Review

Strategies to improving patient safety in hospitals

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Abstract

Introduction: Patient safety is the initial foundation of quality healthcare that shared responsibility between policymakers as well as healthcare delivery, especially nurses, who aim for improvement. Interventions in patient safety culture reduce safety incidents, thereby, lowering the disability rates and deaths due to side effects of healthcare delivery. Therefore, this research aims to provide an overview of strategies to improve patient safety culture, which involves nurses in hospital settings.

Design and Methods: In this research, a Scoping review was carried out using online database searches at ProQuest, Ebsco, and Sciencedirect. The selected article was experimental research, using English, published between 2011-2021, and fulfilled the criteria for inclusion and exclusion set.

Result: In the initial disbursement, 480 articles were obtained with 13 studies that meet the inclusion criteria. The articles obtained used quasi-experimental research methods (2 articles), pre-post intervention design (4 articles), intervention time series (2 articles), randomized controlled trial (1 article), prospective cohort intervention (1 article), repeated cross-sectional experimental research (1 article), Mix quasi-experimental method non-randomized design and qualitative (1 article), and control groups (4 articles). Based on the articles obtained, the strategies to increase the patient safety culture in hospitals can be categorized into 4, which include educational, simulation, team, and comprehensive programs.

Conclusions: All interventions implemented possess a positive impact on patient safety culture.

Introduction

Patient safety is the most crucial indicator of quality in the world and the basis of the quality of health services.[1,2] In 2020, Ünver&Yeniğün defined patient safety as measures to prevent and eliminate injuries affecting patients and their families during the delivery of healthcare delivery. Meanwhile, its incidents and severe errors caused by sick patients are potentially life-threatening.[3] In 2020, World Health Organization reported that patient safety incidents are among the global top 10 causes of disability and death causes. In high-income countries, it is the first among the 10 incidences of patients injured due to health services.[4] The financial impact of patient safety incidents in high-income countries is estimated to be 13% of the health budget incurred for costs and 8.7% due to preventable incidents, with a total cost of USD 606 billion per year. Meanwhile, in low-income countries such as Indonesia, there are 134 million patient safety incidents every year, which contribute to approximately 2.6 million deaths.[5-7] This implements a patient safety program to be a shared responsibility, especially for health workers such as nurses who provide direct services to patients.

Nurses are professionals who provide health services and have a crucial role in succeeding patient safety programs. This is because their profession is the highest number in the hospital that has the longest contact time with patients. This allows the nurses to understand the importance and have updated information about the feelings and physical condition of patients.[8,9] Nurses are also the first to be aware of the potential problems and stop them at the right time to avoid injuries.[10] Therefore, the patient safety culture conducted by nurses needs to be considered. Among nurses, patient safety culture is an essential aspect to enhance and identify factors that affect healthcare delivery. In 2017, Carlesi discovered several factors affecting the application of patient safety in nurses, which include knowledge of patient safety, perception of professionalism, motivation, and work experience. In addition to job satisfaction, transformational leadership style, Burnout nurse attitude, nurse fatigue rate also affects patient safety and increases healthcare-related complications such as hospital-acquired infections, medication errors, and falling patients.[11-14] Moreover, several studies have been enacted to enhance patient safety culture. In 2017, Xie used the implementation of the Safety Culture Training (SCTP) program on 83 nurse managers in 5 Chinese hospitals, which significantly enhanced patient safety culture and lowered safety of patient incidence (p <0.05). This averaged the patient rate, which fell from 0.66 to 0.44 per 1,000 patient days, and the rate of hospital-acquired decubitus ulcers from 1.13% to 0.87% in 100 patient days. In 2018, Amiri also conducted an experimental quasi on 60 nurses and 20 supervisors at Iran's Namazi hospital by establishing 2 days of workshops, sticking posters, and distributing pamphlets against intervention groups. The innovation program empowered supervisors and nurses, which enhanced patient safety culture scores. Although various interventions have been administered to enhance the patient safety culture in hospitals, there was no general picture of interventions that specifically involve nurses. Therefore, this research aims to provide an overview intervention to improve patient safety culture in hospitals with the nurses' involvement.

Significance for public health

Patient safety culture is the foundation of high-quality health care, but hospitals' improvement strategies are often underutilized. Even today, patient safety culture is a challenging topic to overcome since it intersects with various elements in hospitals and among health staff. As a result, this study gives an early review of improving patient safety in preparation for future interventions to improve culture.

Design and Methods

Based on the scoping review method, an international journal search was carried out on the topic by browsing online databases from ProQuest, EBSCO, and ScienceDirect, using the keywords "Patient Safety" AND "culture" AND "Nurse" AND "Intervention" OR "Program". The literature was selected based on inclusion criteria, which were according to the topic, full-text article, English language, quantitative methods, experimental, and articles published in the last 10 years (2011-2021). Meanwhile, the exclusion criteria of the sample were research that did not have a nursing profession, and those with setting outside the hospital. The stages of search and selection of journal articles were adapted from the PRISMA flow chart as shown in figure 1.1

Results and Discussions

Search results and description of studies

The initial search results of the database identified 480 articles and were selected based on the suitability of the title and topic. Subsequently, the article was selected based on the criteria of inclusion and exclusion (Figure 1) to obtain 13 relevant articles, which were used for data extraction and interpretation.

The year of the article publication obtained ranged from 2011 to 2021 and the major participants were nurses, which include managers or front liners. This research was administered in the hospital setting, ICU/PICU, medical/surgical ward, cardiac unit, and Emergency Room. The most research articles derived from the United States 5 articles, Norway, Iran, Germany, Egypt, China, and Denmark.

A total of 2 methods were implemented to measure the impact of interventions on patient safety culture, which were 9 articles using The Hospital Survey of Patient Safety Culture (HSOPSC) and 4 articles using The Safety Attitudes Questionnaire (SAQ). The questionnaire measurements were obtained before and after the intervention, but a time difference was used for the measurement after the intervention. In HSOPSC, the evaluation was carried out from 3 months, 6 months, and 12 months, respectively. Meanwhile, In SAQ, the measurements were carried out directly after the intervention[5] for 4 and 8 weeks, 6 months as well as 12 months. All interventions in the article positively affected patient safety culture in the hospital. Generally, the interventions administered in the article can be categorized into 4 groups, namely encompassing educational programs (5 articles), simulations (1 article), team strategies (3 articles), and comprehensive programs (4 articles). A summary of journal interpretation results is shown in Table 1.[15-20]

Educational programs

The educational programs employed seminar methods, workshops, and training, where learning was designed per session, implemented one-on-one teaching and divided into small groups.
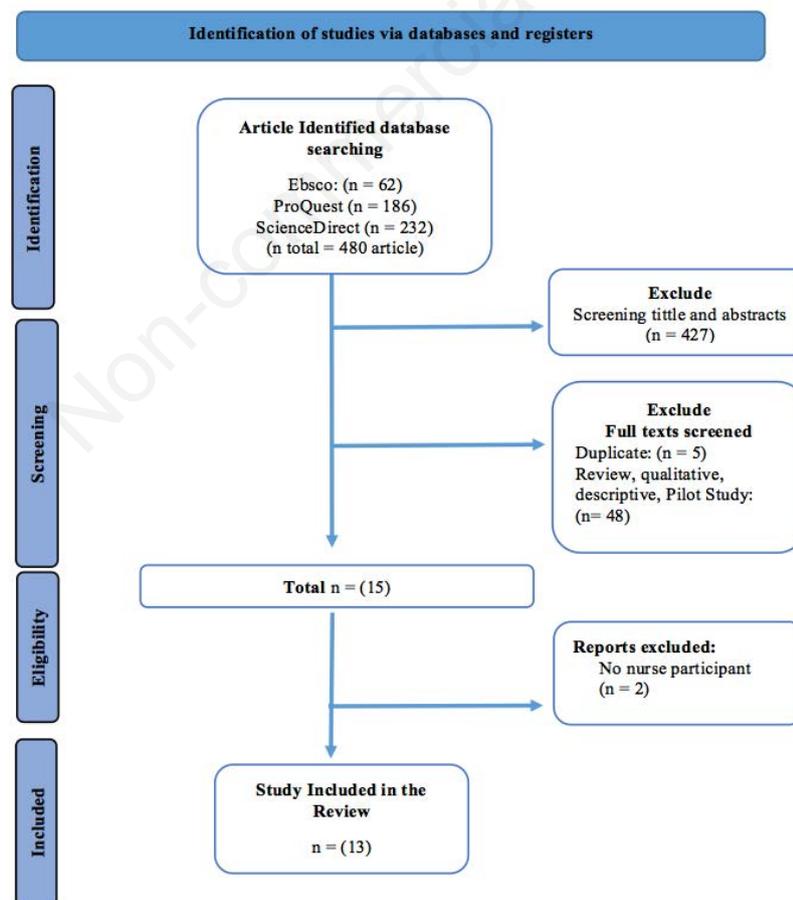

Figure 1. Flow chart of article selection following the PRISMA guideline.

Table 1. Characteristics of the studies selected in the scoping review.

No	Study, year and design	Sample, Setting and measurement	Intervention	Result
1	Xie et al., 2017. Quasi-experimental before and after measurement	83 nurse managers. Hospitals, China. HSPSC: Hospital Survey of Patient Safety Culture. SAQ: Safety Attitudes Questionnaire	Training Program about Safety Culture with a complete of 76 hours of tutorial units, which consists of 30 hours of theoretical classes, 40 hours of realistic scientific publications, and 6 hours of institution dialogue and feedback	The total score (HSPSC) increased significantly after 6 months of training (p <0.05), while SAQ scores also increased in all measurement dimensions (0.000)
2	Amiri et al., 2018. A randomized controlled trial with a pre-posttest and control groups	80 nurses and supervisors. ICU, Hospital, Iran. HSOPSC: Hospital Survey on Patient Safety Culture	Control: Not receiving intervention. Intervention: Two-day workshop (8-hour), posters were hung, and informational brochures were distributed to the supervisors and nurses of the group of intervention at the job field.	The total mean of patient safety culture was significantly lowered in the control group than the experimental group (p < 0.001) (3.46 ± 0.26) vs (2.84 ± 0.37)
3	Hanifi et al., 2018. Single-blind clinical trial study with pre-posttest design and control group	26 Nurse, in the heart unit 2 hospital, Iran. HSOPSC: The Hospital Survey on Patient Safety Culture Scale	Control: Get a patient safety brochure. Intervention: Two-session educational program, where each session lasts almost three hours. Participants were involved in the discussion using the question and answer (Q&A) method.	Only the overall perception of patient safety dimensions increased significantly. (p = 0.034)
4	Schmidt et al., 2021. intervention pretest and posttest design	Number of participants (t0) 528, (t1)366. Nurses and physicians. Hospital. German HSPSC	Control: not attending training. Intervention: Interprofessional team training consists of 2 methods. Method 1: Management training (top-bottom approach) module 1 seminar 2 days. module 2: 1.5 days seminar. Method 2: Champion training (bottom-up approach)	In the nursing profession: There has been a significant improvement in patient safety culture in the characteristics of: Teamwork (at the units of the hospital), expectations of Supervisor and, promoting safety actions
5	Soliman et al., 2020. Pre-posttest interventional study	73 participants. Nurses and physicians. Hospital (PICU), Egypt. The Safety Attitudes Questionnaire (SAQ)	Patient safety training, conduct interactive training with a total of 12 sessions, where approximately 30 minutes and 15 minutes was used for each session with questions, answers, and discussions. In addition, posters were hung in the room, with brochures, small brochures, and badges for the participants.	Statistically significant enhancement in some items in the characteristics of Climate Safety, Perception of Management, ICU Interaction and Communication, Incident Reporting, and Openness of Communication.
6	Aaberg et al., 2021. Pre-posttest intervention study	43 participants. Registered nurses, nursing assistants and physicians. Surgical ward, Hospital, Norway. HSOPSC	The TeamSTEPPS intervention consists of three phases, which include the setting of the intervention location and deciding what to do, make it happen. Make it stick	Scores improved significantly after a six-month interference: "continuous and organizational learning improvement (0.001)" and "Openness to communication (0.025)". After a 12-month intervention: "openness to communication (0.017)", "teamwork within the unit (0.025)" and "manager's expectations and measures to promote patient safety (0.012) ".
7	Jones et al., 2013. Quasi-experimental	346 participants. Nurses, administration, physicians, 24 hospitals. America HSOPS	Control: No intervention Intervention: TeamSTEPPS training intervention through the implementation of TeamSTEPPS trainers, workshops to overcome disruptive behaviors, implementation of basic TeamSTEPPS courses, implementation of 17 calls of an hour and a half to maintain innovation.	There was a tremendous increment between the control and the intervention group. Similarly, 76% vs 71% on continuous improvement, 82% vs 80% teamwork, and 67% vs 62% on teamwork between departments.
8	Braddock et al., 2015. 1-year prospective cohort interventional study	Participants (t0= 131, t1 = 286) Nurse and resident physicians Hospital America HSOPS	Patient safety TRANSFORM project: simulation training, monthly patient safety group meetings on medical emergencies, champion for patient safety, interdisciplinary conference on patient safety, exemplary teamwork recognition program.	Overall score of (HSOPS) one year after the intervention, significant for nurses (p < 0.001)
9	Muething et al., 2012. Pre-posttest intervention	100 participants. Nurses, physicians, other health workers. Hospital America. HSOPS	Focus Interventions on (1) prevention of error, (2) Patient safety management, (3) using database for common and root cause analysis processes, (4) conspicuous curriculum, and (5) interventions for high-risk areas.	All aspects of the measure of patient safety culture increased significantly, but 3 aspects, namely actions and expectations of supervisor/manager, teamwork at the unit of the hospital, and non-punitive feedback to error were not significant statistically.
10	Schram et al., 2021. repeated cross-sectional experimental study design	38 participants. Nurses, midwives, and other employees Denmark. The Safety Attitude Questionnaire	On-site simulation intervention 39 staff members from 2 hospitals were trained as simulation instructors. All instructors take the 4-day course. Facilitator training courses emphasized team building, communication, and leadership skills. The instructors also performed on-site simulations in their respective units.	There was an increase in the dimensions of Teamwork atmosphere. conditions of work. management. and satisfaction job perception at hospital 1. In hospital 2, there was only 1 significant increase, namely (safety climate).
11	Pettker et al., 2011 multiple interventions	191 participants physicians, nurses, administrators, assistants. Hospital America the Safety Attitude Questionnaire (SAQ)	Training Program about Safety Culture with a complete of 76 hours of tutorial units, which consists of 30 hours of theoretical classes, 40 hours of realistic scientific publications. and 6 hours of institution dialogue and feedback.	Significantly increased the employees' percentage with favorable awareness of teamwork atmosphere (39% to 63%), satisfaction (39% to 53%) and management (10% to 37%) of job.
12	Storm et al., 2018. Mix method quasi-experimental. Non -randomized design and qualitative)	340 participants Nurse. physicians. nurse assistant. Hospital and homecare Norway. HSOPS: Hospital Survey on Patient Safety Culture. NHSOPS: Nursing Home Survey on Patient Safety Culture	Control: Not receiving intervention Intervention: Two-day workshop (8-hour). posters were hung and informational brochures were distributed to the supervisors as well as nurses of the group of intervention at the job field.	There were significant differences between the control and intervention groups. In the dimensions: transition and handover, teamwork Cross unit. Non-punishment response to mistakes. Continuous improvement of organizational learning, management expectations. Overall perception of patient safety, Patient safety level, Staffing.
13	Brilli et al., 2013. Quasi-experimental time series	8000 clinical and non-clinical staff, 600 manager physicians, nurses, Management America. The Safety Attitudes Questionnaire	Control: Get a patient safety brochure. Intervention: Two-session educational program, where each session lasts almost three hours. Participants were involved in the discussion using the question and answer (Q&A) method.	After carrying out the Zero Hero program, a significant increase in the overall opinion score on the safety environment was observed. The percentage of positive environment security scores in 2009 was 72 (preceding the Zero Hero program), contrasted with 76 out of 2011 (after the Zero Hero program) (P<0.05)

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The material used was submitted using methods of lectures, discussions, Q&A, and case scenarios. Although materials were related to the education program (Table 2), additional materials based on the objective of the research were also obtained. Furthermore, there are additional interventions such as the hanging of posters in the room, distributing pamphlets, providing hand-outs badges, and the opportunity of participants to ask questions by email for approximately 1 week after training. The total training time provided was between 6 hours, 8, 9, and 76 hours.[21-23]

Table 2. Summary of the intervention.

NO	Author and year	Strategy or program
1	Xie *et al.*, 2017	**Educational Program** The training program consists of 5 sessions, where the trainees are trained according to the one-on-one teaching method. The trainees were divided into 5 groups, which consists of people from 12 to 15 in each group. Subsequently, the trainees pass through a training program for 76 hours. The schedule includes 30 hours of theory, clinical practice for 40 hours, and group discussion as well as feedback for 6 hours. Training program under expert supervision with >5 years of experience in patient safety training. Use module from the Institute for Healthcare Improvement Topic: Safety culture, reporting and handling the adverse event, management and risk assessment, protection and safety communication, management and feedback of clinical practice.
2	Hanifi *et al.*, 2018	**Educational Program** Before training, materials were sent to the nurses and the training program was conducted in 2 sessions by one of the researchers, where each session lasted approximately 3 hours with two breaks. During the training course, participants were asked to participate in a discussion by a question and answer method and also ask questions via email for 1 week after the training. The control group received the brochure with similar content to the intervention group. The training program was carried out by researchers Topic: Patient safety concept, seven steps to ensure patient safety, enhance patient safety, the safety of patient culture concept, and twelve aspects of patient safety culture.
3	Amiri *et al.*, 2018	**Educational Program** The program started with a two-day (8-hour) workshop, which consists of lectures, group discussions, and scenario presentations. This was followed by the hanging of posters in the room and distributing pamphlets to the experimental group. The training program was carried out by researchers Topic: Patient safety culture, speaking out in situations that threaten patient safety, team strategy skills, and tools to improve patient safety and performance (TeamSTEPPS). The TeamSTEPPS includes skills in communication, leadership, mutual support, and monitoring.
4	Soliman *et al.*, 2020	**Educational Program** The training course consisted of 12 sessions of 30 minutes each, with an additional 15 minutes of discussion, question, and answer sessions. It was conducted in the intensive care unit during working hours. Meanwhile, after the training, participants immediately filled out a questionnaire, and each assessment was issued a Patient Safety badge, written in English and Arabic. In addition, leaflets, hand-outs, and posters are hung in the medical staff room. The training program was designed with the hospital quality team. The material provided was adjusted from the results of the initial survey Topic: Definition, overview, goals of patient safety and safety culture, cause of the error and 'near miss' incidents reporting, based on WHO educational guidelines on safety patient.
5	Storm *et al.*, 2018	**Educational Program** The meeting point takes place in form of a half-day seminar, which consists of discussion and educational sessions. Each session consists of a 15-minute introduction, 45-minute teaching on scenarios specific to thematic areas participants through group activities performed by study team members. The training program was carried out by researchers Topic: Planning materials include 3 thematic areas related to transition care: (1) Factors of risk, (2) Patient's perspective, and (3) System of perspective The scenarios discussed include textual risk factors cases for transitional care, movie scenarios showing the patient's point of view of transitional care, system perspective film.
6	Schram *et al.*, 2021	**Simulation program** At least one employee from 23 groups was trained (4-day course) as a simulation instructor. Training focuses on soft skills namely team, leadership, and communication. The instructors conduct in situ simulations in respective groups to enhance the handling of a particular clinical situation and the care quality and safety. The instructors started after completing the training and performed the prospective simulations Training facilitated by 3 employees of Midstim (regional simulation training center in Denmark area of Denmark) Curriculum: Module one: Theoretical presentation by experts working at MidtSim. Participants performed the role of facilitator. Module two: Performing simulations in place, the physicians and nurses design a scenario and animate it in front of the class. Trainers provide feedback and arrange the module. Module three: Quality assessment and feedback of trainers lead their scenario and received feedback from others participants.
7	Schmidt *et al.*, 2021	**Interprofessional team training** Training of teams with management and front liners, implementation of training based on a top-down approach (management training) and bottom-up (champion training) in 4 days/employee/year. Management training with a 0.5-day seminar on human factors and critical errors, 2-day seminar to strengthen communication in hospitals, 1.5-day seminar to reflect on the development of the safety culture in hospitals. Meanwhile, the champion training includes 2 days of seminars to strengthen communication in hospitals (operational level), meetings every three months to promote reflection, exchange of experiences around the culture of patient safety, and the establishment of a safety net for patient safety. Topic: Influence of human factor in critical errors briefing, 2-way feedback, avoidance of killer phrases, communication.

Simulation

In 2021, Schram carried out a simulation program by training at least one staff member from 23 groups as a simulation instructor. The training was a 4-day program that emphasized non-technical skills concerning team training, leadership, and communication and needs to be completed by all instructors. Subsequently, the instructor carried out simulations for their respective groups. The instructors also began in-situ simulation after their training ended and conducted the prospective simulation.

Team strategy

Interprofessional team training

Team training involves managers and front liners, moreover, Schmidt conducted training in 2021 using top-down (management training) and bottom-up (champion training) approaches for 4 days/employee/year. The management training contains 0.5 days of seminars on human factors and critical error, 2 days seminar on strengthening communication in hospitals, and 1.5 days of seminars on reflections about progress safety culture in hospital. The champion training contains 2 days of seminars on strengthening communication in hospitals (operational level), meeting every 3 months to promote reflection and exchange of experiences related to safety culture, and the establishment of the safety of patient culture network.

Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS)

In 2021, Aaberg carried out TeamSTEPPS Intervention in a surgical ward consisting of three phases. Moreover, phase 1 conducted an assessment of the location of the intervention to provide an overview and confirm the readiness of the leader to intervene in

Table 2. Summary of the intervention.

NO	Author and year	Strategy or program
8	Aaberg et al, 2021	**TeamSTEPPS** The TeamSTEPPS intervention consists of three phases. Meanwhile, phase 1 involves the determination of the current situation of the intervention, provision of an overview of the intervention and confirmation of the leader's willingness to intervene in the corresponding unit, the creation of an intervention plan, and establishment of goals and targets performance by leaders and researchers. The training in Phase 2 includes a didactics combination, video projections, simulations, and role-plays. Participants were demanded to discover patient safety issues at the unit and attempt to resolve them using the TeamSTEPPS tool. Subsequently, a team of interprofessional change, which consisted of 12 members was formed. The training was conducted on the change team based on the identified problems, then planned the goals and strategies for solving the problems. During 6 months, the team implemented 5 tools in daily activities in meetings and monthly newsletters. After 5 months of initial training, a refresher training was carried out for 75 minutes. Phase 3 continues to use the other 5 tools within 6 months, celebrate success, and take refresher training 11 months after initial training.
9	Braddock et al, 2015	**The Patient safety TRANSFORM project** The interventions carried out included four simulation exercises in-situ in day and night shifts per unit of study and month. In this stage, a nurse who is in charge of searching for the factors that contribute to the blue code is called. There is also another nurse (minimum) per shift in every unit who goes about as a patient security advocate. Monthly Meetings Team of Patient Safety, Quarterly Interdisciplinary Patient Safety Conference in discussing and enhancing care issues or interdisciplinary teamwork. Awards are provided for the best or exemplary teamwork.
10	Brilli et al., 2013	**Comprehensive obstetrics patient safety program** A patient safety program is as follows: A nurse is responsible for patient safety, while the standardization of practice was based on protocols to codify and standardize existing practices. The Crew Resource Management Training is a resource management seminar for employees. In the seminar, each class lasts four hours and includes videos, lectures and role-playing games, and an integrated domain of midwifery personnel (physicians, nurses, administrative staff, assistants). The training was supervised by a patient safety committee that is responsible for quality assurance. Physicians are on call 24 hours, seven days a week for anonymous reports of the incident.
11	Brilli et al., 2013	**Zero Hero Program** The Zero Hero Program of Patient Safety, namely analysis for common causes of serious safety events. Many individuals are needed for project-based experiential learning, with further development as the main driver investigation measure. Framework disappointments require a remedial activity plan including a proprietor, course of events, and observing arrangement. The executive's choice aide was used to survey individual disappointments, while a prepared security mentor was applied for forefront staff in preparing their associates on the powerful use of error anticipation strategies. For straightforwardness, all outcomes and accomplishments information are informed on the emergency clinic intranet.
12	Muething et al., 2012	**Quality Improvement Program** Patient safety improvement program: Form a team to reduce patient safety incidents, identify key issues, Educational training including dynamic interactive video lectures, small group discussions. The training was conducted by trained staff to enhance communication and make teams practice the expected behaviors of safety simulation training. Reorganization of Patient Safety Governance, oversight group, concerned on responsibility, balances handy solutions and long haul arrangements in events safety response, a program of the study provides admittance to information, making of a straightforward and profoundly apparent mechanism of feedback, and interventions for high-cautious areas.
13	Jones et al., 2013	**TeamSTEPPS** The intervention was carried out by implementing and maintaining the team's behavior in 24 intervention hospitals. Interventions are as follows: Create an improvement plan based on a basic assessment to identify weaknesses in communication and teamwork. Assess weaknesses in the safety culture with the TeamSTEPPS tool. Organize a TeamSTEPPS trainers course to train the head trainers to train each intervention Hospital. Conduct workshops on the treatment of disruptive behaviors. Trainers trained with implementation (a course with 14 basic concepts conducted by TeamSTEPPS) or 17 conference call lasting one and a half hours to exchange strategies, clarifications, and behavioral routines, to maintain innovation. Audit of the frequency of use of tools, conduct information sessions throughout the hospital, integrate using of tools, and TeamSTEPPS strategies in the orientation of the new employees.

the related unit. Subsequently, the researcher and the leader established an intervention plan and arranged goals as well as achievement targets. In Phase 2, a TeamSTEPPS training, lasted for 3 days, containing a combination of didactics, video playback, role-playing, and simulation was established. On the final day of training, participants were obliged to discover patient safety in the unit and solve the problems using TeamSTEPPS instruments. Subsequently, a team of interprofessional change consisting of 12 members was established. The training was further conducted on the change team based on the problem which has been identified and a plan of goals and strategies was created to solve the problem. For 6 months, the team implemented 5 tools on daily activities at monthly meetings and bulletins, while a refreshment training of 75 minutes was conducted after 5 months of initial training. In Phase 3, continues implementation of 5 other tools within 6 months, celebrates success, and conducts refreshment training after the first 11 months. There are slight differences in TeamSTEPPS, in 2013, Jones conducted an intervention in 24 hospitals using several steps. These include establishing a plan based on basic data of patient safety to discover the weaknesses in communication and teamwork, fitting the culture of safety weaknesses with TeamSTEPPS tools, conducting training on TeamSTEPPS coaches at 24 intervention hospitals, workshops to address disruptive behavior, basic TeamSTEPPS training to assist coaches to apply the implementation, conducting 17 and a half-hour conferences to share strategies and tools to redefine/restructure, clarifies and routines behavior to sustain innovation. Furthermore, bulletin boards and articles were used to add additional opportunities for learning after training the classroom. The strategies for describing behavior were also implemented by auditing the frequency of tool use, performing briefings of hospital-wide, integrating TeamSTEPPS tools implementation and methods into the latest employee orientations, and TeamSTEPPS tools application in job descriptions as well as performance assessments.[24-26]

Comprehensive program

The comprehensive program is a term employed to describe the interventions performed. It refers to the variety and complement of interventions administered with several similarities for implementing educational programs such as simulations, scenarios, discussions, and lectures. The origin of the material and programs designed is based on the results of the studies conducted from the database and the opinion of consultants, patient safety nurse, or team. It was also based on regular feedback, transparency, and award or celebrate success. Meanwhile, the implementation of strategies in high-risk areas such as operating rooms, easy, and unknown incident reporting were also administered.

The transform patient safety project

An approach was used to enhance the quality program and clinical outcome, comprising in-situ simulation training for increasing detection and treatment on hospital-acquired. In this method, scenarios were designed to simulate clinical state before worsening, integrated training with new employee orientation, and intervention period 4 training/unit/month. The emergency medical intervention was implemented by debriefing the medical urgency and emergencies, while the patient safety champion role monthly award was provided to recognize a nominated. Interdisciplinary patient safety conferences were carried out by presenting cases and action plans, reviewing cases involving interdisciplinary care issues. Moreover, quarterly interdisciplinary patient safety conferences encompass nurses, residents, and attending physicians, reviewing issues of interdisciplinary, and providing group discussions to enhance care issues.

Comprehensive obstetrics patient safety program

The program for improving patient safety in obstetrics involves nurses who are responsible for data collection and lead education efforts, reporting events, as well as initiating unexpected event reviews. Protocol-based standardization of practice was used to codify and standardize existing practices. Meanwhile, training is an ongoing series of employee resource management seminars, where each class has four hours, including video, lectures, role-play, and an integrated midwifery staff domain, including doctor, nurse, administrator, and assistant. The seminars served as a chance of 1-time preparation for the introduction of individual employees. The enrollment of the representatives was coordinated after the introductory series of the course acknowledged preparation as they started work. The supervision was carried out by a patient safety committee, which was obliged for the enhancement and assurance quality review as well as protocols and policies to enhance quality. There are 24-hour obstetrics hospitalists, while computerized and anonymous event reporting systems also allow any hospital worker to report events.

Comprehensive patient safety program "zero hero"

The program was conducted by analyzing the common causes of serious safety events in the past and making it the basis for preparing training in error prevention. This was also carried out by analyzing the addition of power to improve data quality. The safety coach program is conducted to prepare frontline staff in preparing their companions on the successful use of prevention techniques error and training on clinical as well as non-clinical staff. Hazard detection was based on the incident reporting systems, triggering tools, pharmaceutical interventions, and complaint analysis. All results are posted on the hospital's internet for transparency and feedback.[27-28]

Quality improvement program

The program was established to improve patient safety by forming a team for the reduction of patient safety incidents, reviewing data on 35 recent safety events, creating common cause data, identifying the survey result on Culture of Safety Culture, hiring expert consultants to provide opinions, creating a key diagram for quality improvement projects, and unexpected event reduction based on data obtained. The intervention reduced errors by training programs for all patients, assigned staff at clinical units, and leaders. In this program, there was a patient safety monitoring team, an analysis of the causes of events was carried out using a database, which was developed to support the analysis of inappropriate actions. The staff was given admittance to data, which makes profoundly apparent a straightforward feedback mechanism, Hospital intranet sites are available to all employees. There are Tactical Interventions directed to High-Risk Areas and interventions in reducing the incidence of perioperative safety.

Based on the description above, there are 4 categories of interventions that can increase the patient safety culture (a summary is shown in Table 2). From the intervention model, there is a need to understand important aspects such as the capabilities of the trainee. Meanwhile, only 3 out of 13 articles explained the competence of the speaker such as having at least 5 years of experience in the field of patient safety, training in collaboration with the hospital quality committee[5] and using the help of a professional team in training. The curriculum or materials provided during training are also a concern, where 3 of 13 studies mentioned the basis of the material given such as the results of the initial assessment. Furthermore, from standardized training modules, the applied innovative methods need to maximize the delivery of materials such as sending files to be read before training, asking questions for approximately 1 week after the lecture. This strategic selection can combine 4

types of interventions and be adjusted based on the results of problem studies and organizational abilities.[15-19]

In this research, it was discovered that only 3 out of the 13 articles obtained, specifically involved nurse participants. These include patient safety culture training programs in nurse managers, supervisors, and education as well as empowerment programs for nurses as frontlines. From the 3 articles, the strategies used to improve patient safety culture in nursing through educational programs had a positive effect.

Conclusions

All strategies carried out positively influence patient safety culture. Generally, the interventions were categorized into 4, namely, educational programs, simulations, team strategies, and comprehensive programs. The strategies to improve the patient safety culture in nurses can be conducted by providing educational programs combined with others understanding their advantages, weaknesses, and adjusting organizational problems as well as abilities. This review expects further research to conduct strategies in improving patient safety culture using a combination of team strategies and comprehensive programs.

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