Sys Rev Pharm 2020;11(12):440-449
A multifaceted review journal in the field of pharmacy

Educational Guidelines for Nurses' Competence Level Caring for Patients with Accidental Chest Trauma during Emergency Period

Tahany El-Senousy[1], Fatma Mostafa Mahrous[2], Shimaa Nabil Abd- Al Salam[3], Hanem Ismael Zedan[4]

[1]Professor of Critical Care Nursing, Faculty of Nursing -Ain Shams University, Egypt.
[2]Assist Professor of Medical-Surgical Nursing, Faculty of Nursing -Ain Shams University, Egypt.
[3]Assist Professor of Medical-Surgical Nursing, Faculty of Nursing -Ain Shams University, Egypt.
[4]Nursing Supervisor, Tanta University Emergency Hospital, Egypt.

ABSTRACT

Background: chest trauma is a common cause of mortality, major disability, and the leading cause of death from physical trauma after head and spinal cord injury.
Aim: This study aimed to evaluate the effect of educational guidelines on nurses' competence level in caring patients with accidental chest trauma during emergency period.
Study design: A one group quasi-experimental research design, with pre and post-test was utilized in this study.
Setting: The study was conducted in the emergency department (ER) affiliated to Tanta University Emergency Hospital.
Subjects: A convenience sample of all available nurses (60) who are working in ER department, and caring patients with accidental chest trauma affiliated to Tanta University Emergency Hospital, from both sex, different age and agree to participate in the study.
Data collection tools: The study data were collected using the following two tools**:** Tool (1): Nurses' self-administered questionnaire and Tool (2): Nurses' Observational checklist.
Results: The present study revealed that there was a highly statistically significant difference between level of nurses' knowledge, practice and attitude pre, post implementation of the educational guidelines. There were significant correlation between nurses educational level and their level of practice and knowledge post implementation of the educational guidelines with (P value= 0.001 & 0.004) respectively as $P \leq 0.05$.while there were no significant correlation between nurses' attitude (pre & post) and their level of education as $P > 0.05$.
Conclusion: The implementation of the educational guidelines has a positive effect on nurses' competence level in caring of patients with accidental chest trauma during emergency period throughout the program phases. These findings support the research hypothesis.
Recommendations: Regular continuous nursing educational program at least every six months should be implemented for enhancing and updating nurses' knowledge and practice about nursing care offered to patients with accidental chest trauma during emergency period, in order to achieve high quality of care. Nursing care protocol for patients with accidental chest trauma during emergency period should be available in the ER department.

Keywords: Trauma, educational guidelines, Emergency nursing, chest trauma, Thoracic injury.

Correspondence:
Tahany El-Senousy
Professor of Critical Care Nursing, Faculty of Nursing -Ain Shams University, Egypt.

INTRODUCTION

Trauma is the leading cause of death worldwide. Approximately 2/3 of the patients have a chest trauma with varying severity from a simple rib fracture to penetrating injury of the heart or tracheobronchial disruption. Blunt chest trauma is most common with 90% incidence, of which less than 10% require surgical intervention of any kind (Ludwig & Koryllos, 2017) and (Abdel Bary, Branscheid &Beshay,2018).

Thoracic injury is a common cause of mortality and major disability, and the leading cause of death from physical trauma after head and spinal cord injury **(Huber, Biberthaler, Delhey & Trentzsch, Winter, 2014)**.

The typical management is supposed to be multidisciplinary and preferably started at the accident location and maintained during patient transport through the arrival to the emergency department, then transport to surgical theatre, and finally to the operating room and then in the ICU. Early management is the key to decrease morbidity and mortality among though group of patients (Ghoneim, Saleh, Salama & Zghloul, 2018).

Assessment of breathing and clinical examination of the thorax (respiratory movements and quality of respiration) are necessary to recognize major thoracic injuries such as tension pneumothorax, open pneumothorax, flail chest, pulmonary contusion and massive hemothorax. Inspection, palpation, percussion and especially auscultation will provide information if a tension pneumothorax is present or not (Ghoneim et al., 2018).

The nurse must realize that the first priority in trauma care is to maintain and support the respiratory system. The nurse must be able to rapidly and effectively perform a primary survey, recognize the clinical manifestations of life-threatening thoracic injuries, and intervene in patient care to help stabilize and maintain the patient's respiratory function. The nurse must not only be able to asses, but must also be able to intervene technically, rapidly and effectively (Ursic & Curtis , 2010)

Regarding complications, and mortality rate they were dramatically increase in patients with thoracic trauma (up to 30%). As the lung represents a target organ for secondary damage by posttraumatic inflammation, lung injury contributes to the development of multiple organ

failure (MOF) and therefore represents a major cause of late deaths (24%) after severe trauma (Horst, Andruszkow, Weber, Pishnamaz, Herren& Zhi, 2017).

Significant of study

In **2015**, Egypt's road accidents recorded 14,548 condition resulting in 6,203 deaths, 19,325 injured and 19,116 damaged vehicles, according to a latest report in 2016 by the Central Agency for Public Mobilization and Statistics (CAPMAS) (Magdi , 2017).

Thoracic injuries account for 20-25% of deaths due to trauma. Penetrating thoracic trauma accounts for almost 33% of the total chest trauma. Thoracic trauma associated with blunt or penetrating injury are a major cause of hospitalization in the world and are associated with a mortality rate ranging from 15 to 77% (Alassal, Elrakhawy, Saffan, Fawzy& Rizk, 2017).

Regarding the educational practice guidelines content for nurses working in the emergency department, it should include: knowledge, skills and competencies to maintain a quality emergency management of unstable and / or undiagnosed patients within an environment of constant movement, competing pressures, change pace and approach in order to accommodate the specific physical and psychosocial dynamics of each patient presentation. Also, to identify the professional strengths, weaknesses, knowledge and skill deficits to support the development of learning objectives and professional goals (Chu & Hsu ,2011).

Aim of the Study

This study aimed to evaluate the effect of educational guidelines on nurses' competence level in caring patients with accidental chest trauma during emergency period through:

1. Assessing nurses' competence level in caring of patients with accidental chest trauma during emergency period.
2. Developing and implementing educational guidelines for nurses who caring patients with accidental chest trauma during emergency period based on need assessment.
3. Evaluating the effect of educational guidelines on nurses' competence level in caring of patients with accidental chest trauma during emergency period.

Research hypothesis

The study hypothesized that

The educational guidelines would have a positive effect on nurses' competence level in caring of patients with accidental chest trauma during emergency period.

SUBJECTS AND METHODS

I- Technical design

The technical design included the setting, subjects and tools used in this study for data collection.

Research design

A quasi-experimental research design on one group with pre and post-test was utilized in this study.

Setting:

The study was conducted in the emergency department affiliated to Tanta University Emergency Hospital.The hospital consisted of six floors as following: the first floor including triage and resuscitation, radiology, blood bank, laboratory, pharmacy and infusions therapy unit which had 20 beds. The second floor including four operating rooms and 4 recovery wards which consisted of 40 beds divided into four wards, two for males and two for females in addition to 2 orthopaedic emergencies words one for males and the other for females which had 40 beds, 20 beds per each. The third floor belonged to internal medicine emergencies and toxicology including 2 wards for males and females separately with 40 beds. The fourth floor including the burn care unit which had 20 beds for females ward and another 20 beds for males' victims. The fifth floor including surgical intensive care unit with 15 beds accompanied with ventilator and post-surgical ward care which had 50 beds divided between males and females' wards in addition to isolation room. The sixth flour included 3 operating rooms regrinding neuro-emergencies surgery and post neurosurgical ward in which had 50 beds in addition to trauma intensive care unit consisted of 20 beds

Subjects

A convenience sample of all available nurses (60) who were working in ER department , and caring patients with accidental chest trauma affiliated to Tanta University Emergency Hospital, from both sex, different age and agree to participate in the study.

Tools for data collection

The study data were collected using the following two tools:

Tool (1): Nurses' self-administered questionnaire

It was developed by the researcher in Arabic language and was filled by the nurses. It included the following two parts:

Part I

Demographic characteristics: this part used to assess nurses' demographic characteristics such as age, gender, educational Level, years of experiences, training courses.

Part II

Nurses' knowledge questionnaire: It was used to assess nurses' knowledge and attitude level in caring of patients with accidental chest trauma during emergency period. It was developed after reviewing the related literatures (Angus Webb, 2016, Mosby, 2012, Diehl, 2012, & Brunner& Suddarth's, 2010 and ATLS 9th edition). It involved knowledge questions about (types, manifestations, nursing care and complications of chest trauma,etc.). It involved six sub-groups containing 60 multiple choice questions (MCQ) as the following: knowledge about anatomy of chest cavity (5 questions), knowledge about mechanism of injury (4 questions), knowledge about primary assessment (15 questions), knowledge about the secondary assessment (5 questions), knowledge about nursing care of specific chest trauma during emergency period (25 questions) and nurses' attitude regarding chest trauma care (6 questions).

Scoring system

In relation to the scoring system of nurses' knowledge assessment questionnaire, every question was given one score for the right answer or agree and zero for the wrong answer or disagree. The total scores for nurses' knowledge were calculated for every subgroup then for the total questionnaire then categorized into satisfactory or unsatisfactory level as the following:

- ≥ 85%was considered satisfactory level.
- < 85% was considered unsatisfactory level.
- The attitude questions were scored as positive or negative.

Tool (2): Nurses' Observational checklist:

It was used to assess nurses' practice level in caring patients with accidental chest trauma during emergency period by direct observation approach. This tool was adopted from (The National Association of Emergency Medical Technicians **NAMET, 2014).** It contains 113 skills identified by subscales as the following:

A. Items related to patient assessment

1. Nurses Primary assessment of trauma victim (31 items).
2. Nurses Secondary assessment (47 items).

B. Items related to management of patients with chest trauma:

1. Nurses' evaluation of patient with chest trauma (11 items).
2. Nurses' performance related to occlusive dressing for open pneumothorax (9 items).
3. Nurses' performance related to needle decompression for tension pneumothorax (15 items).

Scoring system

A total score of the checklist was 113 marks. It was distributed as the following; one point for each item done correctly while zero point was given to not done or done incorrectly and the total level of nurses 'psychomotor skills were categorized as unsatisfactory (<85%), and satisfactory (≥85%).

II. Operational Design

The operational design consists of the preparatory phase, validity and reliability, pilot study and field work.

Preparatory phase

It involved reviewing the recent related literatures and theoretical knowledge of various aspects of the study using books, articles, periodicals and magazines to develop the first tool for data collection and carry out the necessary modifications for the second tools.

Validity and reliability

Validity of the developed tools was tested through face and content validity. Validity was tested through a jury of seven experts, five of them from the medical surgical nursing department (critical care nursing), Faculty of Nursing Ain Shams University (one professor and four assistant professors). The other two members were assistant professors of emergency medicine and cardiothoracic surgery, at the Faculty of Medicine, Tanta University, working at Tanta University Emergency Hospital. The experts reviewed the tools for clarity, relevancy, comprehensiveness and simplicity; minor modifications were done. The questionnaire and checklists reliability were confirmed by *Cronbach's alpha* coefficient (alpha = 0.88 for nurses' knowledge questionnaire & alpha = 0.85 for observation checklist.

Ethical considerations

The ethical considerations in the study include the following

1. The research approval was obtained from the ethical committee in the Faculty of Nursing Ain Shams University before starting the study.
2. The researcher clarified the objective and aim of the study to the nurses included in the study before obtaining their consents to conduct the current study.
3. The researcher assured anonymity of nurses and confidentiality of subjects' data.
4. Nurses were informed that they are allowed to choose to participate or not in the study, and that they have the right to withdraw from the study at any time.

Pilot study

A pilot study was conducted on 6 nurses (10% of the study sample) to test applicability of the study and to test clarity of the designed questionnaires, as well as to estimate the time needed to answer the tool. Nurses who were included in the pilot study were excluded from the study sample and replaced by other 6 nurses were deputed newly from Bassun Central Hospital to Emergency department affiliated to Tanta University Emergency Hospital.

Field work

The field work included four phases: Assessment phase, planning phase, implementation phase and the evaluation phases.

A. Assessment phase

1. This phase started preoperatively by interviewing the nurses working in the emergency department and explaining the aim and nature of the study as well as obtaining their approval to participate in the study prior to data collection.
2. The nurses' knowledge assessment questionnaire was filled in by the nurses. The tool had taken about 30-45 minutes to be filled in for every nurse. The researcher met about 4-5 nurses per day, Saturday, Monday and Wednesday in critical care unit affiliated to the emergency department from 8.00 am to 2.00 pm every day per week and sometimes from 2.00 pm -8.00 pm every Sunday, Tuesday and Thursday in the emergency and CPR room according to the nurses' roster.
3. Then, each nurse was observed directly during caring the trauma victim especially who had chest trauma as a result of care accident or falling since transporting by the ambulance to ED until transporting to the operating room or other department. The period of this phase was lasted for 3 weeks starting from the first of May to 22, 2019.
4. The questioner form was collected from nurses and corrected manually.

B. Planning phase

1. All data collected regarding nurses' knowledge and practice concerning caring patients with accidental chest trauma during emergency period were analyzed to identify nurses' needs.
2. Based on nurses' needs and the recent related literatures, an illustrated Arabic-language booklet was developed covering knowledge and practice about priorities of trauma management and nursing care of patients with accidental chest trauma during emergency period

C. Implementation phase

1. The educational sessions were carried out in a hall at the emergency department for theoretical and practical sessions for 3 days during morning and afternoon shifts for every 6 nurses as individual or group according to their load of work.
2. The implementation of the educational guidelines lasted over a period of two months for all nurses starting from May 2019 to the end of July 2019.
3. Every educational session started by explaining the objective of the session then providing nurses with the knowledge related to the proposed topic. It had taken about 1 hour to be completed.
4. The researcher demonstrated the psychomotor skills regarding primary assessment, secondary assessment, airway managements, preparing an occlusive dressing and needle decompression using real manikin, materials videos and posters. The nurses re-demonstrated each procedure one by one.

5. Nurses were allowed to ask questions in case of misunderstanding while listening and expressing interest.
6. At the end of these sessions, the researcher emphasized the importance of the continuing training courses.

D. Evaluation phases

1. Immediately after implementation of the educational guidelines, each nurse was reassessed using the same tools used in the pre assessment including: nurses' knowledge assessment questionnaire and observational checklist.
2. Evaluating the effectiveness of the educational guidelines on nurses' competence level in caring patients with accidental chest trauma during emergency period was tested by comparing the results of the data collected pre and post the implantation of the educational guidelines.

III. Administrative Design

An official letter was issued from the dean of the Faculty of Nursing, Ain Shams University, to the director of Tanta University Emergency Hospital, Tanta University, explaining the purpose of the study to obtain the permission to conduct this study.

IV. Statistical design

The data were collected, coded and entered into a suitable excel sheet. Data were analyzed using the SPSS, as follows: Numerical data were presented as mean and standard deviation (SD) values. Qualitative data were presented as frequencies (n) and percentages (%). Cochran's Q test was used to compare between correct responses, satisfactory levels pre and post implementation of the educational guidelines. Chi-square test when applicable was used for comparisons regarding qualitative data. No significance at $P > 0.05$, significant at $P \leq 0.05$, highly significant at $P < 0.001$.

Limitations of the study

Work load of nurses was an obstacle as the researcher was waiting for a long time to start the session with participants, also this caused some participants to be tired to listen and has low concentration and need continuous repetition, which required a lot of time and effort. Interruptions during conducting sessions by other staff members or duty call if an accident arrived emergency department.

RESULTS

Table 1: Number and percentage distribution of nurses according to their demographic characteristics (n=60).

Items		N	%
Gender	Male	10	16.7
	Female	50	83.3
Educational level	Secondary	7	11.7
	Technical	20	33.3
	Bachelor	32	53.3
	Postgraduate	1	1.7
Years of Experience	1 – < 5	36	60
	5 – < 10	7	11.7
	≥ 10	17	28.3
Training courses	Yes	27	45
	No	33	55
Protocols of trauma care	Yes	41	68.3
	No	19	31.7

Table (1) showed that, more than tow third (83.3%) of the nurses were females. Concerning the educational level, more than half of the nurses (53.3%) were holding bachelor's degree. Regarding the years of experiences, more than one half of them (60 %) were between one and less than five years. As well, more than half of the nurses did not have any training course. Regarding the presence of protocols related to emergency trauma care, most nurses (68.3 %) agreed about that.

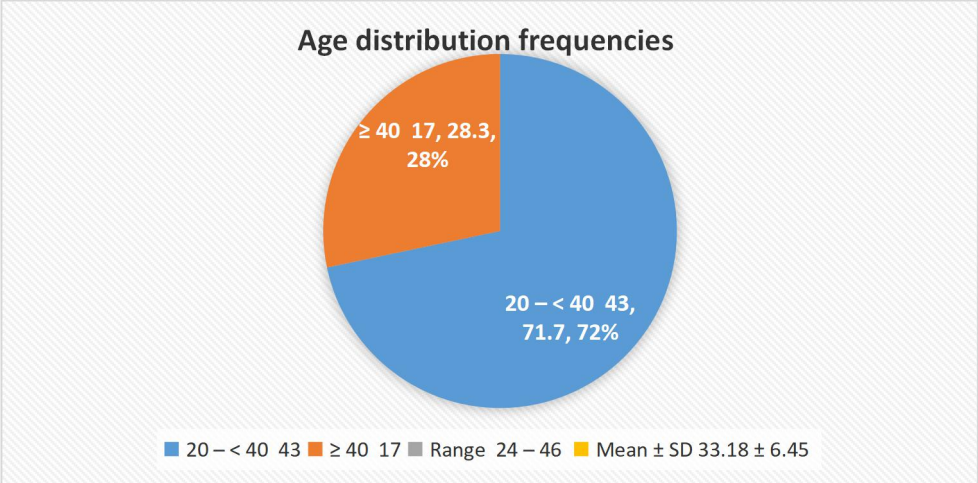

Figure 1: Number and percentage distribution of nurses' Age group (n=60).

Figure (1) showed that, the percentage of nurses' age from 20 to less than 40 years old was 71.7 % while 28.3 % were more than or equal to 40 years old. In addition to, the mean age of nurses of the current study was 33.18 ± 6.45.

Table 2: Distribution of Nurses' knowledge regarding nursing care of patient with chest trauma during emergency period pre and post implementation of the educational guidelines (N=60)

Knowledge items	Pre				Post				X^2	P value
	Satisfied ≥85%		Unsatisfied <85%		Satisfied ≥85%		Unsatisfied <85%			
	N	%	N	%	N	%	N	%		
Anatomy of chest cavity	23	38.3	37	61.7	55	91.7	5	8.3	37.509	0.001*
Mechanism of injury	12	20	48	80	40	66.7	20	33.3	26.606	0.001*
Primary survey	5	8.3	55	91.7	46	76.7	14	23.3	57.323	0.001*
Secondary survey	9	15	51	85	47	78.3	12	21.7	48.348	0.001*
Nursing care of patient with chest trauma	8	13.3	52	86.7	44	73.3	16	26.7	43.982	0.001*

No significance at P> 0.05, Significant at P≤ 0.05*, highly significant at P< 0.001**

Table 2. Revealed that, there are highly statistically significant differences between nurses' knowledge pre and post implementation of the educational guidelines, concerning knowledge regarding anatomy of chest cavity, mechanism of injury, primary survey, secondary survey and nursing care of patient with chest trauma (P value ≤ 0.001).

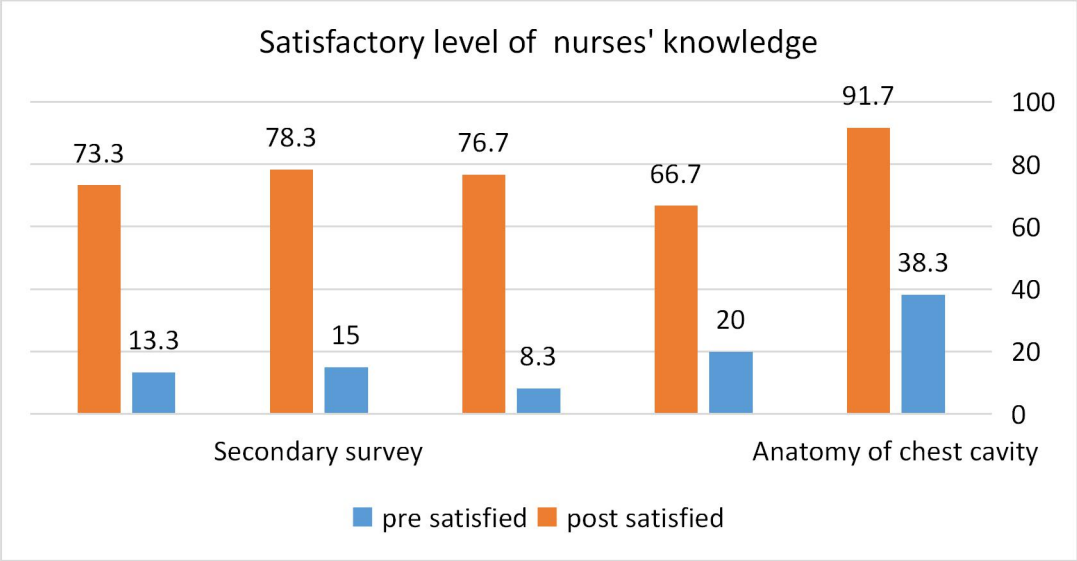

Figure 2: Nurses' satisfactory level of knowledge regarding nursing care of patient with chest trauma during emergency period pre and post implementation of the educational guidelines (N=60).

Also, the figure presented that there were statistically differences among all items of knowledge regarding pre and post implementation of the educational guidelines especially regarding anatomy of the chest (91. 7 %).

Table 3: Nurses' performance regarding nursing care of patient with chest trauma during emergency period pre and post implementation of the educational guidelines (N=60)

Variables Items of Practice	Pre				Post				X^2	P value
	Satisfied ≥85%		Unsatisfied <85%		Satisfied ≥85%		Unsatisfied < 85%			
	N	%	N	%	N	%	N	%		
Primary assessment	14	23.3	46	76.7	50	83.3	10	16.7	43.393	0.001*
Secondary assessment	0	0	60	100	46	76.7	14	23.3	74.595	0.001*
Evaluation of Patient with chest trauma	11	18.3	49	81.7	50	83.3	10	16.7	50.714	0.001*
Occlusive dressing	17	28.3	43	71.7	48	80	12	20	32.257	0.001*
Needle	18	30	42	70	52	86.7	8	13.3	39.634	0.001*

decompression										

No significance at P> 0.05, Significant at P≤ 0.05*, highly significant at P< 0.001**

Table (3) revealed that there were highly statistically significant differences between nurses' practice pre and post the educational guidelines, concerning primary survey, secondary survey, patient evaluation with chest trauma, occlusive dressing, and needle decompression with (P value ≤ 0.001). Regarding needle decompression, the nurses' competence level of practice become satisfied among (86.7 %) of the nurse's post implementation of the educational guidelines.

Table 4: Nurses' attitude related to **nursing care of patient with chest trauma** Pre and post implementation of the educational guidelines **(N=60)**

Attitude items	Pre				Post				X^2	P value
	Positive (agree)		Negative (disagree)		Positive (agree)		Negative (disagree)			
	N	%	N	%	N	%	N	%		
What is your opinion regarding the emergency transport report of victim regarding chest trauma, do you consider it a medicolegal document?	33	55	27	45	58	96.7	2	3.3	28.420	0.001*
Do you believe all people in the community should have at least basic knowledge and skills in rescue and prehospital care?	20	33.3	40	66.7	55	91.7	5	8.3	43.556	0.001*
Do you believe that each person who works in accident and emergency services, should be provided with comprehensive, specialized training to act in emergencies situation competently	29	48.3	31	51.7	51	85	9	15	18.150	0.001*
To save a life in an emergency, nurses must do very costly and complicated procedures	23	38.3	37	61.7	48	80	12	20	21.558	0.001*
Despite of providing emergency care to a victim in a proper way, in a life-threatening condition, nurses can't minimize the mortality rate happening due to delay ingoing to hospital.	34	56.7	26	43.3	52	86.7	8	13.3	13.297	0.001*
During providing emergency care for patients with chest injuries, using	16	26.7	44	73.3	47	78.3	13	21.7	32.114	0.001*

triage system affect the prognosis of the victim's condition.										

No significance at P> 0.05, Significant at P≤ 0.05*, highly significant at P< 0.001**

Table 4. Showed that, there were highly statistically significant differences among all items of nurses' attitude regarding nursing care of patients with chest trauma pre and post implementation of the educational guidelines, especially during the emergency transport report of a victim and the community should have at least basic knowledge and skills about trauma care pre hospital care (96.7, 91. 7 %) respectively.

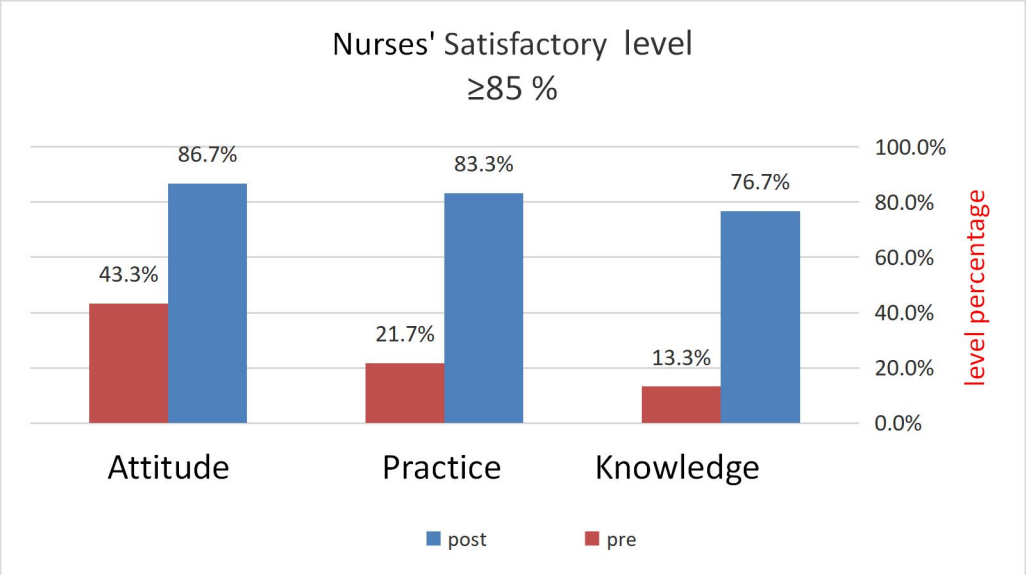

Figure 3: Satisfactory level of nurses' knowledge, practice and attitude regarding nursing care of patient with chest trauma during emergency period pre and post implementation of the educational guidelines (N=60). The figure illustrated that nurses had a satisfactory level of knowledge, practice and attitude (76.7 %, 83.3 % & 86.7 %) respectively, regarding nursing care of patient with chest trauma during emergency period post implementation of the educational guidelines.

DISCUSSION

The present study revealed that more than three quarters of the study sample were females nurses .the finding was in agreement with Hassan (2016) who reported that , the majority of the nurses who conducted a study titled " Effect of an Educational program for nurse's working at Mansoura University Hospitals on Chest Tube Complications' were females. The researcher suggested that, this result may be due to the fact that the study of Bachelor Sciences in Nursing (BSN) in the Egyptian Universities was exclusive for females only till few years ago, so the profession of nursing in Egypt was mostly feminine.

Regarding the level of education, the present study revealed that more than half of nurses had bachelor's degree. These results might be due to that the Faculty of Nursing at Tanta University started 1982, so the number of graduates up-till now is enough to be assigned in the critical care units as emergency and trauma units. This result was nearly in agreement with Shaker, (2018) who stated that (49.3%) of his study sample of nurses had bachelor's degree in nursing. This was in his study titled "Knowledge, attitude, and clinical skill of emergency medical technicians from Tehran emergency center in trauma exposure". While Ghaniyoun, (2017) stated that more than half of his study sample had technical degree, in his study conducted under the titled "The Association of Psychological Empowerment and Job Burnout in Operational Staff of Tehran Emergency Center"

Concerning years of experiences, the present study showed that, more than half nurses included in the study, their years of experience were between one and less than five years. This result was supported by WANG et al., (2019) who conducted a study under the titled " Nurses' knowledge, attitudes and practices related to physical restraint: a cross-sectional study" in Hubei Province, China, in which (47.1 %) of the study sample their years of experience were from 1-5 years. In contrast Chege et al., (2018) conducted a study titled "Evaluation of the Nursing Management for Patients on Underwater Chest Drainage at Kenyatta National Hospital" in Nairobi, Kenya, showed that more than quarter of this study sample their years of experience were from 1-5 years.

Regarding training courses of trauma care, the present study found that more than half of nurses didn't have training courses. Mohamed& Elhanafy (2019) agreed with this results as the majority of their study subjects from ICU nurses' didn't received any specific course about mechanical ventilation in the study titled "The Effect of A Structured Training Program on Intensive Care Nurses Performance" in Khartoum, Sudan. This result might be due to continuous shifting of nurses and overload roster. So, they were not had the opportunities to attend continuous training courses during working hours.

Regarding the trauma care protocol, the present study revealed that more than two thirds of the nurses confirmed the presence of the algorism of primary, secondary assessment and management of trauma patient. In contrast, Pulhorn, (2016) reported that more than half of his study subjects did not use any trauma care protocol in his study titled "The management of minor head trauma (GCS 15-13) across a Trauma

Network "in Liverpool, UK .This result in our study might be due to the separation between the emergency and trauma department from the anesthesia department since 6 years ago in the faculty of medicine which affiliated to Tanta university. So, the emergency and traumatology department declared the main role of emergency and trauma department through explaining specific algorism regarding trauma patient.

In relation to the age, the present study showed that most of the studied nurses were in their second and third decade. This result was supported by Sharifi (2019) who conducted a study titled " Effect of an education program, risk assessment checklist and prevention protocol on violence against emergency department nurses: a single center before and after study" in Kurdistan that the mean age of the participants was 30.1 ± 4.5 years. This may be due to the majority of the working power who provide direct care for the patient in nursing field in the current study were young nurses while higher age category 'senior nurses' perform administrative role only.

Regarding the nurses' level of knowledge, the present study revealed that more than three quarters of nurses including in the study had a satisfactory level regarding the items related to the primary survey, secondary survey and nursing care of chest trauma. While almost all the nurses had a satisfactory level regarding anatomy of the chest cavity post implementation of the guidelines with significant differences between pre and post implementation of the educational guidelines about chest trauma nursing care during the emergency period. Ahayalimudin & Osman, (2016) agreed with the study finding when they reported that, more than 80% of the study subjects had a satisfactory level of knowledge post the implementation of a disaster management program in their study titled "Disaster management: Emergency nursing and medical personnel's knowledge, attitude and practices of the East Coast region hospitals of Malaysia". Also Cannona, (2020) supported the current results when he stated that, The content of the guidelines improve nursing students' knowledge and skills about Trauma Informed care(TIC) which provided in his study titled " Trauma-informed education: Creating and pilot testing a nursing curriculum on trauma-informed care " in Michigan, USA. On the other hand of this results, Jordi, (2015) reported that 63.8% of nurses respond correctly regarding triage post training scenarios in his study titled " Nurses' accuracy and self-perceived ability using the Emergency Severity Index triage tool: a cross-sectional study in four Swiss hospitals" in Basel, Switzerland.

Concerning nurses' attitude and believe related to nursing care of a victim with chest trauma, the study finding showed positive attitude with a highly statistically significant differences among all items of nurses' attitude regarding nursing care of victim with chest trauma pre and post the implementation of the educational guidelines especially regarding the victim emergency transport report and also regarding the issue that the community should have at least the basic knowledge and skills about trauma care pre hospital care. Hulla, (2019), supported that finding when he stated that the majority of participant had positive attitude post intervention of the workshop's orientation.

On the other side, Shaver (2018) disagreed with the relevant results who revealed that the mean pre survey of the nurses' scores were slightly higher (91.3± 7.0) than the post survey score (89.8 ± 5.3%) with no significant difference between the participant's attitude after the guidelines course implementation in his study titled " Trauma and Intensive Care Nursing Knowledge and Attitude of Foley Catheter Insertion and Maintenance" in Hollywood, Florida, USA .

In comparing of all items of nurses' practice level, the current study finding presented that, there were highly statistically significant differences between nurses' practice pre and post implementation of the educational guidelines. Concerning the primary and secondary survey, that related to patient with chest trauma assessment, occlusive dressing, and needle decompression. Regarding needle decompression, most of the nurses had competence level of practice due to the implementation of the educational guidelines. In congruent with these finding , Sepahvand, (2019) in her study when she compared between nurses' performance items as regarded to primary assessment, orthopedic assessment and pain Management; she found that the triage nurses' performance was poor in the pre-intervention group in terms of primary and orthopedic assessments, but nurses performance improved in the post-intervention group. In addition, the nurses' performance related to pain management improved significantly in the post intervention group compared with the pre intervention group.

As regard to nurses' satisfactory level related to knowledge and practice in caring of patients with accidental chest trauma during emergency period, it was found that more than three quarters of the nurses had satisfactory level of knowledge and the majority of them **get satisfactory level** in practice post implementation of the educational guidelines with highly significant difference between the pre and post result. Mitchell,(2017) supported these results when she stated that , for role adequacy and role Support, nurses level of knowledge and practice was improved in the both levels from pre-training to post-training, in her study titled " Educating Emergency Department Registered Nurses (EDRNs) in Screening, Brief Intervention, and Referral to Treatment (SBIRT): Changes in attitudes and knowledge over time" in, Pittsburgh, United States. Also, Naidoo, (2017) reported in his study that, participants showed significant improvement in knowledge, skills and the objective measures the post the implementation stage of the intervention.

(Qalawa, 2020, Ahmadi, 2019, Sepahvand, 2019, Sharifi, 2019, Mohamed & Elhanafy 2019& Tuzer, 2016) all were in the same line of agreement with the finding of this study. Finally, the guidelines offered the nurses the opportunity to increase their knowledge and maintain competency in caring of patients with accidental chest trauma during emergency period and enables them to provide safe care when they are required to care for a patient with accidental chest trauma. The competency might be maintained easily when routine work is performed, and nurses' experience is high. Nurses' training and educational needs could not be discovered easily if there were not encounters very often. Educational guidelines can increase those encounters, so the nurse allows ready to be competent when the need arises.

CONCLUSION

The conclusion, of the present study results revealed that, the educational guidelines had a positive effect on nurses' competence level in caring of patients with accidental chest trauma during emergency period throughout the

program phases. Based on this finding, the research hypothesis was fulfilled. In addition to, there was no significant correlation between nurses' knowledge, practice, attitude, and their gender, age, and years of experiences pre and post implementation of the educational guidelines .While the study finding reveal that there was significant correlation between nurses' educational level and their satisfactory level of knowledge post implementation of the educational guidelines.

RECOMMENDATION

- A protocol related to nursing care of patients with accidental chest trauma during emergency period should be available in the emergency units and should be updated and revise periodically .
- Nurses' knowledge and practice about nursing care of patients with accidental chest trauma during emergency period should be updated periodically through:
  - Encouraging nurses to attend regularly national and international congresses, seminars, symposium and workshops about nursing care of patients with accidental chest trauma during emergency period.
  - Plan periodically a continuous educational program about nursing care that should be offered to patients with accidental chest trauma during emergency period to nurses working in emergency department prior to work as an orientation program for the newly employed nurses and at least every six months for enhancing nurses' knowledge and practice to achieve high quality of care.
  - Encourage nurses caring patients with accidental chest trauma during emergency period to attend regular formal in-service educational programs about chest trauma, triage system, and any other related topics to be able to provide comprehensive care for such group of patients.
  - Emergency and critical Nurses involved in patient care should have a valid trauma care certificate like BLS, ACLS & PHTLS and renew it regularly at least every two years.

Recommendations for researchers

- Studying the impact of educational programs on chest trauma care continuously using a wide probability sample in different areas to monitor improvement in nurses' performance and identify points of weakness for developing more educational program to nurses dealing with patients with accidental chest trauma during emergency period to improve nurse's competence level.

REFERENCES

1. Abdel Bary M, Branscheid D, Mertzlufft F& Beshay M, (2018): Long term management of thoracic trauma in a high frequency trauma center; what have we learned?, Journal of the Egyptian Society of Cardio-Thoracic Surgery, Volume 26, Issue 1, Pages 73-81, https://doi.org/10.1016/j.jescts.2017.12.004, accessed on 9/6/2018 at 8:39 am
2. Ahayalimudin, N., & Osman, N. N. S. (2016): Disaster management: Emergency nursing and medical personnel's knowledge, attitude and practices of the East Coast region hospitals of Malaysia. Australasian Emergency Nursing Journal, 19(4), 203–209. doi: 10.1016/j.aenj.2016.08.001, accessed on 13/1/2020 at 20:16 pm.
3. Ahmadi, M., Bagheri-Saweh, M. I., Nouri, B., Mohamadamini, O., & Valiee, S. (2019): Effect of Interventional Educational Programs on Intensive Care Nurses' Perception, Knowledge, Attitude, and Practice About Physical Restraints. Critical Care Nursing Quarterly, 42(1), 106–116. doi:10.1097/cnq.0000000000000244, accessed on 17/1/2020 at 13 :02 pm.
4. Alassal M, Elrakhawy H, Saffan M, Fawzy E, Rizk M, Elgazzar M, Mofreh B, Ghoniem A,(2017): Chest Trauma: A Tertiary Center Experience, SciFed Journal of Surgery Chest Trauma: Available from:https://www.researchgate.net/publication/321211291_SciFed_Journal_of_Surgery_Chest_Trauma_A_Tertiary_Center_Experience ,accessed on 28/5/2018 at 19:57 pm
5. Cannon, L. M., Coolidge, E. M., LeGierse, J., Moskowitz, Y., Buckley, C., Chapin, E., … Kuzma, E. K. (2020). Trauma-informed education: Creating and pilot testing a nursing curriculum on trauma-informed care. Nurse Education Today, 85, 104256. doi: 10.1016/j.nedt.2019.104256, accessed on 13/1/2020 at 21:03 pm.
6. Chege, A., Mwaura, J., & Kirui, A. (2018). Evaluation of the Nursing Management for Patients on Underwater Chest Drainage at Kenyatta National Hospital. Open Journal of Obstetrics and Gynecology, 8, 1222-1235, 10.4236/ojog.2018.812124, accessed on 17/1/2020 at 12 :33 pm.
7. Chu W & Hsu L. (2011): Developing Practical Knowledge Content of Emergency Nursing Professionals. Journal of Nursing Research, 19(2), 112-118, doi: 10.1097/JNR.0b013e31821aa0eb.At https://www.ncbi.nlm.nih.gov/pubmed/21586988 PubMed , accessed on 3/7/2018 at 22:30 pm.
8. Ghaniyoun A, Shakeri K, Heidari M (2017): The association of psychological empowerment and job burnout in operational staff of Tehran emergency center. Indian J Crit Care Med 2017;21:563-7, 10.4103/ijccm.IJCCM-56-17. 28/5/2018 at 18:15 pm.
9. Ghoneim AT, Saleh GE, Salama RS& Zghloul MK, (2018): Management of chest trauma. Benha Med J 2018; 35:1-4, DOI: 10.4103/bmfj.bmfj_82_16 accessed on 28/5/2018 at 18:13 pm.
10. Hassanin A.A& Mohammed H.A(2016): Effect of an Educational program for nurse's working at Mansoura University Hospitals on Chest Tube Complications, e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 5, Issue 5 Ver. VIII (Sep. - Oct. 2016), PP 34-42, DOI: 10.9790/1959-0505083442 , accessed on 18/ 7/2019 at 00.21 Am.
11. Horst K, Andruszkow H, Weber CD, Pishnamaz M, Herren C& Zhi Q, (2017): Thoracic trauma now and then: A 10-year experience from 16,773 severely injured patients. PLoS ONE 12(10): e0186712. https://doi.org/10.1371/journal.pone.0186712 https://sjtrem.biomedcentral.com/articles/10.1186/s13049-014-0052-4 accessed on 28/5/2018 at 16:15 pm.
12. Huber S, Biberthaler P, Delhey P, Trentzsch H, Winter H, Griensven MV& Lefering R, (2014): Predictors of poor outcomes after significant chest trauma in multiply injured patients: a retrospective analysis

from the German Trauma Registry Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, at https://doi.org/10.1186/s13049-014-0052-4

13. Hulla S , McLieshb P & Salamon Y(2019): Does an orthopaedic workshop improve the confidence of nurses transitioning into the specialty of orthopaedics?, International Journal of Orthopaedic and Trauma Nursing Volume 35, November 2019, 100700, https://doi.org/10.1016/j.ijotn.2019.04.003,accessed on 1/1/2020 at 11:38 am.
14. Jordi, K., Grossmann, F., Gaddis, G. M., Cignacco, E., Denhaerynck, K., Schwendimann, R., & Nickel, C. H. (2015): Nurses' accuracy and self-perceived ability using the Emergency Severity Index triage tool: a cross-sectional study in four Swiss hospitals. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 23(1). doi:10.1186/s13049-015-0142-y , accessed on 13/1/2020 at 20:54 pm.
15. Ludwig C& Koryllos A, (2017): Management of chest trauma, J Thorac Dis. 2017 Apr;9(Suppl 3):S172-S177. doi: 10.21037/jtd.2017.03.52. at https://www.ncbi.nlm.nih.gov/pubmed/28446982, accessed on 28/5/2018 at 16:20 pm.
16. Magdi M. (2017): Trauma care in Egypt: how to efficiently meet patients' needs? available at https://www.egypttoday. com/ Article/ 1/12484/Trauma-care-in-Egypt-how-to-efficiently-meet-patients-needs, at 19:39 pm on 28/ 5/ 2018.
17. Mitchell, A. M., Kane, I., Lindsay, D. L., Hagle, H., Puskar, K., Aiello, J& Knapp, E. (2017): Educating Emergency Department Registered Nurses (EDRNs) in screening, brief intervention, and referral to treatment (SBIRT): Changes in attitudes and knowledge over time. International Emergency Nursing, 33, 32–36. doi: 10.1016/j.ienj.2016.12.003, accessed on 17/1/2020 at 12 :37 pm.
18. Mohamed I. & Elhanafy E, (2019): The Effect of A Structured Training Program on Intensive Care Nurses Performance, Journal of Health, Medicine and Nursing www.iiste.org ISSN 2422-8419 An International Peer-reviewed Journal DOI: 10.7176/JHMN Vol.60, 2019, accessed on 1/1/2020 on 9:42 AM.
19. Naidoo M. (2017): An evaluation of the emergency care training workshops in the province of KwaZulu-Natal, South Africa. Afr J Prm Health Care Fam Med. 2017;9(1), a1283. https://doi.org/10.4102/ phcfm. v9i1.1283, accessed on 14/1/2020 at 21:02 pm.
20. Pulhorn H., Westmoreland L., & McMahon C,(2016): The management of minor head trauma (GCS 15-13) across a Trauma Network, BRITISH JOURNAL OF NEUROSURGERY, 2016 VOL. 30, NO. 5, 536–540 http://dx.doi.org/10.1080/02688697.2016.1211249 ,accessed on 30/12/2019 at 13:23 pm.
21. Qalawa, S. A., Sobeh, D. E., & Elkader, H. M. A. (2020): Effectiveness of Applying Simulation Based Learning on Nurses' Performance and Self-Efficacy Regarding Advanced Basic Life Support. American Journal of Nursing, 8(1), 1-8., DOI:10.12691/ajnr-8-1-1, accessed on 14/1/2020 at 13:50 pm.
22. Sepahvand, M., Gholami, M., Hosseinabadi, R., & Beiranvand, A. (2019): The Use of a Nurse-Initiated Pain Protocol in the Emergency Department for Patients with Musculoskeletal Injury: A Pre-Post Intervention Study. Pain Management Nursing. doi: 10.1016/j.pmn.2019.02.012, 1/1/2020 at 22:06 pm
23. Shakeri K, Fallahi-Khoshknab M, Khankeh H, Hosseini M& Heidari M. (2018): Knowledge, attitude, and clinical skill of emergency medical technicians from Tehran emergency center in trauma exposure. Int J Crit Illn Inj Sci; 8:188-93. Available from: http://www.ijciis.org/text.asp?2018/8/4/188/247783,Accessed on 11/10/2019 at 17.03 pm.
24. Sharifi, S., Shahoei, R., Nouri, B., Almvik, R.,& Valiee, S (2019): Effect of an education program, risk assessment checklist and prevention protocol on violence against emergency department nurses: a single center before and after study, International Emergency Nursing (2019), doi: https://doi.org/10.1016/j.ienj.2019.100813, accessed on 31/12/2019 at 20:59 pm.
25. Shaver, B., Eyerly-Webb, S. A., Gibney, Z., Silverman, L., Pineda, C., & Solomon, R. J. (2018): Trauma and Intensive Care Nursing Knowledge and Attitude of Foley Catheter Insertion and Maintenance. Journal of Trauma Nursing, 25(1), 66–72. doi:10.1097/jtn.0000000000000344, accessed on 17/1/2020 at 13 :36 pm.
26. Tuzer, H., Dinc, L., & Elcin, M. (2016): The effects of using high-fidelity simulators and standardized patients on the thorax, lung, and cardiac examination skills of undergraduate nursing students. Nurse Education Today, 45, 120–125. doi: 10.1016/j.nedt.2016.07.002, accessed on 15/1/2020 at 19:25 pm.
27. Ursic C & Curtis K, (2010): Thoracic and neck trauma. Part one, Int Emerg Nurs. 2010 Jan;18(1):47-53, at https://www. ncbi.nlm.nih. gov/pubmed/20129442, 10.1016/j.ienj.2008.11.010, at 16:57 pm on 28/5/2018.
28. Wang, L, Zhu, X., Zeng X, & Xiong P. (2018): Nurses' knowledge, attitudes and practices related to physical restraint: a cross-sectional study. International Nursing Review 66,122-129, doi:10.1111/inr.12470 accessed on 30/12/2019 at 11:06 am