
EFFECT OF IMPLEMENTING NURSING MANAGEMENT GUIDELINES FOR PATIENTS WITH CHEST TUBE DRAINAGE ON NURSES' PERFORMANCE AT MANSOURA UNIVERSITY HOSPITALS

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Abstract:

Background: Chest tube is an essential life saving measure for the management of pneumothorax, hemothorax and hemopneumothorax developed as a consequence of chest trauma or surgery. **The aim** of this study was to assess the effect of developing and implementing guidelines of nursing management of patients with chest tube drainage on nurses' Performance. **Subjects and method:** Quasi experimental design was utilized to carry out this study. **Study Subjects:** All available nurses were included in the study (44) nurses of both sexes who are working in chest department at Mansoura University Hospitals. **Two tools** were used for data collection; first tool included two parts sociodemographic characteristics of the studied nurses and interview questionnaire sheet about nursing management of patients with chest tube drainage. Second tool is nurses' performance observational checklist about nursing management of patients with chest tube drainage. **Results:** the majority of the studied nurses were females in their second and third decade. Before implementing the guidelines 62.5% of the studied nurses had low knowledge level, and 70% of them had moderate practice level, while after direct implementation of the guidelines 65.0% of them had moderate knowledge level and 90% had high practice level. **The study concluded;** nursing management intervention guidelines significantly improved nurses' performance for patients with chest tube drainage. **The study recommended;** administrators should create policies and plans for providing education to the nursing staff, evaluating nurses' Performance periodically to determine the effect of the training programs, and chest department should be supplied by checklists about all chest tube procedures.

Key words: chest tube, guidelines, nursing management

Introduction:

Chest tube placement is one of the most commonly performed procedures as it is widely used throughout medical, surgical, and critical care specialties from bedside to operating room, from life-threatening emergencies to postoperative chest drainage in elective surgery⁽¹⁾.

American Heart Association (AHA) stated that annually more than 448,000 patients underwent cardiothoracic surgery including Coronary Artery Bypass Grafting (CABG), valve replacement or repair, or repair of defects which are familiar rationales for chest tube

insertion⁽²⁾. Every year, over one million chest tubes are inserted for patients in the U.S. alone⁽³⁾.

Chest tube insertion is a surgical procedure which means inserting a tube into the pleural space to drain fluid, blood, or air, reestablish a negative pressure, facilitate lung expansion, and restore normal intrapleural pressure⁽⁴⁾.

Chest tubes are used to treat conditions that disturb the pleural space as chylothorax, empyema, hemothorax, hemothorax, pleural effusion, pneumothorax and cardiothoracic surgeries⁽⁵⁾. Another indication is thoracic trauma which accounts approximately 25% of trauma. Fortunately over 80% of injuries can be managed non-operatively using chest tube, appropriate analgesia and adequate respiratory therapy^(6&7).

Complications of chest tube insertion include malposition, lung injury, diaphragmatic perforation, subcutaneous placement, intercostal artery bleeding, recurrence, empyema, injury to abdominal organs, perforation of the heart and lungs, cardiogenic shock and mediastinal perforation. Although serious complications proper observation and expert consultation during both procedural

and maintenance of thoracic procedures could prevent them⁽⁸⁾.

Caring for patients with chest tubes is an essential element of nursing practice, especially for those nurses who care for patients with complicated respiratory problems or undergo cardio-thoracic surgery. It is vital that nurses and healthcare members use the most excellent accessible evidence in making decisions concerning these patients' care⁽⁹⁾. So professional development should take place throughout the nurse's career. Educational programs need to be planned to promote professional growth of nurses to improve skills and knowledge. This provides high quality and effective health care for patients⁽¹⁰⁾.

Significance of the study

Rate of complications in patients with chest tubes have been reported to be as high as 30%. even with the enormity of its clinical function, this procedure carries significant preventable morbidity⁽¹¹⁾. Complications can result due to inadequate knowledge of thoracic anatomy or inadequate training and experience⁽¹²⁾.

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

the collapsed lung. This are associated with large morbidity. It is important that health care team caring for patients with chest tube, should have acceptable understanding of the physical principles of chest tube and drainage system. Complications are more likely if the nurses caring for patients with chest tube do not have the necessary skills and training⁽¹³⁾. So the aim of this study is to assess the effect of developing and implementing guidelines of nursing management of patients with chest tube drainage at Mansoura University Hospitals.

Subjects and Methods:

The aim of this study:

- 1- Assessing the nurses' performance regarding nursing management of patients with chest tube drainage.
- 2- Developing and implementing nursing management guidelines for patients with chest tube drainage.
- 3- Assessing the effect of developing and implementing guidelines of nursing management of patients with chest tube drainage.

Research Hypothesis:

There is a significant difference between nurses' knowledge before and after implementing guidelines

of nursing management of patients with chest tube drainage.

There is a significant difference between nurses' practice before and after implementing guidelines of nursing management of patients with chest tube drainage.

Subjects and method of the current study were discussed under the following four main designs:

1. Technical Design
2. Administrative Design
3. Operational Design
4. Statistical Design

Technical Design

Technical design of the current study included: research design, study setting, subjects, and tools for data collection

Research design:

Quasi experimental design was utilized to carry out this study. Quasi experiment used usually to evaluate the effect of an ongoing program on one or more indicators of output or outcome. It have two characteristics they make before and after (pretest –posttest), and also they compare outcomes at time⁽¹⁴⁾.

Setting:

This study was conducted in the chest department at Mansoura University Hospitals.

Subjects:

All available nurses were included in the study (44) nurses of both sexes who are working in chest department at Mansoura University Hospitals, with diverse age, qualification, years of experiences, different level of education who provide nursing care for patients and willing to participate at the study.

Tools of Data Collection:-

Data was collected by using the following tool:

Two tools were used for data collection:-

Tool I:- Nurses Knowledge interview questionnaire sheet.

Nurses Knowledge sheet was used for the purpose of assessment of nurses' knowledge about chest tube and nursing management of patients with chest tube drainage. It was adopted from Shaker (2012) and modified by the investigator it was in Arabic form. It consists of (14) questions divided into two parts.

Part(1): Sociodemographic Characteristics of the Studied Nurses

Included questions related to personal characteristic of the study subjects which composed of (6)

questions including sex, age, qualifications, years of experiences, attending training sessions on how to provide nursing care for patients with chest tube, and the number of these courses.

Part (2): Nurses' knowledge about nursing management of patients with chest tube drainage.

Nurses' knowledge about chest anatomy and chest tube nursing management included 14 questions in the form of choosing the correct answer.

Regarding scoring system, for the chest tubeinterviewsheet each correct answer was given score of one while incorrect answer or don't know were given zero. The answers of nurses were evaluated using model answer prepared by the investigator. For each part, the score of the items were summed up and divided by the total of items, giving a mean score of the part. These scores were converted into percent score. All scores were transformed into score % as follow:

- The observed nurse score = score of knowledge sheet
- The maximum score = total score of the knowledge sheet
- Score % = (score of knowledge sheet /total score of the knowledge sheet) x 100. Then

score % was transferred into categories as follow:

Knowledge categories:

- Low: For those who had a score % <50.0%
- Moderate: For those who had a score % 50.0% to 75.0%
- High: For those who had a score % >75.0%

Tool II: Nurses practice observational checklist.

Aimed at assessing the practice of the studied nurses regarding chest tube management, and evaluating the effect of implementing nursing management guidelines on nurses' practice. It was adopted from; Shaker (2012) who adopted it from; Dobra et al. (2001), Perry & Potter, (2004), Jacob et al. (2007), Randle et al. (2009), Toca (2010) and other modification is done by the investigator and it was written in English. The chest tube practice checklists consisted of (6) main parts covering all the procedure related to chest tube nursing procedures and consists of 96 questions which included this categories:

Part 1: Patient assessment it included (13) sub items.

Part 2: Assessing the drainage system patency it included (8) sub items.

Part 3: Changing chest tube insertion site dressing it included (22) sub items.

Part 4: Changing the chest drainage bottle. It included (19) sub items

Part 5: Health education for the patients with chest tube it included (12) sub items.

Part 6: Chest tube removal Procedure it include (22) sub items.

Regarding scoring system, for chest tube practice items, the item done was scored one and not done was scored zero for each item, the scored items were summed up and the total divided by the number of the items, giving mean score. All scores were transformed into score % as follow:

Score % = (the observed nurse score/ total score) x 100 Then score % was transferred into categories as follow:

Practice categories:

Poor: For those who had a score % <50.0%

Fair: For those who had a score % 50.0% to 75.0%

Good: For those who had a score % >75.0%

Good: For those who had a score % >75.0%

2. Administrative design:-

An official permission was obtained from the Faculty of Nursing, Mansoura University to the directors of Mansoura University Hospitals at which the study was conducted. Before collecting data from the nurses participated in the study, the investigator explained the purpose of the study and took oral consents from them.

3.Operational Design

This part included: validity& reliability, pilot study, field work, and limitation of this study.

Validity& Reliability:

Extensive review of the current national and international literatures related to the research was done using textbooks, articles, magazines, internet, and other related researches. Tools of data collection were adopted and modified by the investigator then tested for content validity by a panel of five experts in the field of medical surgical nursing all were assistant professor of medical surgical nursing at the faculty of Nursing, Mansoura University reviewed the tools for clarity, relevance, comprehensiveness, understanding, applicability and simplicity for implementation and

some modification were applied accordingly.

Reliability test was made by using Cronbach's Alpha and was in knowledge part (alpha= 0.882) which is very good.

A pilot study was carried out on 10% (four nurses) who were selected randomly from 44 nurses under study those nurses were then excluded from the study. The purpose of the pilot study was to ascertain the clarity and applicability of the tool and to estimate the time needed to answer for each tool. Based on the finding of the pilot study, modification was made to make the tool more applicable to nurses.

Field Work:

The study was implemented through the following four phase:

Phase 1: Preparatory Phase (Assessment):

The investigator introduced herself to the study sample and gave them a brief idea about the aim of the study. Then oral consent was obtained from each nurse in the study. The interview sheets were filling by the investigator in the nurses' room after interviewing each nurse individually. The average time taken by the

investigator to fill out the form for each nurse was 15 to 20 minutes.

Observing nurses' practice during chest tube management was done in order to fill practice checklist sheets of the studied nurses, observing span was 3 hours/day at morning and afternoon shift. This phase was conducted by the investigator during the period from the beginning of February to the end of June 2014. The investigator took pictures showing that nurses need education.

These pre-tests were done to assess the level of knowledge and practices of the study group concerning chest tube and nursing management of patients with chest tube drainage before starting the educational program.

Phase II: Developing nursing management guidelines:

The investigator assessed the educational needs of the nurses regarding chest tube then went through literature review and internet searching for relevant information to construct the educational program under the guidance of the supervisors. The main aim was to improve performance of nurses regarding nursing management of patients with chest tube drainage. A simple colored Arabic booklet was developed for nurses covering all

items related to chest tube and its management.

The Educational booklet includes definition of chest tube, its purpose, indications, contraindications, complications and different nursing procedures related to chest tube management including patient assessment, assessing drainage system patency, changing chest tube insertion site dressing, changing the chest drainage bottle, health education for the patient, and chest tube removal procedure. It is written in simple Arabic language containing colored pictures clarifying each step in all procedures mentioned above for more understanding.

Phase (III): Implementation phase:

The educational program considered for this study has been carried out in nurses' room at chest department. The implantation of the program was within the schedule of the nurses working hours. The subjects were divided into small groups (5 groups), each group consist of eight nurses, except the last group was 4 nurses according to the total number of nurses (44). The program was conducted through five sessions; each group obtained the five sessions through 2 weeks, each session took about 30- 45 minutes.

Diverse teaching methods were used during the sessions including; interactive lectures, group discussion, demonstration & re-demonstration, data show, pictures, printed booklets, and actual nursing management on the patients. It took three months from the beginning of July to the end of September 2014.

Phase IV: Evaluation phase:

The evaluation phase focused on determining the effect of the program through nurses' chest tube interview sheet and practice checklists using the same tools in pre-program assessment directly after implementing the guidelines (post-test) from the beginning of October to the end of December 2014. The results were compared to the pretest results to evaluate the impact of the program on knowledge and practices of the nurses. Also taking pictures by the investigator showing improved nurses' performance after implementing the guidelines through improved patient health education.

The period of data collection take

place from the beginning of February 2014 to the end of December 2014 about eleven months.

Ethical Consideration:

All relevant ethical issues were taken into consideration including the following: The research approval was obtained before starting with the program, the aim of the study was explained to each nurse and then an oral consent for participation in the study was obtained from each one of them, ensuring nurse's privacy and confidentiality of the collected data during the study. Voluntary participation as they were given an opportunity to refuse the participation, and they were assured that their information which would be used for research purposes only.

Statistical analysis

After data were collected it was revised, coded and fed to statistical software IBM SPSS version 20. The given graphs were constructed using Microsoft excel software.

Results:

Table (1): Distribution of sociodemographic characteristics of studied nurses (no. =40).

| demographic data | No | % |
|--------------------------------|----|------|
| Gender | | |
| Female | 36 | 90.0 |
| Male | 4 | 10.0 |
| Age | | |
| 18-29 years old | 17 | 42.5 |
| 29-39 | 18 | 45.0 |
| 39-49 | 4 | 10.0 |
| 49-60 | 1 | 2.5 |
| level of education | | |
| Diplom of Nursing | 21 | 52.5 |
| Diplom + specialization | 1 | 2.5 |
| Health technician Institute | 8 | 20.0 |
| Bachelor of Nursing | 8 | 20.0 |
| Post graduate | 2 | 5.0 |
| Experience years | | |
| <10 | 27 | 67.5 |
| 10-26 | 13 | 32.5 |
| Training courses | | |
| No | 27 | 67.5 |
| Yes | 13 | 32.5 |
| No. of training courses (n=13) | | |
| 1& 2 | 9 | 69.2 |
| 3& 4 | 4 | 30.8 |

This table shows, distribution of sociodemographic characteristics of the studied sample:

The table revealed that, the majority of the studied nurses were females (90%). In relation to the age almost all the studied nurses were in their second and third decade (42.5% & 45%) respectively. As regard to level of education of the studied nurses it was found that, above half of them had diplom degree (52.5%), while only 5% of them are post graduate university. Above two-thirds of the studied nurses (67.5%) had less than ten years of

experience. One third of studied nurses (32.5%) attended training courses and only one third of them (30.8%) had training courses from 3 to 4 times

Table (2): Distribution of basic nurses' knowledge concerning chest tube pre, and post the implementation of guidelines of chest tube nursing management (n =40).

| Knowledge items | Phase | | | | X ² _{mc} | P |
|---|--------|------|-------|-------|------------------------------|--------|
| | Before | | After | | | |
| | No | % | No | % | | |
| Pleural cavity is closed cavity with pressure | | | | | | |
| Incorrect answer | 27 | 67.5 | 0 | 0.0 | 24.2 | 0.001* |
| Correct Answer | 13 | 32.5 | 40 | 100.0 | | |
| Pleural cavity pressure is the pressure in the | | | | | | |
| Incorrect answer | 32 | 80.0 | 5 | 12.5 | 18.5 | 0.001* |
| Correct Answer | 8 | 20.0 | 35 | 87.5 | | |
| Material of chest tube | | | | | | |
| Incorrect answer | 22 | 55.0 | 7 | 17.5 | 7.6 | 0.001* |
| Correct Answer | 18 | 45.0 | 33 | 82.5 | | |
| Aims of Chest tube | | | | | | |
| Incorrect answer | 24 | 60.0 | 14 | 35.0 | 4.2 | 0.025* |
| Correct Answer | 16 | 40.0 | 26 | 65.0 | | |
| Indications of chest tube | | | | | | |
| incorrect answer | 16 | 40.0 | 6 | 15.0 | 5.1 | 0.012* |
| Correct answer | 24 | 60.0 | 34 | 85.0 | | |
| Contraindications of chest tube | | | | | | |
| Incorrect answer | 18 | 45.0 | 6 | 15.0 | 6.8 | 0.003* |
| Correct Answer | 22 | 55.0 | 34 | 85.0 | | |
| Complications of chest tube insertion | | | | | | |
| Incorrect answer | 32 | 80.0 | 2 | 5.0 | 4.0 | 0.043* |
| Correct Answer | 8 | 20.0 | 38 | 95.0 | | |
| When a bulge in the lung (Emphysema) in chest tube insertion site should expect | | | | | | |
| Incorrect answer | 27 | 67.5 | 11 | 27.5 | 10.5 | 0.001* |
| Correct Answer | 13 | 32.5 | 29 | 72.5 | | |

X²_{mc}: Mc-Nemar test

* P < 0.05 (significant)

Table (2) revealed that, as regard to questions about materials of chest tube, aims, indications and contraindications before implementing the guidelines was (55%, 60%, 40%, 45%) respectively which improved after implementing the guidelines (82.5%, 65%, 85%, 85%) respectively.

This table reveals that there were statistical significant difference in regard to basic knowledge of the studied sample between pre, and post the implementation of the guidelines ($P < 0.05$) and a significant improvement in nurses knowledge about chest tube in all knowledge items

Table (3): Distribution of nurses according to their total knowledge level (n =40).

| Knowledge | Phase | | | | X^2_{mc} | P |
|---------------|---------------|------|---------------|------|------------|--------|
| | Before | | After | | | |
| | No | % | No | % | | |
| Low | 25 | 62.5 | 1 | 2.5 | 20.2 | 0.001* |
| Moderate | 14 | 35.0 | 26 | 65.0 | | |
| High | 1 | 2.5 | 13 | 32.5 | | |
| Range | 1-8 | | 4-9 | | t=3.4 | 0.001* |
| Mean \pm SD | 4.1 \pm 1.8 | | 6.8 \pm 1.1 | | | |

The table portrayed that, post implementing nursing guidelines, nurses in the study had a highly statistically significant improvement in total level of knowledge about (6.8 \pm 1.1). Also it could be seen, change in the level of knowledge of nurses included in the study from low level (62.5%) before implementation to (2.5%) after. Also, the table clarified that, among high level knowledge increased from (2.5%) before which improved to (32.5%) after implementation of the educational guidelines. There are a highly significance difference between before and after implementing the educational guidelines

Figure (2): Shows distribution of nurses according to their practice before and after implementing the guidelines.

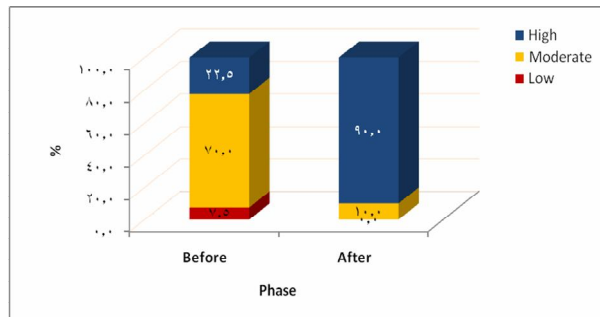


Fig.(2): clarifies that, 22.5% of the studied nurse' score were improved to 90% after implementation of the guidelines. The fair score percent before the guide was 70% decreased to be 10% after implementing the educational guidelines showing statistical significant difference

Table (4): Relations between personal characteristics and nurses' basic knowledge: (n =40).

| Socio demographic data | Baseline knowledge | | | | | | MCP |
|--------------------------------|--------------------|-------|----------|-------|------|------|-------|
| | Low | | Moderate | | High | | |
| | No | % | No | % | No | % | |
| Gender | | | | | | | |
| ▪ female | 21 | 58.3 | 14 | 38.9 | 1 | 2.8 | 0.264 |
| ▪ male | 4 | 100.0 | 0 | 0.0 | 0 | 0.0 | |
| Age | | | | | | | |
| ▪ 18- | 11 | 64.7 | 5 | 29.4 | 1 | 5.9 | 0.724 |
| ▪ 30- | 11 | 61.1 | 7 | 38.9 | 0 | 0.0 | |
| ▪ 40- | 3 | 75.0 | 1 | 25.0 | 0 | 0.0 | |
| ▪ 50-60 | 0 | 0.0 | 1 | 100.0 | 0 | 0.0 | |
| Qualification | | | | | | | |
| ▪ Diplom of Nursing | 12 | 57.1 | 8 | 38.1 | 1 | 4.8 | 0.811 |
| ▪ Diplom + specialization | 1 | 100.0 | 0 | 0.0 | 0 | 0.0 | |
| ▪ Health technician Institute | 7 | 87.5 | 1 | 12.5 | 0 | 0.0 | |
| ▪ Bachelor of Nursing | 4 | 50.0 | 4 | 50.0 | 0 | 0.0 | |
| ▪ Post Graduate | 1 | 50.0 | 1 | 50.0 | 0 | 0.0 | |
| Experience years | | | | | | | |
| ▪ <10 | 18 | 66.7 | 8 | 29.6 | 1 | 3.7 | 0.497 |
| ▪ 10-26 | 7 | 53.8 | 6 | 46.2 | 0 | 0.0 | |
| Training courses | | | | | | | |
| ▪ No | 16 | 59.3 | 11 | 40.7 | 0 | 0.0 | 0.223 |
| ▪ Yes | 9 | 69.2 | 3 | 23.1 | 1 | 7.7 | |
| No. of training courses | | | | | | | |
| ▪ 1& 2 | 8 | 88.9 | 1 | 11.1 | 0 | 0.0 | 0.058 |
| ▪ 3& 4 | 1 | 25.0 | 2 | 50.0 | 1 | 25.0 | |

MCP: P value based on Mont Carlo exact probability

This table demonstrates that there was no statistical significant relation between nurses' sex, age, qualifications, experience years, number of training courses and nurses' basic knowledge (p= 0.264, 0.724, 0.811, 0.497, 0.223, 0.058) respectively

Table (5): Relations between personal characteristics and nurses' basic practice: (n =40).

| Socio demographic data | Baseline Practice | | | | | | MCP |
|------------------------------|-------------------|------|------|-------|------|------|-------|
| | Poor | | Fair | | Good | | |
| | No | % | No | % | No | % | |
| Gender | | | | | | | |
| ▪ female | 3 | 8.3 | 24 | 66.7 | 9 | 25.0 | 0.386 |
| ▪ male | 0 | 0.0 | 4 | 100.0 | 0 | 0.0 | |
| Age | | | | | | | |
| ▪ 18- | 1 | 5.9 | 11 | 64.7 | 5 | 29.4 | 0.812 |
| ▪ 30- | 2 | 11.1 | 12 | 66.7 | 4 | 22.2 | |
| ▪ 40- | 0 | 0.0 | 4 | 100.0 | 0 | 0.0 | |
| ▪ 50-60 | 0 | 0.0 | 1 | 100.0 | 0 | 0.0 | |
| Qualification | | | | | | | |
| ▪ Diplom of Nursing | 0 | 0.0 | 16 | 76.2 | 5 | 23.8 | 0.349 |
| ▪ Diplom+ specialization | 0 | 0.0 | 1 | 100.0 | 0 | 0.0 | |
| ▪ Healthtechnician Institute | 1 | 12.5 | 6 | 75.0 | 1 | 12.5 | |
| ▪ Bachelor of Nursing | 2 | 25.0 | 3 | 37.5 | 3 | 37.5 | |
| ▪ Post Graduate | 0 | 0.0 | 2 | 100.0 | 0 | 0.0 | |
| Experience years | | | | | | | |
| ▪ <10 | 2 | 7.4 | 18 | 66.7 | 7 | 25.9 | 0.753 |
| ▪ 10-26 | 1 | 7.7 | 10 | 76.9 | 2 | 15.4 | |
| Training courses | | | | | | | |
| ▪ No | 3 | 11.1 | 18 | 66.7 | 6 | 22.2 | 0.454 |
| ▪ Yes | 0 | 0.0 | 10 | 76.9 | 3 | 23.1 | |
| How many | | | | | | | |
| ▪ 1& 2 | 0 | 0.0 | 8 | 88.9 | 1 | 11.1 | 0.125 |
| ▪ 3& 4 | 0 | 0.0 | 2 | 50.0 | 2 | 50.0 | |

MCP: P value based on Mont Carlo exact probability

This table shows that the relationship between sociodemographic data (sex, age, qualifications, experience years, training courses and its number) and

the baseline chest tube practice. It was found that there was no significant relation between nurses' sex, age, qualifications, experience years, number of training courses and the baseline chest tube practice ($p= 0.386, 0.812, 0.349, 0.753, 0.454, 0.229$) respectively

Discussion:

Chest tube insertion is the first line of treatment for variety of life threatening chest diseases and it is commonly performed throughout the world. It is safe & effective procedure associated with significant major and many minor complications⁽¹⁵⁾ Nearly all nursing management of patients with a chest tube insitu, has received little attention. Nurses are the responsible persons for managing the chest tube and drainage system after inserting a chest tube. So they should have adequate knowledge regarding the chest-tube position, observing fluid evacuation, identifying when to change or empty the drainage containers, caring for the tube and drainage system while transporting the patient⁽¹⁶⁾.

This study was carried out to asses the effect of implementing guidelines of nursing management of patients with chest tube drainage on nurses' knowledge and practice at Mansoura University Hospitals.

I- Sociodemographic characteristics of studied nurses:

The present study findings revealed that the majority of the studied nurses were females. This is in agreement with⁽¹⁷⁾ who stated

that, all the nurses of her study were females. This was in the same line with⁽¹⁸⁾ and⁽¹⁹⁾ who stated that most of their studied samples were females. This result may be due to the old belief that nursing is a private profession for female so the majority of nurses in Egypt are females.

In relation to the age almost all the studied nurses were in their second and third decade. Similarly to⁽¹³⁾ who reported that, more than three quarters of their studied nurses were aged less than 25 years. Also⁽¹⁸⁾ reported that most of the studied nurses in their study were in the age group of 20-29. This in contrast with⁽²⁰⁾ as the ages of their study nurses were between 26 – 45 years.

This may be due to the majority of nurses work power providing direct care for the patient in nursing field in our study are young females while higher age category 'senior nurses' perform administrative role.

II- The effect of the guidelines on nurses' knowledge scores:

The present study showed that, majority of the studied nurses gave incorrect answer before implementing the educational guidelines regarding knowledge about chest tube. This lack of knowledge maybe due to large

number of nurses in our study sample had diplom nursing education, and not attending training courses about chest tube nursing management.

The findings is in congruence with ⁽¹⁷⁾ who said that majority of nurses had unsatisfactory knowledge level about all aspect of care about chest tube in her study. Also⁽²¹⁾who supported these results andreported that, there was poorknowledge level affecting chest tube nursing care. This study is consistent with⁽²²⁾ who revealed that there is a worrying poor level of knowledge among nurses in their study.

There is a significant improvement at the post-guidelines phase as more than half of nurses had high knowledge level regarding improvement in nurses' knowledge about chest tube. This shows that nurses were able to learn and get correct information about chest tube management as this is a practice of their daily work.

III- The effect of the guidelines on nurses' practice scores:

This study revealed that, two thirds of the study sample had moderate score level beforeimplementing the guidelines. This result is in harmony with ⁽¹⁷⁾ who mentioned that, concerning total nurses' practice regarding management of patient with chest tube most of nurses had

unsatisfactory practice regarding (patient assessment, assessing of drainage system patency, chest tube dressing change, changing drainage bottle if broken or filled, documentation of chest tube care, health teaching, patient preparation for chest tube removal, patient assessment for signs that reveal lung expansion, chest tube removal procedure, and assessment of patient after removal).

The study showed that, there was a marked improvement in nurses' practice after implementing the educational guidelines in comparison with their practice level before implementing the guidelines and there was a statistical significant improvement as about one quarter of the studied nurses had high score which improved to majority of them after implementing the guidelines.

This may be due to the immediate effect of explaining the correct steps of chest tube nursing procedures in the educational guidelines with colored pictures illustrating each step, using data show and implementing these steps on the patient for all study group. In addition to ⁽²³⁾and⁽²⁴⁾ they allfound that structured education programme was highly effective to improve the subjects' knowledge. In agreement with our findings, ⁽²⁵⁾ who examined the effectiveness of an in service education program in

improving nurses' knowledge, practice and attitudes.

IV- Relation between personal characteristics of the studied nurses and nurses' basic knowledge

This study revealed that there is no statistical significance between all items of personal characteristics (gender, age, qualification, experience years, training courses, and no. of training courses) and nurses' basic knowledge. Similar to ⁽²⁶⁾ who reported that, nurses' age and experience had no influence on their knowledge and practice improvements.

The study found that there was no significant relation between nurses' sex, age, qualifications, experience years, training courses and its number and the baseline chest tube practice. In my point of view, all nursing staff providing care are encountered with the same circumstances such as large numbers of patients with shortage of staff, limited time, and lack of needed supplies regardless to their personal characteristics.

In this point, ⁽¹⁰⁾ who mentioned that, there is a lack of standard practice regarding chest tube nursing management. This inconsistency of treatment regimes, with the lack of evidence-based nursing care, creates a general

difference regarding the care of patients with chest tubes

Conclusion:

Based on the present study findings, it can be concluded that nursing management intervention guidelines significantly improved nurses' knowledge and practice about chest tube nursing management.

Recommendations

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

- 1) Nursing Administrators should create policies and plans for providing education to the nursingstaff.
- 2) Necessary administrative support should be provided for preparing educational materials for various nursing procedure.
- 3) Continuous training programs to nurses for updating their knowledge related to care of patient with chest tube drainage.
- 4) Evaluating nurses' knowledge and practice periodically to determine the effect of the training programs.

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