

A PRE-EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF PLANNED TEACHING PROGRAM ON THE LEVEL OF KNOWLEDGE REGARDING CHEST TUBE DRAINAGE AND ITS CARE AMONG NURSING STUDENTS

Kusum Lata^{*1}, Iris George Dennis², Presithajency. F³, Rohit Dimri⁴, Ayush Raturi⁵, Mosammad Sahida Begum⁶

¹Assistant Professor, Department of Medical Surgical Nursing, Doon Institute of Medical Sciences, Sahaspur, Dehradun,

²Assistant Professor, Department of Medical Surgical Nursing, Doon Institute of Medical Sciences, Sahaspur, Dehradun

³PhD Scholar, Assistant Professor Saveetha College of Nursing, Saveetha Institute of Medical and Technical Sciences, Thandalam, Chennai – 602105

⁴Associate Professor, Department of Mental Health Nursing, School of Nursing, Dev Bhoomi Uttarakhand University, Dehradun

⁵Assistant Professor, Department of Medical Surgical Nursing, Narayan Swami College of Nursing, Ras Bihari Bose, Subharti University, Dehradun Uttarakhand

⁶PhD Scholar, Assistant Professor, Department of Medical Surgical Nursing, School of Nursing, Dev Bhoomi Uttarakhand University, Dehradun

*Corresponding Author: Kusum Lata, Kusumchaudharykc94@gmail.com

ABSTRACT

Introduction: A chest drain is a tube that is placed through the rib cage and into the pleural cavity of the chest to facilitate the evacuation of pus (emphysema), blood (haemothorax), fluid (pleural effusion), or air (pneumothorax). An appropriately positioned drain and an airtight, one-way drainage system are necessary for the efficient drainage of air, blood, or fluid from the pleural space in order to maintain sub-atmospheric intrapleural pressure. This permits the lung to expand again and the pleural contents to be drained. The overall aim of the study was to assess the effectiveness of planned teaching program (PTP) on knowledge regarding Chest tube drainage and its care among nursing students.

Methodology: A qualitative research approach with a Quasi experimental with one group Pre-test Post-test design was used for the study to accomplish the objectives. The sample consisted of 60 nursing students. They were chosen by purposive sampling technique. The study was conducted in selected nursing college at Dehradun. A structured knowledge questionnaire was used to assess the knowledge regarding Chest tube drainage and its care. Reliability of the tool was test by using split half method.

Result: The overall findings of the study shown that the comparison between pre-test and post-test knowledge score of nursing students regarding Chest tube drainage and its care. It was observed that during pretest mean was 18.58 with mean percentage of 53.08%, whereas during posttest mean was 27.66 with mean percentage 79.02%. Therefore, overall enhancement was 25.94%, Hence, the research hypothesis H1 is accepted and null hypothesis is rejected. The knowledge mean score of nursing students regarding Chest tube drainage and its care. The results showed the enhancement of knowledge with a mean score of 9.08 and the combined 't' test value was significant i.e 19.648 at P<0.05 level. Which indicate planned teaching program was effective in improving knowledge of nursing students regarding Chest tube drainage and its care. The obtained chi – square value for Age ($\chi^2 = 3.949$, $p>0.05$), Gender ($\chi^2 = 0.622$, $p>0.05$), educational qualification status ($\chi^2 = 0.622$, $p>0.05$), duration of clinical postings ($\chi^2 = 6.570$, $p>0.05$), Clinical postings in the department of pulmonary medicine ($\chi^2 = 0.387$, $p>0.05$) and source of information ($\chi^2 = 3.584$, $p>0.05$). The obtained p value for these variables is less than 0.05, which indicates that there is no significant association between Knowledge of nursing students regarding chest tube drainage and its care with selected socio-demographic variables. Hence, the research hypothesis H2 is accepted and null hypothesis is rejected.

Conclusion: The present study in short gave the researcher a new experience, a chance to widen the knowledge and venue to work with student nurses. Constant encouragement and guidance of the guide, cooperation of the educational authorities and student nurses have contributed to the fruitful completion of the study.

KEYWORDS: Effectiveness, Planned Teaching Program, Knowledge, Chest Tube Drainage & Nursing Students.

INTRODUCTION

The most important organs for breathing are the lungs. The pleura, a double-layered serous membrane, covers the lungs. The parietal and visceral pleurae are these. Pleural fluid, which is found in the area between the pleura, aids in lubricating and reducing friction between the chest wall and lungs. A chest drain is a tube that is placed through the rib cage and into the pleural cavity of the chest to facilitate the evacuation of pus (emphysema), blood (haemothorax), fluid (pleural effusion), or air (pneumothorax). An appropriately positioned drain and an airtight, one-way drainage system are necessary for the efficient drainage of air, blood, or fluid from the pleural space in order to maintain sub-atmospheric intrapleural pressure. This permits the lung to expand again and the pleural contents to be drained. The process of emptying air, water,

blood, and other fluids into the pleural or mediastinal cavity through the insertion of a tube is known as chest drainage. Patients who have had chest damage or heart and chest surgery are typically treated with chest drainage. Since chest draining is an intrusive procedure, a lack of expertise on the part of the medical staff could result in unintended consequences. Mishandling chest drainage can lead to a number of issues, including higher morbidity, longer hospital stays, and in certain situations, even death. In order to drain the pleural cavity of air, blood, pus, or lymph, a hollow, flexible drainage tube is surgically inserted through the side of the chest and into the pleural space. This technique is known as a chest tube insertion. One-way air and fluid movement from the pleural cavity is made possible by the water seal container attached to the chest tube. The purpose of the chest tube is to maintain intrapleural pressure and keep the lungs from collapsing. When caring for patients with chest tube drainage, nurses' primary responsibility is to maintain the tube's appropriate functioning. This is known as chest tube management.

MATERIALS AND METHODS

The overall aim of the study to assess the effectiveness of planned teaching program (PTP) on knowledge regarding Chest tube drainage and its care among nursing students. A qualitative research approach with a Quasi experimental with one group Pre-test Post-test design was used for the study to accomplish the objectives. The sample consisted of 60 nursing students. They were chosen by purposive sampling technique. The study was conducted in selected nursing college at Dehradun. A structured knowledge questionnaire was used to assess the knowledge regarding Chest tube drainage and its care. The instruments were validated by 5 experts from the field of Nursing and Medicine. The experts suggested addition, deletion of certain items and re- organization of the questions. Appropriate modifications were made and the tool was finalized. Reliability of the tool was test by using split half method. The collected data was organized, tabulated and analyzed by using descriptive and inferential statistics.

RESULT

Section 1 - Description of the Socio demographic variables of the subjects

The distribution of nursing student according to age. The data revealed that 13 (21.7%) were in the age group of 18 years followed by 24 (40.0%) were in the age group of 19 years and remaining 23 (38.%) were in the age group of 20 years and above. the distribution of nursing student according to gender, followed by 34(56.7%) nursing students were females and 26 (43.3%) nursing students were males. the distribution of nursing student according to professional educational status. The data revealed that 34(56.66%) nursing students were pursuing B.Sc nursing, and 26 (43.33%) nursing students pursuing GNM. the distribution of nursing student according to duration of clinical postings. The data showed that 41(68.3%) nursing students had more than one year exposure to clinical postings, 14 (23.3%) had 7-12 months exposure of clinical postings, 3(5%) had 3-6 months exposure of clinical postings, 2(3.4%) had completed their primary education less than 3 months exposure of clinical postings. the distribution of nursing student according to clinical posting in department of pulmonary medicine. The data revealed that 32 (53.3%) nursing students were posted in department of pulmonary medicine and 28 (46.7%) were not posted in department of pulmonary medicine. the distribution of nursing student according to whether undergone workshop/training related to chest tube drainage and its care. 60(100%) of nursing students had not undergone any workshop/training related to chest tube drainage and its care. the distribution of nursing student according to source of information. Result highlights that 21 (35%) nursing students had information from health personnel and clinical postings respectively and remaining 18 (30%) were received information through books and journals.

Section – 2 Finding related to knowledge score

Part - 1: Findings related to knowledge regarding Chest tube drainage and its care among nursing students before administration of PTP.

Table 1: Finding relation to pre-test knowledge score (N=60)

Part	Area wise	No of items	Mean	Mean %	SD
1.	Pre-Test Knowledge regarding chest tube drainage and its care	35	18.58	53.08%	2.99

Table 1 depicts the pre-test knowledge score of the nursing students regarding Chest tube drainage and its care, the overall knowledge mean scores of nursing students were found to be 18.58 and mean percentage 53.08% with standard deviation 2.99.

Part - 2: Findings related to knowledge regarding Chest tube drainage and its care among nursing students after administration of PTP

Table 2: Finding relation to post-test knowledge score(N=60)

Part	Area wise	No of items	Mean	Mean %	SD
1.	Post-Test Knowledge regarding chest tube drainage and its care	35	27.66	79.02%	2.69

Table 2 depicts the post-test knowledge score of the nursing students regarding Chest tube drainage and its care, the overall knowledge mean scores of nursing students were found to be 27.66, mean percentage 79.02 % with standard deviation 2.69.

Part - 3: Findings related to level of pre-test and post test knowledge regarding Chest tube drainage and its care among nursing students.

Table 3: Finding related to Knowledge level(N=60)

Sl. No	Area wise	Score	Pre-test		Post-test	
			F	%	F	%
1.	Inadequate knowledge	0-10	1	1.6%	0	0%
2.	Moderate knowledge	11-20	43	71.7%	1	1.7%
3.	Adequate knowledge	21-35	16	26.7%	59	98.3%
Total			60	100%	60	100

Table 3 depicts that in pre-test majority 43 (71.7) of the nursing students had moderate knowledge, 16 (26.7%) had adequate knowledge and only 1(1.6%) percent of them had inadequate knowledge regarding Chest tube drainage and its care.

In Post-test Majority 59 (98.3%) of the nursing students had adequate knowledge, 1 (1.7%) had moderate knowledge regarding Chest tube drainage and its care.

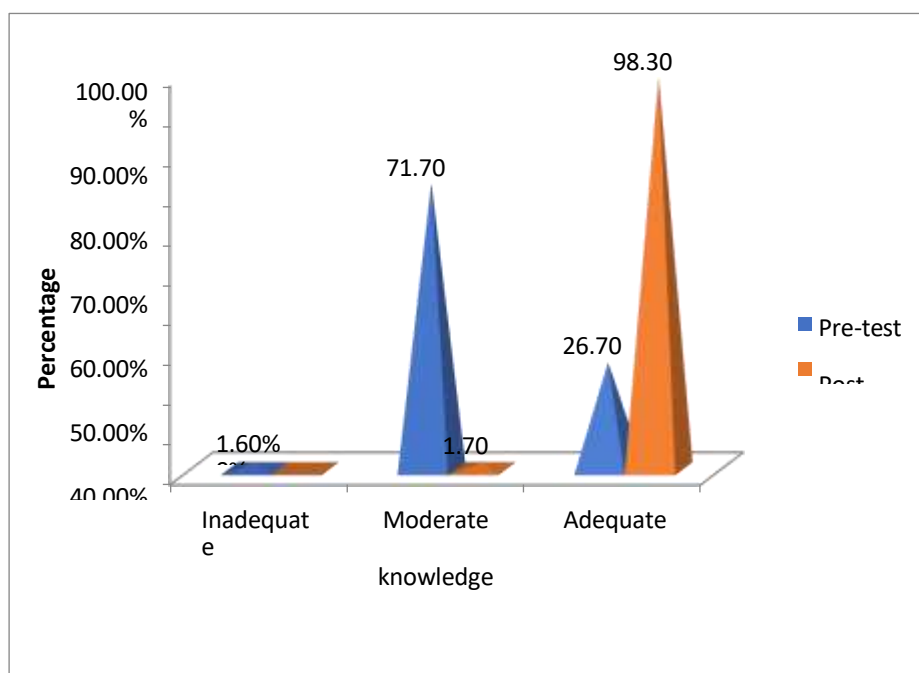


Figure 1: Finding related to Knowledge level

Section 3: Part - 1: Findings related to compare the pre test and post test level of knowledge regarding Chest tube drainage and its care among nursing students.

Table 4: Comparison of overall knowledge score(N=60)

Area of Knowledge	Pre-test		Post test		Mean % Enhancement
	Mean score	Mean %	Mean score	Mean %	
Over all	18.58	53.08%	27.66	79.02%	25.94%

Table 4 shows the comparison between pre-test and post-test knowledge score of nursing students regarding Chest tube drainage and its care. It was observed that during pretest mean was 18.58 with mean percentage of 53.08%, where as during posttest mean was 27.66 with mean percentage 79.02%. Therefore overall enhancement was 25.94%.

Section 4:

Part-1: Findings shows the effectiveness of planned teaching program on knowledge of Chest tube drainage and its care among nursing students.

Table 5: Effectiveness of planned teaching program on knowledge of nursing students regarding Chest tube drainage and its care. (N=60)

Component	Group	Mean	Mean difference	Standard deviation	't' value
Overall	Pre-test	18.58	9.08	2.99	19.648
	Post-test	27.66		2.69	

*- Significant at 0.05 level

Table 5 represents the knowledge mean score of nursing students regarding Chest tube drainage and its care. The results showed the enhancement of knowledge with a mean score of 9.08 and the combined 't' test value was significant i.e 19.648 at P<0.05 level. Which indicate planned teaching program was effective in improving knowledge of nursing students regarding Chest tube drainage and its care.

Section 5: Part – 1: Deals with association between selected demographic variables with pre-test knowledge of Chest tube drainage and its care among nursing students.

Table 6: Association between selected demographic variables with pre test knowledge level(N=60)

Table 6: Association between selected demographic variables with pre test knowledge level(N= 55)						
Variable	Poor	Average	Good	Chi-square value df	P value	Inference
Age in year						
18 yrs	13	00	00	3.949 Df=2	0.34	NS
19 yrs	20	04	00			
20 yrs and above	22	01	00			
Total	55	05	00			
Gender						
Female	32	02	00	0.622 Df=1	0.739	NS
Male	23	03	00			
Total	55	05	00			
Professional educational status						
Urban	32	02	00	0.622 Df=1	0.286	NS
Rural	23	03	00			
Total	55	05	00			
Duration of clinical postings						
No exposure	00	00	00	6.57 Df=3	0.173	NS
Less than 3 months	01	01	00			
3-6 months	24	02	00			
7-12 months	19	02	00			
More than 1 year	11	00	00			
Total	55	05	00			
Clinical posting in department of pulmonary medicine						
Yes	30	02	00	0.387 Df=1	0.317	NS
No	25	03	00			
Total	55	05	00			
Undergone workshop/training related to chest tube drainage and its care						
No	55	05	00	Df=0	0000	NS
Yes	00	00	00			

Total	55	05	00			
Sources of information						
Health care personnel	19	02	00			
Variable	Poor	Average	Good	Chi-square value df	P value	Inference
Books and Journals	15	03	00	3.584 Df=2	0.024	NS
Clinical Postings	21	00	00			
Total	55	05	00			

*Significant at 0.05 level. S = Significant, NS = Not – Significant

The obtained chi – square value for Age ($\chi^2 = 3.949$, $p > 0.05$), Gender ($\chi^2 = 0.622$, $p > 0.05$), educational qualification status ($\chi^2 = 0.622$, $p > 0.05$), duration of clinical postings ($\chi^2 = 6.570$, $p > 0.05$), Clinical postings in the department of pulmonary medicine ($\chi^2 = 0.387$, $p > 0.05$) and source of information ($\chi^2 = 3.584$, $p > 0.05$). The obtained p value for these variables is less than 0.05, which indicates that there is no significant association between Knowledge of nursing students regarding chest tube drainage and its care with selected socio- demographic variables.

DISCUSSION

The objective of the current study was to investigate whether planned teaching program was effective for increasing the knowledge regarding Chest tube drainage and its care among nursing students. Findings are discussed based on different review of literature with reference of the study findings. The discussion is prepared under the following subsequent headings.

Objective 1: To assess the pre-test knowledge regarding Chest tube drainage and its care among the nursing students. The pre-test knowledge score of the nursing students regarding Chest tube drainage and its care, reveals that the overall knowledge mean scores of nursing students were found to be 18.58 and mean percentage 53.08% with standard deviation 2.99. In pre-test majority 43 (71.7) of the nursing students had moderate knowledge, 16 (26.7%) had adequate knowledge and only 1 (1.6%) percent of them had inadequate knowledge regarding Chest tube drainage and its care. A similar study was conducted by Rajbir Kaur, (2018) The study's goal was to gauge staff nurses' familiarity with chest tube drainage and its cares. According to the survey, there are 57.5% of staff nurses who have average understanding of chest tube drainage and its cares, 25% who have high knowledge, and the remaining 17.5% who have bad knowledge. The chest tube drainage and its care is regarded as an important tool for enhancing respiratory care since it enables nurses to provide prompt care.(46)

Objective 2: To assess the post-test knowledge regarding Chest tube drainage and its care among the nursing students. The post-test knowledge score of the nursing students regarding Chest tube drainage and its care, reveals that the overall knowledge mean scores of nursing students were found to be 27.66, mean percentage 79.02 % with standard deviation 2.69. In Post-test Majority 59 (98.3%) of the nursing students had adequate knowledge, 1 (1.7%) had moderate knowledge regarding Chest tube drainage and its care. A similar study was conducted by Harshpinderpal Kaur, Parvesh Saini, (2008) to evaluate the labour room staff nurses' knowledge of and practice with chest tube drainage and its care. The results showed that 75% of staff nurses had average understanding of the chest tube drainage and its care and 25% had good knowledge, but 50% of staff nurses had average practice of the chest tube drainage and its care and 15% had good practice. The knowledge and practise had a strong favourable association. The investigation came to the conclusion that staff nurses lacked chest tube drainage and its care understanding and practice. Therefore, it is necessary to organise in-service training to improve chest tube drainage and its care.

Objective 3: To find out the effectiveness of planned teaching program on knowledge regarding Chest tube drainage and its care among nursing students. The comparison between pre-test and post-test knowledge score of nursing students regarding Chest tube drainage and its care. It was observed that during pretest mean was 18.58 with mean percentage of 53.08%, where as during posttest mean was 27.66 with mean percentage 79.02%. Therefore overall enhancement was 25.94%, Hence, the research hypothesis H1 is accepted and null hypothesis is rejected. The knowledge mean score of nursing students regarding Chest tube drainage and its care. The results showed the enhancement of knowledge with a mean score of 9.08 and the combined 't' test value was significant i.e 19.648 at $P < 0.05$ level. Which indicate planned teaching program was effective in improving knowledge of nursing students regarding Chest tube drainage and its care. A similar study was conducted by Rohit Tongariya, (2018) A quasi-experimental research design and evaluative research methodology were used. According to the study, out of all nurses, 100%, 3.3% had strong knowledge prior to the Planned teaching program, 60% had average knowledge, and 36.6% had bad knowledge. After completing a planned teaching program in advanced respiratory care, nurses had medium knowledge compared to the majority of subjects, who had strong knowledge (76.7%). Before completing the Planned teaching program, 10% of the nurses had inadequate knowledge about practice, 38.3% had moderate practice competency, and 51.7% had adequate practice competency. After completing the Planned teaching program on advanced respiratory care, 16.7% of nurses reported having moderate knowledge of practice, while the majority of nurses (83.3%) had adequate knowledge. The level of knowledge and practice

of staff nurses about the advanced respiratory care are positively correlated. According to the study, staff nurses' knowledge and skills about the respiratory care have improved.

Objective 4: To find out the association between pre-test knowledge level with their selected demographic variables. The obtained chi – square value for Age ($\chi^2 = 3.949$, $p > 0.05$), Gender ($\chi^2 = 0.622$, $p > 0.05$), educational qualification status ($\chi^2 = 0.622$, $p > 0.05$), duration of clinical postings ($\chi^2 = 6.570$, $p > 0.05$), Clinical postings in the department of pulmonary medicine ($\chi^2 = 0.387$, $p > 0.05$) and source of information ($\chi^2 = 3.584$, $p > 0.05$). The obtained p value for these variables is less than 0.05, which indicates that there is no significant association between Knowledge of nursing students regarding chest tube drainage and its care with selected socio-demographic variables. Hence, the research hypothesis H2 is accepted and null hypothesis is rejected. A similar study was conducted by the purpose of the study was to evaluate the effectiveness of the proposed teaching programme as well as the nurses' current knowledge related plotting chest tube drainage and its cares in pulmonary care wards. To achieve the goals, a pre- and post-test interventional investigation was conducted on one group. Thirty nurses who worked in the pulmonary wards at selected hospitals in the Vidarbha region were chosen by non-probability convenience sampling. According to the study's findings, 46.7% of the samples had more than five years of experience, and 73.3% of the samples were GNMs. Both the post-test knowledge score (91%) and practice score (91.66%) were significantly higher than the corresponding pre-test knowledge scores (53%) and (24.76). Between nurses' knowledge and practice, there was a positive association ($p = 0.04$). The study's findings showed that the intervention had a significant impact on the participants' chest tube drainage and its care knowledge and practice.

CONCLUSION

The present investigation concludes that planned teaching program was effectual in increasing the knowledge regarding Chest tube drainage and its care among nursing students. This chapter has dealt with the discussion of the findings and provides the implications for nursing practice, nursing education, nursing administration and nursing research. It clarifies the limitations of the study and gives recommendations for further research.

FUNDING - Authors declares no any funding provided for the study.

CONFLICT OF INTEREST – Authors declares no any conflict of interest.

REFERENCES

1. Nursing. In: Wikipedia [Internet]. 2023 [cited 2023 Dec 30]. Available from: <https://en.wikipedia.org/w/index.php?title=Nursing&oldid=1190372955>
2. Brunt BA, Morris MM. Nursing Professional Development. In: StatPearls [Internet].
3. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Dec 30]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK531482/>
4. The lungs are covered by a two layered membrane called the: [Internet]. [cited 2023 Dec 31]. Available from: <https://byjus.com/question-answer/the-lungs-are-covered-by-a-two-layered-membrane-called-the-pleura-diaphragm-respiratory-membrane-1/>
5. Chest Tube Insertion: Purpose, Procedure & Risks [Internet]. [cited 2023 Dec 31].
6. Available from: <https://www.healthline.com/health/chest-tube-insertion>
7. Kayser - Chapter 13 - Management of the Critical Care Patient.pdf [Internet]. [cited 2023 Dec 31]. Available from: https://www.traumayellow.com/uploads/2/0/9/5/20955098/management_of_the_critical_patient.pdf
8. Chest drainage. In: Wikipedia [Internet]. 2023 [cited 2023 Dec 31]. Available from: https://en.wikipedia.org/w/index.php?title=Chest_drainage&oldid=1177558735
9. Chest Tube Procedure | American Lung Association [Internet]. [cited 2023 Dec 31].
10. Available from: <https://www.lung.org/lung-health-diseases/lung-procedures-and-tests/chest-tube-procedure>
11. Nursing guidelines: Chest drain management [Internet]. [cited 2023 Dec 31]. Available from: https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Chest_Drain_Management/
12. Allibone L. Nursing management of chest drains. Nurs Stand R Coll Nurs G B 1987. 2003 Feb 12;17(22):45–54; quiz 55–6.
13. CLIN145_SGH_UWSD_CM.pdf [Internet]. [cited 2023 Dec 31]. Available from: https://www.seslhd.health.nsw.gov.au/sites/default/files/groups/StGTrauma/Policies/CLIN145_SGH_UWSD_CM.pdf
14. Crawford D. Care and nursing management of a child with a chest drain. Nurs Child Young People. 2011 Dec;23(10):27–34.
15. Ali Hessami M, Najafi F, Hatami S. Volume Threshold for Chest Tube Removal: A Randomized Controlled Trial. J Inj Violence Res. 2009 Jul;1(1):33–6.
16. Ravi C, McKnight CL. Chest Tube. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Dec 31]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK459199/>
17. Elfaki DBA, Mustafa DHE, Ahmed AH. Nurses' knowledge and Practice regard Care of Patient with Chest Drains in Sudan Heart Center, Khartoum, Sudan.
18. Rn) OR for N (Open, Ernstmeyer K, Christman E. Chapter 6 Manage Chest Tube Drainage Systems. In: Nursing Advanced Skills [Internet] [Internet]. Chippewa Valley
19. Technical College; 2023 [cited 2023 Dec 31]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK594490/>
20. Nickson C. Underwater Seal Chest Drainage System [Internet]. Life in the Fast Lane

21. LITFL. 2019 [cited 2023 Dec 31]. Available from: <https://litfl.com/underwater-seal- chest-drainage-system/>
22. Magner: Nurses' knowledge of chest drain management... - Google Scholar [Internet]. [cited 2023 Dec 31]. Available from: https://scholar.google.com/scholar_lookup?journal=J.%C2%A0Clin.+Nurs.&title=Nurses%27+knowledge+of+chest+drain+management+in+an+Irish+Children%27s+Hospital&author=C.+Magner&author=C.+Houghton&author=M.+Craig&author=S.+Cowman&volume=22&issue=19-20&publication_year=2013&pages=2912-2922&pmid=23829520&
23. 6.3 Nursing Responsibilities for Clients With Chest Tube Drainage Systems – Nursing Advanced Skills [Internet]. [cited 2023 Dec 31]. Available from: <https://wtcs.pressbooks.pub/nursingadvancedskills/chapter/6-3-nursing-responsibilities-for-clients-with-chest-tube-drainage-systems/>
24. Charnock Y. The nursing management of chest drains: a systematic review. In: Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet] [Internet]. Centre for Reviews and Dissemination (UK); 2001 [cited 2023 Dec 31]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK68847/>
25. Swaen B. Scribbr. 2022 [cited 2023 Dec 31]. What Is a Conceptual Framework? | Tips & Examples. Available from: <https://www.scribbr.com/methodology/conceptual-framework/>
26. McCombes S. Scribbr. 2023 [cited 2023 Dec 31]. How to Write a Literature Review | Guide, Examples, & Templates. Available from: <https://www.scribbr.com/dissertation/literature-review/>
27. Morrison J. Healthcare Professionals' Perceptions and Knowledge of the Management and Removal of Underwater Seal Chest Drains in Children and Young People: New Zealand. 2023 [cited 2023 Dec 31]; Available from: <https://hdl.handle.net/10292/16061>
28. Sayed S. A DESCRIPTIVE STUDY TO ASSESS THE KNOWLEDGE AND PRACTICE REGARDING NURSING MANAGEMENT OF PATIENTS WITH CHEST TUBE DRAINAGE AMONG STAFF NURSES WORKING AT TERTIARY CARE HOSPITAL, JODHPUR. EPRA Int J Res Dev IJRD. 2022 Jun 16;7(6):176–80.
29. Ullah S, Naz N, Saeedullah, Khan N, Rahman S, Sultan A. Assessment of Nurse's Knowledge Regarding Management of Chest Tube Drainage at a Public Tertiary Care Hospital. Pak J Med Health Sci. 2022 Nov 11;16(10):31–31.
30. Queiroz PG, Cruz IF. Nurses' knowledge of chest drainage management: An integrative review. J Spec Nurs Care [Internet]. 2022 Jan 10 [cited 2023 Dec 31];14(1). Available from: <http://www.jsncare.uff.br/index.php/jsncare/article/view/3454>
31. Development and validation of the first performance assessment scale for interdisciplinary chest tube insertion: a prospective multicenter study | European Journal of Trauma and Emergency Surgery [Internet]. [cited 2023 Dec 31]. Available from: <https://link.springer.com/article/10.1007/s00068-022-01928-9>
32. article_216269_b8535d94e04ef0d423517d552753aac7.pdf [Internet]. [cited 2023 Dec 31]. Available from: https://znj.journals.ekb.eg/article_216269_b8535d94e04ef0d423517d552753aac7.pdf
33. Malpositioned chest tubes and their indications; an experience from Addis Ababa, Ethiopia | Ethiopian Medical Journal. [cited 2023 Dec 31]; Available from: <https://www.ajol.info/index.php/emj/article/view/252299>
34. Kurt Y, Özkan ÇG, Bayram A. Evaluation of Nursing Interventions Performed By Nursing Students and Their Competency Levels in Clinical Practice. Samsun Sağlık Bilim Derg. 2022 Aug 29;7(2):509–22.
35. De Mol L, Desender L, Van Herzeele I, Van de Voorde P, Konge L, Willaert W. Assessing competence in Chest Tube Insertion with the ACTION-tool: A Delphi study. Int J Surg. 2022 Aug 1;104:106791.
36. Moeller D, Lioce L, Budisalih K, Gunter C, Maddux G, Schroer B. EXTENDING THE LIFE OF CENTRAL VENOUS CATHETERIZATION TRAINER AND CHEST TUBE AND NEEDLE DECOMPRESSION TRAINER IN NURSING STUDENT TRAINING: DEVELOPMENT OF SILICONE RUBBER PATCHES. INTED2022 Proc. 2022;1871–80.
37. Seyma ZK, Meral YC, Atiye E. Nurses' Knowledge Levels About the Care of the Patients with Chest Tube.
38. Kalyan G, Bibi R, Kaur R, Bhatti R, Kumari R, Rana R, et al. Knowledge and Practices of Intensive Care Unit Nurses Related to Prevention of Ventilator Associated Pneumonia in Selected Intensive Care Units of a Tertiary Care Centre, India. Iran J Nurs Midwifery Res. 2020 Sep 1;25(5):369–75.
39. AL-gabri MM, Mohammed MA, Mehany MM. Assessment of Nurses' Performance Regarding Care Of Chest Trauma Patients at Trauma Emergency Unit. Assiut Sci Nurs J. 2019 Jun 1;7(17):121–32.
40. "Undergraduate Nursing Student Perceptions and Knowledge of Chest Tube " by Nada J. Kent [Internet]. [cited 2023 Dec 31]. Available from: <https://digitalcommons.georgiasouthern.edu/honors-theses/472/>
41. Effect of an Educational Guideline on Nurses' Performance Caring for critically ill Patients with Digital Chest drainage system | Research Square [Internet]. [cited 2023 Dec 31]. Available from: <https://www.researchsquare.com/article/rs-3205532/v1>
42. Alaswad NK, Bahnsawy NSM. The Effect of Chest Tube Instructional Package Application on Pediatric Nurses' Performance. Assiut Sci Nurs J. 2023 Sep 1;11(39):242– 52.
43. Sayed WN, Ali HS, Khorais AM. EFFECT OF EDUCATIONAL PROGRAM ON NURSES' PERFORMANCE REGARDING SUBGLOTTIC SUCTIONING AND PATIENTS' OUTCOMES. 2023;66(01).
44. Mohanty N, Swain T, Chakraborty D, Kumari P, Gaigouria S, Singha S. Effectiveness of Planned Teaching Program on Nursing Management of Patients with Chest Tube Drainage among Nursing Students of Selected Nursing College in Bhubaneswar, Odisha. Int J Sci Res IJSR. 2022 May 21;11:1472–5.

45. Patidar D, Patidar K, Patel A. A study to assess the effectiveness of planned teaching program on knowledge about practice regarding management of patient with chest tube drainage among nurses working in selected Hospitals of North Gujarat. *Int J Nurs Educ Res*. 2021;9(1):67–8.
46. Jabar HA, Aziz AR. Effectiveness of an Education Program on Nurses Knowledge toward Care of Chest Tube in Children at Pediatric Teaching Hospital Baghdad City. | *Indian Journal of Forensic Medicine & Toxicology* | EBSCOhost [Internet]. Vol. 15. 2021 [cited 2023 Dec 31]. p. 839. Available from: <https://openurl.ebsco.com/contentitem/doi:10.37506%2Fijfmt.v15i3.15414?sid=ebsco:plink:crawler&id=ebsco:doi:10.37506%2Fijfmt.v15i3.15414>
47. Ho CJ, Chiu WH, Li MZ, Huang CY, Cheng SF. The effectiveness of the iLearning application on chest tube care education in nursing students. *Nurse Educ Today*. 2021 Jun 1;101:104870.
48. The Effect of Simulation-Based Chest Tube Drain Management Nursing Education on Nursing Students' Response to Scenario Experiences, Confidence in Learning, and Problem Solving Ability -*Journal of Digital Convergence* | Korea Science [Internet]. [cited 2023 Dec 31]. Available from: <https://koreascience.kr/article/JAKO202110265884560.page>
49. (PDF) Effectiveness of Planned Teaching Program on Nursing Management of Patients with Chest Tube Drainage among Nursing Students of Selected Nursing College in Bhubaneswar, Odisha [Internet]. [cited 2023 Dec 31]. Available from: https://www.researchgate.net/publication/360783360_Effectiveness_of_Planned_Teaching_Program_on_Nursing_Management_of_Patients_with_Chest_Tube_Drainage_among_Nursing_Students_of_Selected_Nursing_College_in_Bhubaneswar_Odisha
50. Soge VS, Ramesh A, Sahare V. Efficacy of Planned Teaching Regarding Care of Patients with Chest Tube Drainage among Nurses. 2012;3(12).