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Nurses' knowledge and practice regarding care of patients undergoing chest tube

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***Abstract*---**Chest tube is a postoperative therapeutic intervention widely applied to the respiratory tract and cardiothoracic care. -Aim: To assess nurses' knowledge and practice regarding care of patients undergoing chest tube. Design: A descriptive exploratory study design was used _Setting: Intensive Care Unit, Surgical and Operational Departments, in El-Mahalla Chest Hospital, and El-Mahalla Cardiac Center. Sample: A convenient sample of all available nurses (60 nurses) who work with patient undergoing chest tube. Tools: 1) Self-administered interview questionnaire consists of two parts part 1: Nurse's demographic data characteristics, part 2: Nurse's knowledge about chest tube. Tool 2) Observational checklist. Results: Findings of the present study showed that more than one third of the studied nurses had average knowledge regarding management of patient with chest tube drainage. While one third and less than one quarterbof them had poor and good knowledge, respectively. Conclusion: the majority of the studied nurses had insufficient knowledge and practice regarding management of patient with chest tube drainage. Recommendations: Development of in-service training programs to maintain efficient performance of nurses Replication of the study on a larger sample and in different geographical areas in Egypt for generalization of findings.

***Keywords*---**nurse's knowledge, practice, chest tube.

Introduction

The management of a critically ill patient therefore represents a continual balancing act in which the risks and benefits of diagnostic procedures and interventions must be carefully weighed. Using chest tubes and chest drainage is a complex and critical nursing function. Up to date knowledge and skill of the staff nurses in this field will be helpful to protect the patient and help them to recover from a serious pulmonary problem *(Ouellette, et al., 2017)*. A chest tube insertion is a surgical procedure in which a hollow, flexible drainage tube is inserted through the side of the chest in to the pleural space in order to drain the pleural cavity of air, blood, pus or lymph. The water seal container connected to the chest tube allows one-way movement of air and fluid from the pleural cavity. The chest tube is used to restore the intra pleural pressure and to prevent the collapse of lungs. Chest tube management includes the actions to keep the tube functioning properly, which is the prime role of nurses while caring of patients with chest tube drainage *(Kuhajda ,et al., 2021)*.

Care of chest drain and management appear complicated but a good understanding of the basic aspects related to drain insertion and system function is important to improve outcomes for patient and reduce the risk of complications. Patients with chest drains should receive care by medical or surgical teams who were experience on management and care and known what the patient needs. Nursing staff who give caring for this patient must have received training and demonstration to become competent *(Ouellette, et al., 2017)* Post-procedural care entails monitoring vital signs, assessing and documenting drainage, caring the water seal drainage system, assisting patients during change of position and in removing of the chest tube after it has served its function. Unacceptable and sometimes life-threatening complications may be associated with inadequate nursing care and poor surgical techniques during insertion that can be classified as technical or infective *(Nydahl,et al., 2017)*.

Chest drains insertion it is responsibility of the doctor but the nurse and the doctor both they were responsible to maintain the drain and drainage system function in addition to monitor the patient. Safe practice is requiring understanding of anatomy and physiology of the respiratory system and the heart, knowledge and skills on how chest drainage functions. Therefore, this study will be done to assess nurses' knowledge and practice regarding care of patients undergoing chest tube *(Zhao, et al., 2017)*.

Significance of study

Chest tube insertion is a commonly performed procedure in hospital practice. Therefore, it is important that every member in the health team taking care of patients with chest tube and should have adequate understanding of the physical principles of chest tube and its drainage system. A survey in a Nigerian semi urban university hospital (2016) show that only (26.2%) respondents had a good knowledge of nursing care of chest drains *(Wuestenberg , 2018)*. *Ibrahim's, (2018)* found that the majority of studied nurses at Ismailia University Hospital had statistically unsatisfactory level of practice related to chest tube. The total number of cases had chest tube at Elmahalla cardiac center where the study will

done was (578) case from 1/1/2018 to31/12/2018 *(Elmahalla cardiac center, 2018).*

Aim of the study

This study aimed to assess nurses' knowledge and practice regarding care of patients undergoing chest tube.

This aim was achieved through the following objectives

1. Assess the level of nurse's knowledge regarding chest tube drainage.
2. Assess the level of nurse's practice in caring for patients undergoing chest tube.

Subjects and Methods

Technical item

Research design: A descriptive exploratory research design was utilized for the conduction of this study its usually provides the least control over variables. . The study was conducted at the intensive care unit, surgical and operational departments at El-Mahalla chest hospital, and El-Mahalla cardiac center, Gharbiya Governorate, Egypt. The working hours are three shifts in the morning , afternoon and night shifts.
Subjects: A Convenient sample of all available nurses (60 nurses) from both sexes who work with patients undergoing chest tube at the intensive care unit, surgical and operational departments.

Tool of data collection

Data for this study were collected by using the following tools:

1st tool: -Nurses self-administered interview questionnaire.
Part (I): to assess the Nurse's demographic characteristics such as: - Age, sex, marital status, educational level, years of experience and training courses.
Part (II): to assess the nurse's knowledge about respiratory system and its function, chest tube drainage and its complications and nurse's role in chest tube management .

2nd tool: - Observational checklist: - It was designed by the investigator in the Arabic language after reviewing the related literature to assess nurse's practice regarding the procedure of chest tube. It included questions from 68-73 and includes the following items: Patient assessment. It included questions from (1-13). Chest tube drainage patency, It included questions from 14-21. Changing chest tube drainage insertion site dressing. It included questions from 15-37. Changing the chest drainage bottle if broken or filled. It included questions from 38-59. Health teaching. It included questions from 60-70. Chest tube drainage removal procedure. It included questions from 71-93.
Scoring system: - Scoring system: each question was evaluated as 1 scores for done and 0 scores for not done. The total practice level was classified into:

- Competent : > 60 %
- Incompetent : < 60 %

Validity& Reliability

The validity of the tools is whether or not the instrument measure what it is designed to measure it was done through seeking the opinions of a jury group consisting of five professors of Medical Surgical Nursing who judged their clarity, comprehensiveness, accuracy, relevance and whether it elicited the type of information sought; thus the tools were the face and content-validated. The tools were modified and rephrased based on the jury's opinions. This phase took three weeks' duration.

Reliability and validity are concepts used to evaluate the quality of research. They indicate how well a method, technique or test measures something. Reliability is the consistency of a measure the degree to which an instrument measures the same way each time it's used under the same conditions with the same subject and validity is about the accuracy of a measure.

Pilot study

It was carried out for one week to evaluate the reliability and applicability of the tools to find the possible obstacles that might be faced during data collection. 10% from the total sample (6 cases) was included and chosen randomly from the previously mentioned setting, then later included in the sample. There were no major modifications found after the pilot study. The pilot also served to assess the reliability of the scale by examining its internal consistency. It showed very high levels of reliability as indicated (0.08) and the cronbach alpha test was used.

Ethical considerations

The research approval was issued from the Scientific Research Ethical Committee in the Faculty of Nursing at Helwan University before starting the study.

- The researcher was clarified the importance and aim of the study to all the nurses included in the study.
- Oral consents were obtained from all the studied nurses.
- The questionnaire didn't include any immoral statements that touch nurse's beliefs, dignity, culture, tradition and religious issues.
- All nurses were informed that they are allowed to choose to participate or not in the study and that they have the right to withdraw from the study at any time without giving any reason and confidentiality of the information was assured.
- All nurses were informed that the collected data would be used only for the present study, as well as for their benefits.

Results

Table (1):Correlation between demographic Characteristics of the Studied Nurses and their Total Knowledge regarding Nursing Management of Patients with Chest Tube

Drainage (N=60): Table (15) demonstrates that, there were highly significant correlation between total knowledge of studied nurses and their level of education and years of experience at (P= < 0.01). While, there were significant correlation with age and attend training courses at (P= < 0.05). But there was no significant correlation with gender at (P= > 0.05).

Table (2):Correlation between demographic Characteristics of the Studied Nurses and their Total Practice regarding care of patient with chest tube (N=60): shows that, there were a highly significant correlation between total practice of studied nurses and their level of education and years of experience at (P= < 0.01). While, there was significant correlation with attend training courses at (P= < 0.05). But there were no significant correlation with gender and age at (P= > 0.05).

Table (3):Correlation between Studied Variables: Table (17) reports that, there were highly statistical significance between total knowledge and practice of the studied nurses regarding nursing management of patients with chest tube at p. value < 0.01.

Table (1): Correlation between demographic Characteristics of the Studied Nurses and their Total Knowledge regarding Nursing Management of Patients with Chest Tube Drainage (N=60)

Items		Total Knowledge							
		Good No=14		Average No=25		Poor No=21		X2	P-Value
		No	%	No	%	No	%		
Gender	Male	5	35.7	4	16	5	23.8	2.010	.058
	Female	9	64.3	21	84	16	76.2		
Age	<20	1	7.1	1	4	8	38.1	4.997	.014*
	20-29	1	7.1	8	32	6	28.6		
	30-39	3	21.5	11	44	6	28.6		
	>40	9	64.3	5	20	1	4.7		
Level of education	Nursing Diploma	0	0	5	20	16	76.2	7.956	.008**
	Technical heath institute	1	7.1	15	60	3	14.3		
	Bachelor of Nursing	9	64.3	4	16	2	9.5		
	Postgraduate (MSc)	4	28.6	1	4	0	0		
Years of experience	Less than 3 years	0	0	2	8	10	47.7	6.958	.009**
	3 - 5 years	1	7.1	2	8	7	33.3		
	5 - 10 years	2	14.3	19	76	3	14.3		
	More than 10 years	11	78.6	2	8	1	4.7		
Attend training courses	Yes	9	64.3	1	4	1	4.7	4.113	.038*
	No	5	35.7	24	96	20	95.3		

Table (2): Correlation between demographic Characteristics of the Studied Nurses and their Total Practice regarding care of patient with chest tube (N=50)

Items		Total Practice					
		Competent No=24		Incompetent No=36		X2	P-Value
		No	%	No	%		
Gender	Male	6	25	8	22.2	2.007	.051
	Female	18	75	28	77.8		
Age	<20	4	16.7	6	16.6	1.567	.071
	20-29	6	25	9	25		
	30-39	10	41.7	10	27.8		
	>40	4	16.6	11	30.6		
Level of education	Nursing Diploma	2	8.4	19	52.8	9.613	.003**
	Technical heath institute	5	20.8	14	38.9		
	Bachelor of Nursing	12	50	3	8.3		
	Postgraduate (MSc)	5	20.8	0	0		
Years of experience	Less than 3 years	1	4.1	11	30.6	9.038	.002**
	3 - 5 years	3	12.5	7	19.4		
	5 - 10 years	10	41.7	14	38.9		
	More than 10 years	10	41.7	4	11.1		
Attend training courses	Yes	10	41.7	1	2.8	3.997	.041*
	No	14	58.3	35	97.2		

Table (3): Correlation between Studied Variables

Items	Total knowledge
Total practice	R. .699 p. value .000**

Discussion

Chest drains have remained a common, simple and effective tool for managing chest trauma and pleural pathologies. They are largely used in patients admitted with these pathologies in accident and emergency units, Intensive Care Units, adult and pediatric medical and surgical wards. Nursing care of chest drains can either be pre-procedural or post-procedural. Pre-procedural care involves ensuring that an informed consent is obtained and giving additional relevant information to the patient, gathering the correct materials for tube thoracotomy and assisting the procedure *(Kesieme, et al., 2021)* .

Post-procedural care entails monitoring vital signs, maintaining a closed system, assessing and charting drainage, protecting the water seal drainage system, assisting patients during change of position and assisting in removing tube after it has served its function. Inefficient nursing care and poor surgical techniques during insertion are associated with unacceptable and sometimes life-threatening

complications that can be classified as technical or infective. So, this study aimed to determine the knowledge and practice gaps in the care of chest drains among nurses *(Caroll , 2017)*.

According to *Fremlin, (2018)*, who conducted a study entitled "Are nursing staff sufficiently educated and competent in managing patients with a chest drain" and pointed out to the lack of evidence-based nursing care and insufficient training has resulted in uncertainty and knowledge deficit on an important aspect of chest tube care, exposing patients to avoidable complications. Moreover, poor instructions to nurses from doctors following chest tube insertion further compromises patient care. A carefully designed and implemented care bundle to guide nurses through chest tube management could significantly lower post-insertion complications.

Findings of the present study showed that, two third of the studied nurses had correct answer regarding the patient should be given general anesthesia before the chest tube insertion and more than half replied it is necessary to make ultrasound on the abdomen before insertion of the chest tube, respectively. While, more than half of them had incorrect answer regarding the chest tube can be inserted to the patient in the bed and one of the important procedures before insertion of the chest tube is to do a triple lipid analysis, respectively. This finding shows that there is a need for training programs for nurses on the management of patients with chest tubes.

These results were in partial agreement with those of *Magner, et al. (2021),* who conducted a study in Ireland and found that around three quarters of the nurses had sufficient and moderate knowledge level regarding management of patients with chest tubes. According to *Schilling, et al. (2021),* who revealed that there is a worrying poor level of knowledge among nurses in their study. This result was consistent with that of *Durai, (2020),* who conducted a study entitled "Managing a chest tube and drainage system" and said that majority of nurses had unsatisfactory knowledge level about all aspect of care about chest tube.

According to *Mohan, (2019),* who conducted a study entitled "Effectiveness of computer assisted teaching on knowledge regarding the nursing management of patients with chest tube drainage among the staff nurses in selected hospitals" and mentioned that, there is a lack of standard practice regarding chest tube nursing management. This inconsistency of treatment regimes, with the lack of evidence-based nursing care, creates a general difference regarding the care of patients with chest tubes

Conclusion

Based on the findings of the present study. More than one third of the nurses under study had poor level of total knowledge and about two thirds of nurses had incompetent level of practical skills regarding nursing intervention for management of patients with chest tube drainage. Furthermore,there was a highly significant correlation ($P<0.01$) between total nurses knowledge and their total practice regarding nursing management of patients with chest tube.

Recommendations

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

- Regular continuous educational program plan about chest tube & its management should be designed to nurses working in ICU at least every six months for enhancing nurses' knowledge and practice to achieve high quality of care.
- Developing procedure booklet by simple language for nurses who provide care for patient with chest tube.
- Conducting health educational workshops in schools, colleges and other community area with appropriate A.V. aids, mass media, posters and role-plays.

Further researches

- Replication of the study on large subjects from different hospitals and in different geographical area in Egypt for generalization of findings and to assess and compare the knowledge and practices chest tube insertion.

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