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The effect of situation, background, assessment, recommendation-based safety program on patient safety culture in intensive care unit nurses

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Abstract:

BACKGROUND: Patient safety culture is an integral part of patient care standards and a prerequisite for safe care. SBAR is an acronym for Situation, Background, Assessment, Recommendation; this communication model has gained popularity in health-care settings, especially among professions such as nursing. However, there is little evidence that nursing professional education can enhance patient safety culture. The aim of this study was to investigate the effect of a SBAR-based training program on patient safety culture in intensive care unit (ICU) nurses.

MATERIALS AND METHODS: The quasi-experimental study was carried out in 2018–2019 at areas covered by Shahrekord University of Medical Sciences, Iran. This study was performed on 60 nurses working in ICU. The participants were randomly assigned to two experimental and control groups of 30 each. For the experimental group, five workshop sessions of SBAR-based program were held. For the control group, the patient delivery process was performed according to the ward routine. Data were collected using patient safety culture questionnaires before and 1 month after the intervention, and were analyzed using descriptive and analytical tests such as paired *t*-test, independent *t*-test, and Chi-square test by SPSS 22.

RESULTS: The mean score of safety culture was 31 ± 23.5 and 55.2 ± 28.6 in frequency of reporting events, 32.8 ± 17.8 and 54.3 ± 19 in overall perception of patient safety, 23 ± 20.1 and 52.9 ± 26 in communication channel openness, and 35.2 ± 19.8 and 52.4 ± 18.8 in information exchange and conveyance before and after training intervention, respectively, so that they improved from poor level to neutral-moderate level. There was no strength in any dimensions of safety culture; however, the implementation of the SBAR-based program was significantly associated with patient safety culture ($P < 0.001$).

CONCLUSIONS: Improving patient safety culture requires attention to patient safety models such as SBAR approach that provides an appropriate and reliable structure for quality improvement. SBAR-based program training is effective in promoting patient safety culture; therefore, it is recommended that managers use this technique to promote patient safety culture.

Keywords:

Delivery of health care, intensive care units, patient safety, situation, background, assessment, recommendation

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Introduction

Intensive care unit (ICU) is one of the hospital bottlenecks to reduce hospital mortality and morbidity.[1] Nurses, as members of the treatment team, play a key role in the care and treatment of these patients and spend more time on the patient's bedside. They are the first group to become aware of changes in patients' conditions and, by performing rapid and

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rescue interventions, can save patients from accidents that lead to injury and increase patient safety.[2] It seems that the first step in improving the quality of health care is to ensure patient safety.[3]

Patient safety has been a vital issue in maintaining quality health and has become a major concern of health-care organizations worldwide.[4] One of the factors that play an important role in promoting patient safety in health centers is the existence of patient safety culture in these centers.[5] Patient safety culture is an integral part of acceptable patient care standards. Safety culture is believed to be a prerequisite for safe medical care. However, there is little evidence that public education can enhance patient safety culture.[6] Meanwhile, most researchers are seeking out a method to move toward a safer health system in the sense of culture. Culture is a set of group beliefs, ideas, and values that are manifested in the behavior of individuals.[7-9] Patient safety culture can be seen as accepting patient safety as the first priority and shared value in the organization as well as an integrated model of individual and organizational behavior based on shared beliefs and values that consistently seek to minimize the damage caused by the care delivery process.[10] The goal of the safety culture is to promote a systematic approach to preventing and reducing harm to patients. Factors such as poor communication, lack of leadership in teamwork, lack of error reporting systems, and inadequate analysis of unwanted events and deficiencies in nurses' knowledge of patient safety undermine safety.[4]

On the other hand, despite the efforts of hospital managers, clinical errors that pose a threat to patients' safety are still seen in various parts of the hospital and incur significant financial and human costs. ICU nurses face the challenges of high work loud and maintaining safety in order to provide services to an inpatient.[11] Accordingly, patient safety in the ICU is more sensitive than in other hospital wards.[12] For example, the possibility of threatening patients' safety in the ICU is maximized due to the complexities associated with patients' conditions and their treatment process, patients' lack of awareness and dependence on care providers, and the presence of many electronic devices and equipment.[13]

To prevent injury due to errors and accidents, patient safety should be considered an organizational priority, and nurses should be trained to minimize injury while delivering services to patients.[14] The occurrence of error in certain wards depends on a combination of different factors such as personal factors, the complexity of the workflow, the quality of communication when conveying information during shift handoff, and environmental conditions.[15] Transferring responsibility and accountability to clinical care during delivery is an important process that deserves further consideration.[16] In spite of changes in science and technology, the delivery of patient clinical information remains a stereotypical process and not all required information is transmitted, resulting in disasters.[17]

The biggest obstacle to effective delivery and the main cause of medical errors and catastrophic events are communication problems.[18-20] One of the key factors for effective clinical delivery is the use of standard patient delivery methods and techniques. If critical clinical information is not available to all members of the health-care team, patient safety will be compromised. It is, therefore, important to understand the difference between the information in the nursing documentation and the information provided in the nurses' clinical handover.[21]

Ahmed *et al*. used a researcher-developed computerized model in accordance with the guidelines to show how clinical information delivered by the Royal College of Surgeons of England and demonstrated that using and training this structural model was effective in transmitting information correctly and improved the quality of care. They, therefore, recommended that a standard tool be used in delivery.[22]

There are many different approaches to handoff communication, including shift report in a room, at the nurses' station, by phone, and at the bedside. Much of the literature indicates a need for a standardized communication method such as the Situation-Background-Assessment-Recommendation (SBAR) technique. This technique provides a framework for effective communication among members of the health-care team and helps create an environment that allows individuals to speak up and express their concerns. This, in turn, reduces the risk of adverse events and ultimately fosters a culture of patient safety.[23]

Wilson used a process called p-vital to transmit clinical information that included patient information, vital signs, patient treatment reviews, discussion of criteria for admission or discharge, and completion of documentation, which showed that although this process is ideal to identify and deliver patients, it does not provide accurate patient evaluation, so it is recommended to use a structured model for clinical delivery.[24] Unfortunately, nurses are less likely to use a systematic, integrated approach and standard communication methods that can help them (during a patient's clinical change).[25,26] Using standard technique for establishing communication between health-care professionals is necessary.[27]

In 2006, the Joint Commission established a standardized patient delivery technique to achieve the national goal of patient safety and improve communication effectiveness among health-care providers.[28] In Iran, clinical delivery of patients is performed orally using the cardex and the p*atient r*e*ports n*o*tes* of the nurse in charge of care, with no consistent and standard guidelines.[29] Therefore, given the impact of incorrect clinical delivery on patient safety, this study was to evaluate the effect of SBAR-based program on patient safety culture in ICU nurses. It is hoped that the results of this study contribute to promoting nurses' performance by using the SBAR-based program in the ICU as a guide to promoting patient safety culture and help health planners to promote patient safety by relying on such techniques. Therefore, the aim of this study was to investigate the effect of a SBAR-based training program on patient safety culture in ICU nurses.

Materials and Methods

Study design and setting

This study was a quasi-experimental study performed in the ICUs of two medical training hospitals in Shahrekord, Iran.

Study participants and sampling

Participant recruitment and data collection were conducted from 2018 to 2019. Samples were first selected by convenience sampling based on inclusion criteria and then by random allocation using a random number table, they were divided into experimental and control groups in double blocks (30 in each group), and those with a bachelor's degree and higher and volunteering to participate in the study were divided into two groups of intervention and control. Exclusion criteria were unwillingness to continue participation in the study, simultaneously working in other words, and history of or simultaneously participating in similar programs during the study. The ICU staff of one hospital were assigned to one group and those of the other hospital to the other group.

Data collection tool and technique

The instrument used in this study was the Hospital Survey on Patient Safety Culture (HSOPS). This questionnaire was designed by the Agency for Healthcare Research and Quality in 2004 and has been used worldwide as a valid and comprehensive tool for assessing the status of patient safety culture in hospitals.[30] The questioner scoring between 50% to 70% shows the neutral points, and <50% is the weaknesses of the patient safety culture.[31] The reliability and validity of this questionnaire have been confirmed in the study of Javad *et al*. The reliability coefficient of this questionnaire was obtained based on Cronbach's alpha as 0.86.[32] In our study, the internal consistency (Cronbach's alpha) was obtained 0.8.

HSOPS contains seven demographic items, and 42 items measure the patient safety culture as the dependent variable. Items in the questionnaire were scored based on five-point Likert scale, and necessary modifications were made on the items with negative load, so that higher scores would indicate the desirability of the patient safety status. In HSOPS, the independent variables included 12 dimensions, including "communication openness," "nonpunitive response toward errors," "organizational learning continuous improvement," "overview of the current status of patient safety," "expectations and actions of manager to promote patient safety" (three items each), "feedback and communication about errors," "frequency of incident report," "management support of patient safety," "employee-related issues," "displacing the important patient data between clinics and shifts," and "teamwork between the wards" (four items each, each item with five options). The total score of each dimension in the HSOPS was calculated by summing up the scores of all the items, which were added up to obtain the overall score. In this questionnaire, scores lower than 105 indicated poor patient safety culture, scores 105 to <157.5 showed medium patient safety culture, and scores 157.5–210 demonstrated favorable patient safety culture.

The survey uses a five-point Likert scale which scores agreement (1= "strongly disagree" to 5= "strongly agree") or frequency (1= "never" to 5= "always"). The questionnaire also includes two outcome questions that measure the respondents' grading of overall patient safety in their hospital (1= "failing," 2= "poor," 3= "acceptable," 4= "good" and 5= "excellent") and the number of events they had reported during the past 12 months ("no events," "1–2 events," "3–5 events," "5–6 events," "6–10 events," "11–20 events," and "21 events or more"). The scores of negatively worded items were reversed to ensure that higher scores always reflect more positive responses. The Likert-type scale was converted to a 100-point scale (1 = 0, 2 = 25, 3 = 50, 4 = 75, and 5 = 100). For the purpose of study, a score equal or higher than 75 ("strong agree" and "agree," or "always" and "most of the time") was considered to reflect a positive perception of the respondent toward the scored dimension.[33]

To obtain a score for each dimension, the total score on the items of that dimension is summed up, and to obtain the overall score on the questionnaire, the scores on all items are summed up. Higher scores indicate a higher level of safety culture in the ward in question and vice versa.[32] In data analysis, the mean percentage of positive response to the items of dimensions of patient safety culture was used.

To this end, first, the percentage of positive responses to each item of each dimension was determined and then the average percentage of positive responses for that dimension was calculated by dividing the sum of percentage of positive responses to the items of that dimension by the number of its items. The overall score of patient safety culture was calculated by calculating the mean percentages of positive response to the items of all dimensions.

The mean total score on the questionnaire was divided into three categories: Less than 40% of the maximum attainable score on the questionnaire was determined as undesirable status, 40%–60% of the maximum attainable score as moderate status, and 60%–100% of maximum attainable score as desirable status.[34] In the final analysis and according to the guidelines of the questionnaire, the dimensions with the mean response percentage of at least 70% were considered the strengths. In this study, after obtaining the necessary permissions, sampling was done, and after explaining the aim of the study, obtaining the necessary permissions from the Research and Technology Deputy of Shahrekord University of Medical Sciences and the heads of the studied hospitals, and obtaining the informed consent to participate in the study from participants, the questionnaires were filled out.

Afterward, five sessions of SBAR-based training program with predefined curricula consisting of theoretical sessions, group discussion, question and answer and role-playing [Table 1] as well as the installation of SBAR training poster and virtual training, as creation of an interactive training channel, were held for the intervention group. After 1 month of intervention in the intervention group, all nurses in the intervention and control groups were asked to complete the questionnaires again and then their scores were analyzed and compared between the two groups. It should be noted that a coresearcher distributed the questionnaires during the study.

In order to control the intervention group and ensure that the program was implemented and used correctly during the study period, the researcher in person evaluated the staff using a researcher-developed SBAR self-reported checklist and observation on three occasions (observation of SBAR in patient delivery on different nursing shift by researchers).

Data were analyzed by IBM SPSS Statistics v20 using Fisher's exact test, independent *t*-test, paired *t*-test, and Pearson correlation coefficient. Mean, standard deviation, and percentage were used to present the data. $P < 0.001$ was considered significance level.

Table 1: The situation, background, assessment, recommendation-based training program on patient safety culture

Sessions	Contents
1	Explaining SBAR step 1 situation: Explaining the patient's current problem and introduce of patient/SBAR
	Step 2 explanation, background: Informing diagnosis, reason for admission, and history of medical and pharmaceutical records of the patient
2	Explaining SBAR step 3, assessment: Evaluating the patient and the results of collaborative efforts to do clinical evaluation
3	SBAR: Recommendation
	Saying what you are looking for, what you want to do for the patient, and when you will do it, and what you expect from other people in the treatment
	Participants were encouraged to discuss ICU training and identify current challenges
4	General issues and role-play
	1. Summary of previous meetings
	2. Expressing the importance of effective communication during patient care, patient safety, correct patient identification, participant experiences of delivery errors, and the importance of appropriate clinical decision-making
	3. Types of clinical environments: Shift change, during visits and consultations, telephone instructions, hourly pass, rest, and management rounds
	4. Writing scenario and role-playing
	5. Expressing learners' deficits in communicating safety culture and observing SBAR techniques in the ICU
	Receiving feedback, reviewing knowledge levels, and resolving participants' deficiencies
5	Implementation of the SBAR technique on the bed in line with the patient safety culture

SBAR=Situation, background, assessment, recommendation, ICU=Intensive care unit

Ethical considerations

The ethical approval was obtained from the Research and Technology Deputy of Shahrekord University of Medical Sciences for all the two health-care centers under study. The ethical approval was obtained from the Research and Technology Deputy of the Shahrekord University of Medical Sciences (Ethical code: IR.SKUMS.REC.1398.12). In this study, the participants were informed of the purposes and significance of the research and then the written informed consent to participate in the study was obtained from them. Furthermore, the participants were assured that participation in the study is voluntary and can be discontinued at any time. The participants were aware of the purpose and importance of research, and informed written consent was obtained. Furthermore, participants were assured that participation in the study was voluntarily and that they may withdraw from the study at any time.

Results

The mean age of the participants was 33.9 years. The average experience was 9.85 years, with 6.35 years of

work experience in ICU. The mean working time of the participants per week was 43.07 h. From our participants, 86.7% had a bachelor's degree and 13.3% had a master's degree. The results of Pearson's correlation test showed that age, work experience, and working hours per week were positively and significantly correlated with patient safety culture ($P < 0.001$) so that patient safety culture improved with increasing age, work experience, and working hours. The average work experience in the ICU of nurses in both the study groups was not statistically significant ($P = 0.94$). In other words, individuals were identical in terms of this factor in both the groups [Table 2].

The results showed that the mean postintervention score of patient safety culture in the intervention group significantly increased ($P < 0.001$, $t = 2.34$). Moreover, no significant change was observed in the control group [Table 3]. The results showed that the mean percentages of positive responses in the domains "overall understanding of patient safety," "organizational learning," "intradepartmental teamwork," "openness of communication channels," "communication and giving feedback on errors feedback," "staffing issues," "interdepartmental teamwork," and "information exchange and conveyance" were significantly higher in the intervention group than in the control group ($P < 0.001$) [Table 4].

The findings showed that the qualitative level of safety culture dimensions before and after the intervention in the intervention group in frequency of reporting events, general understanding of patient safety, openness of communication channels, and information exchange and conveyance changed from poor level to neutral or moderate levels; in other dimensions, the qualitative levels of safety culture did not change. The qualitative level of safety culture dimensions before and after educational intervention in the control group changed from neutral level to poor level only in management expectations and actions for patient safety, while in other dimensions, qualitative levels of patient safety culture did not change. According to the results on the dimensions of safety culture, no strength was observed in the dimensions; however, implementation of the SBAR-based program was effective on patient safety culture [Table 5].

Table 2: Comparison of mean±standard deviation scores of safety culture in two groups

Variable	Group	Test time	Mean±SD	*P*
Patient safety culture	Intervention	Preintervention	±118.117.8	<0.001
		Postintervention	139.3±19.77	
	Control	Preintervention	114±22.8	>0.999
		Postintervention	114±22.47	

SD=Standard deviation

Discussion

The purpose of this study was to evaluate the educational program based on SBAR technique on patient safety culture of ICU nurses. In hospital setting, especially ICU where patients with complex needs are managed by a group, ensuring patient safety is a priority. The results of this study were similar to those of Velji *et al*.,[35] which showed that using the SBAR technique increased the overall score of patient safety culture and promoted its dimensions, especially organizational learning, communication channel openness, intradepartmental teamwork and communications and providing feedback on error relationship to staff. De Meester *et al*.'s study[36] also showed that SBAR improved physician–nurse communication and reduced unexpected patient mortality and increased patient safety. Toghian Chaharsoughi *et al*. reported that using role-playing to educate SBAR technique increases nurses' communication skills during patient care and increases patient safety.[25]

The study of Novak and Fairchild showed that using the SBAR technique increases nurses' communication and patient satisfaction, and reduces unwanted complications and improves patient safety.[37] Information conveyance errors are the most important cause of adverse events during patient care. Information should be conveyed among consistently, clearly, and desirably to ensure that all team members have a good understanding of patient clinical information. The SBAR information technique supports a shared language among team members that will improve nurses' performance, and promote patient safety and patient safety culture.[38,39] By creating an environment where clinical situations arise, holding training courses can be instrumental in promoting patient safety culture. Despite the fact that it is easy to enumerate the characteristics of a safety-based culture, a great revolution should be accomplished to turn an organization into an organization where patient safety is considered a value. In such revolution, changing the values, beliefs, and behaviors of staff to be consistent with the values of safety culture, is one of the most substantial components of fulfillment as with other great changes and revolutions.[40] Nurses play a key role in promoting patient safety culture. Research has shown that nurses' understanding and safety behavior has a significant impact on promoting patient safety culture.[4]

This study demonstrated the effectiveness of a SBAR-based training program in developing nurses' empowerment to establish communication while delivering clinical information and promoting patient safety culture. The SBAR technique requires training of all clinical staff so that information can be conveyed efficiently. This also requires a culture change for all health-care providers to apply and maintain structured information frameworks.

Table 3: Comparison of mean±standard deviation percentage of positive responses before and after implementation of situation, background, assessment, recommendation-based training program between two groups

Variable	Mean±SD		*P*
	Intervention	Control	
Preintervention	31±23.5	43.3±23.4	0.049
Frequency of events reported	55.2±28.6	46.7±25.7	0.234
Postintervention			
Preintervention	32.8±17.8	35.8±29.1	0.628
Overall perceptions of safety	59.5±19.4	39.2±30.6	0.004
Postintervention			
Preintervention supervisor/manager expectations and actions promoting patient safety	52.6±26.2	51.7±27	0.895
Postintervention	54.3±19	46.7±27.6	0.222
Preintervention	52.9±22.7	52.2±27.2	0.921
Organizational learning-continuous improvement	62.1±21.3	21±50	0.033
Postintervention			
Preintervention	34.5±19.4	39.2±24.3	0.417
Teamwork within the units	43.1±18.8	31.7±20.7	0.03
Postintervention			
Preintervention	23±20.1	16.7±24.4	0.283
Communication openness	52.9±26	17.8±19	<0.001
Postintervention			
Preintervention	56.3±22	37.8±34.7	0.018
Feedback and communication about error	64.4±21.7	27.8±24.9	<0.001
Postintervention			
Preintervention	20.7±24.3	26.7±26.8	0.374
Nonpunitive response to error	27.6±23.7	16.7±24.4	0.086
Postintervention			
Preintervention	29.3±19	24.2±22.2	0.344
Staffing	33.6±20.3	20.8±17.5	0.012
Postintervention			
Preintervention	28.7±23.1	24.4±26.2	0.507
Hospital management support for patient safety	29.6±20.6	26.7±28.2	0.602
Postintervention			
Preintervention	34.5±28.8	22.2±23.7	0.079
Teamwork across hospital units postintervention	48.3±30.3	20±18.8	<0.001
Preintervention	35.2±19.8	32±22	0.563
Hospital handoffs and transitions postintervention	52.4±18.8	26.2±20.8	<0.001
Preintervention	35.9±22.25	33.92±25.91	0.4
Total score of patient safety culture	48.6±22.37	30.85±23.26	<0.001
Postintervention			

SD=Standard deviation

The SBAR information technique is easy to use, but it is challenging for complex clinical conditions such as ICU patients.[41] Although SBAR is regularly used in the Western world and has been found to be effective, the technique is not commonly applied in Iran. Now is the time for Iranian nurses to take into account the importance of a standard approach for handoffs from one shift to another or from one health-care provider to another one and act accordingly in their own clinical practice to produce a positive outcome for patients and thus play an important role in ensuring patient safety.

However, most of the results of the above studies confirm the findings of this study regarding the effectiveness of using the above model in promoting patient safety culture. However, the results of some studies, such as the study by Lancaster *et al*., which aimed to investigate the use of SBAR to improve clinical judgment in postgraduate nursing students, showed that although SBAR technique is an important tool for clinical judgment, 62% of students did not successfully pass all stages of clinical judgment and were not able to interpret the data collected from the patient, which is also the second stage of clinical decision-making. The use of this technique was not associated with the promotion of clinical judgment, which was not consistent with the results of the present study.[42] Furthermore, in the study of Müller *et al*., which was conducted to investigate the

Table 4: Comparison of the status of changes in the level of safety culture dimensions in two sections before and after the implementation of situation, background, assessment, recommendation-based training program among nurses

Variable	Intervention		Control	
	Before	After	Before	After
Frequency of events reported	Weak	Moderate	Weak	Weak
Overall perceptions of safety	Weak	Moderate	Weak	Weak
Supervisor/manager expectations and actions promoting patient safety	Moderate	Moderate	Moderate	Weak
Organizational learning-continuous improvement	Moderate	Moderate	Moderate	Moderate
Teamwork within the units	Weak	Weak	Weak	Weak
Communication openness	Weak	Moderate	Weak	Weak
Feedback and communication about error	Moderate	Moderate	Weak	Weak
Nonpunitive response to error	Weak	Weak	Weak	Weak
Staffing	Weak	Weak	Weak	Weak
Hospital management support for patient safety	Moderate	Weak	Weak	Weak
Teamwork across hospital units	Weak	Weak	Weak	Weak
Hospital handoffs and transitions	Weak	Moderate	Weak	Weak

Table 5: Comparison of the status of changes in the level of safety culture dimensions in two sections before and after the implementation of situation, background, assessment, recommendation-based training program among nurses

Variable	Intervention		Control	
	Before	After	Before	After
Frequency of events reported	Weak	Moderate	Weak	Weak
Overall perceptions of safety	Weak	Moderate	Weak	Weak
Supervisor/manager expectations and actions promoting patient safety	Moderate	Moderate	Moderate	Weak
Organizational learning-continuous improvement	Moderate	Moderate	Moderate	Moderate
Teamwork within the units	Weak	Weak	Weak	Weak
Communication openness	Weak	Moderate	Weak	Weak
Feedback and communication about error	Moderate	Moderate	Weak	Weak
Nonpunitive response to error	Weak	Weak	Weak	Weak
Staffing	Weak	Weak	Weak	Weak
Hospital management support for patient safety	Moderate	Weak	Weak	Weak
Teamwork across hospital units	Weak	Weak	Weak	Weak
Hospital handoffs and transitions	Weak	Moderate	Weak	Weak

effect of communication and SBAR patient delivery technique on patient safety in 2018, the results of this study found moderate evidence regarding the use of SBAR technique on patient safety culture which was not consistent with the results of the present study.[43]

Limitation and recommendation

It should be considered that due to the existing limitations, which include the small sample size and the educational nature of the hospitals, the generalization of the results should be done with caution. Therefore, it is recommended that studies with the same approach and in other care departments be designed, implemented, and compared.

Therefore, it is recommended that this technique be taught to all nurses and physicians. In addition, the use of the SBAR information tool requires scientific training and culture change to continue its clinical application, so it is necessary in future research to evaluate the impact of the SBAR information tool on its outcomes in patients, validate the instrument in other specialized subsets, and compare it with other information tools such as illness severity, patient summary, action list, situation awareness and contingency planning, synthesis by receiver.

Conclusion

The findings of this study showed that although the score of patient safety culture was moderate in Shahrekord ICU and no strength in the dimensions was observed, the dimensions were improved from poor level to moderate level, and using SBAR-based program and training, this technique to nurses was effective in promoting nurses' safety culture. Considering the importance of patient safety culture in nursing care and the need to strengthen and improve it, as well as the effectiveness of programs based on the SBAR technique, which can be easily and simply implemented, it is

suggested that this program be emphasized and paid more attention by health managers.

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Conflicts of interest

There are no conflicts of interest.

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