Effect of Educational Guidelines on Knowledge and Practice for Patients with Chest Trauma

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Abstract

Background: Globally, chest trauma ranks among the foremost causes of morbidity and mortality, with a variety of injuries ranging from simple chest wall contusion to vital organ injury. Educational guidelines are aimed to expand knowledge concerning chest trauma, raise, promote self-care practices, and minimize readmission. **The aim** of this study was to evaluate the effect of educational guidelines on knowledge and practice for patients with chest trauma. **Research design:** A quasi-experimental research design was used. **Setting:** The study was conducted in outpatient chest clinic and cardio thoracic department in accidental hospital at Zagazig University Hospitals.**The study sample:** purposive sample of 50 adult patients with chest trauma. **Tools:** Three tools were utilized for data collection, pertinent as follow: Structured interview questionnaire, Patient's knowledge regarding chest trauma, Observation checklist for self-care practice, **Results:** Revealed that, nearly three quarters of the studied patients (72.0%) were males, with age ranged from 25-≥45 with Mean ± SD 38.24±12.02, three fifth of the studied patients (60.0%) were educated. Total patient' knowledge in post- guidelines (74%) satisfactory, total patients' self-care practice in post- guidelines (80%) satisfactory. **Conclusion:** There were highly statistically significant improvements in patients' knowledge and practice after implementing the guidelines **Recommendations:** Regular follow-up for all patients with chest trauma to evaluate their health conditions, detect the complications early and improve their practice.

Key words: Chest trauma, educational guideline, Knowledge, Practice

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Introduction

Globally, chest trauma ranks among the foremost causes of morbidity and mortality, particularly impacting the younger demographic. It holds the position as the third most prevalent injury worldwide, trailing only head and extremity injuries. Thoracic injury-related mortality, the second highest following head injury, underscores the critical significance of initial management

in these cases. Notably, 25% of all trauma-related deaths worldwide stem from chest trauma alone **(Adal, et al, 2024).**

The prevalence of trauma-related mortality ranges from 2% to 32%; in the world, however, In Egypt, it reaches 8%. Trauma chiefly affects people in the productive age group; seriously ill patients with multiple injuries present with various levels of polytrauma (**Elbaih, et al, 2023).** Chest trauma comprises 10-15% of all traumas. Chest trauma directly accounts for approximately 25% of trauma related mortality and is a contributing factor in another 25%. Eastern Mediterranean region had one of the highest rates of trauma mortalities around the world **(Ibrahim, &Abdelaziz, 2021).**

Chest trauma, the relatively sudden application of large physical forces to the chest, is a frequent cause of serious and fatal injury in present-day society. It has been estimated that 25% of chest trauma fatalities due to motor vehicle accidents. Chest injury can be either closed (blunt) or open (penetrating) injury. Blunt chest injuries are considered more common than penetrating injuries **(AL-Gabri, et al, 2020)**

According to the Advanced Trauma Life Support (ATLS) protocol, these injuries including airway obstruction, flail chest, massive hemothorax, open pneumothorax, tension pneumothorax, and cardiac tamponade must be diagnosed immediately due to their fatal outcomes. Moreover, there are some serious injuries that could be delayed or masked due to other injuries, including tracheobronchial rupture, pulmonary contusion, traumatic aortic disruption, blunt cardiac injury, diaphragmatic tear, and esophageal perforation. As a result of that, immediate and accurate assessments must be done for patients with potentially life-threatening chest trauma **(Alsulaiman, et al, 2023)**

Management strategies for patients with chest trauma include thorough assessment and intervention according to Advanced Trauma Life Support guidelines and in-hospital treatment interventions such as pharmacological pain management analgesics (oral/intravenous/intramuscular), intercostal nerve block, epidural analgesia was used, placement of intercostal catheters as thoracostomy, and thoracotomy were performed as indicated, chest physiotherapy, Oxygen supplementation, non-invasive or invasive mechanical ventilation, and if indicated, surgical rib fixation **(Van -Aswegen, et al, 2020)**

Nursing protocol for patients with chest trauma should be applied in chest units periodically in order to improve knowledge, practice for those patients. The primary goals of nurse for chest trauma management are slowing disease progression, relieving symptoms, improving exercise tolerance, preventing and treating complications, promoting patient's participation in care, preventing and treating exacerbation and reducing mortality risk **(Labieb, et al, 2020).**

Patient educational guideline is associated with better patient outcomes and supported by international guidelines and organizations that give basic resources for patient knowledge about chest trauma but many barriers remain in progress preventing comprehensive education of patients with chest trauma to improve their knowledge about management of trauma. Patient education and decision support can be strengthened, with particular attention to low educational literacy, which is common among chest trauma patients **(Rajabi, et al, 2024).**

Knowledge of current medical guidelines is crucial, especially when it comes to life-threatening conditions. Therefore, guidelines are updated every few years to ensure that patients receive the best possible care. Good post-traumatic care is important because it can reduce post-injury mortality by up to 30%. It is necessary that both practicing staff and those in training are familiarized with evidence-based medicine centered recommendations. There is no doubt that practical skills are crucial, especially in stressful situations that require decisive action, but they do not exist without an appropriate theoretical background. Appropriate management of chest trauma patients is significant as most of them are young and of working age, and injuries often have physical, emotional, and socio-economic consequences **(Dąbrowska, et al, 2024).**

Significance of the study

Approximately 30% of the deaths due to chest traumas occur due to the complications arising from the delays in the diagnosis and/or intervention such as presence of a large volume hemothorax, incomplete re-expansion of the damaged lung, presence of pulmonary parenchymal contusion, extra-thoracic hematoma, unstable thoracic wall injury with multiple costal fractures **(Dumanlı, et al, 2020).**

Nurses have closed and continuous contact with the patient, therefore, uniquely placed to incorporate preventive, caregiver, evaluator and promote teaching guidance in the day-to-day care they provide which help such group of a patient to improve their respiratory function, feeling of pain and farther faster recovery after chest trauma **(Baker, 2018).** In an attempt to improve patient knowledge, discharge instructions provide as a reference for patients with details about their medical condition, ongoing management and recommended follow-up. Through improving patients' knowledge and promoting self-care capabilities in order to enhance their self-care maintenance, management, and confidence in managing their condition. So that the study will be carried out to evaluate the effect of educational guidelines on knowledge and practice for patient with chest trauma.

Aim of the study

The aim of this study was to evaluate the effect of educational guidelines on knowledge and self-care practice among patients with chest trauma at Zagazig University hospitals.

Research Hypothesis:

This study achieved the following hypothesis:

H1: Mean score of patient's knowledge regarding chest trauma will be improved after implementation of educational guidelines than before.

H2: Mean score of patient's self-care practice regarding chest trauma will be improved after implementation of educational guidelines than before.

Subjects and Methods

Research design: A quasi-experimental research design with pre-post test was conducted to achieve the aim of the study.

Setting: The study was conducted in in outpatient chest clinic and cardio thoracic department in accidental hospital at Zagazig University Hospitals.

Subjects: A purposive sample of 50 adult patients with chest trauma and fulfil the following criteria**:** Adult conscious patients from both sexes, agree to participate in the study and able to communicate.

Exclusion criteria:

Patients who connected to mechanical ventilation, endotracheal tube, tracheostomy tube, and those who received educational guidelines before. Patients with neurological or mental disorder, with unstable condition and with chronic end stage disease as liver failure, cancer.

Sample size:

Sample size calculation based on year 2022 census report of patients' admission to the cardio-thoracic department, the total number of subjects assigned to perform cardio-thoracic was 400. Steve Thomson equation was used to calculate the sample size, at 5% ∞ error (95.0% significance) and 20.0 β error (80.0% power of the study) **(Peacock, & Peacock, 2011).**

$$n = \frac{N \times p(1-p)}{[[N-1 \times (d^2 \div z^2)] + p(1-p)]}$$

Where: N= Population size (400), Z= degree of standardization for 95.0% significance, it is equal to 1.96, d= Error percentage (0.05), P= Percentage of occurrence of event or not, it is 0.5. Accordingly, the sample size was determined to be 39.99. The sample size is calculated by Epi-Info software considering the confidence level 95%, power 80% and assuming the improvement after intervention will be 20% (expert opinion) the sample will be 50 patients who will receive educational guidelines.

Tools of data collection:

Three Tools were used for data collection, pertinent to this study as follow:

Tool I: Structured interview questionnaire for patient with chest trauma: (Appendix I)

Designed by researcher based on literature review (**Said, Nasr, and Ebrahim, 2021**) and opinions of expertise for content of validity. It was designed in the Arabic language to avoid misunderstanding and applied as pre and post-test. It included the following parts

Part 1: Demographic characteristics of patients with chest trauma:

This part was composed of 10 closed-ended questions that covered age, sex, marital status, level of education, occupation, income, place of residence, height, weight, body mass index.

Part 2: Medical history of patients with chest trauma

This part was concerned with assessment of past, and present medical history for patients with chest trauma. It consisted of 16 (closed and open ended) question

Tool II: Patient's knowledge regarding chest trauma (Pre/post- test)

It was developed by **(Zedan, El-Senousy, Mahrous, and Abd-Al Salam, 2021)** and modified by researcher concerned with assessment of patient's knowledge regarding chest trauma for developing the booklet of educational guidelines. It was designed by the researcher in the Arabic language to avoid misunderstanding and applied as pre and post-test. It consisted of 30 questions as MCQ, yes or no question. These questions were classified under two sections:

Section I: Patients knowledge regarding anatomy and physiology of the thoracic cavity such as component, functions of respiratory system, composition of right, left lung, normal respiratory rate…etc.

Section 2: Patient knowledge regarding chest trauma such as types of chest trauma, causes of acute, penetrating chest trauma, signs, symptoms, complication, methods of treatment of chest trauma, diagnosis or examination, therapeutic procedures after chest trauma…etc

The scoring system for Patient's Knowledge Assessment:

Each question is scored "zero" for the incorrect answer and "one" for the correct answer, and these points are counted for each patient. Total score of overall patients' knowledge were 30 grades and classified as the following:

- Satisfactory knowledge if the score is ≥ 60% from the maximum score
- Unsatisfactory knowledge if it is <60% based on statistical analysis.

Tool III: Observation checklist (Pre/post- test): (Appendix II)

It was adapted from (**Perry, Potter, & Ostendorf, 2020, and Baird, 2017)** and modified by researcher to evaluate patients' self-care practice regarding the most important skills before and after educational guidelines. It was covered four procedures with totally 41 steps include breathing and cough exercise 17 steps, and relaxation technique 24 steps.

The scoring system for Patient's practice**:**

Each step is scored "zero" for not done and "one" for done correctly, and these points are counted for each patient. Total score of overall patients' practice were 41grades and classified as the following:

- Satisfactory practice if the score is ≥ 60% from the maximum score
- Unsatisfactory practice if it is <60% based on statistical analysis.

Administrative and ethical consideration:

At the initial interview, each potential subject was informed about the nature, purpose, benefits of the study, and informed that his/her participation is voluntary. Confidentiality and anonymity of the subjects were also assured through coding of all data. The researcher assured that the data collected, and information will be confidential and would be used only to improve their health and for the purpose of the study and there was no risk for study subject during application of the research.

The necessary approvals were obtained from the dean of the Faculty of Nursing and submitted to general director of Zagazig University Hospitals. Then Permission to carry out the study was obtained from the head of mentioned setting after explaining the purpose of the study and a verbal consent was obtained from patients for participation in the study.

Pilot study:

A pilot study was carried out on 15% (5 patients) of the main study sample to check and ensure the clarity, applicability, relevance, comprehensiveness, understanding and feasibility, and estimation of time needed to fill out the tools. then the tools were modified according to the result of the pilot study. Simple modifications were done based on the pilot study as rephrasing and rearrangement. The pilot study was excluded from the study sample.

Field work:

The study was implemented from May, 2023 till February, 2024. Two months for pre- test (from the beginning of May, 2023 to the end of June, 2023), and 6 months implementing the educational guidelines, and 2 months for post-test (from January, 2024 to February, 2024). The educational guideline was conducted in assessment, planning, implementation, and evaluation phases.

Assessment phase: The researcher started to recruit the sample according to eligibility criteria. Those who gave their consent were interviewed individually using the data collection form. The information obtained served as baseline data or pretest, and guided the researcher in the preparation to educational guideline booklet.

Planning phase: Using the assessment data and related literature, the researcher developed educational guideline to train patients and improve their knowledge, practice, after chest trauma. The educational guideline included a theoretical and a practical part. The researcher prepared an illustrated guideline booklet in simple Arabic language to help patients assimilate and refresh the information provided to achieve aim of the study.

Implementation phase: The researcher met with the patients individually, and administered the educational in eighty sessions each session 30-45 minutes.

The first session was for orientation about the educational guideline. The researcher used simple language to suit the level of patient's education, with motivation and reinforcement to enhance learning. A copy of the booklet was offered for each patient to use it as future reference. The six sessions were theoretical and covered Anatomy and physiology of chest cavity, mechanism of injury, incidence, causes, types, manifestation, complication, investigation, methods for

treatment of chest trauma, guidelines of care after chest trauma, danger and emergency signs after discharge, instruction related reducing pain.

This was followed by twelve practical sessions that include Care after chest trauma, physical exercise, coughing, deep breathing exercise**,** relaxation technique, activities of daily living including proper setting, standing, clothing, bathing, driving, in addition to walking, smoking, sleeping pattern, after chest trauma**.**

Evaluation phase: Each patient in the study was evaluated two times using the same data collection tools. This was done upon recruitment (pre-test), immediately after the end of the educational guidelines (post-test).

Content validity& Reliability:

It was established by a panel of 5 expertise in nursing and medical staff including: professor, assistant professor, two lecturer of Medical Surgical Nursing, and professor of cardio-thoracic disease who reviewed the instruments, and designed booklet for clarity, relevance comprehensive, understanding, applicability, and easiness for administration. Minor modifications were required.

Alpha Cronbach's test was used to measure the internal consistency of the three tools used in the current study as follow: 1st tool (patients' interviewing questionnaire) is 0.876, 2nd tool (knowledge questionnaire) is 0.890, 3rd tool (observation checklist) is 0.913,

Statistical analysis:

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of frequencies and percentages. Chi-square (χ^2) is a statistical test used to determine the relationship between categorical variables. A correlation coefficient "Pearson correlation" is a numerical measure of some type of correlation, meaning a statistical relationship between two variables. Highly significant at p-value < 0.01. Statistically significant was considered at p-value < 0.05. Non-significant at p-value ≥ 0.05

Results:

Table1: Illustrated demographic characteristic of the studied patients. The age of studied patients ranged from 20-≥52 with Mean ± SD 38.24±12.02. In addition, nearly three quarters of the studied patients 72.0% were males. As well, majority of the studied patients 82.0% were married, more than two thirds of the studied patients 68.0% work, while 90.0% of studied patients had not enough family income and more than three quarters of the studied patients 78.0% were from rural residents.

As regard to height, more than half of the studied patient's height 52.0% ranged from 160 to less than 170 cm with mean SD=170.08±7.93, more than two fifths of the studied patient's weight 42.0% ranged from 90 to 100 kg with mean SD= 80.90±14.4. Also, half of the studied patient's body mass index 50.0% ranged from 25 to less than 30 with Mean± SD 27.76±2.92, and more than half of the studied patients 60.0%were educated.

Table 2: Revealed that less than one fifth of the studied patients 14.0%suffered from disease before chest trauma, more than one quarter of studied patients suffer from coronary artery disease and more than two fifths of the studied patients 42.8% suffer from diabetes. In addition, nearly one fifth of the studied patients 18.0% had previous surgeries and more than three quarters of studied patients 77.8% had previous cesarean section.

Table 3 reflected that more half of the studied patients 54.0% had the accident 5 to less than 10 days ago with Mean ±SD8.26±3.89. As well, less than three quarters of studied patients (74.0%, 70.0%) suffer from chest pain and difficult breathing, respectively.

Table 4 indicated that nearly to three quarters of studied patients 74.0% suffer from cough, had chest pain as a result of cough respectively, while two fifth of studied patients 40.0% had dry cough, most of the time had difficult to breathe due to cough, and had coughing that hinder work and daily tasks. Furthermore, slightly more than one third of studied patients 34.0% had

moist cough after chest trauma, and cough lasts 3 min.

Table 5 represented that, in pre-guidelines phase three quarter of the studied patients76 % had unsatisfactory level of total knowledge, while in post-guidelines three quarters of the studied patients 74.0% had satisfactory level of total knowledge regarding chest trauma.

Table 6 showed that, in pre-guidelines phase less than one fifth of the studied patients 16.0% had satisfactory level of total self-care practice regarding chest trauma, while in post-guidelines 80% of the studied patients had satisfactory level regarding chest trauma

Table 7 portrayed that there was a highly statistically significant relation between the studied patients' total knowledge regarding chest trauma post-guidelines and studied patients' gender, educational level and job (p≤.009**), (p≤0.001), (p≤.002**), respectively. In addition, there was a statistically significant relation with studied patients' age (p≤0.05) with p value≤.012*, while there was no statistically significant relation with studied patients' marital status, family income and residence (p>0.05).

Table 8 demonstrated that there was a highly statistically significant relation between the studied patients' total self-care practice regarding chest trauma post-guidelines and studied patients' age and educational level (p≤0.01). Besides, there was a statistically significant relation with studied patients' gender and job (p≤0.05), but there was no statistically significant relation with studied patients' marital status, family income and residence (p>0.05).

Table 9 declared that, there was highly significant statistical positive correlation between the studied patients' total knowledge and total self-care practice at post-guidelines with (p < 0.01).

Table 1: Frequency and Percentage Distribution of Demographic Characteristics for Studied Patients (n=50).

Demographic Characteristics	No	%
Age		

< 25 years	6	12.0
25 - < 35 years	16	32.0
35 - < 45 years	10	20.0
≥45 years	18	36.0
Mean± SD 38.24±12.02		
Range 20 - 52		
Gender		
Male	36	72.0
Female	14	28.0
Marital status		
Married	41	82.0
Not married	9	18.0
Educational level		
Educated	30	60.0
Uneducated	20	40.0
Job		
Works	34	68.0
Does not work	16	32.0
Family income		
Enough	5	10.0
Not enough	45	90.0
Residence area		
Rural	39	78.0
Urban	11	22.0
length in centimeters		
160 - <170	26	52.0
170 – 180	24	48.0

Mean± SD 170.08±7.93		
Weight		
50 - <70	15	30.0
70 - <90	14	28.0
90 – 100	21	42.0
Mean± SD 80.90±14.4		
Body mass index		
20 - <25(normal)	9	18.0
25 - <30(above normal)	25	50.0
≥30(obese)	16	32.0
Mean± SD 27.76±2.92		

Table 2: Frequency and Percentage Distribution of Previous Medical History for Studied Patients (n=50).

Previous Medical History	**No**	**%**
Suffering from any disease before chest trauma		
Yes	7	14.0
No	43	86.0
Diseases related to the circulatory system and blood vessels		
Coronary artery disease	2	28.6
Diabetes	3	42.8
Hypertension	2	28.6
Had surgeries previously		
Yes	9	18.0
No	41	82.0
If the answer is yes, what is it		

Cesarean section	7	77.8
Coronary artery bypass graft	2	22.2

Table 3: Frequency and Percentage Distribution of Current Medical History and Pain for Studied Patients (n=50).

Current Medical History and Pain	No	%
How long ago had the accident		
1 - < 5 days	6	12.0
5 - < 10 days	27	54.0
10 – 15 days	17	34.0
Mean± SD 8.26±3.89		
Currently complaining		
Chest pain	37	74.0
Difficulty breathing	35	70.0
Nausea and vomiting	6	12.0
Shallow breathing	24	48.0
Presence of sputum	17	34.0
Dry cough	20	40.0
Characteristics of the pain		
A feeling of pressure	10	20.0
A sense of squeezing	18	36.0
Spreads to the jaw, shoulder and arm	28	56.0
Chest pain occurs after		
Effort/movement	32	64.0

Sadness and nervousness	15	30.0
Rest time	5	10.0
Without reason	3	6.0
Pain relieved by		
Comforts	4	8.0
Analgesic	36	72.0
There is nothing to relieve the pain	14	28.0
The level of pain intensity		
Light/ simple	3	6.0
Middle	25	50.0
Intermittent	8	16.0
Continuous	14	28.0

*more than one answer

Table 4: Frequency and Percentage Distribution of the Studied Patients Regarding Cough Complain (n=50).

Characteristics of cough	No	%
Suffering from cough		
Yes	37	74.0
No	13	26.0
Nature of cough		
Moist	17	34.0
Dry	20	40.0
Nothing	13	26.0
Cough last		
3 min	17	34.0
5 min	12	24.0
10 min	8	16.0

None	13	26.0
Suffered from chest pain as a result of cough		
Yes	37	74.0
No	13	26.0
Difficult to breathe due to cough		
Most of the time	20	40.0
little time	15	30.0
Nothing at the time	15	30.0
Cough hinder work and daily tasks		
Yes	20	40.0
No	30	60.0

Table 5: Frequency and Percentage Distribution of Studied patients Total Knowledge Regarding Chest Trauma throughout Study Phases

Total Patients Knowledge	Pre		Post		X^2 P-Value
	No	%	No	%	
Satisfactory ≥60%	12	24.0	37	74.0	16.42
Unsatisfactory<60%	38	76.0	13	26.0	<0.01**
Mean ± SD	12.54 ± 3.6		28.33 ± 4.8		

***: Highly statistically significant*

Table 6: Frequency and Percentage Distribution to Total Self-Care Practice of Studied Patient Regarding Chest Trauma Throughout Study Phases (n=50).

Total patients practice	Pre		Post		X^2 P-Value
	No	%	No	%	
Satisfactory ≥60%	8	16.0	40	80.0	19.77
Unsatisfactory<60%	42	84.0	10	20.0	<0.01**

Mean ± SD	9.65 ± 1.9	28.7 ± 3.97	

***: Highly statistically significant*

Table 7: Relation between Demographic Characteristics of Studied Patients and Total Knowledge Regarding Chest Trauma Post-Guidelines (n=50).

characteristics		Total knowledge				X2 P-Value
		Satisfactory N=37		Unsatisfactory N=13		
		No	%	No	%	
Age	<25	1	2.7	5	38.5	6.573 .012*
	25 - <35	14	37.8	2	15.3	
	35 - <45	9	24.4	1	7.7	
	≥45	13	35.1	5	38.5	
Gender	Male	32	86.5	4	30.8	9.124 .009**
	Female	5	13.5	9	69.2	
Marital status	Married	33	89.2	8	61.5	.955 .052
	Not married	4	10.8	5	38.5	
Educational level	Educated	28	75.6	2	15.4	7.113 .001**
	Uneducated	9	24.4	11	84.6	
Job	Work	31	83.8	3	23.1	7.953 .002**
	Not work	6	16.2	10	76.9	
Family income	Enough	1	2.7	4	30.8	.827 .059
	Not enough	36	97.3	9	69.2	
Residence	Rural	32	86.5	7	53.8	1.244 .069
	Cities	5	13.5	6	46.2	

***Significant at p ‹0.05. **Highly significant at p ‹0.01. Not significant at p>0.05**

Table 8: Relation between Demographic Characteristics of Studied Patients and Total Self-Care Practice Regarding Chest Trauma Post-Guidelines (n=50)

Characteristics		Total Self-care Practice				X2 P-Value
		Satisfactory N=40		Unsatisfactory N=10		
		No	%	No	%	
Age	< 25	5	12.5	1	10.0	11.20
	25 - < 35	14	35.0	2	20.0	.000**
	35 - < 45	9	22.5	1	10.0	
	≥45	12	30.0	6	60.0	
Gender	Male	29	72.5	7	70.0	5.253
	Female	11	27.5	3	30.0	.015*
Marital status	Married	36	90.0	5	50.0	1.582
	Not married	4	10.0	5	50.0	.069
Educational level	Educated	27	67.5	3	30.0	7.994
	Uneducated	13	32.5	7	70.0	.005**
Job	Work	32	80.0	2	20.0	6.117
	Not work	8	20.0	8	80.0	.019*
Family income	Enough	2	5.0	3	30.0	.921
	Not enough	38	95.0	7	70.0	.054
Residence	Rural	33	82.5	6	60.0	1.283
	Cities	7	17.5	4	40.0	.087

*Significant at p ‹0.05. **Highly significant at p ‹0.01. Not significant at p>0.05

Table 9: Correlation Matrix between Total Knowledge and Total Self-Care Practice of Studied Patients Post-Guidelines (n=50).

		Knowledge	Practice
1. Total knowledge	R P		

2. Total Self-care practice	R	.628	
	P	.001**	

(**) Statistically significant at p<0.01. r Pearson correlation

Discussion:

Chest trauma comprises around 10-15% of all traumas world-wide with a variety of injuries ranging from simple chest wall contusion or rib fractures to vital organ injury including lung contusion, haemothorax, pneumothorax, flail chest, Broncho-pleural fistula and tracheobronchial rupture. Vast majority of chest trauma cases can be managed conservatively through chest tube insertion, blood transfusion, and intubation **(Hajjar, et al, 2021).**

As regards to the patients' characteristics, results of the present study revealed that the age of the studied patients ranged from 20 to 52 years old with the mean of all patients 38.24. The finding of the present study is supported with **Baru et al., (2020)** in the study of "Characteristics and outcome of traumatic chest injury patients visited a specialized hospital in Addis Ababa, at Ethiopia", found that the mean age of the studied patients was 35.5 years old.

Related to Gender, results of the present study showed that nearly three quarters of the studied patients were males, this finding goes in the same line with **Baru et al., (2020)** whose founded that nearly three quarters of the studied patients were males. The male predominance can be explained on the basis of that females are less exposed to external factors as compared to males. Young males are involved in high-risk-taking daily activities and outdoor activities like driving and other hazardous occupations.

Moreover, **Alsulaiman et al., (2023)** in the study on "Causes and Pattern of Chest Trauma among Adults: A Scoping Review of Studies from the Middle East at SAU" indicated that the majority of the victims were males

Related to marital status, the present study revealed that majority of the patients were married. This is consistent with, **Mohammed, et al., (2018)** In the study "The Impact of Chest Physiotherapy Technique on Respiration, Pain and Quality of Life Post Thoracic Wall Fixation Surgery among Flail Chest Patients, in London" found that one third of sample were married.

Concerning the level of education, the current study revealed that more than half of the studied patients were educated. The result of the present study is consistent with **Gonçalves et al., (2023)** whose reported in their study about "Clinical-epidemiological evaluation of victims of thoracic trauma in a reference hospital in Aracaju-SE" that majority of sample had educated.

This result is contraindicated with, **Naghdi, et al., (2023)** whose reported in the study about "The association between the outcomes of trauma, education and some socio-economic indicators in Iran" that most of the patients were below the high school level. This finding demonstrates that, chest trauma is spread among different level of education in the community.

Regarding past medical and surgical history of the studied patients, results of the present study revealed that less than one fifth of the studied patients suffered from disease such as

coronary artery disease, hypertension, diabetes before chest trauma, and nearly one fifth of the studied patients had previous surgeries. This study is in agreement with **Mduma, et al, (2023),** in the study about "Pattern, Management, and Outcomes of Chest Injury at Kilimanjaro Christian Medical Centre" whose reported that less than one tenth of patients had previous history of disease such as hypertension, diabetes and previous surgical history.

Regarding current complain, the present study revealed that less than three quarters of studied patients suffered from chest pain that was relieved by analgesics, difficult breathing, before implementation of the program. Multiple rib fractures are very painful and in a conscious patient after trauma can lead to shallow breathing, respiratory secretion poling, segmental lung collapse and hypoxemia, optimization of analgesia is key to preventing complications. This finding is supported by **Willis, et, al (2023)** in the study about "Management of chest trauma in a District General Hospital - Audit of current practice, in United Kingdom" stated that less than three quarter of patients had pain, dyspnea and patients received a nerve block.

Regarding cough complain, the present study indicated that less than three quarters of studied patients suffer from cough that leads to chest pain, while two fifth of studied patients most of the time had difficult to breathe due to cough, Patients with pulmonary contusion may present with chest pain, dyspnoea, coughing, and hypoxemia especially after significant chest trauma. This due to pain restricts tidal volume, leading to hypoventilation, and impairs coughing ability, leading to sputum retention; these combine to cause atelectasis and predispose to pneumonia.

These results are on the same line with a study done in Türkiye by **Telafarli &, Cakir, (2023)** in the study titled "Evaluation of pneumonia incidence and risk factors after rib fracture" detected that the rate of pneumonia development is higher than in the literature, chest pain was the first reason for admission to the emergency department in the majority of the patients, the cough reflex may be impaired due to pain, or the patient may limit coughing. As a result, limiting coughing may create a predisposing factor for the development of pneumonia in patients who cannot remove secretions

These results are in contrast with **Féray, et al, (2023)** whose stated in the study about "Surgical and perioperative management of flail chest with titanium plates a French cohort series from a thoracic referral center in France" that sixth of patients were hypoxemic with ventilator-associated pneumonia and one of patients had difficulty coughing.

Regarding total patients` knowledge post-implementation of educational guidelines, the results of the current study showed that less than three quarters of the studied patients had satisfactory level of total knowledge regarding chest trauma. This improvement in patient's knowledge may be due to the use of different teaching strategies as lecture, discussion, a coloured booklet, and video playing, in addition to the researcher's reinforcement of information received at the end of each session and pre the next session together with adherence of the subjects to the given instructions regarding chest trauma.

Moreover, education for patients with chest trauma have a perceptive effect on their knowledge and understanding the risk involved with carelessness about the health.

These findings were matched with **Khatiban, et al, (2019)** in the study about "Orem's Self-Care Model with Trauma Patients: A Quasi-Experimental Study, in Iran, that revealed a significantly greater improvement in the experimental group'' than that in the control group, also showed all study aspects, including the self-care knowledge, attitudes, and practices, as well as the respiratory conditions, significantly improved after the application of Orem's model.

As regards to total score for the studied patients 'self-care practice throughout the study phases, Results of the current study revealed that, pre-guidelines less than one fifth of the studied patients had satisfactory level of total self-care practice regarding chest trauma. While in post-guidelines majority of the studied patients had satisfactory level regarding chest trauma self-care practice, there was highly statistically significant difference of total self-care practice within the studied patients pre, and post-guidelines.

From the researcher's point of view, this improvement was due to the continuous follow-up of patients and re-demonstration of the self-care practices at regular intervals with continuous correction of missed or malpractices performed skills for both patients and their caregivers. This result is supported with, **Zhang, (2022)** who revealed in the study about "Effects of Targeted Intervention plus Comprehensive Nursing on the Quality of Life and Nursing Satisfaction in Multiple Traumas in China' 'that, after program, self-care ability scores and comprehensive self-care ability scores of the study group were remarkably higher versus those of the control group.

Concerning the relation between demographic characteristics of the studied patients and total knowledge regarding chest trauma post-guidelines, the current study portrayed that there was a highly statistically significant relation between the studied patients' total knowledge regarding chest trauma post-guidelines and studied patients' gender, educational level and job. In addition, there was a statistically significant relation with studied patients' age, while there was no statistically significant relation with studied patients' marital status, family income and residence.

This result in the same line with **Naghdi, et al, (2023)** whose reported in their study entitled "the association between the outcomes of trauma, education and some socio-economic indicators, in Iran'' that there were statistically significant associations between knowledge score of chest trauma and education levels. The correlation of socio-economic status with each patient's education level is a critical issue that avoids broad conclusions regarding health conditions' outcomes. Higher education levels may lead to higher socioeconomic status and better outcomes following trauma.

Concerning the relation between demographic characteristics of the studied patients and total self-care practice regarding chest trauma post-guidelines, the present study demonstrated that there was a highly statistically significant relation between the studied patients' total self-care practice regarding chest trauma post-guidelines and studied patients' age and educational level. Besides, there was a statistically significant relation with studied patients' gender and job, but there was no statistically significant relation with studied patients' marital status, family income and residence.

This result is supported with **Van-Aswegen, et al, (2020)** whose reported in the study about "Physiotherapy management of patients with major chest trauma: Results from a global survey in South Africa" that there was, Significant differences between educational level and patient use of manual chest therapy techniques such as cough, deep breathing exercise. There was a moderate to high correlation between the frequency of use of these techniques and education. This mean that demographic characteristics of the studied patients affected regarding positively on their practice score.

This result in disagreement with **Kao, et al, (2022)** whose showed in the study entitled "Press tack needle stimulation for blunt chest trauma: a randomized double-blind control trial in Taiwan", that there were no significant differences between in gender, age and patient practice regarding deep breath, cough and body turn over movements, on the baseline measurements

The present study revealed that there was highly significant statistical positive correlation between the studied patients' total knowledge and total self-care practice at post-guidelines. This indicate that high level of knowledge was positively improve level of self-care practice and implementation of educational guidelines has positive effect on patient self-care. This result is agreement with **Wassif, & El Din, (2022)** in their study entitled "Relationship between knowledge, attitude, and practice of COVID-19 precautionary measures and the frequency of infection among medical students at an Egyptian University "showed that a statistically significant positive correlation between knowledge and practice scores ($P < 0.01$).

Finally, analysis of data and discussion proved the research hypotheses in the current study showed that, patient's knowledge and self-care practice scores increased significantly immediately after implementing educational guidelines.

Conclusion

On the light of the present study results, there was significant improvement of patient's knowledge and self-care practices post implementing the educational guidelines compared to pre-guideline phases. It can be concluded that, the educational guidelines had a positive effect on improving their knowledge and self-care practices of studied patients.

Based upon the findings of the present study, the following Recommendations can be deduced:

- An educational guideline for chest trauma patient's condition should be available in the form of audiovisual materials.

- Training guideline about chest trauma and its treatment modalities should be provided for chest trauma patients and their caregivers.

- Regular follow-up for all patients with chest trauma to evaluate their health conditions, detect the complications and early management to improve self- practice.

- Replication of the study on a larger probability sample from different geographical areas for generalization of the results.

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