Original Article

Nurses' Knowledge Levels About the Care of the Patients with Chest Tube

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Background: Chest tube application is a surgical approach that aims to restore the impaired negative pressure of the pleural cavity in the treatment of pleural diseases such as pneumothorax and hemothorax. Nurses' early detection of a potential problem in a patient with a chest tube and resolving it ensures that care is given in a quality and effective manner. In this way, the right decisions are made at critical points and this situation is vital in terms of minimizing the complications that may occur.
Aim: This study was planned in a descriptive type in order to determine the knowledge level of nurses about the care of patients with chest tubes.
Methodology: 152 nurses working in a city's university and state hospital were included in the study. The data were collected by face to face interview method. Statistical evaluation of the data obtained in the study was calculated using IBM SPSS v22 program. Descriptive statistics (mean, standard deviation, median, number, percentage, etc.) were calculated in the evaluation of the data.
Results: The average knowledge scores of the nurses about patient care with chest tubes were as follows. It is seen that they got an average of 45.34 points in questions about chest tube insertion and monitoring, an average of 48.16 points in questions about development of complications and an average of 59.14 points in questions about nursing care.
Conclusion: As a result of the study, it was found that nurses tend to perform different practices regarding the care of patients with chest tubes. In this study, it is recommended to develop a standardized procedure/protocol for the care of patients with chest tubes in order for nurses to provide a holistic nursing care to the patients.

Keywords: Chest Tubes, Nurses, Nursing Care

Introduction

Chest tube is a system that aims to restore the negative pressure of the region by allowing the blood, air and fluid accumulated in the pleural cavity to be discharged to the outside environment. The history of the chest tube began in the Hippocrates era. It was used especially in the treatment of chest traumatized soldiers injured in wars, and has been and continues to be developed to this day (Ergin & Yeginsu, 2010). Although chest tube application is relatively simple compared to other major surgical procedures, it also brings serious complications between insertion and removal (Koser et al., 2010). These complications are misplacement of the tube, damage to adjacent organs, subcutaneous emphysema, bleeding especially due to trocar chest tube applications or excessive dissection of the incision site, and rarely intercostal neuralgia, chylothorax and horner syndrome (Yıldızeli & Yuksel, 2002; Fikkers et al., 2004; Cobanoglu, Ekin & Kemik, 2017).

Nurses are the people who spend the most time with the patient, ensure continuity in patient care and follow-up, and are primarily responsible for the protection and development of health. For this reason, it is vital that nurses recognize and resolve a potential problem earlier in a patient with a chest tube, provide information and support to the patient, and have sufficient knowledge and skills to maintain the patient's care. In this way, quality and effective care is provided in cooperation with patients and other healthcare professionals and the complications that may occur are minimized by making the right decisions at critical points (Demir, Karayurt & Dramalı, 2002; Terzioglu & Sahan, 2017). In the follow-up of patients with chest tubes, monitoring the oscillation of the fluid in the tube, recording daily drainage amount, drainage color and character, teaching and doing deep breathing and cough exercises, mobilizing the patient, keeping the peripheral venous catheter (PVC) open, hydrating the patient according to the physician's request, initiation of bronchodilator and other medical treatments, daily dressing of the incision site and follow-up of the tube line are the most important points (Ergin & Yeginsu, 2010).

Nurses' having sufficient knowledge and experience in the care of patients with chest tubes contributes to the acceleration of the recovery process of the patients, the reduction of potentially fatal complications, increasing patient satisfaction, shortening the duration of hospital stay, protecting them from nosocomial infections and reducing the cost (Tcherveniakov et al., 2012). For this reason, it is extremely important for nurses to know the care of patients with chest tubes and to recognize complications that may develop early.

While nurses take part in the care of patients with chest tubes, due to the lack of standardized principles, it has been observed that they remain hesitant during insertion and dressing of the chest tube, perform different practices in mobilizing the patient and clamping the chest tube, and their theoretical knowledge about monitoring the operation of the chest tube is insufficient. The tendency of nurses to apply different practices in the treatment regimen and to be more timid due to lack of information cause inconsistencies in the care of patients with chest tubes and a lack of evidence-based nursing approach (Lehwalt & Timmins, 2013).

Aim: In this study, it was aimed to determine the knowledge level of nurses about the care of patients with chest tubes and to be a guide by contributing to the literature.

Research question

What are the knowledge levels of nurses regarding the care of patients with chest tubes?

Methodology: This descriptive study was carried out with the nurses who agreed to participate in the study between March and May 2019 in the emergency department, clinic and intensive care units of a city's university hospital and state hospital where chest tube application was performed. Clinics with at least one chest tube application in the last year were preferred. The population of the study was 591 nurses, and no sample calculations were made, and it was aimed to reach the entire population. The whole population could not be reached due to reasons such as the nurses' refusal to participate in the study, and their inability to reach them because they were on leave, and the study was completed with 152 nurses who met the sample selection criteria and agreed to participate in the study. Power analysis of study data was calculated with the program "G.Power-3.1.7". With a sample size of 152 and an error level of 5%, the strength of the sample was determined to be 100%. The average age of the nurses participating in the study is 29.88±6.98, and 40.13% of them are male and 59.8% are female. 61.2% of the nurses work in the university hospital, 38.82% in the state hospital, and the median working time is 71 (4-320) months. When the education levels of the participants are examined, it is determined that the distribution is 27.63% for high school, 16.45% for associate degree, 55.92% for undergraduate and graduate degrees.

Data Collection Tools: In the study, a questionnaire consisting of two separate parts titled "Descriptive Features of Nurses" and "Nurses' Information Regarding Patient Care with Chest Tube" prepared in the light of the literature was used.

"Descriptive Features of Nurses" Form (First Part): It consists of 15 questions including sociodemographic and occupational characteristics of nurses such as age, gender, education level, clinic they work, and clinical status.

"Nurses' Information Regarding Patient Care with Chest Tube" Form (Second Part): It consists of 49 questions in total. It includes 18

questions for nurses regarding the follow-up and care of a patient with a chest tube, 5 questions about complications that may develop in a patient with a chest tube, and 25 questions about insertion and operation of the chest tube. In addition, there is 1 open-ended question that nurses are asked to write in detail about the care of the patient with chest tube and the points he/she pays attention to. The participant was asked to mark one of the "Correct'", "Incorrect", "I don't know" options. The questionnaire forms developed by the researcher based on the relevant literature and observations were presented to expert opinion (Fikkers et al., 2004; Sullivan, 2008; Yenigun & Yuksel, 2018). After the opinions received, the questionnaire took its final form.

Implementation of the Study: The questionnaire form was filled by face to face interview method. In order to prevent interaction between the participants, the nurses working in the same clinic were interviewed in a separate room on the same day and the interviews lasted about 15 minutes.

Data Analysis: Statistical evaluation of the data obtained in the study was calculated using IBM SPSS v22 program. Descriptive statistics (mean, standard deviation, median, number, percentage, etc.) were calculated in the evaluation of the data. The conformity of quantitative variables to normal distribution was examined using the Kolmogorov Smirnov test and box-line graphics. While looking for the difference between the two groups in terms of quantitative variables, the independent groups t-test was used for those with normal distribution, and the Mann Whitney U test was used for those who were not normally distributed. The difference between more than two groups in terms of quantitative variables was examined by the following methods. One-way analysis of variance (ANOVA) was used for those with normal distribution, and Tukey test, one of the post hoc tests, was used to look at which group the difference originated from. The Kruskal Wallis test was used for those who did not distribute normally, and the group that caused the difference was examined using the Dunn-Bonferroni test, one of the post hoc tests. The relationship between quantitative variables was evaluated with the Pearson correlation coefficient. The level of significance was taken as $p < 0.05$.

Ethical Considerations: In order to conduct the study, permission was obtained from the ethics committee of a university's "Non-Interventional Clinical Researches Ethics Committee", dated 04.02.2019 and numbered 2019/14 and from the Provincial Directorate of Health, dated 10.04.2018 and numbered 81860040/100/. Verbal and written consent was obtained from the relevant departments of the hospitals where the study was conducted. The nurses were informed about the research and the consents of the participants who agreed to participate in the study were obtained. The study was carried out in accordance with the Helsinki Declaration Principles.

Limitations of the study: The fact that the research results cannot be generalized to an institution other than the hospitals where the study was conducted is the limitation of the study.

Results

Information on the working experiences of the nurses is included in "Table 1". Although not specified in the table, it was found that only 45.39% of the nurses participating in the study received training for patient care with chest tubes. It was determined that they received this training mostly from the school they graduated from (57.97%) and in-service trainings (21.74%), and less frequently from congresses/courses or other sources (20.29%). Nurses said that they use the internet (36.84%), scientific publications (17.10%), congresses (1.32%), social media (1.32%), courses (0.66%) and other resources (physician they worked with) (7.89%) in order to update the care information about the patient with chest tube. Some of the nurses (36.84%) stated that they did not use any resources to update the care information. About nurses' patient care with chest tube, the scores they got for the insertion and monitoring of the chest tube, the development of complications, nursing care and their total knowledge level are shown in "Table 2". Although not specified in the table, the nurses were asked what they pay attention to in the care of patients with chest tubes in the unit they work in and 27% of the nurses stated the practices they pay particular attention to, in patients with chest tubes.

For the patient with a chest tube, nurses stated that they frequently monitor vital signs, monitor the hourly drainage amount, color and character, monitor the position of the chest tube, dressing the incision site daily and follow the signs of

infection, monitor pain, and give the patient breathing exercises. Besides, some of the nurses stated that they limit the mobilization of the patient, they clamp the tube while mobilizing the patient and during the transfer of the patient, and they dress incision site when needed.

Table 1. Information on the working experiences of the nurses (n=152)

	Number (n)	Percentage (%)
Clinic		
Emergency	28	18.43
Reanimation and Anesthesia Intensive Care Unit	22	14.47
General Intensive Care Unit	15	9.87
Internal Medicine Intensive Care Unit	13	8.55
Chest Diseases and Thoracic Surgery	12	7.89
Internal Medicine	12	7.89
Cardiovascular Surgery Intensive Care Unit	10	6.58
General Surgery	10	6.58
Second Level Intensive Care Unit	7	4.61
Cardiology	7	4.61
Coronary Intensive Care Unit	6	3.95
Brain Surgery Intensive Care Unit	4	2.63
Common Clinic	3	1.97
Brain Surgery	3	1.97
Previous Clinical Experience		
Did not work in another clinic	34	22.40
Worked in 1 clinic before	41	27.00
Worked in 2 clinics before	29	19.00
Worked in 3 clinics or more before	48	31.60
Working Status		
Clinical Responsible Nurse	9	5.92
Emergency Nurse	25	16.45
Clinical Nurse	44	28.95
	74	48.68
Intensive Care Nurse		
Frequency of Care for a Patient with a Chest Tube		
One or two patients a week	20	13.16
Once in a month	37	24.34
Once in three to four months	43	28.29
Once a year	24	15.79
Never met	28	18.42
Training for Patient Care with Chest Tube		
Yes	69	45.39
No	83	54.61

Table 2. Nurses' knowledge point averages about patient care with chest tube

Variables	Mean	Standard Deviation	$\bar{X}\pm SD$
Chest tube insertion and monitoring	45.34	18.61	0-84
Complication development	48.16	30.57	0-100
Nursing care	59.14	19.73	0-94
Total	51.69	18.55	0-90

Discussion

In this study, the knowledge levels of nurses about patient follow-up with chest tubes were tried to be determined and the results were discussed in the light of literature.

In the follow-up of patients with chest tube, in addition to the surgeon placing the chest tube, the knowledge level of nurses who provide holistic care of the patient before, during and after the procedure is important in determining quality care standards by establishing the main principles required for care rather than random subjective decisions and is also imptotant for evidence-based practice and better care for the patient (Karagozoglu, 2005; Terzioglu & Sahan, 2017). Therefore, it was wondered whether the nurses had received training on chest tube care knowledge and from what sources they gained their current knowledge and more than half (57.62%) of the nurses participating in the study stated that they had not received training on the subject before. In the study of Lehwaldt and Timmins, this rate is quite low (5.3%) (Lehwaldt & Timmins, 2013). It is thought that the reason for the excess number of nurses who did not receive training in our study may be related to the insufficiency of the trainings given in schools or hospitals. Nurses stated that the most used resource for obtaining chest tube care information is the internet (36.84%). However, some of the nurses (34.87%) stated that they did not use any resources, and a small number of nurses (7.89%) stated that they obtained information about chest tube management from the physician or from the trainings given in their own clinics. In the studies of Magner et al., It is stated that in-hospital training is the most common source that nurses use to provide information (Magner et al., 2013). In a study

conducted to determine the views of nurses working in hospitals about in-service training, nurses stated that they needed in-service training, but the training was not done according to need (Atay et al., 2009). In-service trainings are also held in the hospitals where our study was conducted, but it is known that training is not given for patient care with chest tubes, and only nurses in the thoracic and thoracic surgery service organize training on the subject in their own services. In our study, it is thought that the nurses' direct use of the internet to provide information in the care of patients with chest tubes is due to the fact that it is easier and faster to access information and they do not receive sufficient in-service training support. Internet is one of the easiest ways to access information, but in a study on the use of the internet as a source of information, it is stated that information whose accuracy and validity is unknown on the internet are presented by non-experts (Tuncer, Yilmaz & Cetin, 2011). In a study that investigated the views and practices of nurses in accessing health-related information, it was determined that although they were concerned about the accuracy of the information, they used frequently preferred search engines rather than scientific databases (Akman et al., 2017). We think that nurses' use of search engines directly to obtain information about chest tube care affects accessing accurate and reliable information. In our study, it is also seen that some of the nurses did nothing about obtaining information and the knowledge scores of the this nurses, are low. In the study of Lehwaldt and Timmins, it is stated that nurses are in search of education on nursing care of patients with chest tubes (Lehwaldt & Timmins, 2013). In our study, it is thought that the nurses who were not seeking information thought that their perceived current knowledge was sufficient and

were not aware that they needed information. The fact that nurses do not need to refresh their old knowledge may cause them to be behind the age in patient care.

In our study, it is seen that the average knowledge point of nurses about patient care with chest tube is 51.69. In Magner's study, the average knowledge score is 78 (Magner et al., 2013). In our study, it is seen that nurses provide basic information about patient care with chest tubes from the internet, and in Magner's study, the main source of information is in-service training. In both studies, it is seen that the basic information sources of nurses about patient care with chest tubes are different and they have different levels of knowledge. In our study, it is thought that the reason why nurses' level of knowledge about patient care with chest tube was lower compared to Magner's study is that in-service training for patient care with chest tube was insufficient in hospitals where the study was conducted. The fact that only 21.74% of the source from which nurses get information about chest tubes is in-service training, supports this view.

The knowledge level of nurses is of great importance in the care after chest tube surgery. In our study, it was observed that the nurses received the lowest score among the care scores in the sub-category of questions including chest tube insertion and monitoring, and their theoretical knowledge about chest tube insertion and monitoring was insufficient. In addition, although most of the nurses are competent in practice skills, it is thought that they are inadequate in understanding the basic principles of some special practices.

It was found that the knowledge level of nurses working in intensive care units was higher in terms of complications and questions about chest tube insertion compared to nurses working in clinics and emergency services. Learning is thought to be more permanent as nurses in intensive care units provide longer care for patients with chest tubes. The knowledge level scores of the emergency service nurses were lower than the general average. This is thought to be due to the fact that the chest tube is inserted in the emergency department and then the patient is transferred to the clinic or intensive care unit, and the patient doesn't receive care in the emergency department for a long time.

In our study, it is seen that as the frequency of providing care to patients with chest tubes increases, the knowledge level of nurses decreases. In Tarhan's study, it is seen that there is an inverse relationship between the frequency of providing care and the knowledge level of nurses (Tarhan et al., 2016). As the frequency of exposure to the chest tube increases, the decrease in correct care knowledge can be explained by the insufficient evidence-based practices in chest tube care and the reflection of non-standardized and unsustainable training deficiencies in chest tube care and the spread of false information among nurses as a result of this (Cebeci, Gursoy & Tekingunduz, 2013).

In our study, 27% of the nurses stated the care they paid extra attention to, in the open-ended question. According to the answers given by the nurses, it was determined that they made correct practices especially in subjects such as the working principle of the tube according to gravity, drainage monitoring and pain control of the patient. However, it was determined that wrong practices were made in matters such as mobilizing the patient, conditions where the tube should be clamped and dressing frequency of the incision site.

Rrestriction of patient mobilization also increases the risk of deep vein thrombosis, embolism and decreased intestinal peristalsis (Gray, 1999; Yilmaz, 2002). In a study examining the factors related to movement levels and movement levels of patients in the postoperative period, it was stated that patients need encouragement to stand up and walk postoperatively (Yolcu, Akın & Durna, 2016). In our study, it was observed that some nurses paid attention to the mobilization of the patient, while some restricted the patient's mobilization. In the study of Akın S. and Horosan E., it was reported that the nurse should work in cooperation with other team members, the patient should be mobilized in the postoperative period, ROM exercises should be performed and pharmacological treatment should be initiated in order to provide deep vein thrombosis and other thrombosis prophylaxis (Akın & Horosan, 2005). Based on these findings, it is thought that patients need encouragement to be mobilized after chest tube insertion.

It is known that complications such as redness, swelling, discharge, scar formation and tissue

separation at the incision site of the patient with a chest tube may develop, and the risk of hospital infections in the first thirty days in the postoperative period is high (Koser et al., 2010). In a study investigating the practices of nurses to prevent nosocomial infections, it was found that the information of nurses about the frequency of changing dressings is not up-to-date and they lack information (Yuceer & Bulut, 2010). In our study, 39.21% of the nurses stated that it is correct to change the dressing of the incision site once a week, and some nurses stated that they changed the dressing of the incision site when they needed it. Based on these responses of the nurses, it is thought that the incision site of patients with chest tubes is not monitored daily by some nurses, and they are not followed carefully in terms of signs of infection.

In a study conducted to develop evidence-based practices to reduce complications in patients with chest tubes in cardiothoracic surgery wards, a checklist was developed that includes practices such as oscillation movement of the fluid in the tube, bubbling in the bottle, air leakage control, and the control of the drainage system in a patient with a chest tube. The checklist was applied to the nurses and the correct application level of the nurses increased from 70% to 91%. Initially, 18% of the nurses considered filling the checklist as a burden and stated that they did not have enough time to implement new ideas. However, other team members also adapted in the following days because the checklist met the increasing need for evidence, provided retrospective information and encouraged the colleagues of the nurses who were positively affected by the application (Gan & Tan, 2015). In our study, the nurses stated that they did not follow up and monitor the operation of the drainage system of the patient with a chest tube. In addition, it is seen that the lowest average score of the nurses was in questions about inserting and monitoring chest tube. It is thought that regular follow-up and care of patients with chest tubes are negatively affected due to the lack of written procedures such as checklists in institutions.

Long-term clamping of the tube may increase positive pressure, leading to complications such as tension pneumothorax or increased pre-existing emphysema (Ergin, Yeginsu & Gurlek, 2010; Yenigun and Yuksel, 2018). In the study of Bulut et al., the correct answer rate for the question regarding whether the tube should be clamped while transferring the patient was 39.9% and this rate is 38.8% in Magner's study, and 41.8% in Tarhan's study (Magner et al., 2013; Tarhan et al., 2016; Bulut, Afsar & Vatansever, 2019). In our study, this rate is 35.53%. Since clamping the tube is suitable for daily use, it is thought that this practice is misunderstood by nurses and has become widespread.

Chest tube is a surgical intervention that is frequently performed in emergency departments because thoracic traumas require an urgent approach (Koser et al., 2010). In our study, the nurses working in the emergency department stated that they only assisted the surgeon while inserting the chest tube and provided radiological imaging of the lungs. The nurses stated that they did not provide any extra care because the patient did not stay in the emergency department for a long time. However, although the patient is not followed up in the emergency room for a long time, it is known that there may be early complications such as severe bleeding, intercostal nerve damage, and hemorrhagic shock due to neighboring organ injuries and intercostal vessel injuries (Koser et al., 2010; Yenigun & Yuksel ,2018). It is thought that a follow-up form should be composed to ensure the follow-up of the patient with chest tube for emergency services in order to be able to intervene in a timely and effective manner for complications that may develop in the patient.

In order to provide nursing services effectively, executive nurses set targets for the demands and needs of caregiving nurses, come up with new ideas, and make and implement plans for the improvement of existing care (Samlıbel et al., 2013). In a study conducted to determine the effect of leadership behaviors on job satisfaction in nurses, it was observed that supportive and success-oriented manager nurses who make future plans and produce new projects positively affect the job satisfaction and success power of the caregiving nurses (Tengilimoglu & Yigit, 2005). Considering the status of the employees, it was found that the level of knowledge of the executive nurses was high in the questions asked about the total level of knowledge, complications and nursing care. It is thought that the higher level of knowledge of the nurses working in the status of "executive nurse" compared to the emergency department, clinic and intensive care nurses, is due to their being in search of more information and their knowledge of the

instructions for use as they provide the materials used in addition to this. And this situation is thought to be due to the manager and supervisory roles of responsible nurses who are more experienced in caring for patients. Based on this finding, it can be said that executive nurses as clinical managers cannot convey their current knowledge to clinical nurses and they cannot provide sufficient control. By defining the training needs of clinical nurses, clinical responsible nurses (executive nurses) can make an in-service training program in line with the needs. There is a need to raise awareness on this issue.

Conclusion: As a result, the knowledge level of the nurses about the care of the patient with chest tube was found to be 51.69 points. In addition, it was found that nurses made wrong practices in matters such as mobilization, clamping the tube and dressing frequency of the incision site in a patient with a chest tube.

Recommendations: In line with these findings, it is recommended to compose a care guide in order to eliminate the lack of knowledge about chest tube management, to be instructive by providing the information repeatedly, to refresh the current information and to raise awareness; in which the nursing care principles of the patient with chest tube are standardized, the nurses' responsibilities during the insertion of the chest tube, the working principles of the chest tube, the nurses' responsibilities after the chest tube is inserted, and the complications that may develop in a patient with a chest tube are explained.

References

Akın, S., & Horosan, E. (2008). Venous thromboembolism and nursing care. Journal of Education and Research in Nursing. 1,7-11.

Akman, Yilmaz, A., Izgu, N., Kav, S., & Ozhan, Elbas, N. (2017) The views and practices of nurses working in the field of internal medicine about internet use in accessing health information. Gumushane University Journal of Health Sciences. 4, 57-68.

Atay, S., Gider, D., Karadere, G., & Senyuz, P. (2009). The views of nurses working in hospitals about in-service training. International Journal of Human Sciences. 1,85-93.

Bulut, A., Afsar, T., & Vatansever, N. (2019). Knowledge levels of nursing students about surgical drain follow-up and care. Adıyaman University Journal of Health Sciences. 1,1278-1292.

Camlıbel, N., Gul, G., Bol, P., & Erbaycu, A.E. (2013). Comparison of working nurses' expected and perceived leadership behaviors from manager nurses. Journal of Performance and Quality in Health. 2,89-112.

Cebeci, F., Gursoy, E., & Tekingunduz, S. (2012). Determining nurses' propensity to make medical mistakes. Anatolian Journal of Nursing and Health Sciences. 3,188-196.

Cobanoglu, U., Ekin, S., & Kemik, Ö.(2017). Evaluation of chylothorax: Etiology, clinical findings, diagnosis and treatment methods. Van Medical Journal, 3,198-203.

Demir, F., Karayurt, O., & Dramalı, A. (2002). Evaluation of nursing care priorities in terms of patients and nurses. Journal of Ege University Nursing School, 18;119-131.

Ergin, M., Yeginsu, A., & Gurlek, K. (2010). Chest tube insertion. National Surgery Journal, 2:115-121.

Fikkers, B.G., Veen, J.A., Kooloos, J.G., Pickkers, P., Hoogen, F.J.A., Hillen, B., & Hoeven, J.G. (2004). Emphysema and pneumothorax after percutaneous tracheostomy, case reports and an anatomic study. Chest, 125,1805-1814.

Gan, K.L.J., & Tan, M. (2015). Evidence-based management of patients with chest tube drainage system to reduce complictions in cardiothoracic vasculer surgery wards. Int J Evid Based Healthc. 13,58-65.

Gray, E. (1999). Pain management for patients with chest drains, nursing standart. 14, 40-44.

Karagozoglu, S. (2005). Nursing as a scientific discipline. C.U. Journal of the School of Nursing. 1, 6-14.

Kartoglu, S., Yuceyar, S., & Akyuz, N. (2008). Basic Principles in Wound Healing and Care. Erdost, S.K., & Cetinkale, O. (Editors). Wound Care and Treatment. Istanbul Hunkar Offset, Istanbul, Turkey, pp.11-27.

Koser, B., Gulbahar, G., Yıldırım, E., Dural, K., & Sakıncı, U. (2010). Complications of tube thoracostomy in 603 patients. Turkey Clinics J Sci, 3,895-899.

Lehwaldt, D., & Timmins, F. (2013). Nurses' knowledge of chest drain care: an exploratory descriptive survey. Journal of Clinical Nursing. 22,2912-2922.

Magner, C., Houghton, C., Craig, M., & Cowman, S. (2013). Nurses' knowledge of chest drain management in an Irish Children's Hospital. Journal of Clinical Nursing. 22, 2912-2922Yıldızeli, B., & Yuksel, M. (2002). Surgical techniques in pleural diseases. Thorax Journal, 3,27-40.

Sullivan, B. (2008). Nursing management of patients with a chest drain. British journal of nursing. 6,388-393.

Tarhan, M., Gokduman, S.A., Ayan, A., & Dalar, L. (2016). Nurses' knowledge levels of chest drain managament: A Descriptive Study. Eurasian J Pulmonol. 18,153-159.

Tcherveniakov, P., Siqueira, J.D., Milton, R., & Papagiannopoulos, K. (2012). Ward-based, nurse-led, outpatient chest tube management: analysis of impact, cost-effectiveness and patient safety. European Journal of Cardio-Thoracic Surgery. 41, 1353-1356.

Tengilimoglu, D., & Yigit, A. (2005). A field study to determine the effect of leadership behaviors on staff job satisfaction in hospitals. Hacettepe Journal of Health Administration. 3,375-400.

Terzioglu, F., & Sahan, F.U. (2017). Nurses' decision-making authority and position in medical intervention. Health and Nursing Management Journal, 4, 136-142.

.Tuncer, M., Yilmaz, O., Cetin, T. (2011). Evaluation of the Internet as a source of information according to the opinions of computer and instructional technology education students. 5th International Computer & Instructional Technologies Symposium. 2011, 3-8.

Yenigun, B.M., & Yuksel, C. Chest tube insertion. (2018). Current Chest Diseases Series. 2, 196-201.

Yilmaz, M., (2002). The effect of pre-operative instruction on postoperative complications and patient satisfaction. Nursing Research Journal. 1, 40-51.

Yolcu, S., Akın, S., & Durna, Z. (2016). Evaluation of the factors related to the movement levels and movement levels of the patients in the postoperative period. Journal of Education and Research in Nursing. 2,129-138

Yuceer, S. & Bulut, H. (2010). Practices of nurses working in the neurosurgical intensive care unit regarding the prevention of nosocomial infections. Dicle Medical Journal. 4,367-374.