

Nurses' Knowledge and Practice regarding Non-pharmacological pain Management for Patients with Cardiothoracic Surgery

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ABSTRACT

Background: Cardiothoracic surgery patients are exposed to a wide range of pain following tissue injury associated with surgery, Postoperative pain is a combined effect of several unpleasant sensory, emotional and mental experiences, and so adequate pain control is a substantial factor in improving patients' outcomes. Non-pharmacological measures reduce the feeling of weakness, and reduce the use of analgesics. **The study aimed to** evaluate nurses' knowledge, and practice regarding non-pharmacological pain management for patient undergoing cardiothoracic surgery. **Research design:** A descriptive design was conducted. **Tools of data collection:** An interview questionnaire and observational checklist for nurses were used to collect data. **Study subjects:** convenient sample of available nurses (35) working in cardiothoracic surgery wards and open heart ICU at Zagazig University Hospitals **Results;** The current study illustrated that at the pre-intervention phase about only 5.7% of the studied nurses had satisfactory total knowledge level about non-pharmacological pain management for cardiothoracic surgery patients while at the post-intervention phase about 85.7% of studied nurses had satisfactory total knowledge regarding non-pharmacological pain management for patients with cardiothoracic surgery. The current study revealed that there was increase in satisfactory total nurses' practice about non-pharmacological pain management for patients undergoing cardiothoracic surgery post intervention (82.9%) compared to pre intervention (11.4%). **Conclusion;** Nurses had an unsatisfactory level of knowledge and practice regarding non-pharmacological pain management. **Recommendations;** Implement continuous evidence-based educational programs for nurses to enhance their knowledge and clinical practice related to non-pharmacological pain management.

Keywords: Cardiothoracic surgery, Nursing performance, Non pharmacological pain management

Introduction

Cardiovascular diseases caused more than 3.8 million deaths per year across Europe, accounting for just under 1.76 million deaths in men and more than 2 million deaths in women. This corresponded to 39% of all deaths in men and 46% of all deaths in women (Townsend et al., 2022).

Pain after surgery usually and directly impedes respiratory function, mobilization, and delays recovery, increase duration of hospitalization and hospital care costs of patient. Additionally, poorly controlled postoperative pain can cause multiple complications in the recovering patient including impairing breathing and movement. Moreover, postsurgical pain after cardiothoracic surgery is a major source of stress and distress for patients (Tola et al., 2023).

Adequate cardiothoracic surgery pain management becomes the main care element for patients in the postoperative period. As the nursing team is the professional class who remain most of the time close to the patient, being responsible for their care, it is clear their important role in pain evaluation and management of the cancer patient, especially non-pharmacological pain management (Kia et al., 2021).

Non-pharmacological methods are practices that can be used as needed, can be easily taught to patients, do not cost much, can be easily applied, and are among the independent roles of the nurse who shows the results immediately. In general, the nurses when implementing the non-pharmacological interventions model can play an important role in improving the quality of care and saving the treatment costs. Moreover, nurses' knowledge and attitude greatly affect the use of non-pharmacological pain management methods (Yıldız, Oyuktaş & Avcu, 2024).

Significance of the study

Surgical interventions are integral medical treatments for patients with CVD. Globally, an estimated 230 million major surgical procedures are performed each year. (Coppes et al., 2020). All surgical procedures, cardiothoracic surgeries cause significant severe postoperative pain and suffering to patients. For this reason, provision of adequate and effective postoperative pain relief is the paramount goal for cardiothoracic surgery patients during postoperative period (Akyüz & Erdem, 2021).

It is important to understand nurses' experiences on non-pharmacological pain management therapies because their practices and knowledge regarding these therapies can affect their response to managing the pain of their patients (Munkombwe, Petersson & Elgán, 2020).

Therefore, the aim of the study was to assess nursing knowledge

and practice regarding non-pharmacological pain management for patients with cardiothoracic surgery at Zagazig University Hospitals.

Aim of the Study

This study aimed to Assessment of Nurses' knowledge and practice regarding non-pharmacological pain management for patients with cardiothoracic surgery

This aim will be fulfilled through the following objectives:

1. To assess nurses' knowledge regarding non-pharmacological pain management for patients with cardiothoracic surgery
2. To evaluate nurses' practical skills in. non-pharmacological pain management for patients with cardiothoracic surgery
3. To examine the relationship between nurses' knowledge and practice regarding non-pharmacological pain management for patients with cardiothoracic surgery

Research questions

This study will have two research questions including:

1. What is the nurses' knowledge about non-pharmacological pain management for patients with cardiothoracic surgery?
2. What are the nurses' practices regarding non-pharmacological pain management for patients with cardiothoracic surgery?

Research design; A descriptive design was utilized. *Setting;* two postoperative cardiothoracic surgery department at Zagazig University Hospitals, which is composed of an open heart ICU and the Heart and chest ward. *Subject;* Convenient sample of available nurses (35) nurses working in previously mentioned setting with inclusion criteria; Nurses with at least one year of experienced.

Tools for data collection:

The following tools was used to collect data in this study.

Tool I: A Structured Interview Questionnaire for Nurses (Bader, Morsy, Ali 2015 / El husseiny et al., 2019): - designed by the researcher after revising of related literature and include the following parts:

Part 1: Demographic characteristics of nurses

Part 2: Nurses' knowledge (Pre/ Post-test): This part was intended to assess nurses' knowledge regarding non-pharmacological pain management for patients with cardiothoracic surgery. It was developed by the researcher based on pertinent literature (El husseiny et al., 2019), it was contained 47 MCQ questions and 33 True and false questions

Scoring system for Nurses' interviewing questionnaire:

For the knowledge items, the correct answer was scored "1" and the incorrect "zero". For each area of knowledge, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the area. These scores were converted into percent scores. The knowledge was considered satisfactory if the percent score was 75% or more and unsatisfactory if less than 75% based on data entering of the pilot study and statistical analysis.

Tool II; An Observational Checklist: it was developed by the researcher based on pertinent literature (Ramadan, Mohamed, Abd Elsalem, 2018). It covered the following areas of practice:

Part I; A-Nurses' practice regarding pain assessment: It was contained eight items.

Part II; Nurses' practice of non-pharmacological pain management methods: It was seven parts contained 131 items covered 135 steps

Scoring System for Observational Checklist

Each practice item observed to be done correctly was scored "one" and the not-done "zero". For each area of practice, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the area. These scores were converted into percent scores. The practice was considered satisfactory if the percent score was 75% or more and unsatisfactory if less than 75% based on data entering of the pilot study and statistical analysis. Score more than 116 satisfactory done, less than 116 unsatisfactory practices.

Administrative Design and ethical consideration;

An official permission was obtained from the dean of the faculty of Nursing and from the director of Zagazig University Hospital before conducting the study. They were given an opportunity to refuse the participation, and they were assured that the information would be used for research purposes only.

Before the initial interview, each potential subject was informed about the nature, purpose, benefits of the study, and informed that his/her participation is voluntary. Confidentiality and anonymity of the subjects were also assured through coding of all data. The researcher assured that the data collected, and information will be confidential and would be used only to improve their knowledge and practice and for the purpose of the

study. There was no risk in study subject during application of the research.

Pilot study

A pilot study for data collection was carried out in order to test whether the tools are clear, understandable, feasible, applicable, and time consuming. Ten percent from the total sample size that equal five nurses' were selected randomly from intensive care units to participate in testing of the tools; these five nurses were selected outside the original study sample which consisted of 35 nurses. The time required for answer questionnaire and complete observation chart was ranged between 30 to 40 minutes. Simple modifications was done based on pilot results and the sample who shared in the pilot study excluded from study sample.

Field work

After an official permission was taken from the dean of the faculty of Nursing, from the manager of Zagazig University Hospitals and from the head of cardiothoracic department, the implementation phase for data collection started as following: The selection of nurses, the collection of data, and began from June 2024 to the end of April 2025 where the researcher was available three days weekly (Saturday, Sunday, and Thursday) during the morning and afternoon shifts.

Content validity

The tools were reviewed by a panel of one professors and four assistant professors in medical surgical nursing, faculty of nursing, Zagazig University to ensure their content validity. The tools were also reviewed for clarity, relevance, comprehensiveness, applicability, and understanding. According to the expertise's modifications and the results of the pilot study, some modifications were applied in the form of rephrasing or rewording accordingly.

Tools reliability

Nurses' knowledge practice and patient outcome were tested for reliability and showed high reliability through measuring its alpha Cronbach coefficient; (Nurses' knowledge was 0.845, Nurses' practice regarding non-pharmacological pain management 0.86) indicating high reliability

Statistical Design

All data were collected, tabulated and statistically analyzed using IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp. Quantitative data were expressed as the mean $\pm$ SD & median (range), and qualitative data were expressed as number & (percentage). Paired t test was used to compare between paired of abnormally distributed variables. Percent of categorical variables were

compared using, Chi square test or Fisher Exact test when appropriate.

Mcnemar test was used to compare between paired categorical data. Marginal Homogeneity Test was used to compare between paired ordinal data. Pearson' correlation coefficient was calculated to assess relationship between various study variables, (+) sign indicate direct correlation and (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation and values near 0 indicate weak correlation. All tests were two sided. P-value < 0.05 was considered statistically significant, p-value $\geq$ 0.05 was considered statistically insignificant. % of improvement = (after value – before value) / before value) * 100

Results;

Table 1 showed that more than half of studied nurses age $\geq$ 30 years (51.4) with median (range) 30 (22-51) with mean $\pm$ SD=31.2 $\pm$ 7.6 years, 74.3% of the studied nurses' were females and the majority of studied nurses were married (80.0%) and 62.9% of studied nurses residing in rural areas. Regarding nursing qualification, 42.9% of studied nurses had technical institute, 62.9% and 68.6% of studied nurses had experience less than 10 years in the nursing experience and cardiothoracic surgical department respectively. Related to the attendance of training courses, 62.9% and 57.1% respectively of studied nurses not attended previous training courses about pain assessment and non-pharmacological pain management methods.

Table 2 Illustrated that at the pre-intervention phase about only 5.7% of the studied nurses had satisfactory total knowledge level about non-pharmacological pain management for cardiothoracic surgery patients while at the post–intervention phase about 85.7% of studied nurses had satisfactory total knowledge regarding non-pharmacological pain management for patients with cardiothoracic surgery

Table 3 Revealed that there was increase in satisfactory total nurses' practice about non-pharmacological pain management for patients undergoing cardiothoracic surgery post intervention 82.9% compared to pre intervention 11.4% with Mean $\pm$ SD 75.54 $\pm$ 22.83 .

Table 4: Showed that there was no statistically significant difference in relation between nurses' knowledge level and their practice regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre intervention program.

Table 5: Showed that there was no statistically significant difference in relation between nurses' knowledge level and their practice regard non-pharmacological pain management for

patients undergoing cardiothoracic surgery post intervention program.

Table 6 Showed that there was no statistically significant difference in relation between nurses' practice dimensions and their knowledge level regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre intervention program.

Table 7 Showed that there was no statistically significant difference in relation between nurses' practice dimensions and their knowledge level regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at post intervention program.

Overall, these findings highlight the pivotal role of education and experience in building knowledge, and show that knowledge translates into better practice, while financial strain may hinder performance; suggesting multifaceted interventions (education upskilling, mentorship, and addressing workplace stressors).

Discussion;

The current study found that at the pre-intervention phase about only one tenth of studied nurse had satisfactory knowledge about pain, less than one tenth of studied nurse had satisfactory knowledge about pain assessment and non-pharmacological pain management methods. While at the post –intervention phase most of studied nurse had satisfactory knowledge about pain, more than three fifths of studied nurse had satisfactory knowledge about pain assessment, majority of studied nurse had satisfactory knowledge about non-pharmacological pain management methods.

This finding was in the same line with **Elsayed et al., (2023)** in a study entitled "Upgrading Nurses' Knowledge, Attitude and Self-Efficacy toward Pharmacological and Non-Pharmacological Pain Management" who reported that, the majority of the studied nurses had low level of knowledge Toward Pharmacological and Non-Pharmacological Pain Management.

Also, these findings are consistent with **Innab et al., (2022)** who carried out a study entitled “The impact of a 12-hour educational program on nurses' knowledge and attitudes regarding pain management”, and found that the program improved nurses' knowledge and attitude regarding pain management.

The current study found that there was statistically different increase in satisfactory and improvement of total nurses' practice regarding non-pharmacological pain management for patients undergoing cardiothoracic surgery, that increased from one tenth of studied nurses had satisfactory practices that increased to majority of studied nurses in post educational

program. This finding was in agree with **Uysal & Yilmazer (2021)**, who concluded that the result of their study, "The Effect of Pain Management Training on the Nurses' Knowledge and Practices for Pain," was that the practice of the nurses regarding pain management significantly increased after the training (p 0.005). Also agree with, **Liu et al., (2021)**, who showed that practice behaviors of nurses' postoperative pain assessment and management improved. The intervention taught nurses to be more active and standardized in postoperative pain management.

The current study showed that there was no statistically significant difference in relation between nurses' knowledge level and nurses' practice level regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre, post intervention program.

This finding consistent with **Selvi, et al., (2022)**, who carried out a study entitled "Assessment of Knowledge, Attitude and Practice towards Neonatal Pain Management among Nursing in New Delhi" and reported that there positive weak correlation between knowledge and practice among the studied nurses. Also, these study findings was supported by **El Awady & Gharib (2021)**, who revealed that there was no statistical significant correlation between nurses' knowledge and practices regarding selected non-pharmacological techniques to alleviate pain throughout the program phases.

Also, these study findings was agreed with **Zelege, Kassaw & Eshetie (2021)**, who carried out a study entitled "Non-pharmacological pain management practice and barriers among nurses working in Debre Tabor Comprehensive Specialized Hospital, Ethiopia", and showed that no statistically significant association between nurses' knowledge the practice of non-pharmacological pain management methods

This finding was in disagreement with **Kgakge et al. (2024)**, who found in his study "Investigating the Risk of Patient Manual Handling Using the Movement and Assistance of Hospital Patients Method among Hospital Nurses in Botswana.", that there was a significant relationship between total practice and total knowledge. This finding also contradicted with the study by **Sayed (2024)**, who found in his study "Assessment of Nurses' Performance Regarding Non-

Pharmacological Pain Management in Intensive Care Unit", that there was a highly significant positive correlation between total knowledge of studied nurses and their total practice about the neonatal pain and non-pharmacological management methods.

This finding also contraindicated with the study by **Mohamed et al., (2018)**, who found in his study "Effect of Educational Program on Pediatric Nurses' Knowledge and Practice Regarding Selected Non-pharmacological Techniques to Relieve Pain" that there was a moderate correlation between nurses' knowledge and practices regarding non-pharmacological methods for relief pain in the post-test phase.

Conclusion;

In light of the current study findings, it can be concluded that studied nurses demonstrated a significant improvement in both knowledge and practice regarding non-pharmacological pain management for patient undergoing cardiothoracic surgery after implementing the educational program. Before the educational program, most of the studied nurses had unsatisfactory Knowledge and practice levels; however, following the educational program, the majority achieved satisfactory levels, indicating the effectiveness of the implemented program. There was significant direct association between post intervention knowledge with post intervention practice among studied nurses.

Recommendations;

Based on the current study results, the following recommendations were suggested:

- 1- Encourage more periodical continuing in service education for nurses that empowering more successive utilization of non-pharmacological methods in cardiothoracic department for patient undergoing cardiothoracic surgery
- 2- Simple illustrated Arabic booklets about non-pharmacological techniques to alleviate pain should be accessible in all cardiothoracic surgery department.
- 3- Hospital managers should motivate and support nurses in using non-pharmacological techniques inside the cardiothoracic surgery department.

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Table (1): Frequency and percentage distribution of demographic characteristics of the studied nurses (n.35):

Nurses' demographic characteristics	No.	%
Age per years		
<30 years	17	48.6
≥30 years	18	51.4
Mean ±SD median(range)	31.2±7.6 30(22-51)	
Sex		
Males	9	25.7
Females	26	74.3
Marital status		
Married	28	80.0
other	7	20.0
Residence		
Urban	13	37.1
Rural	22	62.9
Nursing qualification:		
Nursing diploma	11	31.4
Nursing technical institute	15	42.9
Nursing Bachelors	7	20.0
Diploma +specialty	2	5.7
Nursing experience in nursing field		
<10 years	22	62.9
≥10 years	13	37.1
Mean ±SD median(range)	10.22±8.15 8(1-32)	
Experience years in cardiothoracic surgical departments:		
<10 years	24	68.6
≥10 years	11	31.4
Mean ±SD median(range)	16.05±4.71 16(5-25)	
Attended training courses about pain assessment		
yes	13	37.1
No	22	62.9
Attended training courses about non-pharmacological pain management methods		
yes	15	42.9
No	20	57.1

Table 2: Frequency and percentage distribution of correct total of nurses' knowledge about non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre and post intervention program (n= 35):

Correct total of nurses' knowledge	Total nurses 'knowledge				% Improvement	Paired t	P-value
	Pre intervention		Post intervention				
	No	%	No	%			
Total correct nurses' knowledge Satisfactory $\geq 75\%$ Unsatisfactory $\leq 75\%$ Mean $\pm$SD Median(range)					78.26	17.66	0.0001*
	2 33	5.7 94.3	30 5	85.7 14.3			
	36.4 $\pm$ 11.01 38(14-61)		64.89 $\pm$ 7.21 67(41-75)				

()# = maximum score, Paired t Test, *p<0.05= significant

Table 3: Frequency and percentage distribution of correct total of nurses' done practices about non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre and post intervention program (n= 35):

Total of nurses' done practices	Total nurses' practices				% Improvement	Paired t	P-value
	Pre intervention		Post intervention				
	No	%	No	%			
Total nurses' practices							
Satisfactory $\geq 75\%$	4	11.4	29	82.9	68.08%	14.49	0.0001*
Unsatisfactory $\leq 75\%$	31	88.6	6	17.1			
Mean $\pm$ SD							
Median(range)	75.54 $\pm$ 22.83 67(47-133)		126.97 $\pm$ 11.17 128(83-142)				

()# = maximum score, Paired t Test, *p<0.05= significant

Table 4: Relation between Nurses' knowledge level and their practice regarding non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre intervention program (n = 35):

Knowledge dimensions pre intervention	Nurses' practice pre intervention				P-value
	Satisfactory n.4		Unsatisfactory n.31		
	No.	%	No.	%	
Nurses' knowledge about pain					
Satisfactory	1	25.0	3	9.7	.339
Unsatisfactory	3	75.0	28	90.3	
Nurses' knowledge regarding pain assessment					
Satisfactory	0	.0	3	9.7	0.99
Unsatisfactory	4	100.0	28	90.3	
knowledge regarding non-pharmacological pain management methods					
Satisfactory	1	25.0	2	6.5	0.313
Unsatisfactory	3	75.0	29	93.5	
Nurses total knowledge level					
Satisfactory	1	25.0	1	3.2	.218
Unsatisfactory	3	75.0	30	96.8	

Fisher exact test, non-significant p $\geq$ 0.05

Table 5: Relation between Nurses' knowledge level and their practice regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at post intervention program (n = 35):

Knowledge dimensions post intervention	Nurses’ practice post intervention				P-value
	Satisfactory n.29		Unsatisfactory n.6		
	No.	%	No.	%	
Nurses’ knowledge about pain					
Satisfactory	28	96.6	4	66.7	0.07
Unsatisfactory	1	3.4	2	33.3	
Nurses' knowledge regarding pain Assessment					
Satisfactory	20	69.0	2	33.3	0.166
Unsatisfactory	9	31.0	4	66.7	
knowledge regarding non-pharmacological pain management methods					
Satisfactory	25	86.2	3	50.0	0.079
Unsatisfactory	4	13.8	3	50.0	
Nurses total knowledge level					
Satisfactory	26	89.7	4	66.7	0.195
Unsatisfactory	3	10.3	2	33.3	

Fisher exact test, non-significant $p \geq 0.05$

Table 6: Relation between Nurses' practice dimensions and their knowledge level regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at pre intervention program (n = 35):

Nurses' practice dimensions pre intervention	Nurses' Knowledge pre intervention				P-value
	Satisfactory n.2		Unsatisfactory n.33		
	No.	%	No.	%	
Pain assessment					
Satisfactory	1	50.0	0	.0	0.057
Unsatisfactory	1	50.0	33	100.0	
Apply a warm compresses					
Satisfactory	1	50.0	3	9.1	0.22
Unsatisfactory	1	50.0	30	90.9	
Apply a cold compresses					
Satisfactory	1	50.0	3	9.1	.218
Unsatisfactory	1	50.0	30	90.9	
Apply a back massage					
Satisfactory	1	50.0	4	12.1	.269
Unsatisfactory	1	50.0	29	87.9	
Apply relaxation techniques					
Satisfactory	1	50.0	3	9.1	0.218
Unsatisfactory	1	50.0	30	90.9	
Apply acupressure					
Satisfactory	1	50.0	3	9.1	0.218
Unsatisfactory	1	50.0	30	90.9	
Apply Deep breathing					
Satisfactory	1	50.0	2	6.1	0.166
Unsatisfactory	1	50.0	31	93.9	
Apply Cough Exercises					
Satisfactory	0	.0	2	6.1	0.99
Unsatisfactory	2	100.0	31	93.9	
Non-pharmacological pain management level					
Satisfactory	1	50.0	2	6.1	0.166
Unsatisfactory	1	50.0	31	93.9	
Total practice level					
Satisfactory	1	50.0	3	9.1	.218
Unsatisfactory	1	50.0	30	90.9	

Fisher exact test, non-significant $p \geq 0.05$

Table 7: Relation between Nurses' practice dimensions and their knowledge level regard non-pharmacological pain management for patients undergoing cardiothoracic surgery at post intervention program (n = 35):

Nurses’ practice dimensions post intervention	Nurses’ Knowledge post intervention				P-value
	Satisfactory n.30		Unsatisfactory n.5		
	No.	%	No.	%	
Pain assessment					
Satisfactory	22	73.3	4	80.0	0.99
Unsatisfactory	8	26.7	1	20.0	
Apply a warm compresses					
Satisfactory	27	90.0	4	80.0	0.477
Unsatisfactory	3	10.0	1	20.0	
Apply a cold compresses					
Satisfactory	28	93.3	4	80.0	0.38
Unsatisfactory	2	6.7	1	20.0	
Apply a back massage					
Satisfactory	29	96.7	5	100.0	0.99
Unsatisfactory	1	3.3	0	.0	
Apply relaxation techniques					
Satisfactory	26	86.7	5	100.0	0.99
Unsatisfactory	4	13.3	0	.0	
Apply acupressure	.	.	.	.	0.99
Satisfactory	28	93.3	5	100.0	0.99
Unsatisfactory	2	6.7	0	.0	
Apply Deep breathing	.	.	.	.	0.99
Satisfactory	24	80.0	4	80.0	
Unsatisfactory	6	20.0	1	20.0	
Apply Cough Exercises	.	.	.	.	0.99
Satisfactory	23	76.7	4	80.0	
Unsatisfactory	7	23.3	1	20.0	
Non-pharmacological pain management level					
Satisfactory	28	93.3	3	60.0	.089
Unsatisfactory	2	6.7	2	40.0	
Total practice level	.	.	.	.	.195
Satisfactory	26	86.7	3	60.0	
Unsatisfactory	4	13.3	2	40.0	

Fisher exact test, non-significant $p \geq 0.05$