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Team STEPPS Approach as a Mean for Improving Nurses' Teamwork Knowledge and Performance

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Abstract: Background: The implementation of Team Strategies and Tools to Enhance Performance and Patient Safety (Team STEPPS), reduce nursing errors, increase team awareness, clarify team roles, resolve conflicts, improve sharing information, enhance quality of care, and patients' safety. **Purpose:** To evaluate the effect of Team STEPPS intervention on nurses' knowledge and their performance related to teamwork. **Methods:** A quasi-experimental two groups' study research design was utilized. A convenient sampling technique was used to recruit 80 nurses from the study setting. **Instruments**: Two instruments were used: Team STEEPS Knowledge questionnaire, and Team performance observation instrument. **Results**: Post- intervention, study group showed remarkable improvement of STEPPS approach knowledge (95% Vs 0.0%) and performance (85% Vs 0%) pre-intervention. Regarding dimensions of STEPPS approach, the results showed no statistically significant difference between study and control group in all dimensions before intervention. However, post intervention, the results show high statistically significant difference in all STEPPS dimensions. **Conclusion:** The implementation of STEPPS strategies intervention have remarkable positive influence on improving study group nurses' knowledge and performance about teamwork. **Recommendations**: The study recommends reinforcement of Team STEPPS to sustain quality of care and patients' safety.

Keywords: Nurses Knowledge, Performance, Team STEPPS.

Introduction

Effective teamwork is necessary for both patient safety and care quality, as it facilitates efficient patient care and averts unfavourable outcomes. emphasizes the need of developing a collaborative culture in the healthcare

organization. emphasizes how crucial it is to foster a culture of cooperation in the healthcare industry (Karlsen et al., 2022). But collaboration is a skill that must be acquired, and early team training in health care education is necessary. The adoption of updated Team STEPPS is anticipated to increase interprofessional cooperation and communication, hence reducing the risk of medical errors and ensuring patient safety. Team STEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) aims to promote teamwork by means of enhanced communication. It raises safety and quality by promoting efficient communication and teamwork abilities. (Mercader et al., 2021).

The Department of Military and the National Agency for Health Research and Quality created Team Tools and Strategies to Improve Patient Safety and Productivity (Team STEPPS), a methodical approach to integrating into practice the concept of teamwork. Its goal is to enhance the standard of quality, patient safety and effectiveness of healthcare services. Team STEPPS is a concept of cooperation created specifically for healthcare providers that is an effective way to increase patient safety inside an institution. Additionally, a teamwork method based on research to enhance health care workers' communication and the teamwork abilities. Moreover, a resource for readily available materials and a training intervention to effectively incorporate the concepts of teamwork into every aspect of your healthcare system. Healthcare workers are taught leadership techniques, mutual trust, shared mental models, and closed-loop communication by Team STEPPS (Grose & Burney, 2022).

The following are the five guiding principles for applying Team STEPPS: 1) Team Structure, which identifies the elements of a multi-team system that must cooperate well to guarantee the safety of patients; 2) The systematic process of communication allows team members to precisely and clearly share knowledge; 3) Leadership is the capacity to enhance team members' efforts by making certain that team actions are comprehended, information updates are communicated, and team members have the tools they need; The practice of actively scanning and evaluating situational aspects in order to learn something new, gain comprehension, or keep awareness in order to enhance teamwork is known as scenario monitoring; 5) Mutual support is the capacity to foresee and assist the requirements of team members by having precise information about their roles and workload (Quinto, 2023).

Team structure is included in the first principle of Team STEPPS and is described as a crucial step in the teamwork process. A well-structured patient care team is the product of and a facilitator of strong leadership, mutual support, situation monitoring, and communication. By having a clear leader, including the patient, and making sure that everyone on the team is committed to their duties in productive cooperation, a well-

designed team structure may foster teamwork (Matzke et al., 2021).

The interchange of precise and unambiguous information within the team is the second STEPPS principle, which is communication. Using these techniques will guarantee that there is effective communication: 1) The SBAR technique (Situation, Background, Assessment and Recommendation) , which offers a structured framework for team members to discuss a patient's condition; 2) The call-out technique, which is employed to direct vital information during an emergency to a particular member; 3) The check-back technique, a closed-loop communication tactic utilized to confirm and authenticate information shared; and 4) The handoff technique, which is intended to improve information exchange during crucial moments like care transitions and sustain continuity of care even when providers change (Staines, Lécureux, & Rubin, 2020).

The third Team STEPPS principle is the leadership, which states that a successful team leader is an informed team member who makes decisions, acts, and sets objectives. Depending on the kind of team they are leading or the circumstances, both designated and situational team leaders need to have a certain set of talents (Khoshnoodifar et al., 2024). Team leaders have three strategies at their disposal to effectively organize the team event: 1) Briefs given to the team to outline a plan at the beginning of a shift or case; 2) Huddles that utilized to review and change the plans in order to keep everyone on the same page or to adjust the plan in response to known or anticipated changes; and 3) Debriefs to analyze the event and enhance team performance by highlighting the things that went well and areas for improvement (Lee et al., 2021).

The practice of constantly scanning and evaluating situational components in order to get knowledge or understanding, or to maintain awareness to support team functioning, is known as situational monitoring, and it is the fourth principle of Team STEPPS. Among the situational monitoring techniques and resources are: 1) Cross-Monitoring is a harm error reduction approach; 2) STEP (Status of the patient, Team members, Environment and Progress towards objective) technique is a tool for monitoring conditions in the delivery of health care; The third strategy is the I'M SAFE (Illness, Medication, Stress, Alcohol and Drugs, Fatigue, and Eating and Elimination) approach, where each team member evaluates their own safety (Shen et al., 2020).

The final Team STEPPS principle is mutual support. Task assistance is one type of mutual support in which team members shield one another from situations where they are overworked, frame all offers and requests for help in terms of patient safety and create an environment where it is expected that help will be actively sought and provided (Arrogante et al., 2023). Additionally, the following tactics may be used to provide: 1) Task assistance, that comprises requesting help when required and lending a hand to teammates when the chance presents

itself; 2) Feedback, that is, data offered to enhance team performance; 3) Advocacy and assertion interventions, which provide the team member a chance to rectify mistakes or a loss of context awareness; 4) The Two-Challenge Rule, that giving team members the authority to halt the queue in the event that they see a critical safety lapse; 5) The aggressive remarks which known as CUS (Concerned, Uncomfortable, and Safety problem) hat offer an additional means of mutual support (Stewart et al., 2023).

The Team STEPPS interventionme was created to increase healthcare safety, quality, and efficiency. It gives nurses the abilities, information, and skills that improve their performance and improve organizational performance. It equips nurse managers with the abilities they need to handle conflict, lead teams more successfully, and enhance teamwork performance. By putting the Team STEPPS techniques into practice, impediments to quality and safety can be removed, mistakes can be reduced, team awareness raised, responsibilities can be clearly defined, disputes can be resolved, and information exchange can be improved. Strong organizational cultures, high production, and job happiness are all predicted by teamwork and good communication. Additionally, establishing a solid basis for cooperation and communication can aid in converting the safety of each individual patient into the entire system of safety (Mohsen et al., 2021).

For health care teams to communicate effectively and, ultimately, ensure patient safety, nurses are essential. When nurses take the lead in multidisciplinary teamwork, health care teams gain. As first responders in the medical field, nurses frequently form bonds with patients, other professionals, and carers. Innovative care models are led and contributed to by nurses as well. When nurses collaborate with physicians and other multidisciplinary teams, patients gain (Fuchshuber & Greif, 2022).

Significance of the study:

Especially among nurses who provide patients the greatest attention, team communication is essential to the delivery of healthcare. Numerous studies have demonstrated that a lack of team communication can have a number of dangerous effects on patients, including as adverse and sentinel events and medical mistakes. Additionally, when comparing nursing to other healthcare specialties, it is more evident that nurses have lower levels of collaborative understanding and performance. Nursing cooperation has been linked to fewer missed nursing interventions, and incomplete interventions are associated with higher adverse event rates and lower nurse-reported quality of care (Vyas et al., 2024).

This study purposed to evaluate the effect of the Team STEPPS intervention on nurses' knowledge and their performance about teamwork.

Purpose of the study

The purpose of this study is to evaluate the effect of team STEPPS intervention on nurses' knowledge and their performance about teamwork.

Research Hypotheses:

1) Nurses who receive team STEPPS intervention (study group) will have a higher level of knowledge about teamwork than nurses who did not receive the training intervention (control group).
2) Nurses who receive team STEPPS intervention (study group) will have a higher level of performance about teamwork than nurses who did not receive the training intervention (control group).

Operational definitions of study variables :

Team STEPPS approach:

It is concerned with team structure, communication skills, leading teams, monitoring situation and mutual support skills.

Nurses' teamwork knowledge:

Nurses' knowledge about team structure, communication skills, leading teams, monitoring situation and mutual support skills. It will be assessed by Team STEPPS Knowledge questionnaire developed by (Rockville, 2014).

Nurses Teamwork Performance:

It is nurses' performance in Team Strategies and Tools to Enhance Performance and Patient Safety. It will be assessed by Team Performance Observation instrument developed by the Agency for Healthcare Research and Quality (AHRQ, 2012), and reviewed by (Rockville, 2019).

Methods

Research Design:

A quasi-experimental design was conducted using pretest, post-test, for both control and study groups.

Setting:

The current study was conducted at National Liver Institute, in the selected units (the Intensive care units, the operation room, and premature Unit) at Shebin El-kom, Menoufia governorate, Egypt.

Sample:

A convenience sampling of 80 nurses were used from mentioned previous settings. They were randomly assigned into two groups (40 nurses for each group). The study group contained 40 nurses (30 nurses, 7 head nurses and 3 nurse supervisors). The study group received the intervention. The control group contained 40 nurses (31 nurses, 6 head nurses and 3 nurse supervisors). The control group didn't receive the Team STEPPS approach.

Sample size:

In order to calculate the sample size, the following equation was used:

Sample size $= \frac{\mathbf{2SD^2\,(Z_{\alpha/2}+Z_{\beta})^2}}{\mathbf{d^2}}$

SD = Standard deviation (it can be calculated after pilot study or can be taken from previous related studies)

$\mathbf{Z_{\alpha/2}} = Z_{0.05/2} = 1.96$ (Type I error at 0.95 level)

$\mathbf{Z_{\beta}} = Z_{\beta 0.20} = 0.842$ (80% power, from Z table)

d= Effect size (difference between means of experimental and control groups)

In this study, the equation results with a total sample size of 80, that then divided in to 40 nurses as study group, and 40 as control group.

Instruments:

Instrument one: Team STEEPS Knowledge questionnaire:

It was developed by the researcher based on valid and reliable modified Team STEPPS questionnaire (Rockville, 2014) and review of literature about Team STEEPS Approach. The instrument contained two main parts:

- Part 1: included personal data of study sample (age, gender, job title, educational qualification, years of experience and the unit of work)
- Part 2: included 16 items to assess nurses' knowledge about Team STEEPS Approach. (Rockville, 2014).

Scoring system:

For each item of 16 items: Two points Likert scale (0 – 1) as (0) for wrong answer and don't know, and (1) for correct answer.

Total scoring system:

The nurses 'knowledge about teamwork was evaluated giving a score of 0-16. Poor knowledge scores ranged between 0 – 5 points. Scores indicating moderate level of knowledge ranged between 6 – 10 points. Meanwhile, scores indicating good knowledge ranged from 11 – 16 points.

Instrument two: Team Performance Observation instrument:

This instrument was developed by the Agency for Healthcare Research and Quality (AHRQ, 2012), and reviewed by Rockville (2019). The Team performance observation instrument contained five principles (23 items): team structure (4 items), communication (4 items), Leading teams (6 items), situation monitoring (5 items) and mutual support (4 items).

Scoring System:

Scoring system for each item: Each item had six points Liker scale (0 – 5) as 0 for not applicable, 1 for very poor, 2 for poor, 3 for acceptable, 4 for good, and 5 for excellent.

Total scoring system: It ranged from 0-20 The total score of each nurse was categorized into "poor team structure" when she achieved 0 - 7 points of the total score, and those who had 8 - 14 points were considered as acceptable team structure, and those who had 15 – 20 points were considered as excellent team structure.

The nurse's performance about communication was evaluated giving a score of 0-20 The total score of each nurse was categorized into poor communication when she achieved 0 - 7 points of the total score, and those who had 8 - 14 points were considered as acceptable communication, and those who had 15 – 20 points were considered as excellent communication.

In addition, the nurses 'performance about Leading teams was evaluated giving a score of 0-30 The total score of each nurse was categorized into

"poor Leading teams" when she achieved 0 - 10 points of the total score, and those who had 11 - 20 points were considered as "acceptable Leading teams", and those who had 21 – 30 points were considered as "excellent Leading teams".

The nurses 'performance about Monitoring situation was evaluated giving a score of 0-25. The total score of each nurse was categorized into "poor monitoring situation" when she achieved 0 - 8 points of the total score, and those who had 9 - 17 points were considered as "acceptable monitoring situation", and those who had 18 – 25 points were considered as "excellent monitoring situation".

The nurses 'performance about mutual support was evaluated giving a score of 0-20. The total score of each nurse was categorized into "poor mutual support" when she achieved 0 – 7 points of the total score, and those who had 8 - 14 points were considered as "acceptable mutual support", and those who had 5 – 20 points were considered as "excellent mutual support".

Regarding the grand total performance, the nurses had from 0-115 points of the grand total score. The total score of each nurse was categorized into "poor total performance" when she achieved 0 – 38 points of the total score, those who had 39 - 76 points were considered as "acceptable total performance", and those who had 77 – 115 points were considered as "excellent total performance".

Validity

These instruments were tested for validity (face validity) through distribution of the instruments between a panel of 5 experts (two professors and three assistant professors) of nursing administration Faculty of Nursing, Menoufia governorate.

Reliability of instruments

Reliability of instrument one using Alfa Coefficient test (Cronbach's alpha) was 0.84.

Reliability of instrument two was measured by using Cronbach's alpha and the value was α=0.80.

Ethical Consideration

After receiving the approval of the Faculty of Nursing Ethical and research committee from the selected hospital, the study was conducted. Ethical and Research Committee Decision No. 917–2022. The respondent's rights were protected by ensuring voluntary participation, so that informed written consents were obtained after explaining the purpose, nature, time of conducting the study, the potential benefits of the study and how data was collected. The respondents were assured that data was treated as strictly confidential. Furthermore, the respondents' anonymity was maintained as they were not required to mention their name.

Pilot study

The pilot study was carried out on 10 % of the study sample (8 nurses) to evaluate study instruments in terms of its clarity, applicability and time required to fulfill all the study

instruments and also to explore its feasibility. The pilot study's sample was not included in the study.

Procedure:

A letter was submitted from the Dean of the Faculty of Nursing to the Dean of the Liver Institute including the purpose and methods of data collection. An official approval was obtained from the Dean of National Liver Institute Hospital Administration (approval 8- 2022). Before data collection, a code sheet was developed. Then, the researcher assigned code numbers randomly to every participant by pulling a number from the pool. The research was conducted over a six-month period, from the beginning of August 2022 to the last day of January 2023.

Assessment phase

Assessment of nurses' teamwork knowledge about Team STEPPS and its key principles (team structure, communication skills, leading teams, monitoring situation and mutual support skills) was done Afterwards, assessment of nurses' teamwork performance about Team Strategies and Tools was conducted

Planning phase:

Based on the findings of the nurses' knowledge questionnaires and their performance observation before Team STEEPS intervention, the educational intervention was planned. It started at the beginning of August 2022 and ended at the beginning of September 2022.

Implementation phase:

The study group contains 40 nurses were divided into two groups; each group contains 20 nurses. Each nurse received 16 hours theory. Each group received eight theoretical sessions (each session was two hours) and four practical sessions. The Team STEEPS intervention lasted for four weeks for each group (one month for two groups Each group received 8 sessions:

- The first session: Theoretical information about concept of Team STEPPS and its principles.
- The second session: Theoretical and practical information about Team structure skills.
- The third session: Theoretical and practical information about communication skills (Situation, Background, Assessment, and Recommendation (SBAR) and handoff technique).
- The fourth session: Theoretical and practical information about communication skills (on Call-Out, Check-Back).
- The fifth session: Theoretical and practical information about leading team skills (Briefs, Huddles, and Debrief techniques).
- The sixth session: Theoretical and practical information about situation monitoring strategy likes STEP (Status of patient, Team members, Environment and Progress).
- The seventh session: Theoretical and practical information about mutual support strategies (task assistance skill and feedback).
- The eighth session: Theoretical and practical information about mutual support strategies by using Two-

Challenge Rule and assertive statements.

- Teaching methods used were group discussion, lecture, scenario-based situations and brainstorming were very important with effective clinical practice. Teaching aids were PowerPoint, videos, and poster were utilized.

Evaluation phase:

Posttest was conducted for the study and control groups 3 months later.

Statistical analysis

Data was entered and analyzed using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using excel intervention. Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using student t- test for comparison between two means, and ANOVA (F) test for comparison between more than two means.

Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square ($\chi 2$) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used (if the table was 4 cells), or Likelihood Ratio (LR) test (if the table was more than 4 cells). Level of significance was set as P value <0.05 for all significant tests.

Results

Table 1 revealed that the majority of studied nurses were females (65%, 60%) in the control and study groups respectively. The studied nurses ages were 20 to 30 years (65%, 75%) in the control and study group respectively. Nearly half of all nurses had Bachelor (42.5, 50) both control and study group respectively.

Table 2 highlights the efficacy of the Team STEPPS approach intervention on the knowledge of studied nurses. Post Team STEPPS intervention revealed a very highly statistically significant improvement ($p<0.0001$) in the different levels of knowledge aspects. The post intervention' good knowledge responses, among study group increased from 0 % in pre intervention to 95% in post intervention. In addition, the total mean score of knowledge increased from 3.5 ±1.7 pre-intervention to 12.6±2.1 post intervention, and the difference was high significant statistically ($P<0.0001$). Concerning the control group, there was no statistically significant difference between mean total score of knowledge pre intervention (3.3±1.2) and post intervention (3.4±1.7), ($t=1.5$, $P=0.09$). Moreover, there was high a highly statistically significant difference between control and study groups post intervention (3.4±1.7 and 12.6±2.1 respectively) with $t=12.6$, $P<0.0001$.

Table 3: reveals the efficacy of the Team STEPPS approach intervention on the performance of studied nurses. Post intervention intervention revealed a very highly statistically significant improvement ($p<0.0001$) between pre and post intervention. The post intervention' acceptable and excellence performance responses, among study group, were increased from 5% and 0% respectively in pre

intervention to 15% and 85% respectively in post intervention. In addition, the grand total mean score of performance increased from 19.7±3.7 pre-intervention to 99.0±6.10 post intervention, and the difference was very highly statistically significant (P<0.0001). Concerning the control group, there was no statistically significant difference between mean total score of performance pre intervention (20.7±3.8) and post intervention (21.32±3.9. However, there was a very highly statistically significant difference between control and study groups post intervention (21.3±3.9 and 99.0±6.10 respectively) with t=56.0, P<0.0001.

Table 4 demonstrates the descriptive statistics of nurses' teamwork performance dimensions on pre, and post interventions for control and study groups. As shown, the lowest mean score related to team STEPPS dimensions; (mutual support) was 3.80, 4.33 for both control and study groups respectively at pre-Team STEPPS intervention. While, the highest mean score regarding team STEPPS dimensions were leading teams (22.7), and situation monitoring (22.25) for the study group post intervention intervention. Post intervention study group revealed a highly significant improvement (p<0.0001) between of all dimensions of team STEPPS approach than control group.

Figure 1: reveals the highest level of nurses' knowledge was about teamwork among nurses (95% of nurses had good knowledge in study group.

Table 1: Sociodemographic characteristics of studied participants (N=80)

Personal characteristics	Control group (N=40)		Study group (N=40)	
	No.	%	No.	%
Age (years)				
20 - <30 Y	26	65	30	75
31 - <40 Y	6	15	7	17.5
≥ 40 Y	8	20	3	7.5
Mean ±SD	29.9 ± 8.3		27.6 ± 6.5	
Gender				
Male	14	35	16	40
Female	26	65	24	60
Experience				
≤ 10 Y	33	82.5	34	85
11 – 27 Y	7	17.5	6	15
Job title				
Nurses	31	77.5	30	75
Head nurses	6	15	7	17.5
Nurse supervisor	3	7.5	3	7.5
Working Units				
ICU	14	35	14	35
Premature Unit	13	32.5	13	32.5
Operations	13	32.5	13	32.5
Education				
Nursing Institute	6	15	5	2.5
Bachelor	17	42.5	20	50
Graduate	16	40	13	2.5
Educational certificate	1	2.5	2	5.0

Table 2: Percentage distribution of the studied nurses according to their knowledge about teamwork before and after intervention (N = 80):

Knowledge levels about teamwork	Pre intervention					Post intervention				
	Control group		Study group		P1 value	Control group		Study group		P2 value
	No	%	No	%		No	%	No	%	
Poor knowledge (0 – 5)	38	95	37	92.5	LR=0.84 P=0.35	37	92.5	0	0	LR=76.1 P 0.0001
Moderate knowledge (6-10)	2	5	3	7.5		3	7.5	2	5	
Good knowledge (11- 16)	0	0	0	0		0	0	38	95	
Total	40	100	40	100		40	100	40	100	
Mean ± SD	3.3±1.2		3.5±1.7		t=1.5 P=0.09	3.4±1.7		12.6±2.1		t=12.6, P<0.0001

P1=Comparison between control and study groups pre-intervention.

P2= Comparison between control and study groups post-intervention

Table 3 Percentage distribution of the studied nurses according to their total performance about teamwork before and After Intervention (N = 80)

Performance levels about teamwork	Pre intervention					Post intervention					P3 value	P4 value
	Control group		Study group		P1 value	Control group		Study group		P2 value		
	No	%	No	%		No	%	No	%			
Poor performance (0 – 38)	39	97.5	38	95	LR=0.0 P=1.0	39	97.5	0	0	LR=74.4 0.0001**	LR=73 0.0001**	LR=0.51 P=0.47
Acceptable performance (39- 76)	1	2.5	2	5		1	2.5	6	15			
Excellent performance (77- 115)	0	0	0	0		0	0	34	85			
Total	40	100	40	100		40	100	40	100			
Mean ± SD (Grand total performance)	20.7±3.8		19.7±3.7		t=1.14, P=0.26	21.32 ± 3.9		99.0 ±6.10		t=56.0 0.0001**	t= 76.5, 0.0001**	

P1=Comparison between control and study groups pre-intervention. LR=Likelihood Ratio

P2= Comparison between control and study groups post-intervention.

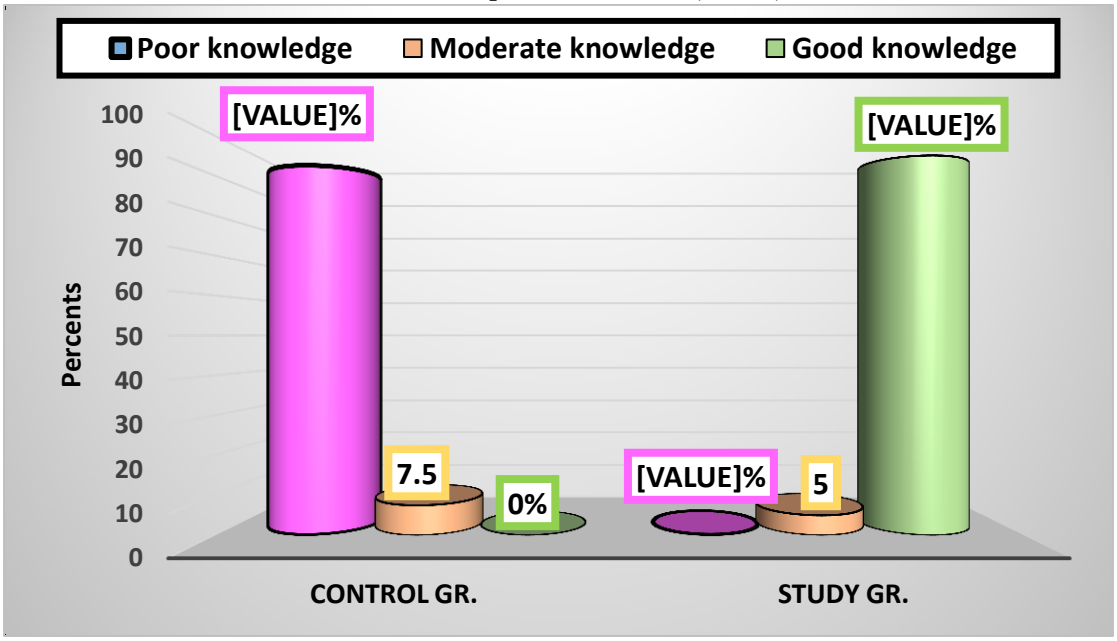
P3= Comparison between pre- and post-intervention' study group.

P4 = Comparison between pre- and post-intervention' control group

Table 4: Percentage distribution of the studied nurses according to their performance' dimensions about teamwork before and After Intervention (N = 80)

Dimensions of Team STEPPS	Pre intervention			Post intervention		
	Control group	Study group	P1 value	Control group	Study group	P2 value
	Mean ± SD	Mean ± SD		Mean ± SD	Mean ± SD	
1. Team structure	5.5 ± 1.5	5.3 ± 1.6	t=0.49, P=0.62	5.7±1.4	17.5± 1.6	t=34.1 P<0.0001
2. Communication	4.2 ± 1.6	4.1 ± 1.3	t=0.29, P=0.77	4.4±1.6	18.9±1.4	t= 41.7, P<0.0001
3. Leading teams	6.7 ± 1.3	6.5 ±1.6	t=0.66, P=0.51	6.7±1.3	22.7±1.8	t= 44.5, P<0.0001
4. Situation Monitoring	5.98±1.8	5.50±1.9	t= 1.11, P=0.27	6.10±1.9	22.25±2.0	t=36.5, P <0.0001
5. Mutual support	4.33 ± 1.4	3.80 ± 1.4	t=1.6, P=0.11	4.53±1.5	17.63±1.51	t=38.8, P<0.0001

Figure 1: Percentage distribution of study sample according to their total knowledge about teamwork post-intervention (N = 80)



Discussion

Nurses are one of the principal healthcare professionals who provide patients' healthcare twenty-four hours a day (Rosengarten, 2022). Nurses' teamwork is a process where members interact together, combine resources and efforts to complete assigned nursing tasks (Schmutz et el. 2019). Cooperative teamwork plays a crucial role in safe and high-quality patients' care (Costello,2022, Kakemam, 2021, Donovan, 2018). Therefore, it is important for first line nursing managers to encourage effective

teamwork. This study evaluates the impact of Team STEPPS intervention for improving nurses' knowledge and performance of teamwork.

The study reveals that there is poor knowledge about teamwork (STEPPS) approach among both study and control groups before implementation of the TeamSTEPPS intervention. Then, the level of knowledge about teamwork STEPPS approach remarkably improved only among study group after implementation of the team STEPPS intervention. However, team STEPPS intervention contain various domains, including team structure, situational monitoring, leadership, mutual support, and communication,

From the researcher's point of view this result may be due to the assumption that the concept of team STEPPS is still fairly recent for different categories of nurses (nurses, head nurses and nurse supervisors) could be one explanation for this result. Moreover, the nursing curriculum didn't include any data regarding this subject. The poor level of knowledge about teamwork (STEEPS) approach is related to shortage of nurses that is a common challenge in all healthcare organizations not only in the setting where the study conducted. Also, case method is the selected strategy for organizing patients' care by nurse managers and nurses especially in the critical care units.

These results are aligned with Khoshnoodifar et al., (2024) whose study evaluate the effects of new practical approach using TeamSTEPPS strategies and tools on healthcare professionals' knowledge and attitudes about teamwork. The study revealed that the low mean score of knowledge about teamwork in the healthcare professional was before the TeamSTEPPS intervention, while, after the intervention was increased in all TeamSTEPPS dimensions, including team structure, communication skills, situation monitoring leadership, and mutual support.

In the same line, the current study results are supported with study of Shaw (2023) that evaluate the effect of Team STEPPS on teamwork perceptions among newly graduated nurse, the study found that participants' pre-intervention mean scores were low about teamwork perceptions but improved significantly after TeamSTEPPS intervention. Furthermore, this study findings are consistent with Dodge et al., (2021) study which found that staff knowledge of teamwork significantly improved after the implementation of TeamSTEPPS training in ambulatory reproductive health care centers. Furthermore, another the study's finding show that nurses' knowledge of teamwork increased when TeamSTEPPS was implemented. This implies that nurses who participate in this training begin to view cooperation as a beneficial aspect of productive workplaces.

In congruence with the current study, Staines et al., (2020) concluded that nursing staff' perception of teamwork and communication improved significantly after implementation of

the Team STEPPS intervention. For instance, Mohsen et al., (2021) demonstrated a significant improvement in healthcare providers' teamwork perceptions, encompassing various facets, alongside increased patient satisfaction upon implementing the TeamSTEPPS intervention in primary care units in Menoufia Governorate, Egypt.

On the contrary, Kwon and Duzyj (2022) stated that Team STEPPS intervention training was not demonstrative of improvement in nurses' teamwork perceptions after implementation training due to ineffective training. Also, Ahsan et al., (2021) showed that there was no difference before and after the TeamSTEPPS training in nurses' teamwork perceptions between intervention and control groups therefore, it means that the implementation of TeamSTEPPS training on nurses' team in the hospital did not have a significant effect. Discrepancies in these results might be linked to differing sample sizes. These variations in sample sizes could affect how sensitively changes in nurses' views of cooperation are detected, which could account for the inconsistent results shown in this research.

Despite the fact that there is no significant difference between both groups regarding dimensions of team STEPPS approach before intervention, while, post intervention study group shows high statistically significant difference between of all dimensions of team STEPPS approach than control group. Obviously, experimental groups who got the training about team STEPPS approach shows better knowledge and practices of teamwork than control group who does not got this opportunity.

The current study is aligned with Shinae (2021) whose study evaluate the effectiveness of teamwork improvement intervention for perioperative patients. the study found no significant difference in the nurses' teamwork performance was identified between the experimental and control groups before team STEPPS training, while, the nurses' teamwork abilities and their performance level showed a significant improvement posttest in the experimental group compared to the control group.

After training, nurses saw a shift in how they saw teamwork in the workplace. At the same line, the Gunberg et al., (2021) study demonstrated that both study group and control groups have poor teamwork performance level among nurses regarding team STEPPS approach before intervention. While, only study group has excellent level of performance after implementation of the training intervention. Certainly, as nurses have inadequate understanding of the STEPPS approach, which promotes teamwork, this concept is not employed as a means for delivering nursing care for patients.

In agreement with this study findings were Milanovich and Kendall (2020) research which reported statistically significant gains were observed on all teamwork dimensions among nurses following a two-month team STEPPS intervention, however, it was revealed

that training increases nurses' teamwork performance. Similarly, Qiu, et al., (2024) who found that practical skills about teamwork among nursing students in the experimental group were significantly greater than the control group after implementation of teamSTEPPS training. Also, another study conducted by Hill (2020) who reported that teamwork training has been shown to have a positive effect on team performance in the obstetric/gynecology departments.

The present study results were inconsistent with Ahsan et al., (2021) study which stated that the implementation of TeamSTEPPS has no significant effect on nurses' teamwork skills and communication behavior in the hospital, this study results was due to two main factors: the lack of motivation and commitment of nurses during their training, several participants lacked self-control and entered and exited the room during the session. In addition to, Curtsinger's research (2018) revealed a 0.02% decline in the communication dimension value attained post-training; nevertheless, it was assumed that this decrease was caused by the absence of discussion activities throughout the training.

This study revealed that the post intervention study group shows significant improvement for all dimensions of team STEPPS approach than control group. Nurses of study group got the highest mean score for leading teams' and situational monitoring dimensions of STEPPS approach. Leading team dimension includes: Identifies team goals and vision, uses resources efficiently to maximize team performance, balances workload within the team, delegates tasks or assignments as appropriate, conducts briefs, huddles, debriefs, and role models teamwork behaviors. This is the positive consequence of effective training intervention about team STEPPS approach. Meanwhile, the lowest mean score is for team structure dimension. It includes: Assembles a team, assigns or identifies team members' roles and responsibilities, holds team members accountable, and includes patients and families as part of the team. This is an expected outcomes as team structures components are mainly the responsibility of nursing managers.

In the same line, the study results are supported by Khoshnoodifar et al., (2024) study. Teamwork training needs were identified significant improvement post-training among nurses for six micro-skills: call-out and check-back, I'M SAFE checklist, briefing, debriefing, cross-monitoring, and two-challenge rule. The outcomes of the intervention demonstrated how the intervention enhanced the interprofessional team's ability to work together while performing cesarean section surgery. Following the intervention, a noteworthy rise was noted in the average score for both teamwork' behaviors and knowledge.

Furthermore, Curtsinger (2018) study found the five core components of TeamSTEPPS training were rated by the participants, the performance on the unit began to shift. Huddles became mandatory and much more organized. Staff was also encouraged

to participate in the huddles, which increased morale and gave them a sense of inclusion during the shift. Another study conducted by Webber (2021) results identified improvement in team function and structure, leadership, mutual support, situation monitoring, and communication. results indicated that the TeamSTEPPS implementation contributed to a positive impact on nurses' teamwork behaviors.

These results are aligned with Ballangrud et. al., (2021) study which found the use of situational monitoring tools were mentioned in relation to improved teamwork skills. Similarly, Stringfield (2019) study identified improvements in all five team STEPPPS categories (team structure, communication, Leading Teams, mutual support, situation monitoring,). There were improvements in leadership communication and Leading Teams after implementing TeamSTEPPS training which use of briefs, huddles, debriefs, and SBAR can enhance nursing teamwork among units. It demonstrated that huddles have beneficial at all levels of the organization. Implementation nurse huddle led to improve the clinical environments teamwork climate. These finding were in accordance with the results of the studies conducted by Curtsinger (2018) which revealed improvements in leadership and situation monitoring, while communication and team structure showed the least the post Team intervention.

On the contrary, Cooke (2021) study results indicated that nurses' teamwork were highest for team structure and leadership, whereas communication, situation monitoring, and mutual support were lower post-TeamSTEPPS training. In addition, the study's findings indicated that an intervention might enhance the domain of team structure. This area places a strong emphasis on the role that patients play as the most vital members of the healthcare team. It also alludes to the important part that patient and family input plays in the effectiveness of healthcare teams.

One explanation for the outcomes of the current study may be connected to the teamwork intervention having a favorable impact on nurses 'teamwork in the critical care units and improved after the TeamSTEPPS training, due to the high interest of the participants in the training. The TeamSTEPPS intervention also improved the performance and knowledge of nurses on teamwork. Putting the TeamSTEPPS training into practice has several beneficial effects on nurse teamwork.

Conclusion

The study concluded that the implementation of STEPPS strategies intervention have remarkable positive influence on improving study group nurses' knowledge and performance about teamwork. Additional research studies on various healthcare institutions would be beneficial when assessing team STEPPS' effectiveness in various healthcare environments.

Recommendations

First, teamwork and communication should be given top priority in the workplace by nursing leaders and healthcare organizations. Also, nurses' leaders should work on developing a teamwork performance that encourages nursing errors reducing and patients' safety. Second, Effective nurses' teamwork enhances the quality and safety of care. Third, Team STEPPS should use as a model for institutionalizing teamwork and effective communication within organizations. Fourth, reinforcement of TeamSTEPPS sustains effective leadership and communication. Further team STEPPS interventions targeted at nurse managers to enhance the long-term effect of Team STEPPS in nurses' teamwork knowledge and Performance after Team STEPPS implementation. Teamwork training improves attitudes towards team structure, leadership, situation monitoring, mutual support, and communication. Fifth, according to those in charge of nursing education, nursing curricula should incorporate team STEPPS concepts and procedures.

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