The Effect of A Team STEPPS Self-Learning Package Application on Teamwork Perceptions, Patient Safety Culture for Nurses and Quality of Care among Patient with Chest Diseases

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Abstract

Background: Most patients with chest diseases are risk for mortality because impaired quality of care in this period COVID-19 was still one of the most serious global health care. Ensuring patient safety is of the utmost importance in nursing practice. **Purpose:** to investigate effect of a Team STEPPS self-learning package application on teamwork perceptions, safety culture of patient for nurses and care quality among patient with chest diseases. **Setting:** at chest units at Menoufia University Hospital in Shebin El-Kom, Menoufia Governorate, Egypt. **Subjects:** a convenience sample comprising of nurses and adult male and female patients with chest diseases. Study group (I) (102) nurses and Study group (2) 116 adult male and female patients with chest diseases. **Instruments:** Five instruments were used: A structured interview questionnaire, Team STEPPS practice observational checklist, Teamwork Perception Questionnaire, Patient Safety Culture Questionnaire Sheet and Nursing Care Quality Questionnaires-Patient. **Results**: The study finding displayed there is a highly statistical significant difference among the studied nurses regarding pre/ posttest and follow-up test of total mean scores of team STEPPS knowledge, team STEPPS practice, teamwork perceptions, both the culture of patient safety and the quality of nursing care had a p-value of 0.001. **Conclusion**: The results showed that healthcare professionals' perceptions of cooperation improved, nurses' cultures of patient safety improved over time, and the quality of patient care improved substantially after implementing Team STEPPS. **Recommendation**: Managers should implement Team STEPPS initiatives to assist nurses in embracing a culture of patient safety, which will ultimately lead to improved results.

Keywords: Team STEPPS, Teamwork Perceptions, Patient Safety Culture, Quality of Care and chest diseases Patients.

Introduction

Every year, millions of patients suffer from chest disease, which causes accidents and deaths an outcome of hazardous medical procedures (Al-Lawati et al., 2019). In developed countries, one out of every ten patients is estimated to be harmed during hospitalization. In addition, 2.6 million people die each year in hospitals in low and middle-income countries (LMICs) as a consequence of 134 million adverse events caused by unsafe care (World Health Organization, 2021).

Most patients with chest diseases are at risk of mortality due to the poor quality of care during this period. COVID-19 remained one of the most severe global health care burdens on patients, families, communities, and health care workers (HCWs). Nurses with insufficient knowledge and gaps in their practices about chest disease have a direct impact on patients' outcomes (Alsabri et al., 2022)

Hospitals must provide quality care by establishing a safe, efficient, and well-managed hospital organization. The term "excellent healthcare" refers to medical treatment that "increases the likelihood of

desired health outcomes and is consistent with current professional knowledge" for both individuals and groups.". Evaluating hospital nursing practices' emphasis on patient safety is an important part of the process (Matzke et al., 2021).

A key component of high-quality nursing care is ensuring the safety

of the patient. Safe and effective patient care is its first priority, and it is responsible for preventing injuries to all hospital staff, particularly critical care nurses. Nurses should be well-versed in interventions and methods that have been shown to enhance patient outcomes (Al-Lawati et al., 2019).

A health system that is well-coordinated and integrated guarantees patient care that is high-quality, safe, and efficient. To guarantee safe, effective patient care, health care providers (HCPS), which include doctors, nurses, chemists, technicians, and other ancillary staff, must coordinate their efforts. They all work towards the same objectives—safe, high-quality patient care—even though they each carry out specific roles and related tasks Although healthcare delivery is most effective when done as a team, team members are rarely trained together and often hail from diverse academic and professional backgrounds. This effort was joined by the Department of Defense and the Agency for Healthcare Research and Quality (AHRQ) with the establishment of Team STEPPS as a national standard for healthcare team training in November 2006 (Agency of Health Care Quality and Safety, 2018).

Medical treatment is considered high-quality when it is efficient, safe, and focused on the needs of the patient or group (WHO, 2018). Patient safety, improved clinical efficacy, and more public accountability are the goals of health care quality improvement programs, which seek to enhance the quality of health care delivery on a worldwide scale. Global healthcare organizations struggle to ensure patient satisfaction while delivering high-quality care. An essential component of evaluating the quality of health care is looking at nursing care from the perspective of the patient, including patient satisfaction (Alsabri et al., 2022).

The most common reason for adverse events (AEs) is improper communication, as mentioned in the annual quality and patient safety reports published by the Joint Commission. Improving team communication can have a positive impact on group dynamics, job satisfaction, and patient safety. Collaborative training is seen by healthcare facilities as an essential intervention for patient safety. Many healthcare organizations see the need of strengthening cooperation and communication skills and have made it a normal practice to train their employees in these areas (Joint Commission, 2015).

The Defense Department and the AHRQ are partners in ensuring the safety and quality of healthcare for patients came up with a program called Team STEPPS to help institutions work together better and communicate about it. If you want to improve the way people in your healthcare system communicate and work together, you should look into implementing Team STEPPS. It's a training curriculum and toolbox backed by research. Military operations, aviation, and nuclear power are examples of high-reliability enterprises that have used this method for decades (Staines et al., 2019).

Team STEPPS has been linked to improved teamwork and communication, lower provider burnout and turnover, and better patient outcomes. Despite a lack of clarity on the necessary implementation supports, the standard procedure for implementing Team STEPPS entails three stages: (1) assessment; (2) planning; (3) training and implementation; and (4) sustainability. A more positive atmosphere and culture in the hospital may be possible as a result of staff members' enhanced teamwork abilities and habits, as highlighted by Team STEPPS, leading to better patient outcomes through improved quality of care (Matzke et al., 2021).

This study aims to examine the impact of a Team STEPS self-learning package application on nurses' capacity to guarantee the well-being of patients and deliver excellent nursing care to those suffering from chest problems. While there have been numerous global studies on the factors that influence patients' perceptions of nursing care, very little is known about this topic in Egypt.

Significance of the study

Safety of patient concerns continues to exist even with the development of multiple deterrent strategies. Even though a lot of safety initiatives result in improvements, they are frequently unsustainable and fleeting. Since teamwork has been shown to be a useful strategy for improving

collaboration, lowering medical errors, and fostering a culture of safety in the healthcare organization, it has an impact on clinical outcomes, patient safety, and the effectiveness of patient care. In order to facilitate organizational culture modification, increase patient safety compliance, or address specific issues, Team STEPPS, an evidence-based framework for team training, was utilized at the hospital to improve performance and patient safety. Finding an association between improved corporate culture and Team STEPPS adoption was the driving force for this study (Staines et al., 2019).

The majority of patients with chest illnesses need to be treated in a hospital. COVID-19 is a respiratory disease that affects the entire body and is considered a global health crisis of our time. The respiratory syndrome coronavirus 2 (SARS-CoV-2) is the causative agent, and it often leads to a variety of complications that can affect all body systems, low employment rates, a significant financial burden, and negative effects on relationships with others, partnerships, and family life. In order to ensure nurse safety in hospitals, nurses should become more knowledgeable and proficient in handling COVID-19. They should also make sure that their safety policies are linked to the patient safety policies already in place (Alsabri et al., 2022).

Therefore, the current study will provide evidence for conducting studies to improve safety culture of patient and Teamwork among nurses for enhancing quality of patient care through team STEPPS application.

Purpose of the study

This study aimed to evaluate impact of a Team STEPPS self-learning package application on perceptions of teamwork, safety culture of patient for nurses and quality of care among patient with chest diseases.

Research hypothesis

The study's purpose is to be reached by testing the following research hypotheses:

1. Team STEPPS program implementation will improve perception of nurses' teamwork.
2. Team STEPPS program implementation will be valuable in improving nurses' safety culture of patients.
3. Team STEPPS program implementation will enhance quality of patient care as reported by patients.

Materials and Method:

Research design: a quasi-experimental approach, which included a pre- and post-test with just a single group being evaluated.

Setting: Researchers in Egypt's Menoufia Governorate conducted the current study in the chest units of Menoufia University Hospital in Shebin El-Kom. Which include three parts: In patient chest department, intensive chest care unit, and chest endoscopy unit.

Subjects: The current study got conducted on staff nurses working in the above-mentioned units and adult male and female patients with chest diseases who are willing to take part in the study if they meet the eligibility criteria.

Sampling technique: A convenient sampling technique was used in the present study from Nurses and adult male and female patients with chest diseases were in previous mentioned units.

Study group (I) The total sample size was (102) nurses working in previous mentioned units.

Study group (2) 116 adult male and female patients with chest diseases.

Subjects of both groups will be selected according to the following criteria:-

Inclusion criteria

- Adult patients from both sexes. (19-65yrs).
- Confirmed diagnosis of chest diseases.
- Willing to participate in the study

Exclusion criteria

- Patients and nurses refuse to participate in the study.
- Intern student and nursing managers.

Instruments of the study

To accomplish the present study's objective and gather the required data five instruments was use by the researcher. These instruments are:

Instrument I: A structured interview questionnaire

It was established by the researcher to collect socio demographic data of nurses, and **Team STEPS knowledge questionnaire**. It consists of two parts as the following:

- **Part one: Nurse's and Patient's demographic characteristics:** This part

was included nurses' demographic characteristics consisting of questions such as age, gender, experience years and education level. This part was including demographic characteristics of patient consisting of questions as age, Marital status, Educational Level, Visit numbers, study units

- **Part two: Team STEPS knowledge questionnaire**

The researcher constructed this tool to evaluate Team STEPS knowledge based on relevant literature review. Twenty True/False and Multiple-Choice questions covering multiple components of Team STEPS were part of it.

Scoring systems:

Each question had a right answer worth 1 point and an incorrect one worth 0 points. To get an average score for each area, we summed up all the item scores and then divided by the total number of items. The percentage scores were derived from these scores. A score of 60% or above was deemed good for knowledge, while a score below 60% was deemed unsatisfactory.

Instrument two: Team STEPS practice observational checklist

The Department of Defense Patient Safety Program and the Agency for Healthcare Research and Quality (2013) collaborated to develop this instrument to evaluate the nursing staff's performance on team STEPS (STEPS). There was a total of 23 questions covering five dimensions: leadership, communication, situation monitoring, teamwork structure, and mutual support.

Scoring systems:

Responses of participants were measured on three-point Scale of Likert varying from done completely (2) done incompletely (1) to not done (0). A score of 60% or above indicated appropriate practice, whereas a score of 60% or below indicated inadequate practice.

Instrument three: Teamwork Perception Questionnaire

This instrument was developed by American Institutes for Research (2010) to assess perception of nurses regarding teamwork. It contained 35 items distributed on five dimensions: Team Structure, Leadership, Situation Monitoring, Mutual Support and Communication. Each dimension includes seven items on a five-point Likert scale, where 1 indicated "strongly disagree" and 5 represented "strongly agree.".

Scoring systems:

Low level: 35 <82.
Moderate level: 82 < 129.
High level: 129 – 175.

Instrument four: Patient Safety Culture Questionnaire Sheet

Developed by the Agency for Healthcare Research and Quality (AHRQ) in 2016, this instrument assesses patient safety culture through a total of 42 items categorized into 12 dimensions. These dimensions include teamwork within units (4 items), actions by supervisors and management that promote patient safety (4 items), organizational learning (3 items), management support for patient safety (3 items), overall perception of patient safety (4 items), feedback and communication regarding errors (3 items), communication openness (3 items), frequency of reported events (3 items), teamwork across units (4 items), staffing (4 items), handoffs and transitions (4 items), and non-punitive responses to errors (3 items). Each item is evaluated using a five-point Likert scale, where 1 indicates "strongly disagree" and 5 indicates "strongly agree." Additionally, there are 15 negatively worded statements that require reverse scoring, meaning that "strongly disagree" is rated as 5 and "strongly agree" as 1.The scoring system for assessing patient safety perception among staff nurses is categorized into three levels. A score between 42 and 98 indicates a low level of patient safety perception. A score ranging from 99 to 154 reflects a moderate level of perception, while a high level of patient safety perception is represented by scores from 155 to 210.

Instrument five: Quality of Nursing Care Questionnaires-Patient

The Quality of Nursing Care Questionnaires-Patient, based on the work of Safford & Schlotfeldt (1978), was utilized to gauge patients' perceptions of nursing care quality. This instrument comprises 43 items divided into five subscales: physical care (12 items), emotional care (17 items), nurse-physician teamwork (1 item), preparation for home care (7

items), and nursing administration (6 items).

Responses are measured using a five-point Likert scale, where 1 indicates "never," 2 means "seldom," 3 represents "sometimes," 4 signifies "usually," and 5 corresponds to "always". The overall quality of nursing care is determined by calculating a composite score from the five subscales. To analyze the results, the mean and standard deviation for each subscale are computed. The average of these five subscales means provides the quality of nursing care score. A mean score of 4 or higher indicates satisfactory care, scores between 2.5 and 4 suggest a neutral perception, and scores below 2.5 reflect dissatisfaction with the care received.

- **Validity and reliability of the scales:**

To guarantee cultural relevance and linguistic accuracy, the instruments used in this study were meticulously translated from English to Arabic, following Beaton's guidelines. Cognitive interviewing, pre-testing, back-translation, expert panel assessment, and forward translation were all essential parts of this comprehensive procedure. Thorough care was taken at every stage to guarantee that the procedures were suitable and accurate for the Arabic-speaking audience, resulting in highly relevant questionnaires for the study Beaton et al., 2000.

The translated scales were reviewed and validated by a panel of experts to confirm their content validity. The insights gathered from this validation process informed adjustments to the phrasing of the items, enhancing clarity and comprehension. These revisions were made prior to the finalization of the Arabic versions of the scales.

Test re-test method was used to ascertain reliability of instrument, the period between both tests was 2 weeks. The internal consistency of the scales utilized in the study was evaluated to determine their reliability. The results indicated excellent reliability, as reflected by high Cronbach's Alpha values. The first instrument, the Team STEPS knowledge assessment, demonstrated a Cronbach's Alpha coefficient of 0.91, indicating strong reliability. Similarly, the second instrument, the Team STEPS practice observational checklist, also showed high reliability with a Cronbach's Alpha coefficient of 0.89. Instrument three Teamwork perception has Cronbach's Alpha coefficient value0.95 Instrument four Patient safety culture has Cronbach's Alpha coefficient value is accepted and highly reliable 0.95. Instrument five Quality of Nursing Care Questionnaires has Cronbach's Alpha coefficient value is accepted and highly reliable0.89.

- **Pilot study**

Twelve nurses participated in a pilot study, representing roughly 10% of the overall sample for the main research. The purpose of this pilot was to assess the clarity of the knowledge questionnaire and the feasibility of the observation checklist. Since the instruments did not require any adjustments after the pilot, the participants from this phase were included in the main study sample.

- **Ethical consideration**

Formal written approval for the study was obtained from the Ethics and Research Committee of the Faculty of Nursing at Menoufia University. This approval ensured that all ethical standards were upheld throughout the research process (approval no 796). The hospital's responsible authorities received an official letter from the Faculty of Nursing, outlining the purpose of the study, and then granted permission to conduct it. The nurses' involvement in the study was entirely voluntary, and they are free to leave at any moment without incurring any fees. All patient data was coded to ensure confidentiality and anonymity. Participants were not experiencing any physical or psychological harm as a result of the instruments.

- **Field work and data collection:**

After providing a clear explanation of the study's purpose, written permission was obtained from the appropriate authorities to conduct the research. The researchers then individually interviewed participants who met the inclusion criteria in the chest department, intensive chest care unit, and chest endoscopy unit before starting the sessions of the therapy. The data collection process lasted for eight months, from the beginning of October 2023 to the end of May 2024. The current study was carried out in three consecutive phases.

During Phase I, the evaluation process began with the establishment of an initial change team that included the study's

researchers. Efforts to assess patient safety culture change preparedness, related behaviors, and resource allocation commitments were undertaken in preliminary research. To explore opportunities for improving patient safety culture through team strategies, the Team STEPPS observation checklist were used. The researchers were use convert observation and participants do not know they are being observed and assess nurse's practical skills for Team STEPS by using instrument II.

And Teamwork Perception Questionnaires were distributed. Concurrently, the patient safety culture questionnaire was administered to nurses to gather pretest data specific to each selected unit. Additionally, pretest data were collected from patients to gain insights into their perceptions of the quality of care provided in those units.

At phase II, First, a strategy was developed; second, medical training was provided; and lastly, the Team STEPPS intervention was put into action and assessed. In 2018, the Agency for Health Care Quality and Safety issued recommendations that were followed in the creation of the action plan.

The action plan outlined the initiative's goals, activities during the Team STEPPS program, potential challenges, team training requirements, and a framework for monitoring and evaluation. To develop the training program and educational resources, researchers used insights from pretest results and teamwork assessments. Key components of the training included: (1) interactive workshops, (2) simulations, (3) SBAR, a standardized method for communicating medical information designed to enhance accuracy and minimize errors— in which the acronym SBAR stands for "Situation," "Background," "Assessment," and "Recommendations." The fourth goal is to have debriefing sessions to promote efficiency and cooperation by discussing what was learnt and pushing for constructive actions.

The program was designed to enhance safety culture, teamwork, communication, and awareness of common medical errors and safety precautions. It was implemented over a period of three months. The nurses were separated into ten groups. Each subgroup included ten nurses who were taught on the designated day. The researchers taught each group of nurses four times about the Team STEPPS self-learning package, including knowledge and practical skills. Each session lasted about thirty to forty-five minutes.

Structure of session and content of team STEPPS program

- **During the first session:** the researchers provided each subgroup with information about Team STEPPS self-learning package such as key principles and concepts of Team STEPPS. It will take from thirty to forty-five minutes.
- **During The second session:** The researchers dedicated approximately thirty to forty-five minutes to inform each subgroup about the Team STEPS self-learning package. This package included essential team-related knowledge along with specific tools and strategies designed to enhance the core competencies of Team STEPS.
- **During The third session**: the researcher provided each subgroup with information about Team STEPPS self-learning package such as barriers and outcomes to support the core competencies of Team STEPPS. It was take about thirty to forty-five minutes.
- **During The fourth session:** The researcher delivered Team STEPPS training to each subgroup, equipping healthcare teams with the knowledge and tools necessary to adapt systematically to changing situations. This training fosters a shared understanding of care plans and other complex processes among team members. By cultivating this common mental model, teams build mutual trust and appreciation, which enhances effective collaboration. Additionally, the training promotes a positive attitude toward teamwork, highlighting its benefits and impact on patient safety. Ultimately, higher-performing teams can better leverage information, skills, and resources to achieve optimal outcomes.
- It was take about thirty to forty-five minutes.
- Direct teaching methods such as discussion and video were used during teaching sessions; also, demonstration for the educational program will be done. Each nurse was given a copy of a CD about Team STEPPS self-learning package.
- An immediate post-training test measured the efficacy of the Team STEPPS intervention. Researchers were able to measure the anticipated gains using the same tools and techniques as the pretest in this test.

Phase III: "Sustainment and integration": The team of change researchers remains accessible to facilitate the incorporation of teamwork behaviors into everyday practice and to offer ongoing support. Three months after the post-assessment evaluation, the same data instruments and checklist were utilized to conduct a follow-up, which lasted for one month.

Statistical analysis

The statistical analysis was carried out using SPSS version 22 (SPSS, Inc, Chicago, Illinois, USA). Testing for data normality was done using histograms and the Shapiro-Wilks test. The quantitative parametric data was evaluated using an unpaired student t-test and was provided as mean and standard deviation (SD). We used the Mann Whitney U-test to examine quantitative non-parametric data, which was reported as the median plus interquartile range (IQR). The qualitative variables were examined using the Chi-square test and were provided as frequency and percentage (%). Use Spearman's correlation when you want to find the relationship between two quantitative variables that don't follow a normal distribution. Results were deemed statistically substantial if the two-tailed P value was less than 0.05.

Results:

Table (1): Shows socio demographic of studied nurses regarding gender, it demonstrates that the highest percentages of female (79.4%), concerning the educational levels the highest percentages of associate degree in nursing (82.4%). Regarding years of experience, it shows that 38.2% of nurses studied >5-10 years, Concerning the age it presents the participants mean age in the study was 29.61±7.264years old. Regarding Study Units, it shows that (55.9%) of nurses studied from chest department. There was no statistically significant difference between nurse's studies regarding demographic characteristics.

Table (2): presents socio demographic of studied patients regarding age, it reveals that the highest percentages of patients are between 30 -40 years old (55.2%), also, it reveals that the highest percentages of patients are female and married (51.7%)(89.7%) respectively. concerning the educational levels the highest percentages of patients are secondary education (37.9%). Regarding Study Units, it shows that (58.6%) of patients from chest department. concerning the visiting numbers, it reveals that the highest percentages of patients are visited more than one (62.1%).

Table (3): Presents that the total mean score team STEPPS knowledge among the studied nurses in pretest were 6.20±2.79 and improved to be 15.67±4.36 in the posttest with slightly decrease in follow up than posttest to 14.47±4.25 . While, the total mean score of team STEPPS practice among the studied nurses in pretest was 4.47±7.13 and improved to be 33.94±17.13 in the posttest with slightly decrease in follow up than posttest to 28.94±17.23. Also, the total mean score of teamwork perceptions among the studied nurses in pretest was 86.32±26.97and improved to be 135.85±42.13.13in the posttest with slightly decrease in follow up than posttest to 120.11±32.69.

Additionally, the safety culture of patient total mean score among the studied nurses in pretest was 108.52±36.469 and improved to be 169.82±46.95 with slightly decrease in follow up than posttest to154.08±39.95. Moreover, the total mean score of nursing care quality among the studied patients in pretest was 116. 62 ±34.36 and improved to be 172.48±33.97 with slightly decrease in follow up than posttest to152.37±34.77. Also, there is a highly statistical significant differences among the studied nurses regarding pre/ posttest and follow-up test of total mean scores of team STEPPS knowledge, team STEPPS practice, teamwork perceptions, safety culture of patient, and quality of nursing care as P- value (0.001, 0.001, 0.001, 0.001, and 0.000) respectively.

Figure (1) shows that unsatisfactory level of knowledge pre intervention was 91.2% while in post intervention and follow up, it decreased to (20.6%, 26.50%) respectively. Also, it presents that satisfactory level of knowledge was 8.8% in pre intervention while it improved to 79.4% post intervention and slightly decrease in follow up than posttest to 73.50%. In addition, there is a highly statistical substantial difference among the studied nurses regarding pre/ posttest as P- value (0.001).

Figure (2) reveals that the in adequate level of team step practice pre intervention was 94.10% while in post intervention and follow up, it decreased to

(20.60%, 26.50%) respectively. Also, it presents that adequate level of team step practice was 5.90% in pre intervention while it improved to 79.4% post intervention and slightly decrease in follow up than posttest to 73.50%. In addition, there is a highly statistically substantial difference between the studied nurses regarding pre/ posttest as P- value (0.001).

Figure (3) it illustrates that there is statically improvement among levels of teamwork perceptions posttest than pretest as high level of teamwork perceptions was 11.8% pretest, improved to 55.9% posttest and slightly decreases in follow up than posttest to 50.00%. Also, it shows a highly statistically significant improvement in levels of teamwork perceptions among studied sample post intervention at P<0.001.

Figure (4) it presents that there is statically improvement among levels of patient safety culture posttest than pretest as high level of patient safety culture was 20.6% pretest, improved to 58.8% posttest and slightly decrease in follow up than posttest to 52.9%. Also, it shows a highly statistical significant improvement in levels of patient safety culture among studied sample post intervention at P<0.001.

Figure (5) it highlights that there is statically improvement among levels of quality of nursing care posttest than pretest as satisfying level of quality of nursing care was 20.7% pretest, improved to 58.6% posttest and slightly decrease in follow up than posttest to 41.3%. Also, it shows a highly statistical significant improvement in levels of quality of nursing care among studied sample post intervention at P<0.001.

Table (4) displays that the total score of team STEPPS knowledge and practice had highly statistically significant positive correlations with total score of teamwork perception (r = 0.778, p = 0.000) (r = 0.794, p = 0.000) respectively. In addition, there were highly substantial positive associations among team STEPPS knowledge and practice with total score of patient safety culture (r = 0.744, p = 0.000) (r = 0.748, p = 0.000) respectively. Additionally, high statistically substantial positive associations were found among total score of team STEPPS knowledge and practice with total nursing care quality score (r = 0.529, p = 0.000) (r = 0.338, p = 0.001) respectively.

Table (5): Shows that there was a highly statistically considerable relation among Team STEPPS practice and team perception, safety culture of patient and nursing care quality.

Table (1): Distribution of demographic characteristic of studied nurses (N=102)

Demographic characteristic of studied nurses	No (n=102)	%
Participants' Gender		
Male	21	20.6
Female	81	79.4
Participants' Educational Level		
Associate Degree in Nursing	84	82.4
Bachelor Degree in Nursing	18	17.6
Participants' Years of Experience		
1-5	36	35.3
>5-10	39	38.2
>10	27	26.5
Age		
X±SD	29.61± 7.264	
Study Units		
intensive chest Unit	33	32.4
Chest department	57	55.9
endoscopy Ward	12	11.8
Total	102	100

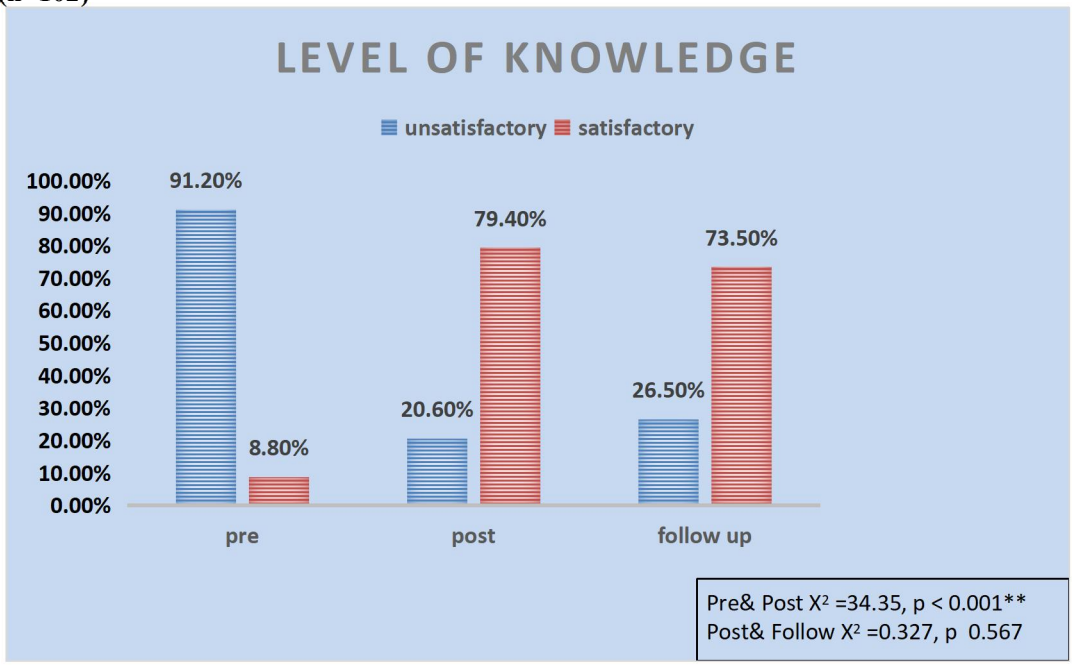
Table (2): Distribution of demographic characteristic of studied patients (N=116)

Demographic characteristic of studied patients	No (n=116)	%
Age		
20-30	**8**	**6.9**
>30-40	**64**	**55.2**
>40-50	**32**	**27. 6**
>50	**12**	**10.3**
Gender		
Male	**56**	**48.3**
Female	**60**	**51.7**
Marital status		
Single	**8**	**6.9**
Married	**104**	**89.7**
(Divorced)	**4**	**3.4**
Educational Level		
Illiterate	**16**	**13.8**
Basic education	**24**	**20.7**
Secondary education	**44**	**37.9**
High education	**32**	**27. 6**
Visit numbers		
One	**44**	**37.9**
More than one	**72**	**62.1**
Study Units		
intensive chest Unit	**24**	**20.7**
Chest department	**68**	**58.6**
endoscopy Ward	**24**	**20.7**

Table (3): Totals mean scores of Team STEPPS knowledge, Team STEPPS practice, teamwork perceptions, patient safety culture, and quality of nursing care on pre, post and follow-up tests

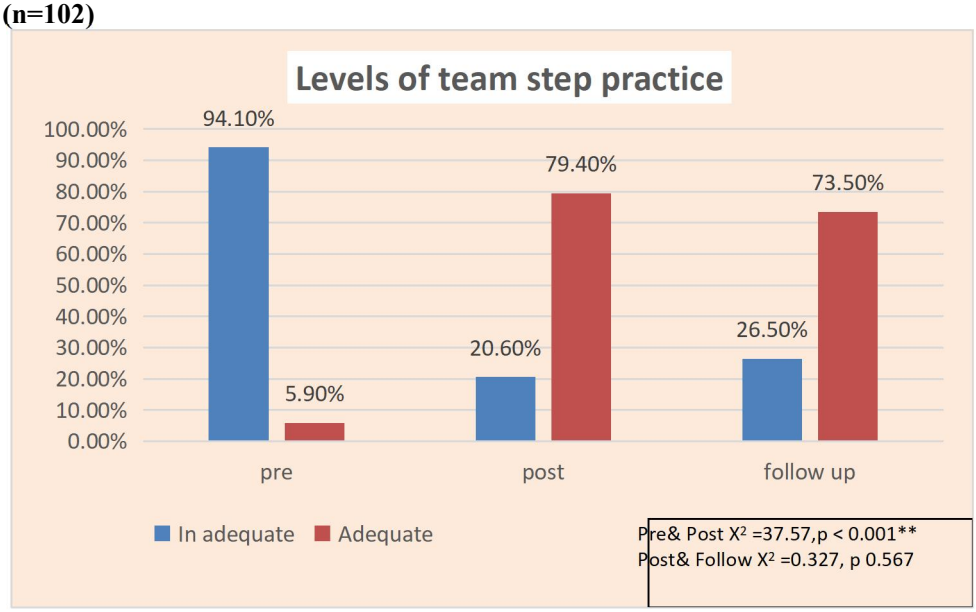
mean scores of Team STEPPS knowledge, Team STEPPS practice, teamwork perceptions, patient safety culture, and quality of nursing care	Pre test	Post test	Follow-up test	Anova Test	P- value
Total Team STEPPS knowledge	6.20±2.79	15.67±4.36	14.47±4.25	60.38^{HS}	0.001
Total Team STEPPS practice	4.47±7.13	33.94±17.13	28.94±17.23	39.54^{HS}	0.001
Total teamwork perceptions	86.32±26.97	135.85±42.13	120.11±32.69	18.29^{HS}	0.001
Total patient safety culture	108.52±36.46	169.82±46.95	154.08±39.95	20.14^{HS}	0.001
Total quality of patient care	116. 62 ±34.36	172.48±33.97	152.37±34.77	19.65^{HS}	0.000

Figure (1) Levels of team STEPPS knowledge on pre, post and follow-up tests among studied nurses (n=102)



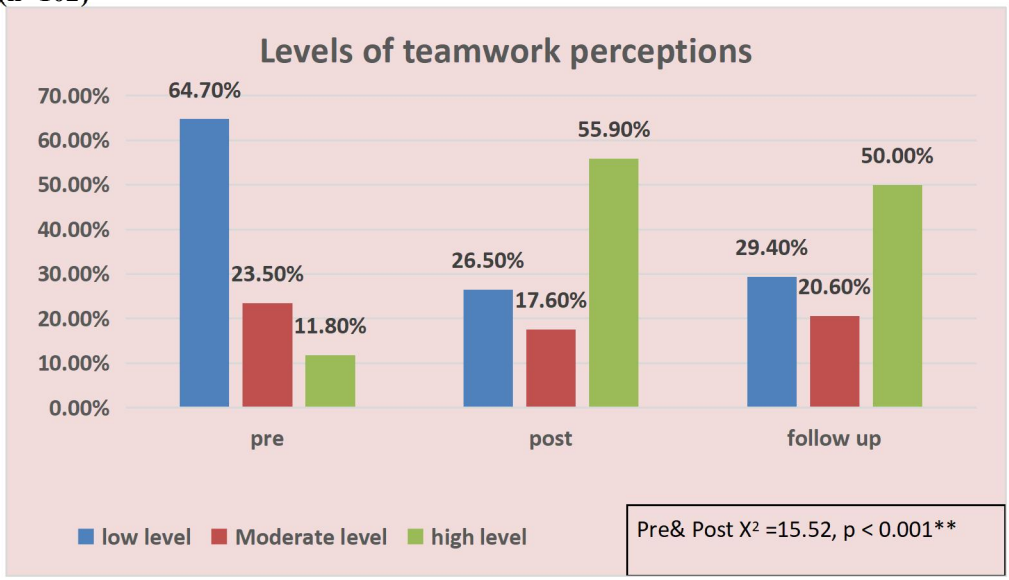
$X^2$1 & P1: Comparison between pre and post intervention.
$X^2$2& P2: Comparison between post and follow-up.

Figure (2) Levels of team STEPPS practice on pre, post and follow-up tests among studied nurses (n=102)



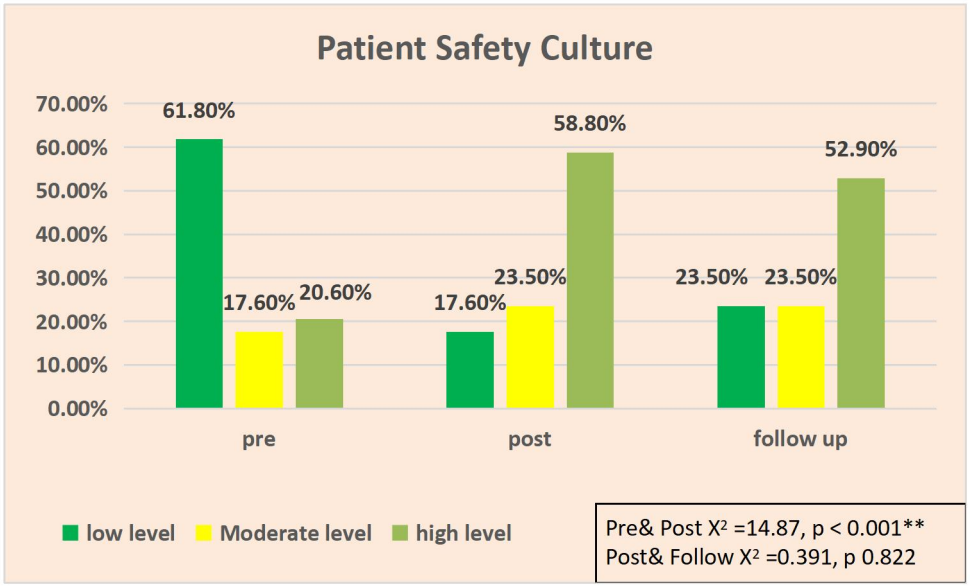
$X^2$1 & P1: Comparison between pre and post intervention.
$X^2$2& P2: Comparison between post and follow-up.

Figure (3) Levels of teamwork perceptions on pre, post and follow-up tests among studied nurses (n=102)



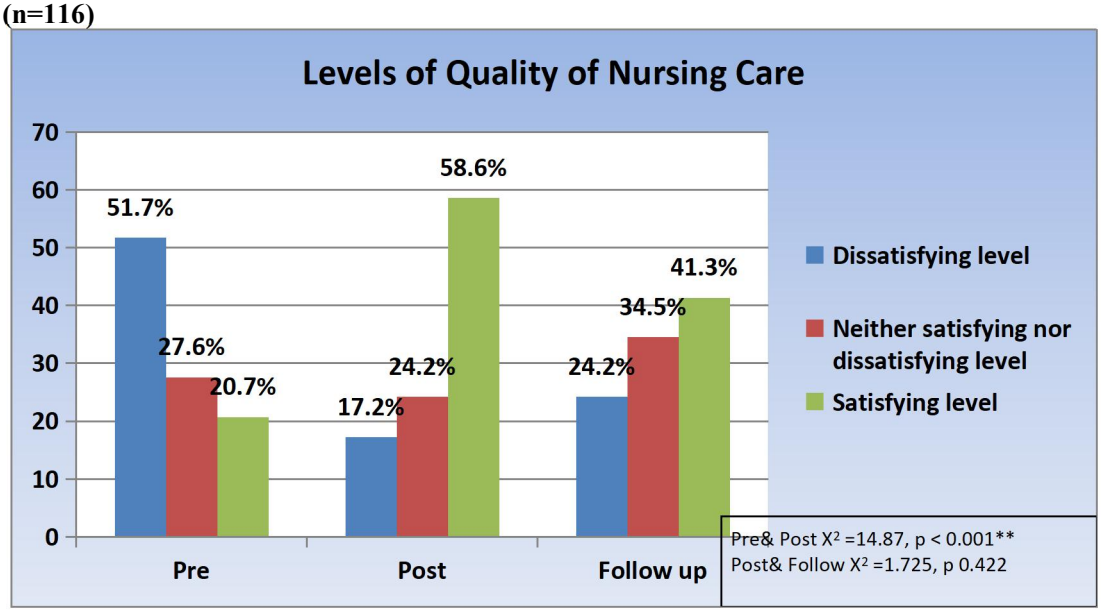
$X^2$1 & P1: Comparison between pre and post intervention.
$X^2$2& P2: Comparison between post and follow-up.

Figure (4) Levels of patient safety culture on pre, post and follow-up tests among studied nurses (n=102)



$X^2$1 & P1: Comparison between pre and post intervention.
$X^2$2& P2: Comparison between post and follow-up.

Figure (5) Levels of quality of nursing care on pre, post and follow-up tests among studied patients (n=116)



$X^2$1 & P1: Comparison between pre and post intervention.
$X^2$2& P2: Comparison between post and follow-up.

Table (4): Correlation matrix among Team STEPPS knowledge, Team STEPPS practice, teamwork perceptions, patient safety culture, and quality of nursing care among studied sample

Variables	Total score of team STEPPS knowledge	Total score of team STEPPS practice	Total score of teamwork perception	Total score of patient safety	Total score of quality of nursing care
Total score of team STEPPS knowledge	-				
Total score of team STEPPS practice	.967^{HS} .000	-			
Total score of teamwork perception	.778^{HS} .000	.794^{HS} .000	-		
Total score of patient safety culture	.744^{HS} .000	.748^{HS} .000	.961^{HS} .000	-	
Total score of quality of nursing care	0.529^{HS} .000	.338^{HS} .001	.801^{HS} .000	.666^{HS} .000	-

Table (5): Multiple linear Regression Analysis of Team STEPPS knowledge, Team STEPPS practice, teamwork perceptions, patient safety culture, and quality of nursing care among studied sample

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	77.378	3.704		20.893	.000
Team perception	1.636	.125	.794	13.081	.000
Patient safety culture	1.872	.166	.748	11.284	.000
quality of nursing care	3.691	.643	.529	5.743	.000

a. Dependent Variable: Team perception, patient safety culture, quality of nursing care
b. Predictors: (Constant), Team STEPPS practice

Discussion

Safety of Patients is essential to the quality of care and is still a work in progress in many nations' healthcare systems. Moreover, providers from a variety of patient care disciplines work in intensive chest care units, which are complicated units (Mohsen et al., 2021). When it comes to lower the risk of complications and higher-quality care for patients with chest diseases, nursing interventions play a major role. Furthermore, a culture that prioritizes patient safety and effective teamwork is necessary for the provision of high-quality healthcare. According to Hassan et al. (2024), In order to enhance these skills, Team STEPPS has developed an evidence-based framework. Therefore, this study aimed to evaluate the impact of a Team STEPPS self-learning package on nurses' perceptions regarding teamwork, patient safety culture, and the quality of care delivered to patients with chest diseases. By assessing these factors, the research seeks to understand how such training can enhance nursing practices in this specific healthcare context.

This discussion covered the following parts: Team STEPS knowledge, Team STEPS practice, Teamwork Perception, Patient Safety Culture and Quality of Nursing Care of Patient.

The current study demonstrated a high substantial increase in mean scores of Team STEPPS knowledge, and practice after implementation of Team STEPPS self-learning package with slightly decrease in follow up than posttest. This study underscores the beneficial impact of the Team STEPPS training program on improving nurses' views of teamwork, hence corroborating hypothesis 1: "The Team STEPPS program will enhance nurses' teamwork perception."

This could explain the observed increase in teamwork scores among nurses following program implementation, as the intervention's efficacy is noticeable in several areas, such as leadership, communication, team structure, situational monitoring, and mutual support. This is evidence of Team STEPPS's competence in enhancing nursing staff communication, cooperation, and teamwork via the application of team concepts and tools.

The results of this study are in line with those of Hassan et al., 2024, who found a substantial increase in mean scores of Team STEPPS perception across multiple assessments. The Team STEPPS training program also had a positive impact on improving novice nurses' perceptions of teamwork.

In line with Mohsen et al., 2021, who conducted research in primary care centers in Menoufa Governorate, Egypt, and discovered that the Team STEPPS program substantially enhanced healthcare providers' perceptions of teamwork across various dimensions, with higher patient satisfaction.

In addition, Matzke et al., (2021) observed that a Level I academic emergency and trauma center in the mid-Atlantic area of Virginia had improved views of communication and teamwork among patient care technicians and registered nurses after participating in the Team STEPPS program. The multidisciplinary healthcare staff at the surgical facility also reported higher levels of cooperation and communication satisfaction in a 2021 pre- and post-study conducted by Dimarino.

On the other hand, Kwon and Duzyj, 2022, ound no significant changes in perceptions of team dynamics or behaviors promoting patient safety among physicians and nurses at a regional perinatal center after undergoing teamwork training. Similarly, Ahsan et al. (2021) reported no notable differences in attitudes and perceptions of team communication between intervention and control groups. These discrepancies may be linked to varying sample sizes, which can affect the sensitivity to detect changes in perceptions, potentially explaining the differences in findings between the studies.

The study's findings revealed a significant increase in mean scores of patient safety culture following the implementation of the Team STEPPS training program, although there was a slight decrease during the follow-up phase compared to pre-implementation scores. This supports the positive impact of the program on participants' patient safety culture, with improvements noted across all dimensions. These results align with the second study hypothesis: "The Team STEPPS program will be effective in improving nurses' patient safety culture".

Researchers suggest that the low level of patient safety culture before the implementation of Team STEPPS was due to a blaming culture that discouraged error reporting. Staff may have feared punishment or reprimand, as indicated by the poor scores in the non-punitive response to errors domain prior to the program's implementation.

The significant improvements in patient safety culture observed during the evaluation periods can be attributed to several factors. One key aspect is that the Team STEPPS program equipped participants with practical resources and techniques to enhance patient safety measures, leading to improvements across various dimensions of patient safety culture. Additionally, the success of Team STEPPS implementation relies heavily on leadership approval and support. As noted by Montminy (2022), active leadership commitment can help foster an organizational culture that prioritizes patient safety and encourages collaborative teamwork.

Leadership support likely played a crucial role in successfully integrating Team STEPPS concepts into routine healthcare practices, positively influencing patient safety culture. This finding aligns with previous research by Mohsen et al. (2021), which also demonstrated that the implementation of the Team STEPPS program led to significant improvements in healthcare providers' patient safety culture.

Bonds (2018) found that the implementation of the SBAR tool significantly improved communication, teamwork, and perceptions of patient safety culture among participants in surgical intensive care units and anesthesia departments at a military teaching hospital. Additionally, Alsabri et al. (2022) discovered that treatments emphasizing teamwork and communication training enhance safety culture in emergency department settings, potentially leading to better patient outcomes. Overall, implementing safety culture programs may help reduce the occurrence of medical errors and adverse events.

In contrast, the findings of this study align with those of Staines et al. (2019), who reported that after implementing the Team STEPPS patient safety culture, only three out of twelve HSPSC dimensions showed improvement in the intervention group. Additionally, Abdo et al. (2018) noted that certain HSPSC domains, particularly the teamwork dimension, received the highest composite scores in various national studies.

The current study demonstrated a significant increase in mean scores for the quality of patient care following the implementation of the Team STEPPS program, although there was a slight decrease during the follow-up phase compared to pre-implementation scores. These findings support the third study hypothesis, which states that the "Team STEPPS program will enhance quality of patient care as reported by patients." This improvement may be attributed to better communication and teamwork among healthcare providers resulting from the training they received as part of the Team STEPPS program.

These findings align with Beiler et al. (2019), who emphasized that effective communication patterns and integrated processes within health teams are essential for enhancing patient experiences and improving the quality of discharge communication. Such improvements contribute to better post-discharge outcomes for patients.

In addition, Behzadifar et al. (2019) identified that healthcare institutions need skilled and dedicated providers who actively practice a safety culture to reduce medical errors and improve patient safety. This commitment is essential for enhancing the overall quality of care delivered in hospitals. Similarly, these findings support Parker et al.'s 2019 integrative review, which found a significant reduction in clinical error rates and improved patient care following Team STEPPS implementation. Furthermore, Kim's (2014) study found that Team STEPPS training improved patient outcomes by increasing patient safety and quality of care in the medical/surgical unit setting.

In contrast, Hoffmann et al. (2015) concluded that the application of Team STEPPS did not lead to measurable improvements in error management, or the quality of care provided. Additionally, Okafor et al. (2018) presented findings that contradicted these results, concluding that, while their study discovered an excellent level of patient care, it was unrelated to Team STEPPS training implementation and a patient safety culture in radio diagnostic units.

Conclusions

According to the researchers, this study is among the few that have assessed the applicability and effectiveness of Team STEPPS specifically in chest units. It focuses on its role in enhancing patient safety culture among healthcare providers and improving patient outcomes. The study utilized a quasi-experimental pretest-posttest design involving only one group.

The generalizability of the results may be limited due to the use of convenience

sampling and the small sample size. Additionally, data collection faced challenges, as some patients were illiterate. Based on the current study's findings, It is reasonable to conclude that the implementation of Team STEPPS effectively improved healthcare providers' perceptions of teamwork and patient safety culture among nurses over time, and significant improvements in patient care quality. Up to three months after the intervention, improvements were seen in both total scores on validated assessments and in individual domains measuring core outcomes.

Recommendation for nursing practice and management

- Nurse Managers should implement Team STEPPS programs to help nurses adopt a patient-safety culture and improve patient outcomes.
- Creating work environments that foster the long-term integration of teamwork skills is essential. This can be achieved by maintaining program fidelity, providing booster training, and implementing supportive organizational processes that reinforce the strategies learned in clinical practice.
- Incorporating Team STEPPS into undergraduate nursing education can enhance students' readiness for practice and provide essential prelicensure training. This approach helps develop comprehensive skills that are applicable in real-world settings.
- Qualitative research can offer valuable insights by exploring participants' perspectives and examining how they integrate their skills into daily work. This approach helps to deepen our understanding of their experiences and practices.
- Further longitudinal research is needed to evaluate the impact of Team STEPPS on nurses' patient safety culture and outcomes after implementation.
- Additional research on public and private healthcare institutions is needed to assess Team STEPPS' effectiveness across various settings.

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