Autonomy improved significantly from 11.5 ± 2.1 to 14.2 ± 2.4 post-intervention and slightly decreased at follow-up (13.84 ± 2.38), was statistically significant ($F = 43.020$, $p < 0.001$, $\eta^2 = 0.618$). Overall, these findings indicate that the intervention had a significant positive effect on all dimensions of psychological well-being, with improvements largely maintained at follow-up

Table (5) presents Total Mean Score of Psychological Wellbeing scale through program implementation among the studied subjects. The total mean psychological well-being score increased significantly from a pre-intervention mean of 71.1 ± 15.7 to 89.4 ± 11.0 post-intervention and was 87.9 ± 10.9 at follow-up. These changes were statistically significant difference ($F = 145.853$, $p < 0.001$), with a large effect size ($\eta^2 = 0.880$), suggesting a strong and sustained improvement in overall psychological wellbeing following the intervention.

Table (6) represents the correlation between the Emotion Regulation and Psychological Well-being scale of studied subjects through program implementation. The results indicated a statistically significant negative correlation between difficulties in emotion regulation and psychological wellbeing at all three measurement points. At the pre-assessment, a moderate negative correlation was observed ($r = -0.576$, $p < .001$).

This relationship became stronger at the post-assessment ($r = -0.756$, $p < .001$), indicating that higher levels of emotion regulation difficulties were associated with lower levels of psychological wellbeing following the intervention. At the follow-up assessment, the correlation remained statistically significant but was weaker in magnitude ($r = -0.395$, $p < .005$), suggesting that the inverse relationship between the two variables persisted over time, although with reduced strength.

Table (1): Socio-Demographic and Professional Characteristics of Studied Subjects(n=50)

Socio-Demographic Characteristics and Professional Data	No	%
Sex		
Male	7	14.0
Female	43	86.0
Age in years		
20-<30	7	14.0
30-<40	24	48.0
40-<50	11	22.0
50-≤ 60	8	16.0
Mean ±SD	37.74±9.63	
Marital status		
Single	9	18.0
Married	41	82.0
Educational qualification		
Nursing Diploma	5	10.0
Nursing Institute	18	36.0
Bachelor's degree in nursing	19	38.0
Postgraduate	8	16.0
Monthly income		
Enough	27	54.0
Not enough	23	46.0
Years of experience in psychiatric nursing		
<5	9	18.0
5-<10	12	24.0
10-<15	15	30.0
15- ≥20	14	28.0
Mean ±SD	11.76±8.74	
Having training courses about psychiatric nursing		
Yes	30	60.0
No	20	40.0

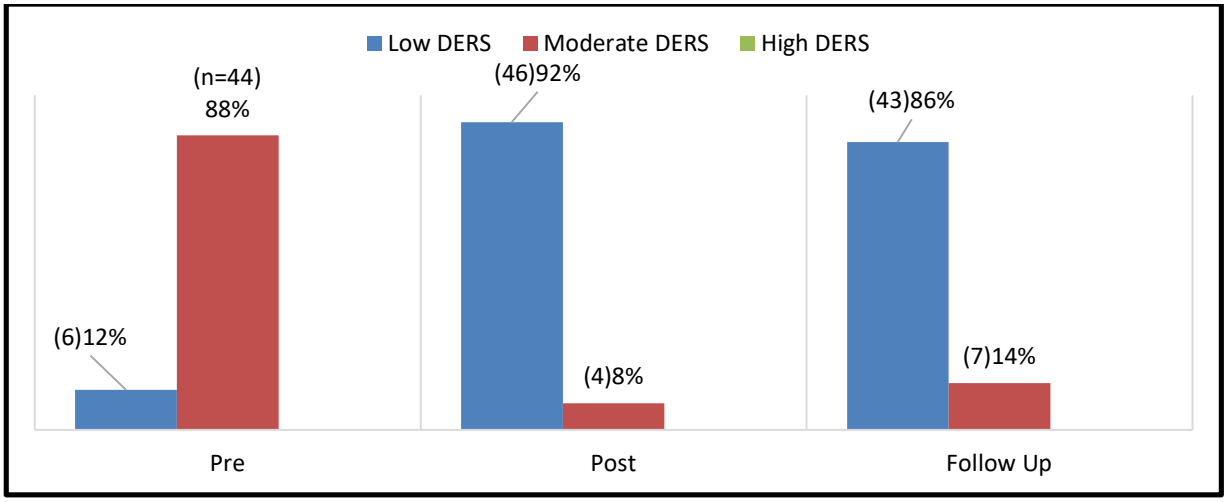

Figure (1): Distribution of Difficulties in Emotion Regulation Scale levels (DERS) among Studied Subjects across the Phases of Program Implementation (n=50)

Table (2): Distribution of Total Mean Score of Difficulties in Emotion Regulation Subscales among Studied Subjects across the Phases of Program Implementation (n=50)

Difficulties in Emotion Regulation Subscales	Pre	Post	Follow up	F	p	η^2
Non-acceptance of Emotional Responses (NONACCEPT)	16.24±2.14	13.86±4.37	14.0±4.15	**9.707***	**<0.001***	**0.465**
Difficulties Engaging in Goal-Directed (GOALS)	14.12±2.78	13.64±1.40	13.18±1.53	**3.441***	**0.036***	**0.266**
Impulse Control Difficulties (IMPULSE)	17.84±1.52	16.40±2.96	16.9±3.38	**6.400***	**0.015***	**0.316**
Lack of Emotional Awareness (AWARE)	26.06±2.0	20.24±5.76	20.46±5.40	**55.038***	**<0.001***	**0.659**
Limited Access to Emotion Regulation Strategies (STRATEGIES)	23.74±4.75	20.0±2.91	20.62±3.09	**25.645***	**<0.001***	**0.434**
Lack of Emotional Clarity (CLARITY)	15.84±1.49	13.40±2.38	14.0±2.40	**30.372***	**<0.001***	**0.505**

F: ANOVA with repeated measures test comparing the three periods
η^2:Partial Eta Squire
* Statistically significant p-value at ≤0.05

Table (3): Total Score in Difficulties in Emotion Regulation Scale (DERS) among the Studied Subjects across the Phases of Program Implementation (n = 50).

DERS	Total Mean score						Difference between pre & follow		Difference between post & follow	
	Pre	Post	Follow up	F	P	η^2	Mean ± SD	p	Mean ± SD	p
	113.8±8.1	97.6±7.4	99.6±9.1	**77.696***	**<0.001***	**0.897**	**-14.26±1.75**	<0.001*	**2.0±0.97**	**0.134**

** Highly statistically significant p-value at ≤0.001

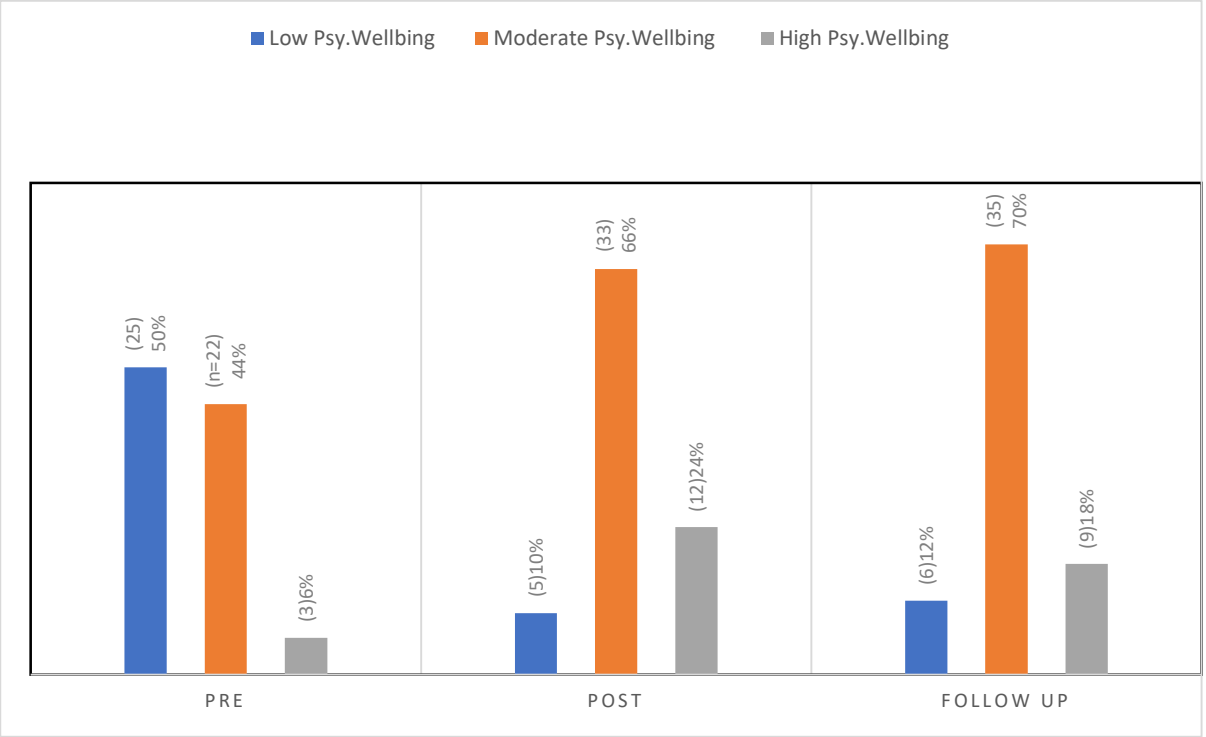

Figure (2): Distribution of Psychological Wellbeing levels among Studied Subjects across the Phases of Program Implementation (n=50)

Table (4): Distribution of Total Mean Score of Psychological Wellbeing Subscales among Studied Subjects across the Phases of Program Implementation (n=50)

Psychological Wellbeing Subscales	Pre		Follow up	F	p	η^2
Self-Acceptance						
	13.12±4.8	16.62±1.74	16.36±1.86	**37.942***	**<0.001***	**0.525**
The Purpose in Life						
	7.64±3.54 25.78±19.7	13.40±2.1 57.78±11.6	12.86±2.62 54.78±14.5	**110.345***	**<0.001***	**0.748**
Environmental Mastery						
	13.2±3.7	16.5±3.6	13.62±2.25	**16.77***	**<0.001***	**0.576**
Positive Relations with Others						
	13.2±2.8	14.84±2.11	14.48±2.22	**16.882***	**<0.001***	**0.596**
The Personal Growth						
	12.44±2.33	14.64±0.69	16.32±3.47	**61.353***	**<0.001***	**0.663**
Autonomy						
	11.5±2.1	14.2±2.4	13.84±2.38	**43.020***	**<0.001***	**0.618**

F: ANOVA with repeated measures test comparing the three periods

η^2: Partial Eta Squire

* Statistically significant p-value at ≤0.05

Table (5): Total Mean Score of Psychological Well-being Scale across the Phases of Program Implementation among the Studied Subjects (n= 50)

Psycho-logical Wellbeing Scale	Total Mean score						Difference between pre & follow		Difference between post & follow	
	Pre	Post	Follow up	F	p	η^2	Mean ± SD	p	Mean ± SD	P
	71.1±15.7	**89.4±11.0**	**87.9±10.9**	**145.853***	**<0.001***	**0.880**	**16.86±1.56**	**<0.001***	**-1.48±0.84**	**0.252**

* Statistically significant p-value at ≤0.05

* Highly Statistically significant p-value at ≤0.001

Table (6): Correlation between Emotion Regulation and Psychological Wellbeing Scale of Studied Subjects across the Phases of Program Implementation(n=50)

Difficulties in Emotion Regulation Scale (DERS)		Overall Psychological Wellbeing		
		Pre	Post	Follow up
DERS	R	-0.576*	-0.756*	-0.395*
	P	<0.001*	<0.001*	<0.005*

Discussion

The present study addressed two main dimensions: Emotion Regulation and Psychological Well-being. Regarding emotion regulation, the findings demonstrated that the implemented training program had a statistically significant and sustained effect in improving emotion regulation abilities among the studied subjects. This improvement was clearly reflected in the marked reduction in overall Difficulties in Emotion Regulation Scale (DERS) scores. During the pre-intervention period, most nurses reported a moderate level of DERS; however, following the intervention, most shifted to a low level of difficulties with emotion regulation, and this improvement was largely maintained at follow-up. These findings may be related to the intervention effectively strengthening nurses' ability to regulate their emotional experiences in demanding clinical contexts. The significant reduction observed in the total Difficulties in Emotion Regulation Scale (DERS) scores across phases of program implementation further supports the effectiveness of the training intervention. The total mean score decreased significantly from 113.8 at pre-intervention to 97.6 post-intervention and remained lower at follow-up, indicating a large and sustained effect size. The results are consistent with those of **Balideh et al. (2025),** who reported that structured emotional regulation training significantly improved emotional regulation among nurses working in psychiatric hospitals. This further supports the effectiveness of emotion regulation-based interventions in improving psychiatric nurses' emotion regulation.

The current study demonstrated statistically significant improvements across all DERS subscales, indicating

that the intervention effectively addressed multiple dimensions of emotion regulation difficulties. The most marked improvement was observed in the domain of lack of emotional awareness, which showed a marked reduction following the intervention. This improvement can be attributed to training sessions focused on emotion-awareness skills, which consisted of: First, noticing and awareness of emotions; Second, describing and naming emotions, where nurses acquired skills of describing, naming, understanding different emotions, and differentiating between them, So, they were taught to observe, notice, and consciously recognize their emotional states in real time, and be able to deal with and regulate their emotions effectively.

Supporting this, **Braet et al. (2024)** reported that higher levels of emotional awareness are significantly associated with better emotion regulation and reduced emotional difficulties. Similarly, **Yoshimura et al. (2024)** highlighted that emotional labelling and accurate emotional recognition enhance emotional regulation processes. This is consistent with the present findings, where training psychiatric nurses to notice, identify, describe, and label their emotions contributed to a significant reduction in DERS emotional awareness scores and, consequently, may be attributed to improvement in both lack of emotional clarity and limited access to emotion regulation strategies among the studied subjects.

Regarding improvements in emotional clarity, it is linked mainly to the session of thought replacement, which taught nurses to apply skills of cognitive reappraisal, which start with a clear understanding, evaluation of thoughts, and checking if emotional reactions are appropriate to the situation, to adjust their beliefs and assumptions to align with the nature of the situation by identifying the facts that help change their emotional reactions.

Cognitive reappraisal enables nurses to reinterpret stressful situations and transform negative emotional reactions into more constructive responses, which in turn helps nurses select appropriate coping strategies and respond more adaptively to stressful clinical situations. Consistent with these findings, **Stover et al. (2024),** in a meta-analysis, demonstrated that cognitive reappraisal is strongly associated with improved emotional regulation of nurses working under stress.

In line with this, **Razak et al. (2025)** emphasized that a clear understanding and emotional clarity are essential for the development of adaptive emotion regulation strategies of psychiatric nurses. This supports the current study, as studied subjects who participated in the program demonstrated improved emotional clarity and greater access to adaptive regulation strategies following the intervention. Furthermore, **Zuo and Bai (2025)** found that emotional clarity is positively associated with better emotional regulation, whereas poor emotional clarity is linked to increased emotional difficulties. These findings align closely with the present study, where improvements in emotional clarity contributed to better emotion regulation outcomes across studied subjects.

Furthermore, the present study showed significant reductions in impulse control difficulties and difficulties in goal-directed behaviour among the studied subjects after the intervention. These improvements are attributed firstly to situational role reversal skills (opposite action), which are used when feelings or emotional reactions don't match the facts, and when emotional response becomes ineffective. Acting oppositely in every situation helps change emotional responses.

Secondly, this improvement is also attributed to distress tolerance skills that include distraction techniques, self-smoothing skills to control, manage, cope with, feel competent and effective in combating difficult emotions. This supports the observation that nurses who participated in the intervention were better able to maintain goal- directed behaviour despite emotional challenges. This is consistent with **Toh et al. (2024),** who reported that inhibitory control and emotional regulation contribute to better impulse control and improved goal-directed behaviour. Also, in line with these findings**, Li et al. (2024)** reported that interventions aiming at distress tolerance significantly enhanced the ability to manage emotional difficulties and improve emotion regulation among psychiatric nurses.

Another important finding of the present study was the significant reduction in non-acceptance of emotional responses among studied subjects following the intervention, compared with the pre-intervention phase. This improvement can be attributed to the mindfulness skills sessions, in which nurses acquired radical acceptance skills that helped

them to accept the facts of the reality of difficult emotions, acknowledge and accept difficult emotional experiences without judgment, and respond more effectively to distressing emotional states. Radical acceptance plays a central role in reducing negative emotional experiences by encouraging individuals to face and accept emotional experiences rather than resist or avoid them. Similarly, **Saccaro et al. (2024)** found that acceptance-based interventions, particularly mindfulness approaches, were effective in reducing emotional difficulties and maladaptive emotional reactions across various psychiatric nurses. This further supports the effectiveness of radical acceptance training in improving the DERS non-acceptance subscale among studied subjects. The marked improvement in emotion regulation among psychiatric nurses may be attributed to the practical and realistic building of the training program, where studied subjects were exposed to realistic clinical scenarios common in psychiatric settings as managing aggressive patients, responding to self-harm, dealing with affected family members, and resolving workplace conflicts. These scenarios provided nurses with opportunities to practice emotional awareness, cognitive reappraisal, distress tolerance, and coping strategies in a safe training atmosphere. Repeated exposure to such situations during the training is expected to enhance participants' ability to identify emotional triggers, regulate emotional responses, and maintain professional functioning under stressful situations. Thus, the skills acquired may explain the significant reduction in emotion regulation difficulties observed after the training program.

Regarding the effect of the emotion regulation training program on the psychological well-being of studied subjects, the present study revealed significant improvement in psychological well-being among them. Half of nurses reported low levels of psychological well-being before intervention, which decreased markedly to only one-fifth of nurses after the intervention, with these improvements largely maintained at follow-up. These results suggest that emotion regulation training program contributes significantly to enhancing psychological well-being among psychiatric nurses. Similar findings were reported by **Lu et al. (2024),** who found that improvements in emotion regulation were associated with enhanced psychological well-

being among psychiatric nurses. The authors concluded that strengthening emotional regulation abilities contributes positively to nurses' psychological well-being, which is consistent with the present study. Likewise, **Shdaifat et al. (2024)** demonstrated a significant positive relationship between emotion regulation and psychological well-being among psychiatric nurses, further supporting these findings.

This improvement in psychological well-being of the studied subjects may be related to the attribution of multiple components of the training program, including skills focused on emotional awareness, which helped nurses to identify and understand their emotional experiences at an early stage. This prevents avoiding or suppressing emotions, which can negatively affect psychological well-being. Task switching skills, including changing emotional responses, cognitive reappraisal, thought replacement, situational role reversal, and opposite action, enabled nurses to reinterpret stressful clinical situations more constructively. Radical acceptance skills helped reduce self-criticism and emotional avoidance. In contrast, distress tolerance techniques, including relaxation exercises, distraction techniques, self-soothing strategies, and mindfulness practices, helped nurses reduce overall psychological distress. The program also strengthened impulse control and goal-directed behaviour, enabling nurses to function more effectively under emotional pressure.

Taken together, these integrated components reflect the emotion regulation process model proposed by **James J. Gross**, where adaptive regulation strategies work collectively to promote psychological well-being. Consistent with the present findings, **Ong et al. (2024)** reported that emotion regulation interventions significantly improved psychological well-being among psychiatric nurses by enhancing emotional awareness, coping skills, and adaptive emotional responses. This supports the conclusion that nurses who participated in the intervention demonstrated improved emotion regulation abilities alongside higher psychological well-being after the program.

Furthermore, **Carol D. Ryff (2024)** emphasized that psychological well-being is a multidimensional construct that includes self-acceptance, autonomy, positive relationships, purpose in life, and environmental mastery. These dimensions can be

strengthened through adaptive emotional regulation and effective coping strategies. This is consistent with the present study, where improvements in emotion regulation were associated with sustained enhancements in psychological well-being among studied subjects.

The results also demonstrated significant improvements across all dimensions of psychological well-being among psychiatric nurses, including self-acceptance, purpose in life, environmental mastery, positive relations with others, personal growth, and autonomy. Among these dimensions, the most notable improvement was observed in purpose in life, suggesting that the training program helped nurses develop a stronger sense of meaning, professional purpose, and personal fulfilment within their work environment.

In line with these findings, **Corbella et al. (2025)** reported that meaning in life serves as an important protective factor that enhances psychological well-being among healthcare professionals working in highly stressful clinical environments such as psychiatric setting. Their findings closely align with the present study, as psychiatric nurses showed marked improvement in purpose in life alongside other psychological well-being dimensions following the intervention.

Furthermore, the improvements observed in psychological well-being may also be associated with the "Building a Life Worth Living" (PLEASE skills) session, which emphasized the importance of maintaining physical health, balanced nutrition, adequate sleep, and healthy lifestyle practices, which are essential in preventing psychological problems and in improving coping with emotional challenges more effectively. Therefore, enhancing nurses' psychological well-being.

Kong et al. (2024) found that better sleep quality and engagement in self-care practices were significantly associated with improved mental health and higher levels of psychological well-being among mental health nurses, and they also highlighted that a healthy lifestyle, such as regular exercise, balanced nutrition, relaxation, and sufficient sleep, contributes positively to psychological well-being, which is consistent with the findings of the present study.

Likewise, **Wu et al. (2024)** reported that effective stress management and improved sleep quality were associated with better psychological

well-being among psychiatric nurses, supporting the current study's results. In addition, **Linehan (2025)** explained that the PLEASE skills in Dialectical Behaviour Therapy focus on treating physical illness, maintaining balanced eating, avoiding mood-altering substances, ensuring adequate sleep, and engaging in regular exercise. These strategies help promote emotional regulation and psychological well-being. This further supports the present study, which demonstrated significant improvements in psychological well-being following the implementation of the emotional regulation training program among studied subjects.

Conclusion and Recommendations

Conclusion

It was concluded that the emotional regulation training program significantly improved psychiatric nurses' emotion regulation and psychological well-being, with benefits maintained at follow-up. improved emotional regulation was closely linked to higher psychological well-being, confirming the study's hypothesis.

Recommendations

It is recommended are that:

-Structured emotional regulation training should be incorporated in ongoing professional development for psychiatric nurses.

-Provide ongoing support, refresher sessions, or digital interventions to sustain benefits.

-Promote institutional policies supporting nurses' psychological well-being, such as counselling and peer support. Regular assessment of emotion regulation abilities and psychological well-being of staff to identify and support nurses at risk of emotional difficulties or poor psychological well-being

-Conduct future research with larger, diverse healthcare samples to examine long-term effects.

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Effect of Mindfulness-Based Intervention on Severity of Auditory Hallucinations and Quality of Sleep among Patients with Schizophrenia

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Abstract:

Background: Auditory hallucinations and poor sleep quality are highly prevalent and interrelated symptoms among patients with schizophrenia, contributing to increased psychological distress and impaired functioning. Mindfulness-based interventions have been increasingly recognized as effective approaches for simultaneously reducing hallucination severity and improving sleep quality through enhanced non-judgmental awareness and emotional regulation. **Aim of the study:** to determine the effect of mindfulness-based intervention on severity of auditory hallucinations and quality of sleep among patients with schizophrenia. **Subjects:** A purposive sample of 60 patients with schizophrenia (30 study group and 30 control group) was be selected from both Neurology and Neurosurgery center and psychiatric department of Tanta University Hospital. **Study design**: Quasi-experimental research design was utilized. **Study tools: Tool I** Southampton Mindfulness of Voices Questionnaire (SMVQ), **Tool II** Hamilton Program for Schizophrenia Voices Questionnaire (HPSV), and **Tool III** Sleep Quality Scale (SQS) were used to collect the study data. **Results:** There was a highly statistically significant improvement in auditory hallucination, sleep quality, and mindfulness of voice immediately after the implementation of the intervention and after three months in study than control group. **Conclusions:** Mindfulness-based intervention has significant effectiveness in reducing severity of auditory hallucinations and improving sleep quality among patients with schizophrenia. **Recommendations**: Incorporate mindfulness-based interventions (MBI) as a complementary, non-pharmacological therapy within the standard treatment protocols for patients with schizophrenia in psychiatric hospitals and outpatient clinics.

Keywords: Auditory hallucination, Mindfulness-based intervention, Patients with schizophrenia, Quality of sleep.

Introduction

Schizophrenia is officially renamed "integration dysregulation syndrome" and "attunement disorder" alternately (**Lasalvia et al., 2021).** It is described as a frequently chronic, severe and disabling mental disorder, characterized by profound, fundamental changes in perception, thinking, and emotions **(Correll & Schooler., 2020)**. It impacts around 24 million people, equating to 1 in every 300 persons (0.32%) globally. This statistic indicates that 1 in 222 adults (0.45%) is affected. The onset typically occurs in late teens and the twenties, with males experiencing it earlier than women **(World Health Organization, 2022).**

Schizophrenia presents with a diverse array of symptoms, typically classified into **cognitive symptoms** such as difficulty understanding information and making appropriate decisions, inability to concentrate or maintain attention, and problems with working memory. **negative symptoms** include (blunted affect, alogia, avolition, asociality, and anhedonia, and **Positive symptoms** include delusions, bizarre behaviors, disorganized speech and hallucinations (**American Psychiatric Association., 2013).** Hallucinations are generally described as "perceptual-like experiences occurring without an external stimulus"**(Yttri, Urfer-Parnas, & Parnas, 2022)**. The content of hallucinations can assume a wide array of forms, reported as occurring across all sensory modalities and in various combinations of these sensory experiences **(Linszen et al., 2022)**.

Auditory hallucination, as delineated by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), refers to the perception of voices in the absence of an external source, and is regarded as a primary characteristic of schizophrenia, approximately 60% to 75% of patients with schizophrenia suffer from auditory hallucinations **(Yin et al., 2021)**. These voices take on numerous forms—quiet whispers, aggressive commands, low murmurs, loud shouts, and endearments **(Lebovitz, Padmavati, Tharoor, & Luhrmann., 2021)**. Such voices can be distressing when they are threatening, insulting, commanding, or haunting, perhaps leading to unproductive struggle and hindrance to meaningful living, affecting an individual's social and occupational functioning, contribute to aggressive behaviors, exacerbate emotional and cognitive difficulties and affect their quality of sleep negatively. **(Thakur & Gupta.,**

2023; Thomas, McLeod, Brewin, Knight, 2022)

Sleep quality is a multifaceted and subjective construct that defined as an individual's self-satisfaction with all aspects of the sleep experience, this does not mean just how long a person sleep but how well their sleep meets their own restorative needs. It encompasses four characteristics: sleep efficiency, sleep latency, sleep duration, and wakefulness after sleep onset **(Nelson, Davis & Corbett, 2022)**. Patients diagnosed with schizophrenia frequently experience significant sleep disturbances as early clinical observation noted that they often suffer from insomnia, fragmented sleep and difficulties initiating or maintaining sleep (**Azargoonjahromi, & Bahrampour., 2025**).

Disturbed sleep can be found in 30-80% of patients with schizophrenia, with the varying in this prevalence according to the severity and intensity of psychotic symptoms. It can produce a range of experiences, including heightened anxiety, social withdrawal perceptual distortions, quality of life and worsen psychotic symptoms as auditory hallucinations. Auditory hallucinations develop with increasing time awake, from simple visual/somatosensory misperceptions to hallucinations, ending in a condition resembling acute psychosis **(Waters, Chiu, Atkinson, Blom, 2018)**.

Several previous studies describing the link between disturbed sleep quality and severity of auditory hallucinations in patients with schizophrenia. They showed that, sleep problems rank among the most significant correlates of auditory hallucinations **(Waters et al., 2018; Waite, Sheaves, Isham, Reeve & Freeman, 2020)**. Prolonged sleep disturbances often precede the onset of psychotic episodes. Specifically, a decrease in sleep duration has been shown to predict a subsequent increase in the severity of auditory hallucinations, typically with a lag of around one day. Furthermore, acute sleep deprivation, even for one or two nights, can trigger significant perceptual distortions, including hallucinations and altered sensory experiences **(Freeman, Sheaves, Waite, Harvey & Harrison, 2020; Waters et al., 2018).**

Major challenge in managing schizophrenia is that patients who suffer from persistent auditory hallucinations and poor sleep quality frequently endure significant emotional distress and a decline in daily functioning (**Rtbey et al., 2026**). Although traditional treatments like antipsychotic

medications can effectively reduce psychotic symptoms in many patients with schizophrenia, a significant number still struggle with persistent residual symptoms, functional impairments, sleep disturbances, and a high risk of relapse. This highlights a critical need for evidence-based psychological therapies, such as mindfulness-based interventions **(Freeman et al., 2020; Gao, Wu, Jin, Yu, & Yu, 2025; Nasim, Nawaz & Nasim, 2025).**

Mindfulness based intervention **(MBI)** represent a psychological and behavioural approach rooted in Buddhist meditation, emphasizing the awareness that arises from intentionally and nonjudgmentally attending to the present moment to the ongoing unfolding of experience **(Guendelman, Medeiros & Rampes, 2020)**. **MBI** is believed to help patients with schizophrenia in relating differently to their psychotic experiences by enhancing their awareness and fostering non-judgmental acceptance, thereby facilitating a more adaptive approach to managing and controlling those psychotic symptoms by letting them to come and go without exaggerated negative reactions **(Hodann-Caudevilla, Díaz-Silveira, Burgos Julián; Santed-Germán, 2020).**

MBI have demonstrated efficacy in enhancing sleep quality and alleviating auditory hallucinations in patients by fostering acceptance, diminishing rumination and anxiety, through augmenting the capacity to detach from negative particularly self-referential content **(Peters, Saunders, & Jackson, 2022; Shonin, Van Gordon, Griffiths, 2021).** Low levels of mindfulness, particularly in relation to auditory hallucinations, are associated with an intensification of these symptoms, which can further disrupt sleep. By enhancing mindfulness skills, patients may better regulate their emotional responses to auditory hallucinations by disrupting interaction with voices and allow a more adaptive strategy of coping, thereby reducing their severity and promoting healthier sleep patterns **(Chadwick., 2019; Sabé et al., 2024).**

Significance of the study: -

Auditory hallucinations and sleep disruptions are prevalent clinical concerns for patients diagnosed with schizophrenia. Experiencing persistent auditory hallucinations and disturbed sleep quality foster unproductive struggle, hinder valued living in those afflicted by schizophrenia and lead to anxiety, depression, frustration, social withdrawal, homicide, suicide,

increase relapse, rehospitalization and poor prognosis (**Azargoonjahromi, & Bahrampour., 2025; Chiang, Beckstead, Lo, Yang, 2018)**, MBI is a promising treatment for theses clinical issues as prior research has suggested that it may enhance psychosocial functioning in both healthy people and those with various health conditions including schizophrenia **(Chen, Chang & Hsieh, 2020; Zhang, Lee, Mak, Ho, Wong, 2021).** Thus, the current study therefore aims to determine the effect of mindfulness-based intervention on severity of auditory hallucination and quality of sleep among patients with schizophrenia.

Aim of the study

This study aimed to determine the effect of mindfulness-based intervention on severity of auditory hallucinations and quality of sleep among patients with schizophrenia.

Research hypotheses:

1- Severity of auditory hallucination among patients with schizophrenia is expected to be reduced after implementation of mindfulness-based intervention.

2- Quality of sleep among patients with schizophrenia is expected to be improved after implementation of mindfulness-based intervention.

Subjects & Method

Subjects

Research design:

Quasi-experimental research design was used in the study.

Setting: -The study was conducted in the following settings:

The psychiatric, Neurology and Neurosurgery center, Tanta University. This center has a capacity of 77 psychiatric beds, divided into the following: men (30 beds), women (10 beds), child psychiatry (10 beds) and substance use treatment (27 beds). The inpatient psychiatric department of Tanta University Hospital, which has a capacity of 42 psychiatric beds, divided into two wards for men (26 beds) and two wards for women (16 beds).

Both previous settings are affiliated with the Ministry of Higher Education and Scientific Research.; they work 24 hours a day, 7 days a week.

Subjects:

A purposive sample of 60 patients with schizophrenia (30 study group and 30 control group) was selected from the previously mentioned settings, diagnosed by consultant psychiatrist and all patients of both groups were on 2nd generation antipsychotics (risperidone ± clozapine). They were divided randomly into study and control

groups by using simple random technique through picking their codes up from a pool. The first two-selected codes were be assigned for the control group and the second two for the study group. The process was repeated till the required number obtained.

The sample size estimated using EPi-Info software program by using the following criteria: Z=95% confidence limit, 80% power of the study, Ratio between study and control group 1:1, d=Error proportion 5% and total population per year (N=200). Based on these criteria the sample size was N>25(for each group) and increase to 30 for each group.

Inclusion criteria

- Aged from 18 years and above.
- Diagnosis of schizophrenia based on Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition.
- Experiencing auditory hallucination.

Exclusion criteria:

- Acute stage of illness.
- Patients diagnosed with mental retardation.
- Substance use disorder.
- Other co-morbid psychiatric disorder.

Tools of the study: The data was collected by using the following three tools:

Tool I: - Southampton Mindfulness of Voices Questionnaire (SMVQ).

This tool is consisting of two parts:

Part I: - Socio-demographic and clinical data sheet: It was developed by the researcher to elicit socio-demographic data about patients which including age, sex, marital status, level of education, occupation, place of residence, and co-habitation, as well as patient's clinical data as age of the onset of the disease, duration of the illness, number of previous psychiatric hospitalizations, and mode of admission.

Part II: Southampton Mindfulness of Voices Questionnaire (SMVQ).

It was developed by **Chadwick et al., 2007.** The SMVQ is a 16- item questionnaire is scored on a 7- point Likert scale rated from "strongly disagree (0) to "strongly agree "(6). It measures

how mindfully person respond to their voices through four interrelated components namely; Mindful observation (MO), letting go (LG), absence of aversion (AV), and non-judgment (J). MO has three positive items and one negative, aversion has three negative items. J and LG both have two positive and two negative items. The negative items are

Subscales	Number of Positive items	Number of Negative items
Mindfulness Observation (MO)	1, 7, 9	16
Letting Go (LG)	4, 10	2, 13
Absence a version (AV)	5	6, 12, 14
Non-Judgmental (J)	11, 15	3, 8

Scoring system: The total measurement had a range of scores from zero to 96 and each of the four subscales had a range from 0 to 24. The total score was be as follow: -

-Low level of mindfulness of voices: patients with a score < 50%.

-Average level of mindfulness of voices: patients with a score 50% - 75%.

-High level of mindfulness of voices: patients with a score > 75.

Tool II: The Hamilton Program for Schizophrenia Voices Questionnaire (HPSVQ): It was developed by ***Van*** **Lieshout& Goldberg (2007)**, The HPSVQ is a 9-item with a five-point Likert scale rated from 0 to 4, to measure the severity of voices from least to most severe. The items are frequency, negative content, loudness, and distress, impact on self-appraisal, clarity and compliance with voice commands. This scale measures the severity of hallucinating voices in schizophrenia based on observation and interviews with patients. The HPSVQ measures physical and emotional criteria of voices and had been used to provide information about the patient's experiences of voice hearing. The four subscales have the following items: reversed for scoring.

Scoring system:

0-7: Absence to minimal auditory verbal hallucinations

-8-13: Mild severity of auditory verbal hallucinations

-14-25: Moderate severity of auditory verbal hallucinations

-<25: Severe auditory verbal hallucinations

Tool III: - Sleep quality scale (SQS): It was developed by **Yi, Shin & Shin (2006)**. It consisted of 28 items on a four-point Likert-type scale, the SQS evaluated six factors of sleep quality, daytime symptoms, restoration after sleep, problems in initiating sleep, difficulty waking, sleep satisfaction, and problems in maintaining sleep. Respondents indicate how frequently they exhibit certain sleep behaviors (0 = few, 1 = sometimes, 2 = often, and 3 = almost always). Scores on items belong to factors 2 and 5 (restoration after sleep and satisfaction with sleep) and are reversed before being tallied.

Scoring system:

The total score of the overall items was summed to determine the quality of sleep with higher scores denoting more acute sleep problems. Total scores had range from 0 to 84. The total score was be as follow: -

Low level of sleep quality: patients with a score > 75%.

Average level of sleep quality: patients with a score 50% -75%.

High level of sleep quality**:** patients with a score < 50%.

Method

1. An official letter was addressed from the Dean of the Faculty of Nursing Tanta University to the director of the Neuro-psychiatric Department of Tanta University Hospital and Neurology, Psychiatry and Neurosurgery Center to request their permission and cooperation for data collection.
2. **Ethical considerations: -**

- Ethical approval was obtained from the Scientific Research Ethical committee in Faculty of Nursing Tanta University and the code number of ethics is 479/6/2024.
- Informed consent was obtained from the participants to participate after explanation of the study's purpose.
- The participants were being reassured about confidentiality of their information. A code of numbers was be used instead of patient's name on questionnaire sheets
- Respecting the right of the participants to withdraw at any time during the data collection period.
- The study was not causing harm for the patients

3. The study tools were translated into Arabic language by the researcher and tested for internal validity by a jury composed of five experts in psychiatric nursing to ascertain the appropriateness of items for measuring what they wanted to measure. The face validity of the questionnaire was calculated based on experts' opinion and it was 98% and the content validity index (%) of its items was **98%** for Southampton Mindfulness of Voices Questionnaire, **97%** for the Hamilton Program for Schizophrenia Voices Questionnaire and **97%** for Sleep quality scale Questionnaire. Total validity Index of all questionnaires was **98.47%.**
4. Before embarking the actual study, a pilot was being carried out on 6 patients (10% of the study subjects) after taking their oral approval and explanation the purpose of the study. Those subjects were selected randomly and were included with the study sample. The pilot study nearly lasted 5 days. After the study implementation and according to its

results, the tools were applicable and no modifications were done.

5. To assess **reliability**, the questionnaires were tested by the pilot subjects at first session for calculating Cronbach's Alpha and it was as the following:

Study tool's reliability	Cronbach's Alpha	No. of Items
Among 60 patients with schizophrenia (30 study group and 30 control group)		
Tool I Part (2): Southampton Mindfulness of Voices (SMVQ) Questionnaire	0.789	16 (4) subscales
Tool II: The Hamilton Program for Schizophrenia Voices Questionnaire (HPSVQ)	0.803	9
Tool III: Sleep Quality Scale Questionnaire	0.793	28

Total reliability (Cronbach's Alpha) of all questionnaires was 0.797

6. The actual study was divided into four phases assessment, planning, implementation, and evaluation. It was applied for patients in the study group.

Phase 1: Assessment It was done for all studied patients in study and control group before implementing Mindfulness- Based Intervention (MBI) by using the study tools as a pre-test.

Phase 2: Planning

-This phase was based on the data from the assessment phase. Priorities and expected outcomes criteria that was formulated.

- MBI was developed by the researcher under the directions of the supervisors and based on an extensive review of literatures **(Heriot-Maitland& Levey 2021; Leach, Kelly& Parry., 2023; Madani, Hossein Sabet, & Borjali 2023; Musa, 2024; Norman, Correia, Paulik 2020; Sheng, Yan, Yang, Yuan, Cui., 2019; etc.…)**
- MBI was conducted through 10 sessions for study group which divided into subgroup (2 patients in each), each session lasting from (60-90) minutes ,3-4 times per week
- Data was collected using interview method on the individual bases. The intervention was implemented for one year started from February (2025) to January (2026).

Phase 3: Implementation

MBI was implemented by covering the following 10 sessions as shown in the following table: -

No. of session	Title of session	Aim	Exercises used
1.	**Introductory session**	Orient the patients about the importance of the intervention and its objectives. Building rapport and using reflective listening, obtaining verbal consent, explaining aim of the intervention and its' planned schedule.	----------
2.	**Overview about auditory hallucination**	Inform the studied patients about type of auditory hallucination, etiology, and the relation between auditory hallucinations and sleep quality.	----------
3.	**Mindful Observation and reflection**	Help patients recognize auditory hallucination and gain a deeper understanding of the underlying factors contributing to their auditory hallucinations by developing awareness of their hallucination with curiosity and openness, rather than avoidance, suppression or judgment.	**Six exercises were involved in this session:** 1st exercise (Practicing Mindful Observation) 2nd exercise (The raisin exercise) 3rd exercise (walking reflection in the street) 4th exercise (mountain reflection exercise) 5rd exercise (walking reflection exercise) 6th exercise (answering key questions about their feelings, mood, triggers, relationships, and personal goals)
4.	**Reality Checking**	Help patients distinguish between auditory hallucinations and reality.	**This session included exercises** that helped patients by using simple strategies to look for physical evidence of auditory hallucination, involved using other four senses (smell, touch, taste, and sight), using logic, or delay

			reactions to see if the experience passed.
5.	**Grounding Techniques**	Help patients how to apply the **Grounding Technique** to feel less overwhelmed with emotion and thoughts after hallucination.	**Grounding Technique**: supported patients in managing hallucinations by anchoring their attention in the present moment through sensory awareness. Using the "5-4-3-2-1" technique, patients were guided to identify: 5 things they can see, 4 things they can touch, 3 things they can hear, 2 things they can smell, and 1 thing they can taste.
6.	**Coping Strategies with auditory hallucination**	Help patients to effectively cope with auditory hallucination.	**This session included** techniques as grounding exercises, deep mindful breathing, positive self-talk, seeking support from trusted people, keeping a diary and distraction through activities like reading, watching programs, or gentle interaction
7.	**Self-Compassion Practice**	Incorporating this practice was to cultivate self-compassion, empathy, and kindness towards oneself and others.	**1stexercise (Compassionate Self-Talk for Hallucinations):** patients Encouraged to use kind phrases like," I am learning to manage my voices better" and "I hope for peace, safety, and happiness"**.** **2nd exercise (Self Compassion Reflection exercise):** This exercise helped patients practice kindness toward themselves by focusing on their breath and heart area, repeated gentle wishes for safety and peace.
8.	**Sleep Hygiene Education**	Educate patients about healthy habits to improve sleep quality.	**This session included** strategies as engage in calming activities, use relaxation techniques, only use the bed for sleep, and go to bed when sleepy, leave the bed if patient can't sleep within 15 minutes, Limit time in bed to actual sleep time, and gradually increasing it as sleep improves.

			Also included one exercise (body scan): it aimed to enhance relaxation and improve sleep by increasing awareness of bodily sensations.
9.	**Mindful breathing before bed**	Teach the patient relaxation techniques like mindful breathing to calm the mind and body before bedtime. Encourage slow, deep breathing exercises to promote relaxation and prepare for sleep.	**Mindful Breathing Exercise:** This exercise guided patients to sit comfortably, and focus on the breath while noticing bodily sensations
10.	**Mindful visualization**	Teach patients the power of imagination to promote relaxation, reduce anxiety, and improve sleep quality by creating mental images of peaceful and calming scenarios by engaging their senses in the visualization.	**Mindful visualization exercise:** this exercise helped patients to focus on a calming, visualized scene while engaging all five senses

Method of teaching and learning materials:

The researcher used variety of teaching strategies, including lectures, group discussion, role play, demonstrations & re-demonstration, and brainstorming. To support learning, different instructional materials were utilized, such as PowerPoint presentations, picture, videos. Moreover, the researcher prepared a booklet covering the session content.

Phase 4: Evaluation at the end of MBI immediately and after 3 months, post-test was done for both study and control groups.

Results:

Table (1) clarifies distribution of the studied patients by their sociodemographic characteristics. The results revealed that no statistically significant difference was found in relation to all sociodemographic characteristics between the study group and the control group, this means that the both groups were matched.

Table (2) shows distribution of the studied patients according the clinical data. The results revealed that no statistically significant difference was found regarding any clinical data between the study

group and the control group, this means that both groups were matched.

Table (3) clarifies the distribution of the studied patients according to their level of mindfulness of voices before and after implementation of MBI. **Immediate after MBI,** 43.3% of studied patients in study group had high level of mindfulness of voices compared to only 3.3% in control group. Likewise, 36.7% of studied patients in study group had a moderate level compared to 16.6% in control group. While only 20 % of studied patients in study group had a low level of mindfulness of voices compared to 80% in control group. **More over after 3 months of the MBI,** 36.7% of studied patients in study group had high level of mindfulness of voices compared to only 3.3% in control group. whereas, 33.3% of studied patients in study group had a moderate level compared to 20% in control group. While 30 % of studied patients in study group had a low level of mindfulness of voices compared to 76.7% in control group.

Table (4) shows the distribution of the studied patients according to their level of total severity of hallucinating voices before and after implementation of MBI. **Immediate after the MBI**, a severity of auditory verbal hallucination dropped to 13.3% in study group compared to 23.3% in control group. Likewise, 40% of studied patients in study group had a moderate level compared to 60% in control group. whereas improvement occur to studied patients in study group as 46.7 % of them had a mild severity of auditory verbal hallucinations compared to 16.7% in control group. **After 3 months of the MBI,** slight increase of severity of auditory verbal hallucination to 20% of studied patients in study group compared to 23.3% in control group. whereas, 43.3% of studied patients in study group had a moderate level compared to 53.3% in control group. whereas 36.7 % of studied patients in study group had a mild severity of auditory verbal hallucinations compared to 23.3% in control group

Table (5) clarifies the distribution of the studied patients according to their level of sleep quality before and after implementation of MBI. **Immediately after the MBI**, it was noticed that low level of sleep quality dropped to 20.0% of patients in study group compared to 63.3% in control group. Likewise, 33.3% of studied patients in study group had an average level compared to 30% in control group. whereas improvement occur to studied patients in study group as 46.7 % of them had a high level of sleep quality compared to

6.7% in control group. **After 3 months of the MBI,** low level of sleep quality return to increase to 30% of studied patients in study group compared to 50% in control group. whereas, equal percentage of 36.7% of studied patients had an average level in both study group control group. But, 33.3 % of studied patients in study group had a high level of sleep quality compared to 13.3% in control group.

Table (1): Distribution of studied patients by their socio-demographic characteristics

Socio-demographic data	The studied patients with schizophrenia (n=60)				χ^2 test P value
	Control group (n=30)		Study group (n=30)		
	n	%	N	%	
-Age years					
20-<30	14	46.7	12	40.0	0.835
30-<40	10	3.33	11	36.7	1.000
40-53	6	20.0	7	23.3	
Range	22-53		20-51		
Mean±SD	32.73±7.79		33.10±7.53		
t-test	0.321				
P value	0.748				
-Sex					
Male	17	56.7	15	50.0	0.268
Female	13	43.3	15	50.0	0.605
-Marital Status					
Single	8	26.7	8	26.7	0.240
Married	13	43.3	12	40.0	0.971
Divorced	7	23.3	7	23.3	
Widow	2	6.7	3	10.0	
-Educational level					
Illiterate	2	6.7	3	10.0	2.428
Read and write	3	10.0	7	23.3	0.489
Secondary education	14	46.7	12	40.0	
University education	11	36.7	8	26.7	
-Occupation					
Working	12	40.0	11	36.7	0.071
Not working	18	60.0	19	63.3	0.791
- Residence place					
Urban	15	50.0	17	56.7	0.268
Rural	15	50.0	13	43.3	0.605
- Cohabitation) With whom you live					
Father	0	0	11	36.7	4.888
Mother	1	3.3	11	36.7	0.430
Siblings	14	46.7	12	40.0	
Husband / Wife	13	43.3	11	36.7	
Single	2	6.7	0	0	
Other	0	0	1	3.33	

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

Clinical data	The studied patients with schizophrenia (n=60)				χ^2 test P value
	Control group (n=30)		Study group (n=30)		
	N	%	N	%	
-Age of the disease onset (years)					
18-<30	27	90.0	24	80.0	3.176
30-<40	2	6.7	6	20.0	0.204
40-42	1	3.3	0	0	
Range	14-42		19-35		
Mean±SD	25.37±5.11		25.60±3.71		
t-test	0.675				
P value	0.840				
-Duration of the illness onset (years)					
1-<5	14	46.7	14	46.7	0.508
5-<10	10	33.3	8	26.7	0.776
≥10	6	20.0	8	26.7	
Range	2-30		1-27		
Mean±SD	7.03±6.14		7.50±6.00		
t-test	0.298				
P value	0.767				
-Number of previous psychiatric hospitalizations					
<3	20	66.7	21	70.0	0.083
3-5	9	30.0	8	26.7	0.959
6 & more	1	3.3	1	3.3	
-Mode of admission					
Voluntary	0	0	3	10.0	3.105
Involuntary	30	100	27	90.0	0.078

Table (3): Distribution of studied patients according to their level of Southampton Mindfulness of Voices (Control vs Study group) before and after implementation of mindfulness-based intervention

Southampton Mindfulness of Voices subscales level (Each item was scored 0-6)	Southampton Mindfulness of Voices subscales level among the studied patients with schizophrenia (Control vs Study group) before and after intervention (n=30)												χ^2 value P value		
	Control Group (n=30)						Study Group (n=30)						Before	Immediate after	After 3 months
	Before		Immediate after		After 3 months		Before		Immediate after		After 3 months				
	N	%	N	%	n	%	n	%	n	%	n	%			
A-Mindfulness Observation (MO)															
Low level (0-11)	24	80.0	24	80.0	22	73.3	22	73.3	7	23.3	9	30.0	0.511	21.275	13.167
Average level (12-18)	5	16.7	5	16.7	7	23.3	6	20.0	10	33.3	12	40.0	0.774	0.0001*	0.001*
High level (19-24)	1	3.3	1	3.3	1	3.3	2	6.7	13	43.3	9	30.0			
B-Letting Go (LG)															
Low level (0-11)	24	80.0	23	76.7	23	76.7	21	70.0	6	20.0	9	30.0	1.486	21.722	14.959
Average level (12-18)	6	20.0	6	20.0	6	20.0	8	26.7	11	36.7	11	36.7	0.476	0.0001*	0.001*
High level (19-24)	0	0	1	3.3	1	3.3	1	3.3	13	43.3	10	33.3			
C-Absence a version (AV)															
Low level (0-11)	24	80.0	24	80.0	22	73.3	22	73.3	6	20.0	9	30.0	0.511	23.733	12.682
Average level (12-18)	5	16.7	5	16.7	6	20.0	6	20.0	10	33.3	10	33.3	0.774	0.0001*	0.002*
High level (19-24)	1	3.3	1	3.3	2	6.7	2	6.7	14	46.7	11	36.7			
D-Non-Judgmental (J)															
Low level (0-11)	24	80.0	24	80.0	23	76.7	22	73.3	6	20.0	9	30.0	0.511	22.133	15.458
Average level (12-18)	5	16.7	4	13.3	6	20.0	6	20.0	11	36.7	10	33.3	0.774	0.0001*	0.0001*
High level (19-24)	1	3.3	2	6.7	1	3.3	2	6.7	13	43.3	11	36.7			
Total scores															
Low level (0-47)	**24**	**80.0**	**24**	**80.0**	**23**	**76.7**	**22**	**73.3**	**6**	**20.0**	**9**	**30.0**	**0.511**	**23.336**	**15.458**
Average level (48-72)	**5**	**16.7**	**5**	**16.7**	**6**	**20.0**	**6**	**20.0**	**11**	**36.7**	**10**	**33.3**	**0.774**	**0.0001***	**0.0001***
High level (73-96)	**1**	**3.3**	**1**	**3.3**	**1**	**3.3**	**2**	**6.7**	**13**	**43.3**	**11**	**36.7**			

N.B. Southampton Mindfulness of Voices (SMVQ) level was classified into; Low level of mindfulness of voices (patients with a score < 50%), Average level of mindfulness of voices (patients with a score 50% -75%) and High level of mindfulness of voices (patients with a score > 75

Table (4): Distribution of the studied patients according to their level of total severity of hallucinating voices before and after implementation of MBI

Level of Severity of hallucinating voices (Each item was scored 0-4)	Total severity of hallucinating voices level of the studied patients with schizophrenia before and after implementation of mindfulness-based intervention (n=60)				χ^2 test P value
	Control group (n=30)		Study group (n=30)		
	N	%	n	%	
Before intervention					
Absence to minimal auditory verbal hallucinations (0-7)	0	0	0	0	0.170
Mild severity of auditory verbal hallucinations (8-13)	5	16.7	4	13.3	0.919
Moderate severity of auditory verbal hallucinations (14-25)	17	56.7	17	56.7	
Severe auditory verbal hallucinations (>25)	8	26.7	9	30.0	
Immediate after intervention					
Absence to minimal auditory verbal hallucinations (0-7)	0	0	0	0	6.281
Mild severity of auditory verbal hallucinations (8-13)	5	16.7	14	46.7	0.043*
Moderate severity of auditory verbal hallucinations (14-25)	18	60.0	12	40.0	
Severe auditory verbal hallucinations (>25)	7	23.3	4	13.3	
3 months after intervention					
Absence to minimal auditory verbal hallucinations (0-7)	0	0	0	0	1.276
Mild severity of auditory verbal hallucinations (8-13)	7	23.3	11	36.7	0.528
Moderate severity of auditory verbal hallucinations (14-25)	16	53.3	13	43.3	
Severe auditory verbal hallucinations (>25)	7	23.3	6	20.0	
χ^2 test	**0.679**		**8.448**		
P value	**0.954**		**0.076**		

***Statistically significant (P<0.05)**

Table (5): Distribution of the studied patients according to their level of sleep quality before and after implementation of MBI

Level of Severity of hallucinating voices (Each item was scored 1-5)	Total Sleep Quality level of the studied patients with schizophrenia before and after implementation of mindfulness-based intervention (n=60)				χ^2 test P value
	Control group (n=30)		Study group (n=30)		
	N	%	n	%	
Before intervention					
Low level of sleep quality: patients with a score (>75)	18	60.0	19	63.4	0.420
Average level of sleep quality: patients with a score (50% -75%)	9	30.0	7	23.3	0.811
High level of sleep quality: patients with a score (< 50%)	3	10.0	4	13.3	
Immediate after intervention					
Low level of sleep quality: patients with a score (>75)	19	63.3	6	20.0	15.813
Average level of sleep quality: patients with a score (50% -75%)	9	30.0	10	33.3	0.0001*
High level of sleep quality: patients with a score (< 50%)	2	6.7	14	46.7	
3 months after intervention					
Low level of sleep quality: patients with a score (>75)	15	50.0	9	30.0	4.071
Average level of sleep quality: patients with a score (50% -75%)	11	36.7	11	36.7	0.131
High level of sleep quality: patients with a score (< 50%)	4	13.3	10	33.3	
χ^2 test	**1.443**		**14.534**		
P value	**0.937**		**0.006***		

***Statistically significant (P<0.05)**

Discussion

A comprehensive understanding of the impact of mindfulness on auditory hallucination can provide valuable insights into its potential as a supplementary therapy as mindfulness interventions for schizophrenia are frequently accessible and inexpensive in contrast to alternative therapeutic or treatment approaches **Böge et al., (2021)**. Therefore, mindfulness-based intervention is believed to improve sleep quality and quantity and reduce auditory hallucinations distress and disturbance through promoting acceptance, reducing rumination and worry **Peters et al., (2022)**. This study aims to evaluate the effectiveness of mindfulness-based intervention on severity of

auditory hallucination and quality of sleep among patients with schizophrenia.

The results of the present study pointed that the majority of studied patients exhibited moderate to severe levels of auditory verbal hallucinations, while only a small proportion experienced mild severity of auditory verbal hallucinations . This finding may be explained by the neurobiological mechanisms underlying schizophrenia, particularly dopaminergic dysregulation within the mesolimbic pathway, which is strongly associated with the emergence and persistence of positive psychotic symptoms, including auditory hallucinations. This explanation is supported by **Hany & Rizvi. (2024)** highlighted the role of dopamine dysregulation in psychotic symptom severity including auditory hallucination.

Medication non adherence is another explanation to this finding that irregular medication intake may impair symptom stabilization and increase patients' engagement with hallucinatory voices, which can further intensify the severity of hallucinations. Supporting this explanation, **Perdana, Wijaya, Sia'tang (2024)** reported that poor medication adherence was significantly associated with recurrence and worsening of auditory hallucinations among psychiatric patients.

Additionally, Patients' recent exposure to psychological stress also might play a role in increasing severity of auditory hallucination . Stress activates the body's physiological stress response system, leading to increased secretion of cortisol, which is associated with dysregulation of dopamine activity in brain pathways involved in perception. This dysregulation may result in misinterpretation of internal thoughts or sounds as external voices, contributing to worsening auditory hallucinations. This is in line with the results of **Iliuta et al. (2024)** declared that the presence of stress increased the severity of voices. Also, **Farina, Mourgues-Codern, Sibarium, Powers (2024)** indicated that a notable correlation existed between recent social stress and both the frequency of and distress associated with hearing voices**.**

Another possible contributing factor to this finding is patients' deficient knowledge on how to cope with auditory hallucinations which play a role in making the voices pervasive and distressing and increased the severity of them. This is consistent with **Ahmed, Osman, Shalaby,**

Alrefaai (2019), stated that learning coping strategies of hallucinations helped patients to effectively manage and reduce severity of auditory hallucinations. This current result comes in accordance with the study of **Wahba, Mahmoud, El-Mohammedy (2023)** revealing that the level of auditory hallucinations were predominantly severe among the studied patients with schizophrenia before implementation of the program Moreover, **Abd ELhay , El-Bilsha, El-Atroni (2019); Ahmed et al., (2019)**, indicated that patients commonly exhibited moderate to severe level of auditory hallucinations, while only a small proportion presented with mild levels before their program. In contrast, the results of **Ibrahim, Abdel Tawab, Gaber (2024)**, exhibited that minority of the patients had a high severe level of psychotic symptoms as auditory hallucinations before the intervention.

Regarding the level of sleep quality, it found that majority of studied patients had a low level of sleep quality before intervention, this might due to existence of auditory hallucinations which interrupt patient ability to sleep. Evidence from the study by **Ferrarelli (2021)** which revealed that the sleep of the patients was disrupted because they were afraid that something or someone will attack them while asleep. Also, **Reeve, Emsley, Sheaves, Freeman (2018)** described the link between disturbed sleep quality and severity of auditory hallucinations in patients with schizophrenia. He showed that poor sleep quality tends to co-occur with more severe auditory hallucinations.

A further possible interpretation, it could be factors related to the hospital environment such as unfamiliarity with the setting, noise, bright light and clinical activity contributed to this result. These factors contribute to heightened patient anxiety and fear, which in turn interfere with their ability to initiate and maintain sleep. In this respect, **Kulpatcharapong et al. (2020),** confirmed that sleep disrupted is heightened in the hospital environment.

The result of the present study consistent with a study conducted by **Rtbey et al. (2026)** reported that poor sleep quality is highly prevalent among patients with schizophrenia even before receiving any therapeutic intervention, In contrast, **Gidey et al. (2026)** found that a considerable proportion of patients with schizophrenia reported satisfactory sleep quality before any intervention, suggesting that not all

patients exhibit poor sleep prior intervention.

Another prominent result of this study is that the majority of studied patients in the study group before the intervention had a low level of mindfulness of voices. This may be explained by a lack of self-compassion, which is considered an important contributing factor. Deficit in self-kindness and difficulty in relating to distressing experiences can prevent a mindful, accepting stance, making patients more susceptible to increased distress from the voices. In this direction, the study of **Scheunemann, Schlier, Ascone, Lincoln (2019)** concluded that low levels of self-compassion are associated with being more distressed by psychotic experiences. Additionally, **Al-Refae, Al-Refae, Munroe, Sardella, Ferrari (2021)** summarized that self-compassion could help in having a compassionate and nonjudgmental response to personal adversity by showing self- tenderness and self-kindness rather than harsh self-criticism during distress leading to decrease anxiety, feelings of loneliness, and employing adaptive coping strategies.

Attachment style might also be among the factors that contributes to low level of mindfulness of voices as tendency of patients to exhibit insecure attachment styles, particularly avoidant and anxious-preoccupied patterns. Insecure attachment is associated with impaired emotional regulation, heightened threat sensitivity, and difficulties in self-soothing. These factors may reduce the individual's capacity to adopt a mindful, non-judgmental stance toward voices. Supporting this explanation, **Puckett, Sood, & Newman-Taylor., (2024).** revealed that the insecure attachment patterns are strongly linked to increased severity of hallucinatory voices and paranoia. Furthermore, **Dudley, Eames, Mulligan, Fisher., (2018)** pointed that high secure attachment was correlated positively with mindfulness of voices, and negatively with severity of voices.

An additional contributing factor to this result, the relation between mindfulness of voice and the severity of auditory hallucinations as severe auditory hallucinations impair patients' ability to be mindful of the voices. **Dudley et al (2018)** reported that patients experiencing highly intrusive and distressing voices struggle to concentrate on the present moment and adopt a non-judgmental attitude toward their hallucinatory experiences. The current findings are consistent with

Raugh and Strauss (2024), they declared that mindfulness level was lower in patients with psychotic disorders and **Tabak, Horan, Green (2015)** found that patients with psychotic scored lower on mindfulness facets related to monitoring (such as describing experiences and acting with awareness) and acceptance (such as non-judgment) and overall reported lower levels of mindfulness compared to control group.

Regarding the effect of MBI on severity of auditory hallucination, it was found that there was a highly statistically significant improvement in severity of auditory verbal hallucination among study group than the control group immediately after the implementation of the intervention then increase slightly after three months but still significant than before implementation of the program. This might due to the fourth session of the MBI, which taught and helped patient to check reality of their perceptions, which affirmed its effectiveness in reducing the severity levels of hallucinating voices because it helps patients distinguish between internally generated thoughts and external stimuli, breaking the cycle of misattribution that fuels distress and voice intensity. In study conducted by **Pontillo et al., (2016); Van der Gaag, Valmaggia & Smit (2014)** showed that using reality checking is effective in the treatment of auditory hallucinations.

Also, the study of **Tang et al.** (**2024**) suggested that MBI involves reality checking is a viable supplementary treatment for the management of auditory hallucinations in patients with schizophrenia, not only reduces the severity of these symptoms but also enhances self-management capabilities and mindfulness levels. In addition, reality checking helped patients to clearly clarify voices and to say to oneself "it is not true" and this strategy helped patients to shift attention away from voices and this helped in dropping level of auditory hallucinations. Moreover, **Sayied & Ahmed (2017**) reported that the majority of patients employed the technique of "clarifying voices and challenging their reality by saying to one self it is not true as a method to manage voices.

Furthermore, the improvement observed in the current study may be linked to the technique used in seventh session of the MBI, which focused on helping patients practice self-compassion meditation that helped them to be aware of their inner experience of negative feelings, perceptions and thoughts at the moment and accept them. This

is consistent with **Dudley et al. (2018).** showed that self-compassion was significantly negatively correlated with distress and severity of voices. The study of **Maisey, Correia, & Paulik (2022)**, suggested that self-compassion could significantly alleviate voice-distress, thereby necessitating further exploration of self-compassion as a target in treatment for help-seeking voice-hearers. Moreover, **Böge et al. (2021)** described that patients experienced intensified feelings of authenticity, benevolence, and empathy both for themselves and for others after participation in mindfulness program that help them to accept the auditory hallucination.

Deep mindful breathing exercise in the ninth session of the program was introduced as a core technique within MBI. Patients were taught its principles through instructional video demonstrations and were then given time to practice the exercise collectively in a group setting, reinforcing both understanding and application. Deep mindful breathing exercises help patients to manage auditory hallucinations by reducing autonomic arousal and anxiety, which can decrease the distress and intensity of the voices .In this regard **El-Refaay, Bahgat & El-Sayes (2015),** presented that majority of the studied patients immediately &after using "deep breathing exercise" reported that it helps them a lot to decrease levels of auditory hallucinations.

Another important explanation is the effect of second and sixth session of the MBI, which taught, and educated the patients about strategies to cope with hallucinations such as **reading aloud, watching television, listening to music, finding a distraction, seeking support, wearing an ear plug**…etc. When the patient knows these techniques and given the opportunity to practice them, this could bring a decrease in the severity level of auditory hallucinations. Also, after being involved in the program, patients understood that these "voices are not true". So, they calm down and be able to use the coping strategies to shift their attention away from auditory hallucinations and consequently the severity of the voice's decreases. In the same direction, **Sayied & Ahmed (2017)** found that wearing ear plugs help patients to manage the auditory hallucinations.

Watching television, is a coping strategy that shift attention away from internal voices and reduce perceived symptom intensity. A study of **Sayied & Ahmed (2017),** discovered that most patients with

schizophrenia utilized loud watching television as a strategy to cope with auditory hallucinations, this could be attributed to the fact that watching television at high volumes assists in diminishing hallucinatory experiences. Seeking support, the researcher encouraged patients to seek support of others to help in dealing effectively with the voices. This was supported by **Sharma & Mahindru (2017),** emphasized that seeking help from doctors or nurses was the predominant approach employed by patients with schizophrenia to cope with auditory hallucinations.

Distraction is another technique that was noticed using after these sessions, studied patients used it to ignore the voices and think in another thing except voices and reported it was effective and helped them to some extent. Consistently, **Turkington et al. (2016)** highlighted that patients frequently activate distraction-based techniques—such as shifting attention, reading, to escape from and effectively ignore the voices. Furthermore, **El-Refaay et al., (2015); Verma, Mehul, Vankar, & Parikh (2021),** demonstrate that "ignoring the voices" and turning attention toward regular daily activities are among the most prevalent and practical coping mechanisms applied by patients to regain control and reduce distress caused by auditory hallucination.

Ahmed, Osman, Shalaby & Alrefaai (2019) and El-Refaay et al. (2015) found that stimulating and interesting activities for patients, including (reading aloud, watching television at high volumes, singing or dancing, playing cards or dominoes, reading a stimulating magazine, participating in drawing or painting competitions, and composing stories or poems) enhance patients' connection to reality and divert their focus from hallucinations. Patients find it challenging to experience hallucinations while simultaneously engaging in reality-oriented activities.

The result of current study is similar to **Wahba, Mahmoud, El-Mohammedy, & El-Sayed, (2023); Sheng et al., (2019),** they indicated that MBI reduced the severity of auditory hallucinations among patient with schizophrenia by promoting acceptance and decreasing emotional reactivity toward auditory hallucinatory. Moreover, **Stephanie, Rossell, Toh, Scott, & Thomas (2018),** demonstrated that MBI have several benefits for patients with auditory hallucinations. It might provide protection against distress,

disruption, adverse beliefs, maladaptive relational patterns and responses, as well as mood disturbances for patients experiencing auditory hallucinations. In contrast, **Jansen, Gleeson, Bendall, Rice & Alvarez-Jimenez (2020)** found that, while MBI significantly improve general psychotic symptomatology, negative symptoms, acceptance, and mindfulness skills, there were no significant effects on positive symptoms, such as auditory hallucinations. This indicates that the direct impact of mindfulness training on auditory hallucination severity remains inconclusive and may vary depending on intervention format, measurement methods, and study design.

Regarding the effect of MBI on sleep quality, there was a highly statistically significant improvement of sleep quality among study group than the control group immediately after the implementation of the intervention then reduced slightly after three months but still significant than before implementation of the program. This improvement may be attributed to the variety of techniques and exercises incorporated throughout the program sessions. In particular, the eighth session which focused on teaching patients healthy sleep habits. During this session, patients received information about sleep hygiene and practiced exercises designed such as controlling stimuli. For example, they were encouraged to engage in activities such as reading outside the bedroom rather than in bed, to go to bed only when feeling genuinely sleepy and tired (e.g., yawning or itchy eyes), and to leave the bed if unable to sleep within 15 minutes, returning only once sleepiness resumed. These strategies collectively aimed to promote healthier and more restorative sleep patterns.

Consistently with this rational **Wang, Cheng, Li, & Yang (2024)**, proved that sleep hygiene habits have been proven to be effective non- pharmacological treatments, effectively improving sleep quality. Furthermore, the sleep quality in the study group exhibited significant improvement when compared to the control group. Moreover, **Eita, Abd Elhy & Aboalizm (2019),** affirmed that sleep hygiene guidelines were effective in improvement of sleep quality among patients with schizophrenia.

Additionally, other important exercises in the eighth and ninth session of the program taught patients about mindful breathing before sleep and body scan. These

techniques significantly help patients with schizophrenia to sleep better by reducing mental/physical arousal, improve relaxation, shifting unhelpful thought patterns about sleep, teach awareness of the body, regulate attention, and foster non-judgmental responses to sleep disruptions, breaking the insomnia cycle. This is consistent with **Yıldırım Üşenmez & Kavak Budak (2025)**, showing that breathing and relaxation techniques may serve as a beneficial intervention to enhance the sleep quality of patients with schizophrenia, complementing pharmacological treatment.

Additionally, **Togo, Takami, & Ishigaki (2024),** suggested that mindfulness facilitates relaxation of both physiological and nervous systems, as mindful breathing reduces stress reactions—a crucial factor in the regulation of sleep quality. Furthermore, **Wolfe et al., (2024)** assured that with mindfulness breathing and body scanning, by assessing physiological alterations during practice, diminish the sympathetic nervous system's activity while augmenting the parasympathetic nervous system's function, crucial for relaxation and repose, in other words, it seeks to lessen cognitive engagement by calming the mind, thus offering feedback to the body and facilitating profound physical relaxation.

Other techniques involved in the tenth session of the program by guiding patients to practice mindful imagery while the third session emphasized mindful observation and meditation. These techniques are designed to reduce stress and anxiety, foster inner peace, and strengthen the connection between body and mind. By cultivating this balance, patients experienced improvements in sleep quality, highlighting the therapeutic value of structured mindfulness practice. Similarly, **DeLeyer-Tiarks, Gammie, Bray, & Moriart (2020)** clarified that guided imagery is a mindfulness intervention grounded in evidence, which entails directing patients to visualize particular images to facilitate mental and physical relaxation. Additionally, **Rusch et al. (2019)**, stated that mindfulness meditation is hypothesized to target multiple cognitive and emotional processes as decrease ruminative thoughts that contribute to poor sleep quality.

This current study supports**, Ong & Moore. (2020),** proposing that MBI improved sleep quality via reduction of both primary and secondary arousals. Primary arousal refers to the cognitive activities directly associated with inability to sleep,

including perceptions regarding daytime consequences. Secondary arousal pertains to the connection with thoughts regarding sleep, including the likelihood for biasing attention and perception toward sleep-related thoughts. Similarly, **Peters et al. (2022),** found that MBI significantly improved sleep quality in study compared to control group, highlighting the potential of mindfulness practices to enhance restorative sleep. However, not all evidence is consistent, an earlier systematic review by **Rusch et al. (2019)**, reported that controlled MBI did not uniformly show significant improvements in sleep quality or duration, indicating that the effect of mindfulness on sleep quality may vary depending on the studied patients.

Regarding the effect of MBI on mindfulness of voices, there was a highly statistically significant improvement in level of mindfulness of voices among study group than the control group immediately after the implementation of the intervention then declined slightly after three months but still significant than before implementation of the program. The third session of the program was specifically designed to teach patients about mindful observation, that means detached, non-judgmental awareness of sensory experiences and treating voices as temporary mental events rather than absolute realities leading to acceptance of the voices. This consistent with **Lüdtke et al., (2020)** concluding that mindful observation can change patients' attitudes towards hallucinatory voices and lessened unpleasant effects by shifting from rejecting to accepting them, diminish rumination and anxiety, by enhancing the capacity to decenter from adverse thoughts content.

Furthermore, **Raugh & Strauss, (2024)** suggested that the practice of mindfulness observation allows people experiencing hallucinatory voices by helping them perceiving these voices from an alternative viewpoint, devoid of reaction or identification, while promoting psychological flexibility, emotional regulation, and acceptance, which seem to be essential elements of mindfulness, particularly concerning challenges in managing hallucinatory voices and functional deficits. Another possible justification is that MBI helped in letting go of the voices by promoting skillful disengagement from them. This is consistent with **Chadwick et al. (2016)** explained that by being engaged in mindfulness interventions, patients with

schizophrenia could improve mindfulness of voices by letting the hallucinatory voices to come and go without exaggerated negative reactions.

From another perspective, Combined using reality checking with several mindfulness techniques in the program as mindful observation, mindfulness reflection, and grounding technique involved in the third, fourth and fifth sessions. These techniques helped patients to verify their perceptions to maintain a grounded sense of reality and preventing hallucinatory voices from taking hold and this at the end helped in raising the level of mindfulness to voices. This comes into agreement with **Kabat-Zinn (2003)** confirming that, novel MBI integrates the benefits of mindfulness and reality checking to mitigate the adverse effects of hallucinatory voices by improving patients' awareness and observation of their immediate experiences, deliberately concentrating on the present without judgment.

Additionally, **Chadwick et al. (2016)** assured that the combination of mindfulness technique with reality checking not only improved patients' beliefs about auditory hallucinations but also could enhance their cognition of hallucinations, helping them to accept their hallucinations and manage their symptoms. The current result is congruent with the study of **Stephanie et al. (2018)** revealing that mindfulness-base intervention led to higher levels of mindfulness of voices that associated with reduced distress and resistance toward voices, suggesting that mindfulness interventions specifically enhance how individuals relate to voices rather than merely reducing symptom severity.

Conclusion & Recommendations

Conclusion

Based on the results of this current study, it can be concluded that MBI is an effective complementary approach for patients with schizophrenia. The intervention contributed to a significant reduction in the severity of auditory hallucinations and improved sleep quality among participants. By promoting present-moment awareness, acceptance, and adaptive coping strategies, mindfulness practices helped patients better manage distressing psychotic symptoms and sleep-related difficulties.

Recommendations

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

- Incorporate mindfulness-based interventions **(MBI)** as a

complementary, non-pharmacological therapy within the standard treatment protocols for patients with schizophrenia in psychiatric hospitals and outpatient clinics.

-Conduct consistent training workshops for psychiatric nurses to enhance their skills needed to safely and effectively deliver mindfulness practices to patient with schizophrenia suffering from auditory hallucination or poor sleep quality.

- Utilize advanced technology to design and implement MBI for patients with schizophrenia by artificial intelligence such as virtual reality, mobile phone applications and chatbots.
- Apply the intervention to a larger, multi-center sample size and compare the efficacy of mindfulness across different stages of schizophrenia or between different age groups to improve generalization of finding.

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