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Nurses' knowledge regarding management of chest tube drainage patient at selected hospital, Dhaka

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Abstract

Background: Chest tube drainage is an essential life saving measure for the management of pneumothorax, hemothorax, hemo-pneumothorax, pleural effusion and emphysema from the pleural space.

Objective: The aim of this study was to assess the level of knowledge regarding management of chest tube drainage among nurses at selected hospital, Dhaka. Methods and Materials: A descriptive type of cross-sectional study was conducted with 50 samples those were conveniently selected from National Institute of Disease of the Chest and Hospital (NIDCH), Dhaka, Bangladesh. Data were collected by using a structured, self-administered questionnaire with a set of 20 knowledge related questions. Data were analyzed by using descriptive statistics such as mean and standard deviation, frequency and percentage.

Results: A total 50 nurses participated in this study. The mean age of the nurses was 33.1±5.68 years with the range of 25 years to 48 years. Majority of the respondents (86%) were female and only 16% respondents got special training on management of chest tube drainage. The overall findings showed that 36% respondents had poor level of knowledge, 20% respondents had average level of knowledge and 24% level had good knowledge whereas only 4% had excellent level of knowledge. The respondent's overall knowledge's mean score was 62.6 which indicate average level of knowledge. The nurses with Master in Public Health (MPH) and Bachelor of Science (B.Sc.) in Post Basic nursing degree had more knowledge mean score was =70) than others nurses. Nurses who had more than 15 years working experience had more knowledge (mean score was=90) than 1-15 years of working experiences.

Conclusion: This study found that over all nurses had poor level of knowledge on management of chest tube drainage patient.

Recommendation: This study suggested nurses need educational program, special training on management of chest tube drainage including the opportunity of attending the workshop and seminar to prevent complications related to mismanagement of chest tube drainage.

Keywords: Nurse, knowledge, chest tube drainage, Nidch, Dhaka

1. Introduction

Background and significance of the study

Intra thoracic tube or chest tube is an important lifesaving portion for the managing of pneumothorax (air), hemothorax (blood) and hemo-pneumothorax (blood and air), emphysema (pus), lymph and fluid (pleural effusion) from the pleural space by inserting a hollow, flexible drainage tube through the side of the chest in the pleural space. It is a widespread therapeutic intervention for patients admitted in medical, surgical, and critical care specialties from beside to operating room, from life-threatening emergencies to postoperative chest drainage in elective surgery [2, 9]. The purpose of the chest tube drainage is to restore normal intra-pleural pressure which helps to expand the lungs by permitting the blood, air and fluid collected in the pleural cavity to be cleared to the outside from the cavity [10].

Chest drains are frequently inserted to patients with different conditions, and nurses frequently deal with them. In every year, over 1 million chest tubes are inserted for patient in the U.S. alone [2]. Among 893 patients in ICUs who required invasive procedures in one year, 150 (16.7%) had chest drain inserted Furthermore, In the United Kingdom (UK), during a six-month period in one hospital, there were 375 children who had an inserted chest drain. Moreover, about 25% of all major trauma patients admitted to trauma centers in Australia needed chest drain [1]. American Heart Association (AHA) stated that annually

more than 448,000 patients underwent cardiothoracic surgery including Coronary Artery Bypass Grafting (CABG), valve replacement or repair, or repair of defects which are familiar rationales for chest tube insertion [2].

There are many complications for chest drain placement and removal. The rate of complication related to chest drain placement and management range from 5-35%. The most serious on is tension pneumothorax, which may occur due the obstruction of the drainage system or during removal [1]. Major complication includes hemorrhage, infection and re-expansion pulmonary edema. Injury to the liver, spleen or diaphragm is possible if the is placed inferior to the pleural cavity. Injuries to the thoracic aorta and heart can also occur. Infection at the skin site is also possible [9].

To decrease the effect of such complications, nurses should be equipped with sufficient knowledge. However, literature revealed inappropriate levels of knowledge among nurses. For instance, a Nigerian study to measure the level of knowledge of care of chest drains among nurses working in different wards (ICU and medical surgical) in a teaching hospital revealed very poor knowledge of about 73.8% of the studied sample [6].Also, a Turkish study revealed that approximately 44% of nurses had insufficient knowledge of chest drain care [8, 11] reported that nurses had knowledge deficit of 22% concerning chest drain care, and another Irish study revealed poor knowledge among nurses of 40% with the lowest knowledge were noticed in the post-procedural care [1]. For example, 85.5% of the nurses had poor knowledge on position of drainage system with relationship to waist level while mobilizing the patient, application of suction to chest drains 83% of the participant, daily changing of dressing over chest drain insertion site 72% of the nurses, and milking of tubes and drainage in a system with a dependent loop 41.1% of the nurses a study revealed that 49% of nurses were uncertain regarding the correct positioning of chest drain tubing [6, 8].

Nurses are the first people after chest tube placement on the patient's bedside, so they should have enough information on the care of chest tube. Nursing care of chest drains can either be pre- procedural or post- procedural. Pre-procedural care includes obtaining an informed consent and providing health education to the patient, preparing the appropriate materials for insertion of the chest tube and later assist in the procedure. 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. Nurses must also teach the patient proper management of the drainage device: how to keep the bottle or the closed plastic system below the level of the chest, and to report any dysfunction. Because inefficient nursing care can cause complication [4, 5]. The mismanagement causes serious problems such as respiratory troubleshoot, increased morbidity, extension of duration of hospital stays, and even in some cases death may also occur [1, 9].

Nurses need having satisfactory knowledge and practice in the care of patients with chest tubes contributes to the quickening of the recovery process of the patients, the decrease of possibly fatal complications, increasing patients' satisfaction, minimizing the duration of hospital stay, protecting them from nosocomial infection. For this reason, it is tremendously vital for nurses to know the care of patient with chest tubes and to identify complications that may develop early [10]. In this perspective although in Bangladesh context nurses get theoretical knowledge on management of chest tube drainage patient but the existing situation is showing deficit regarding implementing in caring of patients. Therefore, it is essential to measure the level of nurses' knowledge regarding management of chest tube drainage patient at national institute of diseases of the chest and hospital (NIDCH), Mohakhali, Dhaka.

Justification

Chest tube drainage is an invasive operation; sufficient knowledge and experience of the health care team may prevent to unwanted complications. The mismanagement of chest tube drainage may cause series of complications such as increased morbidity, resulting prolong sufferings, and even death in some cases [11]. Nurses are the front-line care provider after chest tube placement on patients' bed side, so they have enough information on the management of chest tube drainage [4, 5]. Maintaining patency and proper functioning of chest tube drainage system are the main roles of the nurses. Moreover, the education of patients related to various aspects and keep themselves updated is the responsibility of nurses [1].

A comprehensive understanding about the procedure of chest tube drainage system and requiring special considerations to decrease the complications that may resulting from chest tube drainage should be maintained by the nurse. So, it is extremely important that nurses need to recognize and resolution a probable problem earlier in a patient with a chest tube, provide information and maintenance to the patient [5, 9]. However, in Bangladesh a few studies were conducted on the knowledge levels of nurses in the management of chest tube drainage patient. Therefore, Researcher is intended to assess the level of nurses' knowledge regarding management of patient with chest tube drainage at NIDCH, Mohakhali, Dhaka.

Research Question

What is the level of nurses' knowledge regarding management of chest tube drainage patient at selected hospital, Dhaka?

Research aim

The aim of this study is to assess the level of nurses' knowledge regarding management of chest tube drainage patient at selected hospital, Dhaka.

Research objectives

1. To assess the level of nurses' knowledge regarding concept of chest tube drainage
2. To identify the level of nurses' knowledge regarding management of chest tube drainage patient
3. To determine the level of the nurses' knowledge about the complications of chest tube drainage
4. To state the socio-demographic characteristics of the respondents

Research variable

1. Socio-demographic variables

- Age
- Sex

- Religion
- Marital status
- Professional qualification
- Length of Govt. service
- Length of working experience in current place
- Special training on chest tube drainage

2. Knowledge related variables

- Concept of chest tube drainage
- Management of chest tube drainage
- Complications of chest tube drainage

Operational definition

Nurse: In this study, nurse refers to a person who have licensed from BNMC as a Senior Staff Nurse and working in medical and surgical wards in National Institute of Disease of the Chest and Hospital, Dhaka and playing a vital role in prevention of nosocomial infection in health care settings

Knowledge regarding chest tube drainage: In this study, knowledge refers to nurses understanding and experience about clear conception, management, complications of chest tube drainage patient admitted at NIDCH, Dhaka.

2. Literature Review

Literature review in the form of comprehensive summary of a specific topic from the previous research. It is the most important step in the research process that is started from the period of thinking about any researchable problem there are many researchers given attention and guided studies on management of chest tube drainage patient. Some relevant studies and best practice guideline were followed on the area of both globally and nationally.

In 2021, a descriptive study was carried out in Busra Turkey by Seyma, Meral and Atiya, among 152 nurses were measured by structured questionnaire on management of chest tube drainage patient. This study finding showed that average knowledge of the nurses about patient care with chest tubes. It is seen that they had an average in questions about chest tube insertion and monitoring, development of complications and nursing care. This study concluded that nurses performed different practices regarding the care of patient with chest tube and provide a holistic nursing care [10].

A non- experimental descriptive design using cross-sectional survey was used for evaluating nurses' knowledge in Jordan by Abuejheisheh, (2021) among nurses who were working in ICU more than 6 months. This study showed that the 3-month period prevalence of chest drain insertion was 8%. The most common indication for chest drains insertion was cardiac surgery (84.8%, *n*=134) followed by pleural effusion (6.3%, *n*=10). The results revealed that the mean score for nurses' knowledge regarding care of chest drain was 15.7 out of 30 (52.3%), with the majority had insufficient or intermediate level of knowledge (47.6%, *n*=107 vs. 51.1%, *n*=115). The areas with least level of knowledge were in the troubleshooting (31.9%), and removal (39.5%). This study recommended that developing, implementing and continuous monitoring of guidelines regarding chest drain care for nurses and physician are [1].

A quantitative pre-experimental (one group pre-test/post-test design) study was conducted in Shimla, India by Sharma (2020) among 40 staff nurses were measured structured questionnaire on effectiveness of a structured interventional program on knowledge regarding care of patients with chest tube drainage. This study finding showed that majority had 20 (70%) average knowledge, 16 (40%) of staff nurses had poor knowledge and 4(10%) of them had good knowledge whereas after intervention majority 28(70%) of the subjects has good knowledge, 12(30%) of subjects has average knowledge and none of subjects has poor knowledge regarding care of patients with chest tube drainage. The mean knowledge score in pretest was (16.6±.98), in posttest was (31.65±6.12) which indicates there is an increase in knowledge of the subjects. This study concluded that structured interventional program on care of patient with chest tube drainage was found to be effective in increasing the knowledge [9].

A quantitative descriptive type of study was conducted in Sudan Heart Center Hospital, Khartoum, by Elfaki (2020) among 50 nurses by structured questionnaire and check list, data process by SPSS program. This study shows that more than 60.0% were know regarding the site and indications of chest tube drainage although more than 60% of them didn't know exactly underwater seal, position of patient during insertion the chest tube, routine milking or striping will increase pleural pressure and morbidity of patient with chest drainage. The master degree and experience from 1-5 years had in significant high knowledge than those with bachelor degree and experience more than 5 years (P-value>0.05). Majority of nurses demonstrate poor level of practice towards preparation of equipment for insertion the chest tube drainage and routine patient care [3].

A Cross-sectional study was conducted at Semi Urban University Hospital in Nigeria by Kesieme *et al*., (2016) among 141 nurses were measured by returned questionnaire. The majority of respondents 45.4% were aged between 31 to 40 years (45.4%) and those who have nursing experience between 6-10 years. Only 305 respondents (26.25) had good knowledge of nursing care chest tube drainage patient. Knowledge was relatively higher among nurses who cared for chest drains daily, nurses who have a work experience of <10 years, low rank nurses and those working in the female medical word [6].

A descriptive study was conducted in a chest diseases and thoracic surgery hospital Istanbul, Turkey by Tarhan *et al*., (2016) among 153 nurses were measured by structured questionnaire form prepared by researcher for data collection regarding the knowledge level of chest drain management. This Study showed that 69.3% of nurses stated that they had obtained information from colleagues. 35.3% considered their knowledge about chest drain management to be inadequate. 55.6% scored 13 points and above from knowledge questionnaire about chest drain management. Results of this study indicate that lack of evidence-based nursing care and insufficient training has resulted in uncertainty and knowledge deficit in important aspect of chest drain care It can be concluded that nurses receive training needs and training protocols are about chest drain management [11].

A descriptive type of study was conducted at Suez Canal University Hospital, Egypt by Mohammed., *et al*., 2016

among 70 nurses were measured by questionnaire and observational check list. The majority of nurses graduated from nursing institute (85.7%) had a satisfactory knowledge level compared to 16.1% of nurses with nursing diploma by questionnaire. Moreover, half of nurses graduated from nursing institute (50%) had satisfactory level of the total knowledge compared to 17.9% of nurses with diploma by observation [12].

3. Methods and Materials

This chapter describes the methodology used in the study. This study consists of brief description of study design, study period, study setting, study population, sample size, sampling technique, sample selection criteria, research instruments, validity, reliability, ethical consideration, data collection procedure, data processing and analysis, data presentation and interpretation, and grading criteria.

Study Design

A descriptive type of cross-sectional study design was carried out to assess the level of nurses' knowledge regarding management of chest tube drainage patient at NIDCH, Dhaka 1212.

Study Period

The study was conducted from July 2022 to June 2023.

Study Place

The National Institute of Diseases of the chest and Hospital (NIDCH), Mohakhali, Dhaka 1212 was selected for this study. It is 700 bedded super specialized hospital where all kinds of chest diseases patients come across the country for better treatment facilities in Bangladesh. In this center, Researchers selected four male and female wards of Thoracic Surgery i.e. named by the ward No-1/2, 3/4, 5/6,7/8, for the study.

Study Population

All nurses 'were the population in this study those who were working at Thoracic Surgery Unit in NIDCH, Mohakhali, Dhaka was considered as the study population. The total numbers of study population in these areas were 100.

Sample Size

The sample size was estimated 50 for conducting this study out of 100 target population.

Sampling Technique

Convenient sampling technique was used for convenience of the researcher to recruit the sample based on the following inclusion criteria.

Selection Criteria

Inclusion criteria

- Respondents who were working in the thoracic surgery Male and Female Ward
- Respondents who participated voluntarily in the study to give information.
- Respondents who were available in the ward during data collection

Exclusion Criteria

- Respondents who were excluded from the study and didn't meet the inclusion criteria.

Research Instrument Development

The instrument of this study was developed by the researchers based on the basis of study objectives and variables after reviewing relevant studies. The questionnaire was consisted of two parts: 1) Demographic characteristics; and 2) Nurses' knowledge regarding management of chest tube drainage patient.

Part 1: Demographic characteristics questionnaire: Consisted of 08 items. The questionnaire was designed to collect the following data: age, sex, religion, marital status, professional qualification, length of government service, length of working experience in current area of practice, special training on chest tube drainage.

Part 2: Nurses' knowledge regarding management of chest tube drainage patient: Consisted of 20 items distributed among three dimensions: concept of chest tube drainage (5 items), management of chest tube drainage (12 items), complication of chest tube drainage (3 items). Each correct answer was carried 05(five) point and a 0 (Zero) to an incorrect answer. Thus, the total knowledge score converted into (20×5=100) estimated.

Validity of the instrument

Validity of the instrument was examined by a panel of three experts (subject teacher and Guide teacher) in academic field. The researchers were modified the instruments based on experts' recommendations.

Reliability of the Instrument

Pre- test was conducted on 10 nurses those are working medicine ward at NIDCH Dhaka for reliability and acceptability of the questionnaire and during data collection this ward was excluded for selecting the sample. After reviewing and pretesting of the questionnaire, the necessary corrections was made and finalized the questionnaire for data collection.

Ethical Consideration

Written permission: After approval of the academic research project proposal by the appropriate authority of the College of Nursing, Mohakhali, Dhaka and prior to start data collection procedures, a written permission letter was issued to the hospital director (National Institute of Chest and Diseases Hospital (NIDCH), Dhaka by the principal, College of Nursing Mohakhali, Dhaka, Memo no. P.F. 1-1/2003/CN/293/1(3) on dated 11.06.2023 and obtained permission from the concerned authority, Director of the NIDCH hospital for data collection to conduct the study.

Informed Consent: Written consent was taken from the respondents after explaining the study purpose and ensured them that this information was used for academic purpose only.

Voluntary participation: Researchers was ensured to the respondents that they have freedom to participate in this study and they were allowed to withdraw themselves any time from the study, if any confusion arise.

Confidentiality and Anonymity: Researchers also ensured them that their confidentiality and anonymity was maintained strictly regarding the obtained information and ensured them not to published anywhere. The collected data was kept confidential

Data collection procedure: Data collection was started after obtaining permission from the director of NIDCH in Dhaka. A structured type of self-administered questionnaire was prepared in English language for data collection. Data was collected from 12th June to 13th June 2023. It was collected by using structured self-administered questionnaire method from the thoracic surgery Ward Male and Female at 8.00 am to 2.00 pm on each official day. The purpose of the study was explained to the participants, and written consent was obtained from them.

Data Management: Collected data was checked, organized, coded and edited manually for omission, inconsistency and improbability and then it was placed in the master sheet to facilitate the analysis processing.

Data Analysis

All collected data was analyzed manually by the researchers help of Microsoft excel and scientific calculator. Data was entered into the master sheet to see both demographic and knowledge related information together at a glance. Data were analyzed by using descriptive statistics such as frequency and percentages, mean and standard deviation. The result was presented in the form of table, bar and pie chart.

Grading criteria

To assess the level of nurses' knowledge regarding nosocomial infections, 20 structured questions was prepared which was contain 100 marks. The marks were categorized into following level-

Sl. No	Knowledge level (Grade)	Percentage (%)
1	Excellent	90-100
2	Very good	80-89
3	Good	70-79
4	Average	60-69
5	Poor	<60

4. Results: Results of the Study: This chapter provided detailed description of the results with appropriate elaboration, depending upon the nature of variables and objectives. The result of the demographic features and knowledge about managing of intra thoracic or chest tube drainage patient were presented as frequency, percentages, mean and SD by using table, bar and pie chart.

Part 1: Socio-demographic Characteristics of the respondents

Table 1: Distribution of the respondents' socio-demographic characteristics (n=50)

Variables	Categories	Frequency (*f*)	Percentages (%)
Age	***Mean=33.1 years, (SD= 5.68), Min=25 years, Max =48 years**		
	25-29 years	16	32%
	30-34 years	16	32%
	35-39 years	11	22%
	40-44 years	5	10%
	45-49 years	2	4%
Sex	Male	7	14%
	Female	43	86%
Religion	Islam	38	76%
	Hindu	12	24%
	Buddhist	-	-
	Christian	-	-
Marital Status	Married	49	98%
	Unmarried	1	2%
Professional Qualification	Diploma in Nursing Science and Midwifery	31	62%
	B.Sc. in (Post-Basic) Nursing and Public Health Nursing	8	16%
	Bachelor of Science in Nursing	3	6%
	M.P.H	6	12%
	M.Sc. in (Geriatric) Nursing	2	4%
Length of Govt. Service	1-5 years	26	52%
	6-10 years	18	36%
	11-15 years	3	6%
	16-20 years	2	4%
	21-25 years	1	2%
Length of working experience in current area	1-5 years	37	74%
	6-10 years	12	24%
	11-15 years	-	-
	16-20 years	1	2%

Description: Table 1. Shows the demographic characteristics of the respondents. Data of the respondents revealed that their mean age was 33.1 years (SD=5.68) with a range from (25-49) years. Majority of respondents (32%) were in the age group between 25-29 years and 30-34 years, (22%) within 35-39 years, (5%) in 40-44 years and the lowest (4%) within 45-49 years of age respectively. Majority of the respondents were female (86%) and rest of them (14%) were female. Most of the respondents (76%) were Islam and (24%) were Hindu. Among them (98%) were married and only (2%) were unmarried. Most of the respondents were diploma in nursing science and midwifery (62%), B. Sc.in nursing was (6%), B.Sc. in (Post-Basic) nursing and public health nursing was (16%), M.P.H was (12%) and only M.Sc. in (Geriatric) nursing degree was (2%). Among all of them, (52%) respondents had total length Govt. service from 1-5 years, (36%) had 6-10 years, (6%) had 11-15 years, (4%) had 16-20 years and only (2%) had 21-25 years respectively and (74%) respondents had working experience from 1-5 years in current area of practice, (24%) had 6-10 years, and (2%) had 16-20 years.

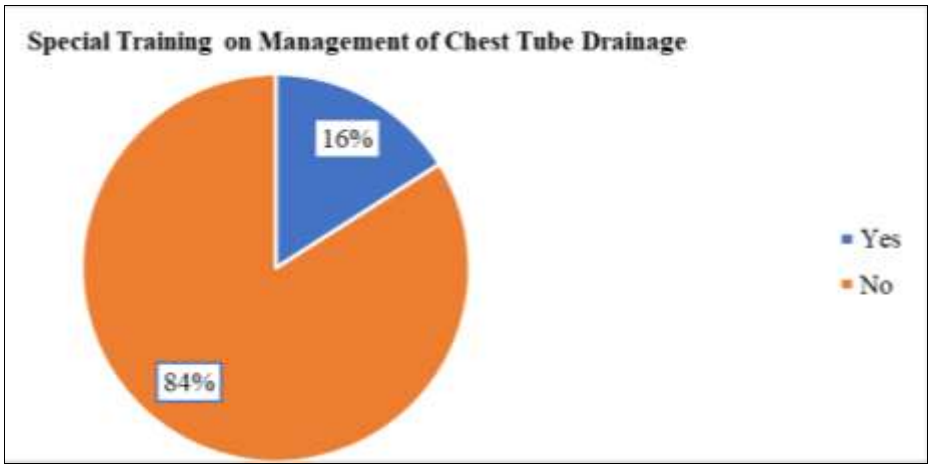

Fig 1: Distribution of respondents by Special training on chest tube drainage (n=50)

Description: Figure 1. Shows that majority of the (84%) did not get special training and rest only 16% respondents got this training regarding management of chest tube drainage.

Part II

Nurses Knowledge regarding management of chest tube drainage

Table 2: Distribution of the respondents' knowledge regarding concept of chest tube drainage

n=50

Sl. No	Variables	Correct Answer		Incorrect Answer	
		f	*%*	*f*	*%*
1.	Indication of chest tube drainage insertion is pneumothorax and hemothorax	49	98%	1	2%
2.	Site of chest tube drainage insertion is 2nd or 6th intercostal space	39	78%	11	22%
3.	Chest tube drain should be kept below 90 cm from the patient chest level	20	40%	30	60%
4.	The movement of fluid by breathing in chest tube is called swinging	25	50%	25	50%
5.	Fluctuation of the water seal bottle indicate is functioning normally	28	56%	22	44%

Description: Table 2. Shows that most of the respondents (98%) delivered right answer to the indication of chest tube drainage insertion, 78% respondents provided correct answer to site of chest drain tube to be inserted, 56% respondents provided correct answer about fluctuation of the water seal bottle indicate is functioning normally. On the other hand, 60% respondents provided incorrect answer about chest tube drain should be kept below 90 cm from the patient chest level. The highest level of knowledge on concept of chest tube drainage was indication of chest tube drainage insertion is pneumothorax and hemothorax (98%) and the lowest level of knowledge was chest tube drain should be kept below 90 cm from the patient chest level (40%).

Table 3: Level respondents' knowledge regarding concept of chest tube drainage Table 3: Level respondents' knowledge regarding concept of chest tube drainage

Variable	Level	Grading Criteria	*(f)*	*(%)*	Obtained Score	Mean Score
Concept of Chest tube drainage	Excellent	90-100%	7	14%	175	25
	Very Good	80-89%	12	24%	240	20
	Good	70-79%	-	-	-	
	Average	60-69%	18	36%	270	15
	Poor	<60%	13	26%	120	9.2
Mean of total Score=16.1						

Table 4: Distribution of the respondents' knowledge regarding management of chest tube drainage patient (n=50)

Sl. No	Variables	Correct Answer		Incorrect Answer	
		f	%	*f*	%
6.	Patient with chest drain tube requires dressing at least once every 8 hours	2	4%	48	96%
7.	The position of patient is permitted for transporting who has chest drainage tube to be clamped	34	68%	16	32%
8.	Necessary to maintain sterile technique merely during the changing of the chest tube drainage	44	88%	6	12%
9.	The absence of fluctuation in the water seal bottle may indicate not functioning	30	60%	20	40%
10.	The level of suction flow meter the pressure generally maintained 10-20 mmHg	21	42%	29	58%
11.	Patient should be kept in lateral or supine position the bed elevated level is 45 degrees	28	56%	22	44%
12.	The stich should be cut off for removing the chest drainage tube before the procedure	10	20%	40	80%
13.	Necessary to check vital signs after removing the chest tube drainage immediately	38	76%	12	24%
14.	Chest drainage tube should be removed at the end of inspiration time	19	38%	31	62%
15.	Nurses should be maintained the record of fluid collection in the chest drain tube in every 24 hours	46	92%	4	8%
16.	Understanding the right position of the chest drain tube drainage through chest x-ray	45	90%	5	10%
17.	If the chest tube drainage is disconnected accidentally nurses should inform the physician immediately	42	84%	8	16%

Description: Table 3. Represents that among all of the respondents (36%) had average knowledge, 26% had poor knowledge, 24% had very good knowledge and only 24% had excellent knowledge on concept of chest tube drainage. The entire mean score of knowledge regarding concept of chest tube drainage was 16.1.

Description: Table 4. Shows that 92% respondents provided correct answer about maintaining the record of fluid collection, 90% respondents provided correct answer about understanding the right position of the chest drain tube drainage, 88% respondents provided correct answer about necessary to maintain sterile technique, 84% respondents provided correct answer to inform physician immediately if chest tube drainage is disconnected. On the other hand, 96% respondents provided incorrect answer on requirements of dressing with chest drainage tube and 80% respondents provided incorrect answer to cut off stich for removing the chest drainage tube. The highest level of knowledge on this dimension was nurses should be maintained the record of fluid collection in the chest drain tube in every 24 hours (92%) and the lowest knowledge was patient with chest drain tube requires dressing at least once every 8 hours.

Table 5: Level of respondents' knowledge regarding management of chest tube drainage patient (n=50)

Variable	Level	Grading Criteria	*(f)*	*(%)*	Obtained Score	Mean Score
Management of chest tube drainage patient	Excellent	90-100%	3	6%	175	58.33
	Very Good	80-89%	5	10%	250	50
	Good	70-79%	5	10%	225	45
	Average	60-69%	7	14%	280	40
	Poor	<60%	30	60%	855	28.5
Total Mean score=35.7						

Description: Table 5. Shows the level of knowledge regarding management of chest tube drainage patient. Out of 50 respondents (60%) had poor knowledge, 14% had average knowledge10% had very good knowledge and only 6% had excellent knowledge. The total mean score of knowledge regarding management of chest tube drainage was 35.7.

Table 6: Distribution of the respondents' knowledge regarding the complications of chest tube drainage (n=50)

Sl. No	Variable	Correct Answer		Incorrect Answer	
		f	*%*	*f*	*%*
18.	The immediate complication may arise during chest drain tube insertion is surgical emphysema	30	60%	20	40%
19.	The complication may arise after chest drain tube insertion are pain and discomfort	46	92%	4	8%
20.	The complication of chest drainage tube insertion is diaphragmatic perforation	30	60%	20	40%

Description: Table 6. Shows that, among all of the respondents 92% gave correct answer to the complication of chest tube drainage insertion, 60% respondents provided correct answer to immediate complication of chest drainage tube insertion and others complications that is diaphragmatic perforation. On the other hand, 40% respondents provided incorrect answer to those questions.

Table 7: Level of respondents' knowledge regarding complication of chest tube drainage

n=50

Variable	Level	Grading Criteria	*(f)*	*(%)*	Obtained Score	Mean Score
Complications of chest tube drainage	Excellent	90-100%	19	38%	285	15.0
	Very Good	80-89%	-	-	-	--
	Good	70-79%	20	40%	210	10.5
	Average	60-69%	--	-	-	-
	Poor	<60%	11	22%	45	4.09
Total Mean score=10.8						

Description: Table 7. Represents the knowledge about the complication of chest tube drainage. Out of 50 respondents 38% had excellent knowledge, 40% had good knowledge and remaining 22% had poor knowledge. The total mean score was10.8 regarding complication of chest tube drainage.

Table 8: Overall Level of nurses' knowledge regarding management of chest tube drainage patient (n=50)

Variable	Grading Criteria	Level of Knowledge						
		Excellent *f (%)*	Very Good *f (%)*	Good *f (%)*	Average *f (%)*	Poor *f (%)*	Obtained Score	Mean Score
Overall nurses' knowledge regarding management of chest tube drainage patient	90-100%	2 (4%)					180	62.6
	80-89%		8(16%)				645	
	70-79%			12(24%)			855	
	60-69%				10(20%)		630	
	<60%					18(36%)	820	
Total							3130	

Description: Table 8. Shows that 36% of respondents had poor level of knowledge, 24% respondents had good level of knowledge, 20% respondents had average level of knowledge, 16% respondents had very good level of knowledge and only 4% respondents had excellent knowledge on management of chest tube drainage patient. The overall mean score of respondents' knowledge was 62.6 which indicate average level of knowledge on management of chest tube drainage patient.

Table 9: Distribution of respondents' knowledge regarding management of chest tube drainage patient by professional qualification and working experience (n=50)

Variable	Categories	*f (%)*	Mean
Professional qualification	Diploma in nursing science and midwifery	30 (60%)	62.3
	B.sc in nursing	4 (8%)	62.5
	B.sc in post basic nursing	8 (16%)	60.6
	M.P.H	6 (12%)	70.0
	M.sc in nursing	2 (4%)	52.5
Working experience	1-5 years	37 (74%)	62.9
	6-10 years	12 (24%)	64.09
	11-15 years	-	
	16-20 years	1 (2%)	90.0

Description: Table 9. Shows that respondents' overall knowledge regarding management of chest tube drainage patient by professional qualification and working experience. Those respondents had professional qualification in M.P.H they had comparatively better knowledge (score 70) than those participants had M.sc in geriatric nursing degree. Almost similar score found in diploma in nursing science and midwifery (62.3) and B.Sc. in nursing (62.5). The mean of total score of M.Sc. in (Geriatric) nursing was poor (52.2). Based on working experience, those respondents had from 16-20 years working experience had mean knowledge score 90 which indicate excellent level of knowledge than those had working experience from 1-15 years.

5. Discussion

The present study was conducted to assess the nurses' knowledge regarding management of chest tube drainage at the National Institute of Diseases of the Chest and Hospital, Dhaka. The findings of the present study are discussed according to the study objectives and result.

Socio demographic characteristics of the respondents

The study was included 50 nurses, their mean age of 33.1 years ranging from (25-48) years and maximum age group of 25-29 years and 30-34 years respectively. Most of the respondents were female. Among all of them (76%) were Muslim and most them were married. The study found that majority of the respondents (62%) had diploma in nursing science and midwifery whereas only (4%) had master degree in geriatric nursing. Most of them (52%) had total length of Govt. service from 1-5 years and the working experience in current place was 5 years. This study also found that only 16% respondents got training on chest tube drainage management.

Knowledge regarding chest tube drainage management

The aim of this study was to evaluate the level of nurses' knowledge regarding chest tube drainage management. This study result showed that only (40%) respondents know chest tube drain should be kept below 90 cm from the patient chest level and (56%) know fluctuation of the water seal bottle indicate is functioning normally. Whereas (98%) respondents know indication of chest tube drainage insertion is pneumothorax and hemothorax. A similar study was revealed that nurses (47.6%) knowledge regarding indication of chest tube drainage [1]. In addition, the result highlighted that the level of knowledge regarding concept of chest tube drainage among the respondents (36%) had average knowledge whereas (14%) had excellent knowledge.

Moreover, (4%) respondents knew patient with chest tube drainage requires dressing at least once every 8 hours, (20%) respondents knew the stich should be cut off for removing the chest drainage tube before the procedure, and 38% knew chest drainage tube should be removed at the end of inspiration time. Furthermore, the result highlighted that the level of knowledge on management of chest tube drainage among the respondents 60% had poor knowledge, 14% had average knowledge, 10% had good knowledge and only 6% had excellent knowledge. The findings indicate that the level of nurses' knowledge on managing of chest tube drainage is insufficient. A similar study conducted in India found 31.6% nurses had insufficient knowledge, despite majority of the respondents came from good educational status [9]. Whereas another study revealed in Turkey that (51.7%) nurses had knowledge regarding care of patient with chest tube drainage [10]. In contrary, a study was conducted in Turkey found that (78.4%) knowledge regarding management of chest tube drainage [11].

The present study also showed the results regarding complication of chest tube drainage. This result found that (40%) had good knowledge, (38%) had excellent knowledge and remaining 22% had poor knowledge. These findings were contrary with the previous study mentioned knowledge regarding complication of chest tube insertion more than half of respondents had insufficient knowledge (36.8%) [3].

Nurses are responsible for the monitoring of patients with chest tube, identification of problems and provision of solutions. In this study, nurses' knowledge on chest tube drainage management using 20 items with multiple choice questions. Based on the results of the present study, it has been suggested that 36% nurses demonstrated the poor level of knowledge on management of chest tube drainage which negatively impact on early recovery from chest related diseases by using chest tube drainage. The overall mean score obtained from knowledge was 62.6 which indicate the average level of knowledge among respondents. Similarly, a descriptive study was carried out in a city's university and state hospital, Busra Turkey by Seyma, Meral and Atiya, among 152 nurses were measured by structured questionnaire on management of chest tube drainage patient, findings showed that nurses had average knowledge on patient care with chest tubes which is consistent to the current study [10].

This finding revealed that higher education significantly influences knowledge on chest tube drainage management. Those respondents had MPH degree comparatively better knowledge (70%) than those participants had Diploma in Nursing science and Midwifery (63.1%). On the other hand, Masters in Geriatric Nursing respondent had poor knowledge (52.5%). Near to similar a descriptive type of study was conducted at Suez Canal University Hospital, Egypt by Mohammed., *et al*., 2016 among 70 nurses were measured by questionnaire and observational check list. The majority of nurses graduated from nursing institute (85.7%) had a satisfactory knowledge level compared to 16.1% of nurses with nursing diploma by questionnaire. Moreover, half of nurses graduated from nursing institute (50%) had satisfactory level of the total knowledge compared to 17.9% of nurses with diploma by observation. The observed relation was statistically significant where (P<0.0001, P=0.012 respectively) [12].

Based on working experience, in present study the respondents with 16- 20 years of experience showed significantly excellent knowledge (90%) than those had 1-5 years' experience (62.9%). A similar study found that nurses with an occupational experience of 16-20 years obtained higher scores from knowledge questions. This finding revealed that working experience significantly influence nurses' level of knowledge on chest tube drainage management [11]. The current study demonstrated 36% had poor level of knowledge on chest tube drainage management among NIDCH nurses. Researchers assume that it happened due to lack of training programs for nurses on the management of patients with chest tube drainage.

Limitation of the study

The present study has some limitation that might have influenced the outcome.

- Data were collected by convenient sampling method which may have possibility of bias.
- This study was conducted only one hospital and only thoracic surgery ward at NIDCH, Dhaka; therefore, the findings cannot be generalized on other hospitals and other ward at NIDCH.
- The study only focused on the assessment of knowledge level but not the attitude and practice of nurses. So, this study may not explore the management of all services.
- The study sample size was very small 50 among the total number of 723 nurses in NIDCH Mohakhali, Dhaka.

6. Conclusion and Recommendation

A descriptive cross-sectional study was conducted to assess the knowledge regarding chest tube drainage management among nurses at the National Institute of Diseases of the Chest and Hospital, Dhaka. In this chapter, the conclusions, limitations and recommendations of the study are addressed.

Conclusion

Fifty (50) nurses were recruited from National Institute of Diseases of the Chest and Hospital, Dhaka. A structured, self-administered, multiple choice questionnaire was used to measure the level of knowledge regarding chest tube drainage management among nurses' at NIDCH, Dhaka. The nurses mean score of age were 33.1 years (SD=5.68) with a range from 25 - 48 years. The respondents' overall knowledge on chest tube drainage management (36%) had poor knowledge, (20%) had average knowledge, (24%) had good knowledge, (16%) had very good knowledge and only (4%) of them had excellent knowledge as they had (16%) training on chest tube drainage management. Overall, the mean score of knowledge was 62.6 which indicate average

level of knowledge remarkably there was significant change in the level of knowledge relating to professional qualification and working experience. Finally, it is suggested to need in service training for nurses on the management of patients with chest tube drainage so that they can play vital role in providing highest quality care to patients.

Recommendation

Based on the results of the present study, the following recommendations are suggested

- Another study can be conducted with large sample for establishing the generalization of its findings.
- Provide special training on management of chest tube drainage patient to improve nurses' knowledge.
- Workshop and scientific seminar should be arranged on management of chest tube drainage patient for improving update knowledge.
- In-service refresher training programs and continuing in-service education program to be emphasized for the nurses on management of chest tube drainage patient.
- An educational module can be developed on the management of chest tube drainage patient for providing educational program to increase nurses' knowledge.
- Identify the gaps in knowledge, sick appropriate resource and all practice should be evidence based.

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