

Assessment the Nurses Performance in Providing Care to Patients Undergoing Chest Tube in Suez Canal University Hospital

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Abstract: Chest tube care is one of the most important nursing procedures because patients who need chest tubes are usually seriously ill and require advanced nursing care. Accordingly, vigilant and expert nursing care can prevent serious complications. The aim of the present study is to assess nurses' performance in providing care to patients undergoing chest tube. The study was a descriptive research design was used to conduct this study; a total number of 70 nurses were selected randomly using systematic sampling technique. Data were collected for a period of four months, using two tools: Tool (1) Questionnaire sheets to assess nurses, knowledge about care provided to patients undergoing chest tube. Tool (2): Observational checklist to assess the nurses' practice in providing care to patients undergoing chest tube. The results of the present study revealed that unsatisfactory level of performance in providing care to patients undergoing chest tube among nurses in the sample. There was significant relation between nurses, knowledge, practice and degree of qualification. Also there was no correlation between nurses, knowledge and practice. The study recommended that improve nurses, theoretical knowledge and clinical applications of chest tube care & continuous evaluation of nurse's knowledge and performance is essential to identify nurse's needs.

Key Words: Chest tube, Nurses, Nursing Care

INTRODUCTION

Trauma is the leading cause of death for individuals younger than 40 years of age, with approximately 140,000 deaths annually in the United States alone. Of these deaths, thoracic injuries are primarily responsible for 25% of cases and are a major contributing factor in up to 75% of cases. However, most injuries may be effectively treated with thoracostomy tube and simple fluid resuscitation (Meredith and Hoth, 2007).

Chest tube is inserted to remove pathological collections of air or fluid in the pleural space, to allow the re-creation of the essential negative pressures in the chest, and to permit complete expansion of the lung, thereby restoring normal ventilation. Chest drains are very simple and effective tools in the management of thoracic and pleural pathology. They need proper safe insertion and correct management. Chest drains are lifesaving in critical care. (Rajan, 2010)

The indication for closed intercostal drainage encompasses a variety of disease processes in the hospital settings, the procedure may be performed to palliate a chronic disease process (e.g., drainage of malignant pleural effusions) or to relieve an acute, life threatening process (e.g., decompression of a tension pneumothorax). chest tube also may provide a vehicle for pharmacologic interventions, as when used with antibiotics therapy for treatment of an empyema or to instill sclerosing agents to prevent recurrence of malignant effusions. (Irwin et al., 2008).

Inappropriate management of chest tube and their drainage systems may lead to delayed or incomplete evacuation of the collected air or fluid in the pleural space, delayed reexpansion

The New Egyptian Journal of Medicine Vol.:45 ; No.: 3 1st September 2011 220 of the collapsed lung, and even development of tension pneumothorax (Miller and Sahn, 1987; Kam et al., 1995). This are associated with significant morbidity, leading to prolonged hospitalization or even mortality. It is therefore, important that every member in the team taking care of patients with chest tube, should have adequate understanding of the physical principles of chest tube and its drainage system (Sim, 1996).

Complications are more likely if the nurses caring for patients with chest drain do not have the necessary skills and training (Avary, 2000).

Significance of the study:

It has been found from the researcher's experience as clinical instructor in Suez Canal university hospital that most of hospitalized patients with chest tube may have many complications from poor nursing management. Also its hoped that data generated from this study could help in planning and managing care in ICU, Cardiothoracic care unit, Intensive Cardiothoracic unit, general surgery units as well as training adequately the personal responsible for such care. This study will generate attention and motivation for

further investigation into this topic as well as the lack of local researches that concern with such problem necessitates the condition of this study. so that the investigator of the study will assess nurses, performance during this procedure.

Aim of study:

Study was carried out to assess nurses' performance in providing care to patients with chest tube in suez canal university hospital.

Research Question:

To achieve the above purpose of this study the following question should be answered:

A-Did nurses have satisfactory knowledge about the care of patients undergoing chest tube?

B-Did nurses have satisfactory practice in providing care to patients undergoing chest tube?

SUBJECT AND METHODS

The design for this study was (a descriptive design), carried out in Suez canal University Hospital at Ismailia Governorate at (ICU,Intensive cardiothoracic,Cardiothoracic care and General surgical units).

The subjects of this study were included all nurses working at previous mentioned settings. Available (70) nurse.

Tools of data collection:

Tool I: Interview questionnaire sheet:

This sheet consists of two parts, **Part I:** includes items related to demographic characteristics of the nurses **Part II:** Knowledge sheet was developed by the researcher to assess the nurses, knowledge regarding nursing care provided to patients with chest tube. It was constructed and reviewed utilizing the most recent and relevant literature and guided by (Lynn and Carlson, 2005; Ellis and bentz,2007; Hirnle and Carven, 2007; Tortorica, 2007; Lynn 2008; Hudson, 2009; Timby, 2009; Altman, 2010; Kowalak, 2010; Smeltzer et al., 2010).

Regarding the scoring system for nurse's knowledge, all knowledge variables were weighted according to the item included in the answer of each question. Each question was corrected from 118 degrees. All questions was measured and divided by the number of questions to obtain the mean knowledge of each nurse. Knowledge below 60% was considered unsatisfactory while those equal to or above 60% was considered satisfactory

Tool II: Observational checklist:

The researcher based on the assessment checklist for nurses practice during managing patient with chest tube. Developed by (Lynn and Carlson, 2005; Ellis and bentz, 2007; Hirnle and Carven, 2007; Lynn 2008; Timby, 2009; Altman, 2010; Smeltzer et al., 2010). It was modified by the researcher to simplify steps of the procedure, and presented to a jury of professors expertise from medical surgical nursing department and medicine department. That is to suit the hospital standard and check its clarity, their comments and suggestions were taken into considerations, and the final form was developed. This checklist was used to assess

nurses,s level of practice in providing care to patient with chest tube.

Regarding the scoring system for practicing of the studied nurses, a check list was assigned to score according to its number of sub item. The answer was represented as it is reported in the answer sheet (done, not done, comments).

(1) score if done and (zero) score if not done. The scoring system of the tool checklist was computed and the sheet received a grade out of 108 points.

Methods Of Data Collection:

- An official permission for data collection in Suez Canal university hospitals was obtained from the hospital administrative personnel by submission of a formal letter from the vice dean of the faculty of nursing in Suez Canal university.
- The study tools were developed based on the review of the related literature.
- In order to test the content of validity of the tool.The tools were reviewed by 10 experts in the field.
- A pilot study was conducted on 10% of subjects. It was done to test the clarity and practicality of the tools, the results of the data obtained from the pilot study helped in modification of the tools .The results from the pilot study were not included in the main statistical sample.
- Field study was conducted during the period from the beginning of September (2010) to the end of December (2010). The researcher visited the university hospital, three days weekly (morning & afternoon) shifts to collect the data by using previous tools. The questionnaire sheet was administered to nurses individually in the work place and explanation of the questionnaire sheet was done by the researcher, each nurse took about 30-45 minutes to complete the questionnaire sheet. The observation checklist was utilized by the researcher to assess nurse's practice. The assessment of nurse's practice was done through three times of observation. The researcher spent four hours daily in observing nurses during morning & afternoon shift .The researcher observed each nurse three times for each skill.

Data analysis:

The following statistical measures were used:

- Descriptive statistics including frequency and distribution were used to describe different characteristics.
- Kolmogorov – Smirnov test was used to examine the normality of data distribution.
- Univariate analysis including: Chi-square test and Monte Carlo test were used to test for significance among qualitative variables

RESULTS

Table (1) shows that slightly more than three quarter of the studied nurses (75.8%) were aged less than 25 years. Moreover, slightly less than three quarters of the studied

nurses were married (71.4%), and four fifth of them had a nursing diploma (80%). Nearly equal percentage of nurses were employed in intensive cardiothoracic unit (21.4%), cardiothoracic care unit (21.4%), general surgery unit (28.6%), and intensive care unit (28.6%). More than two thirds of the studied nurses (67.1%) were employed for less than 5 years while 32.9% were employed for duration of 5 years up to 10 years. Regarding receiving training on chest tube, most of nurses (85.7%) didn't attend any previous training. Nearly all nurses who attended previous training courses (12.9%) reported that they got benefit from such courses by more than 50%. Meanwhile, only one nurse constituting (1.4%) reported that benefit from such training course was less than 50%.

Table(2): show that total knowledge level about different studied items was calculated. Only knowledge about documentation was satisfactory among more than half of the studied nurses (51.4%) as compared to all other studied parameters about chest tube. The lowest levels of knowledge were recorded for nursing care for patient with chest tube (22.9%), problems associated with chest tube (25.7%), and indications of chest tube (28.6%).

Table (3) reveals total level of practice observed among studied nurses regarding different steps of nursing care offered to patients with chest tube. The highest satisfactory practice scores were observed in nursing care during changing the drainage system (75.7%) and chest tube dressing (72.9%). Meanwhile, worst practice were observed in patient assessment (0%), documentation (0%), and care provided to patient with chest tube (1.4%). Less than half of the nurses had satisfactory level of practice regarding their tasks about preparation of patient (25.7%), chest drainage system assessment (38.6%), and care of the patient after thoracotomy (27.1%). The total practice level was satisfactory among only 4.3% of the studied nurses indicating how poor is the overall practice level of nurses.

Table (4) illustrates that nurses graduated from technical nursing institute had higher level of knowledge about Anatomy and physiology of respiratory system and total knowledge level. The majority of nurses graduated from nursing institute (85.7%) had a satisfactory knowledge level compared to 16.1% of nurses with nursing diploma. Moreover, half of nurses graduated from nursing institute (50%) had satisfactory level of the total knowledge compared to 17.9% of nurses with diploma. The observed relation were statistically significant where (P<0.0001, P=0.012 respectively). Otherwise, none of the studied knowledge parameters showed significant relation between nurses graduated from nursing institute and those who had nursing diploma.

Table (5) describes effect of degree of qualifications on their practice. All nurses who practiced care of patient after thoracotomy and were graduated from nursing institute

(100%) had a satisfactory level of practice compared to only 42.9% of nurses who had a nursing diploma. The observed relation was statistically significant where (P=0.009).

Moreover, the total practice level of nurses graduated from nursing institute was better than the total level of nurses with nursing diploma as (21.4%) of nurses from nursing institute had a satisfactory level of total practice level compared to none of the nurses with diploma (0%). The observed relation was statistically significant where (P=0.007).

Table (6) Studying the relationship between knowledge level and practice level of the studied nurses .This table revealed that no correlation was found between both levels (r=0.153, P=0.206).

Table (1): Number and percentage distribution of the studied nurses according to their sociodemographic characteristics.

Socio-demographic characteristics	Studied nurses (n=70)	
	No.	%
Age		
Less than 25	53	75.8
25 or more	17	24.2
Marital status		
Single	20	28.6
Married	50	71.4
Degree of qualifications		
Diploma	56	80.0
Nursing technical institute	14	20.0
Department of employment		
Intensive cardiothoracic unit	15	21.4
Cardiothoracic care	15	21.4
General surgery	20	28.6
ICU	20	28.6
Duration of experience (years)		
2-<5	47	67.1
5-<10	23	32.9
Attending previous training on chest tube		
Yes	10	14.3
No	60	85.7
Benefits from previous training		
Less than 50%	1	1.4
50% or more	9	12.9

Table (2) : Nurses, level of knowledge regarding providing care to patient with chest tube

Knowledge	Satisfactory		Unsatisfactory	
	No.	%	No.	%
Anatomy and physiology of respiratory system	21	30.0	49	70.0
Indications of chest tube	20	28.6	50	71.4
Nursing care for patient with chest tube	16	22.9	54	77.1
Problems associated with chest tube	18	25.7	52	74.3
Infection control	27	38.6	43	61.4
Documentation	36	51.4	34	48.6
Health education	29	41.4	41	58.6
Total knowledge level	17	24.3	53	75.7

Table (3) : Nurses, level of practice regarding providing care to patient with chest tube

	Satisfactory		Unsatisfactory	
	No.	%	No.	%
Preparation.	18	25.7	52	74.3
Patient assessment.	0	0.0	70	100.0
Chest drainage system assessment.	27	38.6	43	61.4
Nursing care provided to patients with chest tube.	1	1.4	69	98.6
Changing the drainage system.	53	75.7	17	24.3
Chest tube dressing.	51	72.9	19	27.1
Care of the patient after thoracotomy.	19	27.1	51	72.9
Preventing postoperative complications after thoracic surgery.	28	40.0	42	60.0
Documentation.	0	0.0	70	100.0
Total practice level	3	4.3	67	95.7

Table (4) : Relation between nurses, level of knowledge and their qualifications.

Knowledge	Degree of qualification								Significance (P)
	Diploma (n=56)				Nursing institute (n=14)				
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		
No	%	No	%	No	%	No	%		
Anatomy and physiology of respiratory system	9	16.1	47	83.9	12	85.7	2	14.3	0.0001*
Indications of chest tube	14	25.0	42	75.0	6	42.9	8	57.1	0.186
Nursing care of patient with chest tube.	11	19.6	45	80.4	5	35.7	9	64.3	0.2
Problems associated with chest tube.	14	25.0	42	75.0	4	28.6	10	71.4	0.784
Infection control	20	35.7	36	64.3	7	50.0	7	50.0	0.326
Data recording	28	50.0	28	50.0	8	57.1	6	42.9	0.632
Health education	21	37.5	35	62.5	8	57.1	6	42.9	0.182
Total knowledge level	10	17.9	46	82.1	7	50.0	7	50.0	0.012*

*significant at P<0.05

Table (5): Relation between nurses, level of practice and their qualifications.

Practice level	Degree of qualifications								Significance (P)
	Diploma (n=56)				Nursing institute (n=14)				
	Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		
	No.	%	No.	%	No.	%	No.	%	
Preparation.	15	26.8	41	73.2	3	21.4	11	78.6	0.750
Patient assessment.	0	0.0	56	100.0	0	0.0	14	100.0	----
Chest drainage system assessment.	21	37.5	35	62.5	6	42.9	8	57.1	0.713
Nursing care provided to patient with chest tube.	0	0.0	56	100.0	1	7.1	13	92.9	0.2
Changing the drainage system.	42	75.0	14	25.0	11	78.6	3	21.4	1.0
Chest tube dressing.	42	75.0	14	25.0	9	64.3	5	35.7	0.42
#Care of the patient after thoracotomy.	12	42.9	16	57.1	7	100.0	0	0.0	0.009*
#Preventing postoperative complications after thoracic surgery.	21	75.0	7	25.0	7	100.0	0	0.0	0.301
Documentation.	0	0.0	56	100.0	0	0.0	14	100.0	-----
Total practice level	0	0.0	56	100.0	3	21.4	11	78.6	0.007*

(n=35)

*significant at P≤0.05

Table (6): Correlation between mean knowledge level and mean practice level among the studied nurses.

Mean practice %	Mean knowledge %	
	r	P
	0.153	0.206

DISCUSSION

Chest tubes improve breathing pattern by removing accumulation of air and fluid from the pleural space, permitting the lungs to return to normal expansion. (Delaune and Ladner, 2011).

Regarding to sociodemographic characteristics, the current study included 70 nurses. (15 from intensive care unit, 15 from intensive cardiothoracic care unit, 20 from cardiothoracic care unit, 20 from general surgical units). Slightly more than three quarter of them were aged less than 25 years. Also, four fifth the studied nurses had nursing diploma. As regard to their marital status was found that about less than three quarter of them were married. According to their years of experience it is found that more than two thirds of them had experience less than five years, the result also indicated that the majority of them had no previous training program about chest tube.

This is in an agreement with Lit et al., (2010) whose studied the need for nurses to have an in-service education of chest drain management, at Queen Elizabeth Hospital, Hospital Authority, Kowloon, and Hong Kong PRC emphasized that that more than half of the nurses had at least 5 years medical experience. And the majority of nurses had not attended an educational lectures and workshops concerning chest drainage management.

Otherwise Hutton et al., (2008) stated that Mistakes in dealing with the thoracostomy tube and its system are commonly being practiced, mainly by the residents and the nurses due to inadequate knowledge and poor experience. Therefore training courses for both the residents and the nurses are mandatory in any hospital dealing with patients with chest tube.

In this respect, Johnny et al., (2010) reported that a comprehensive educational session relating to chest drain management should be held regularly. An appropriate evidenced-base clinical guidelines and protocols are needed to develop for safe clinical practices.

Moreover Lit et al., (2010) asserted that identification of nurse's educational needs regarding chest drains care is urgently required to improve clinical practice and reducing unnecessary complications. Also Laws et al., (2003) mentioned that it is important that nurses receive appropriate training in the management of chest drains and ensure that patients are cared for safely and competently. Furthermore Tang et al., (2002) suggested that patients are more likely to develop complications when practitioners lack skills and knowledge in dealing with chest drains.

Regarding assessment of nurses, knowledge about care of patient with chest tube, the present study revealed that the majority of studied nurses were unsatisfactory knowledge

about chest tube. This result may be due to that most of the studied nurses their years of experience were less than five years, without attending any in-service training program especially related to chest tube. Another explanations were the majority of the studied nurses were diploma graduates, and their knowledge gained during school study years might be insufficient for such a specialized service or forgotten. In addition to, there is a lack of supervision and evaluation system for nurses during their working.

This finding is supported by Shokier (1996) who stated that whatever is learnt in nursing school tends to be forgotten if not applied or stressed on. Therefore, lack of in-service training, continuing education programs and proper supervision, may also contribute to the problem.

This result is in agreement with Timmins and Lehwaldt (2005) whose studied Nurses' knowledge of chest drain care: an exploratory descriptive survey. at School of Nursing & Midwifery Studies, Dublin City University, Dublin 9, Ireland; revealed that a lack of consensus among nurses on the major principles of chest drain management. This inconsistency of treatment regimes, together with the lack of evidence-based nursing care, creates a general uncertainty regarding the care of patients with chest drains.

Moreover, Frantz *et al.*, (1995) found that nurses had poor knowledge related to chest tubes and there is a great need for giving information to nurses related to nursing management of the patients having chest tube drainage. Also emphasized that the nurses in clinical setting should focus their emphasis on utilization of research validated knowledge to improve their clinical practice.

Concerning assessment of nurses, practice for patients with chest tube, the point of psychological aspect, the practice of nurses was unsatisfactory in nearly two thirds of the studied nurses in explaining the procedure to the patient. This result is contradicted with Lynn, (2008) who stated that explanation relieves anxiety and facilitates cooperation

The finding of the present study revealed that more than half of the studied nurses had unsatisfactory level of practice regarding to patient's assessment. This might be related to that the nurses considered the assessment is the responsibility of the physician. Otherwise, Shaheen, (2003) stated that the assessment is the first and important steps to successful nursing care plan.

As regard to nurses, practice related to chest drainage system assessment, it was found that more than half of nurses were unsatisfactory level of practice. This result might be due to lack of supervision and lack of knowledge related to importance of assessment of chest drainage system. So Mallet and Dougherty, (2000) recommended that a careful assessment is required to look at the whole system thoroughly and to ensure that there are no loose connections through the tubing or circuit. Great care needs to be taken when checking the drain.

Unfortunately, the more highly unsatisfactory areas of performance was documentation. This finding is in agreement with Davis *et al.*, (1994) who found that nurses have poor documentation of assessment, missing information on non-physical problems and in the use of the nursing process, explained this by the fact that written communication was undervalued by nurses who place more emphasis on the contribution of rich verbal communication to quality patient care.

Also this is in agreement with Edelstein, (1990) who shown that nurses do not adequately document the nursing process, family teaching and discharge planning, and patient problem were not addressed properly. It was concluded that attitudes about documentation needed to improve.

There is significant relation between nurses, knowledge and degree of qualifications. In addition to there was significant relation between nurses, practice and degree of qualification Nurses graduated from nursing institute were better than nurses with nursing diploma possibly because diploma nurses did not receive any cognitive or psychomotor learning related to this topic. In addition to nurses with high educational level have great chances to obtain knowledge from press, books and other mass media. Also they may grasp knowledge correctly. This result indicated that degree of qualification play a very vital role to provide nurses by practical knowledge and that by increasing degree of qualification .The nurses have to learn more to improve their knowledge and skills.

This is in agreement with Gomma, (1992) who stated that, when the level of education of nurses is high, their total grades of nurses, knowledge and practice are more than that of nurses with a lower level of education, and it was found statistically significant difference.

The result of the present study revealed that there was no statistically significant relationship between nurses, knowledge and practice .These findings may be due to that most studied nurses were lack knowledge and skill, so there were nothing to compare with .These findings were in line with Kowalski, (2003) who stated that nursing is a combination of a body of knowledge and the application of that knowledge through nursing practice. In this respect, Kim, (1999) has claimed that nursing knowledge has been developed and established as a systematic and generalized knowledge base for practice. The knowledge is necessary for nurses to improve their practice. This is based on the recognition that nursing knowledge production must also be viewed in conjunction with practice itself, as practice invades not only the use of knowledge but also gaining of knowledge.

Moreover, Pridham *et al.* (1998); Fenwick (2001) asserted that nursing competencies depend largely on intuitive knowledge and skills, resolve, and action. Therefore, the reasons for nurses, improper performance are usually the lack of nurses' knowledge and skills (Zaky, 1990; Kadry, 1992)

Furthermore, Zaky, (1990); Zahran, (1991); Kadry, (1992); El-Said (1996) reported that the reasons for nurses' improper performance are lack of nurses' knowledge and skills, improper environment, lack of perseverance and in-service training of the nursing staff, and lack of supervision from head nurses, In addition to the increase of patient's ratio

CONCLUSION

In conclusion, the result of the present study revealed a general unsatisfactory level of knowledge and practice related to care of patient with chest tube. This result agrees with (Sobeh, 2005) who studied nurses' knowledge and practice related to care of the mechanically ventilated patient. Also agrees with (Ahmed, 2003).

Finally, the frame of the present study aimed at shedding some light on the reality and nature of care provided to patients with chest tube. The revealed finding pointed out the necessity of improving the current nurse's knowledge and practice in the area of independent nursing procedure.

RECOMMENDATIONS

From the foregoing conclusion, the following recommendations are suggested:

(I) In services:

- Developing system of periodical nurses' evaluation to determine strategies of upgrading their knowledge and enhancing their practice.
- Developing specific procedure book about the care of patient with chest tube and chest drainage system. Development of follow up courses and in-service training programs should be conducted to maintain efficient performance of individual, previously trained in care of patients with chest tube.
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- Emphasis on monitoring and supervision as an importance for service improvement.
- Encouraging nurses to attend national and international congresses, seminars, symposiums and workshop about chest tube, care of the patient and chest drainage system.

(II): In Education

- Assessment sheet should be developed for patient with chest tube.
- Basic information needs about how to handle and avoid chest tube problems should be available at each unit where patient with chest tube presented.
- Hand washing is the single most important procedure in the prevention infection that should be supervised by the head nurse.

(III): In Research

There is need for more research in this area of such independent nursing function such as:

- Identification of most problems related to care of patient with chest tube.
- Effect of training programs on nurses' knowledge and practice about care for patient with chest tube.
- Identification of nurse's educational needs regarding chest drains care is urgently required to improve clinical practice and reducing unnecessary complications.

(IV): Recommendations for Future Studies

- Reapplication of the study on a large sample required from different hospitals, as well as from different geographical area in Egypt to construct national statistics about chest tube in Egypt.

Study the impact of chest tube training program on nurses' knowledge and practice.

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