Original Article

Access this article online
Quick Response Code:

Website: https://journals.lww.com/jehp/
DOI: 10.4103/jehp.jehp_693_24

# Investigating the impact of implementing structured patient handover through the SBAR model on clinical errors of nurses in the emergency department

**Narges Toghian Chaharsoughi, Mohammad Nasr-Esfahani[1], Shahnaz Alikhah[2], Maryam Moghimian**

*Department of Nursing, Nursing and Midwifery Sciences Development Research Center, Najafabad Branch, Islamic Azad University, Najafabad, Iran, [1]Department of Emergency Medicine, Isfahan University of Medical Sciences, Isfahan, Iran, [2]Nursing Services Office of Ayatollah Kashani Hospital, Isfahan, Iran*

**Address for correspondence:**
Narges Toghian Chaharsoughi, Department of Nursing, Nursing and Midwifery Sciences Development Research Center, Najafabad Branch, Islamic Azad University, Najafabad, Iran.
E-mail: toghiann@gmail.com

Received: 18-04-2024
Accepted: 28-11-2024
Published: 31-10-2025

**Abstract:**

**BACKGROUND:** Correct patient handover by nurses is important. Failure to follow a standard procedure results clinical errors. This study aimed to determine the effect of structured patient handover based on the SBAR (Situation, Background, Assessment, and Recommendation) model on the incidence of clinical errors by nurses in the emergency department (ED).

**MATERIALS AND METHODS:** A quasiexperimental, single-group, before–after study was conducted in an ED in Ayatollah Kashni hospital (Isfahan, Iran). For 3 months, errors were collected by checklist. Then the SBAR model was taught to nurses to use it during handover. Postintervention errors were collected using the checklist and subsequently analyzed.

**RESULTS:** The total number of errors decreased from 102 to 25 after the intervention ($P < 0.0001$; 95% CI). The intervention significantly reduced laboratory, care, and handover errors ($P < 0.0001$; 95% CI). The frequency of clinical errors was statistically associated with shift and error severity ($P < 0.05$).

**CONCLUSION:** Using the SBAR handover model significantly reduced clinical errors in the ED. Then, it is recommended that this standard method be used during patient handover to improve safety in EDs.

**Keywords:**

Emergency department, errors, SBAR, patient handover

## Introduction

The process through which the patient's information and care are transferred consistently between healthcare providers is referred to as patient handover. The goal of patient handover is to ensure patient safety and effective care throughout shift transitions and rotations.[1,2] Failure to handover the patient or the use of ineffective methods is one of the factors that contribute to errors and accidents for the patient, which most commonly occur during shift transitions.[2,3] Miscommunication errors account for 70% of adverse events, 62% of which are associated with "continuous care," itself linked with shift transitions. Furthermore, up to 80% of serious medical errors involve miscommunication during patient handovers, and up to 24% of emergency department (ED) malpractice claims involve insufficient handovers.[4] According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), communication factors at the time of patient handover are responsible for 65% of adverse

This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

**For reprints contact:** WKHLRPMedknow_reprints@wolterskluwer.com

**How to cite this article:** Toghian Chaharsoughi N, Nasr-Esfahani M, Alikhah S, Moghimian M. Investigating the impact of implementing structured patient handover through the SBAR model on clinical errors of nurses in the emergency department. J Edu Health Promot 2025;14:450.

events and 90% of the root causes of these errors.[5,6] Among these factors, communication breakdowns account for two-thirds of all adverse events.[7] While precise data regarding communication errors during patient handover remain scarce in Iran, certain documents suggest that the possibility of clinical errors in the country's healthcare system might be high. These reports claim that 42% of patients have experienced clinical errors.[8,9] Clinical errors in hospitals are responsible for the death of 1 in 150 patients.[8-12]

Implementing a standardized protocol during the patient handover process has the potential to enhance treatment outcomes, minimize errors, promote effective communication among nurses,[3] alleviate workload concerns related to unintended drug accidents and disease complications, increase productivity, enhance clinical outcomes, boost job satisfaction, and increase patient satisfaction.[13] Meanwhile, the ED faces its own set of challenges when it comes to implementing the patient handover process. Various factors can impede the proper handover of a patient, including but not limited to overcrowding and the presence of multiple tasks, frequent interruptions, alarm noise, round-the-clock patient flow, and multiple admissions and discharges.[14] Patient handover is a high-risk and complicated process in the ED compared to other departments.[15] Handovers in ED occur several times a day, including when patients are transferred to the ED and from prehospital to hospital care.[16] Patient handover in the ED is different from that in other departments because it is influenced by the complex, busy, and dynamic environment that shapes the culture of that environment.[17] Patient overcrowding, staff workload, increased noise, and ineffective listening skills can lead to human errors and subsequently information loss during patient handover.[15] Unfortunately, nurses frequently do not follow special instructions when transferring patient information to other health care providers, and handover is typically done at the nursing station.[14,18]

There are various approaches to patient handover. Among these techniques are I-PASS, PSYCH, I PUT PATIENTS FIRST, I-CATCH, and SIGNOUT.[19,20] Although the use of these techniques creates a framework for the patient handover process, most of them, such as I-PASS, have not been thoroughly studied or are very time-consuming to implement.[21] In Iran, there are no necessary standards for the transfer of data and information, and most patient handovers are done verbally. There are communication gaps and insufficient knowledge of standard protocols.[22]

Among these techniques, SBAR (Situation, Background, Assessment, and Recommendation) is a standard, simple, safe, concise, and effective technique for transferring information during patient handover.[23-25] This technique assists nurses in organizing their thoughts during patient handover.[7] This method provides a predictable structure for coherent communication and is recommended by the WHO for use during handover.[26] The situation or S section comprises the speaker's (the nurse) identification and the following information: the nurse's role, the name and room number of the patient, the reason for the communication, and the reason for the patient's hospitalization. B or Background entails the patient's past medical history, earlier treatment interventions for the current issue, and any relevant information about the patient. An assessment describes the current conditions and recent changes in the patient's condition, as well as recent assessment information. Finally, in the R or recommendation component, the nurse poses her questions and requests for testing or counseling, as well as changes in the treatment or transfer process, if any.[26,27]

There is, however, little evidence that this method is effective during nurse shift transitions in the ED or that it can reduce clinical errors. In 2018, researchers conducted a study to evaluate the use of the SBAR technique at the patient's bedside in the ED of a trauma center in the Midwest. Nurses regarded this method as a straightforward approach to implement at the patient's bedside and as a safeguard against the occurrence of patient data loss. Moreover, the use of the SBAR technique improved the patient's safety culture in this study.[14] Another study published in 2021 by Oneymaobi on the use of the standard patient handover method (SBAR) in a postacute rehabilitation unit in Central California found that the SBAR method significantly reduced medication errors.[28] The results of a study on the effect of using the ISBAR standard checklist on nursing clinical handover in the coronary intensive care unit in Iran in 2020 revealed that the indicators of complete transfer of patient information in the fields of patient identity, current situation, clinical background, system assessment, and recommendations increased significantly. These findings indicate that information transfer based on standard checklists and a specific framework can increase the amount of information provided during clinical transfer while decreasing medication errors.[29] However, no research on the effect of using this method on the rate of clinical errors in the ED was available. As a result, the purpose of this study is to determine the impact of structured patient handover using the SBAR method on clinical errors made by nurses in the ED.

## Materials and Methods

### Study design and setting

A quasiexperimental, single-group (before–after) study was conducted in a 90-bed emergency department in Ayatollah Kashani hospital, Isfahan, Iran. Given the study's terms, the triage section, resuscitation room, and

emergency operating room were excluded, and the study was carried out merely in three inpatient EDs.

## Study participants and sampling

To conduct the study, ED nurses were invited to participate via the hospital information system (HIS) and a notice on the notice board. Participants included nurses with a bachelor's degree or higher who worked full time or part time in the ED. The 61 emergency nurses were all trained.

## Data collection tool and technique

A researcher-made error report checklist served as the data collection tool. This checklist was adapted from the Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER) error report checklist [Box 1].[30] This checklist had two sections: demographic characteristics of the person reporting the error and the person making the error, and the section related to the error report in terms of type and severity (example below). The face and content validity of the error report checklist were evaluated by ten related stakeholders, including head nurses, educational supervisors, patient education unit officials, safety experts, and nursing service managers. The internal consistency method was used to calculate the tool's reliability, yielding a Cronbach's alpha coefficient of 0.47.

The nurses were briefed on the routine procedure for handing over patients in the ED and the nature and severity of the error, in addition to the study's objectives and the significance of error reporting and checklist completion. Within this particular department, patient handovers were conducted through verbal communication and a cardex, lacking a structured and comprehensive framework. As a result, patients were frequently handed over based on bed numbers and were left at the nursing station, with no recommendation or suggestion for the next shift nurse.

**Box 1: Error reporting checklist**

Details of the person reporting the error:

Position: Nurse □ Head nurse □ Paramedic □ Doctor □ Laboratory staff □ Imaging staff □

Employment status: Project-based □ Official and the like □ Tenure:

Gender: Female□ Male□

Details of the error-making person:

Position: Nurse □ Head nurse □

Employment status: Project-based □ Official and the like □ Tenure:

Gender: Female□ Male□

Time of error:

Shift: Morning □ Evening □ Night □

Error type

Laboratory□ Improper registration□ Equipment □ Care □ Pharmaceutical □ Improper handover □Other

Error Severity:

No error and no harm □ Error but no harm □ Error and harm □ Error and death □

Following this session, the error reporting form was distributed to the nurses (a large quantity of the forms was duplicated and placed in the nursing stations) so that any errors could be reported. For 3 months, reported errors were collected and regarded as baseline data. Subsequently, the nurses were instructed by the researcher in the SBAR method of patient handover during a 2-hour session. The instruction took the form of a lecture and role-playing using a hypothetical scenario. Upon completion of the session, the nurses were asked to consistently apply the SBAR method when handing over patients. The SBAR Nursing Handover Worksheet was used to perform handover at the patient's bedside. In this manner, the items explained in the training classes and briefly mentioned in the SBAR worksheet were handed over to the nurse of the next shift in each of the parts A, B, S, and R. This worksheet was used by Denise Campbell (2018),[14] and we used in this study with minor changes [Box 2]. The head nurse or shift manager supervised the implementation of the technique at the patient's bedside. The educational supervisor and the hospital's safety expert also supervised the correct handover weekly. The ED used this intervention for 3 months. During this time, if an error occurred, the aforementioned reporting checklist was completed and placed in a special box prepared for this purpose, which was then placed in the ED. The patient safety expert collected the forms on a weekly basis and delivered them to the researcher. After the checklists were collected, the

**Box 2: Situation, background, assessment, and recommendation worksheet**

S: Situation
- Patient name, age, and sex
- Chief complaint
- Details of the patient's current situation.
- Surrounding circumstances

B: Background
- Previous injury or illness,
- Past medical history related to chief complaint
- Significant information regarding patient's care/history
- Any testing patient has undergone
- Allergies, addiction

A: Assessment
- Patient's current clinical condition.
- Test results/abnormal findings
- Medications administered
- Recent vital signs
- IV status
- Cardiac monitor rhythm

R: Recommendation
- Outstanding orders
- Test results waiting for Items
- About which the doctor should
- Be called
- Patient's plan of care
- Questions for off going nurse

same errors reported by multiple people were deleted, and the data were analyzed.

### Ethical considerations

A research ethics committee provided the code of ethics [IR.IAU.NAJAFABAD.REC.1397.060] for the study. Nurses entered the study with personal consent. They were assured that their personal information and reports would be kept private and that the study's findings would be reported anonymously. They were told that if they wished, they could receive the study's findings from the researcher. Further, it was optional for the nurses to complete the demographic characteristics of the person making or reporting the error.

### Statistical analysis methods

Descriptive statistics (frequency and percentage) were used to analyze the demographic characteristics of the nurses participating in the study, such as sex, age, and education. The binomial test was used to compare the frequency of clinical errors before and after the intervention. Chi-square, Fisher's exact test, and binomial test were used to investigate the relationship between types of clinical errors and demographic characteristics of wrongdoers before and after the intervention, and the Chi-square and Fisher's exact test were used to examine the relationship between clinical error and the intensity of the error and work shift before and after the intervention. We used Chi-square and Fisher's exact test to investigate the relationship between the demographic characteristics of the wrongdoers before and after the intervention. Data analysis was done in SPSS software version 26, and the significance level was considered less than 0.05.

## Results

The ED nurses ranged in age from 26 to 52 years old. The vast majority (93.4%) held a bachelor's degree and were female (82%). Their work experience ranged from 1 to 26 years, with 57.4% having 1 to 10 years of tenure. The highest frequency of errors reported before the intervention in 3 months was related to laboratory errors (84.2%), and the lowest type of error was related to medical equipment errors (0.5%). During the 3 months following the intervention, the highest error rate was related to laboratory errors (15.8%), and the lowest error rate was related to medical equipment (0.5%). Laboratory errors, incorrect handover, and care errors were significantly reduced after the intervention ($P < 0.0001$). Overall, the frequency of clinical errors decreased significantly ($P < 0.0001$) following the intervention [Table 1].

"Error with no harm" accounted for 61.8% of errors before the intervention and 80.0% of errors after the intervention. The lowest frequent category of errors was "Error and death," which did not occur before or after the intervention. "Error and harm" were the subsequent category with 1% and 8% frequencies before and after the intervention, respectively. The night shift had the highest error occurrence rate (47.1% before and 56% after the intervention, respectively). Before intervention, the morning shift had the lowest error rate (23.5%), while after intervention, the evening shift had the lowest error rate (4%). There was no statistically significant relationship between the error-makers' demographic characteristics before and after the intervention ($P > 0.05$). Clinical errors were significantly related to shift and the severity of errors both before and after the intervention ($P < 0.05$), as shown in Table 2.

**Table 1: Comparison of the frequency of reported errors before and after the intervention**

| Type of error | Before intervention *n* [%] | After intervention *n* [%] | *P* |
|---|---|---|---|
| Laboratory | 48 [84.2] | 9 [15.8] | 0.0001 |
| Incorrect documentation | 6 [66.7] | 3 [33.3] | 0.508 |
| Care | 17 [77.3] | 5 [22.7] | 0.017 |
| Medicinal | 13 [68.4] | 6 [31.6] | 0.167 |
| Incorrect hand off | 97 [94.4] | 1 [5.6] | 0.0001 |
| Equipment and other items | 1 [0.5] | 1 [0.5] | 1.00 |
| Total | 102 [71.7] | | 0.0001 |

**Table 2: Relationship between clinical errors and demographic characteristics of wrongdoer, intensity, and work shift before and after the intervention**

| Categories | Before intervention *n* [%] | After intervention *n* [%] | *P* |
|---|---|---|---|
| Work Experience | | | |
| 1-5 years | 74 [84.1] | 5 [100] | 0.99 |
| 6-10 years | 13 [14.8] | 0 [0] | |
| 11-15 years | 1 [1/1] | 0 [0] | |
| 16-20 years | 0 [0] | 0 [0] | |
| Total | 88 [100] | 5 [100] | |
| Gender | | | |
| Women | 73 [82] | 9 [81/8] | 0.999 |
| Men | 16 [18] | 2 [18.2] | |
| Total | 89 [100] | 11 [100] | |
| Employment status | | | |
| Nursing plan | 54 [61.4] | 7 [46.7] | 0.123 |
| Official etc. | 34 [38.6] | 8 [53.3] | |
| Total | 88 [100] | 15 [100] | |
| Error severity | | | |
| Sentinel event | 0 [0] | 0 [0] | 0.012 |
| Adverse event | 1 [100] | 2 [8] | |
| No Harm Event | 63 [61.8] | 20 [80] | |
| Near miss | 38 [37.3] | 3 [12] | |
| Total | 102 [100] | 25 [100] | |
| Shift work | | | |
| Morning | 24 [23.5] | 10 [40] | 0.019 |
| Evening | 30 [29.4] | 1 [4] | |
| Night | 48 [47.1] | 14 [56] | |
| Total | 102 [100] | 25 [100] | |

The gender and employment status of the error-making person were found to be significantly correlated with the types of clinical errors before the intervention ($P < 0.05$) [Table 3]. It was not possible to examine the correlation between the demographic characteristics of the error-maker and the types of clinical errors after the intervention. This was because the nurses had not completed the information related to this part completely and the number of missed findings was high.

## Discussion

The current study aimed to determine the impact of structured patient handover training using the SBAR method on clinical errors made by nurses in the ED. Before and after the implementation of the structured SBAR-based handover, the most and least frequent types of reported errors were laboratory and medical equipment errors, respectively. The results of Alavi *et al.*'s (2020)[31] study revealed that laboratory errors were the most prevalent. Sonmez (2018)[32] found that implementing a standard training program could significantly reduce the number of laboratory errors made by nurses. The findings from the ED indicate that the substantial workload experienced by nurses contributes to a high likelihood of laboratory errors. However, the implementation of a standardized program can substantially mitigate these errors. Although our study's working method differed from that of the previous study, the use of the SBAR method could significantly reduce laboratory errors.[33]

Following the SBAR training, errors caused by inaccurate patient handover decreased significantly. Starmer *et al.*'s (2013)[34] study in the United States found that standard handover training and proper communication reduced handover errors. Implementing the standard method of patient handover decreased errors associated with handover, according to the research of Dewar (2019) and Blazin (2020).[35,36] To clarify, nurses successfully completed patient identification using the prescribed handover procedure, which included the provision of general information, diagnosis, name, age, and date of admission. Although the studies used different methods for standard patient handover, the results showed that using the appropriate method could reduce the errors caused by patient handover. As a result of better communication between nurses, a standardized approach to patient handoffs can be established, providing a specific framework to avoid the loss of essential information during shift rotations.

The SBAR technique significantly reduced care errors in this study. In China, Zou (2016)[37] discovered that using the standard handover method at the patient's bedside significantly reduced care errors such as line care, bedsores, nasogastric tube, oxygen therapy by catheterization, and the risk of falling. All these cases are likewise provided to patients in the ED. Patient care is always provided by nurses in the wards, and if the patient handover is not done correctly at the time of shift change, the likelihood of care errors increases, particularly in the ED due to overcrowding and numerous admissions and discharges in each shift. The need to perform multiple care procedures and services for patients, on the other hand, increases the possibility of care errors. As a result, employing a principled method for patient handover reduces care errors.

In this study, registration and medical equipment-related errors did not decrease significantly after the intervention. In this regard, Zou's (2016)[37] study in China found that using a standard handover program reduces registration errors. This discrepancy in results between the two studies may be attributable to the infrequent occurrence of these types of errors prior to and following the intervention. Indeed, equipment error occurred only once before and after the intervention, whereas

**Table 3: The relationship between the types of clinical errors with the demographic characteristics of the wrongdoer before the intervention**

| Categories | Laboratory *n* [%] | Incorrect documentation *n* [%] | Equipment etc. *n* [%] | Care *n* [%] | Medicinal *n* [%] | Incorrect hand off *n* [%] | *P* |
|---|---|---|---|---|---|---|---|
| Work Experience of the wrongdoer | | | | | | | |
| 1-5 years | 38 [51.4] | 5 [6.8] | 1 [1.4] | 2 [2.7] | 12 [17.9] | 15 [20.3] | 0.131 |
| 6-10 years | 10 [76.9] | 1 [7.7] | 0 [0] | 0 [0] | 0 [0] | 2 [15.4] | |
| 11-15 years | 0 [0] | 0 [0] | 0 [0] | 1 [100] | 0 [0] | 0 [0] | |
| Total | 48 [54.5] | 6 [6.8] | 1 [1.1] | 3 [3.4] | 13 [14.8] | 17 [23.3] | |
| Gender of the wrongdoer | | | | | | | |
| Women | 43 [58.8] | 5 [6.8] | 0 [0] | 4 [5.5] | 4 [5.5] | 17 [23.3] | *0.0001 |
| Men | 5 [31.2] | 1 [6.2] | 1 [6.2] | 0 [0] | 9 [56.2] | 0 [0] | |
| Total | 48 [53.9] | 6 [6.7] | 1 [1.1] | 4 [4.5] | 13 [14.6] | 17 [19.1] | |
| Employment status of the wrongdoer | | | | | | | |
| Nursing plan | 31 [57.4] | 3 [5.6] | 1 [1.9] | 1 [1.9] | 9 [16.7] | 9 [16.7] | *0.014 |
| Official etc. | 17 [50] | 3 [8.2] | 0 [0] | 2 [5.8] | 4 [11.7] | 8 [23.5] | |
| Total | 48 [54.5] | 6 [6.8] | 1 [1.1] | 3 [3.4] | 13 [14.8] | 17 [19.4] | |

registration error occurred six times before and three times after the intervention. As a result, it is suggested that more studies on these types of errors be conducted over a longer period of time so that the effect of using the SBAR method in reducing them can be investigated further. In other words, using the standard handover method alone is insufficient to reduce errors caused by registration and equipment because these errors occur for a variety of reasons and are not limited to the use of a standard handover method at the time of nursing shift handover.

In this study, registration and medical equipment-related medication errors were reduced in our study, but the reduction was not statistically significant. Hada's (2018)[38] study in Australia found that using the SBAR method reduced medication errors. This disparity could be attributed to the design of the SBAR worksheet for the handover of nurses' shifts, which assigned more importance to the handover of prescribed drugs.

This is especially in the case of errors that are not significantly reduced by using the SBAR method (medication, registration, and equipment errors).

Among the study's limitations was some nurses' reluctance to report errors and complete the form due to fear of punishment or blame from managers. As shown in Table 3, this issue caused the demographic characteristics of the error-making people to be incomplete after the intervention, and the amount of missing data was significant. Hence, we were unable to analyze the results of this portion of the data. They did not cooperate well in providing the personal information following the intervention, possibly due to apprehension that they would continue to make errors despite receiving training in the standard technique or because of managerial criticism. On the other hand, conducting the study in a single hospital and department may make generalizing the findings difficult. A further imitation of this study was that the research population comprised a teaching hospital, where the presence of students might have contributed to an elevated probability of errors. As a result, it is suggested that additional studies be conducted in different wards and in several nonteaching and teaching hospitals in different cultures and compared. On the other hand, some hospital errors may occur for a variety of reasons, including organizational factors (budget, human resources, etc.). As a result, more research on the occurrence of various types of hospital errors and their relationship with patient handover or other related causes is required.

## Conclusion

The findings of this study show that the use of standard SBAR handover method by nurses during patient handover significantly reduces clinical errors in the ED, especially errors that are directly related to patient handover, such as errors caused by incorrect handover, laboratory errors, and care errors. To achieve effective and standard handover, nursing managers should create organized and standardized structures in different units and departments, especially the ED, according to the conditions of each department because the use of these methods can improve the safety of patients during hospitalization in the ED by reducing the incidence of clinical errors.

## Acknowledgment

We are grateful to the Research and Technology Vice-Chancellor of Islamic Azad University, Najafabad branch, for approving this research project. We are also grateful to the officials of Isfahan Kashani Hospital and the nurses of the emergency department for their cooperation in the research.

## Financial support and sponsorship

This study was done with the financial support of Islamic Azad University, Najafabad branch.

## Conflicts of interest

There are no conflicts of interest.

## References

1. Kumar P, Jithesh V, Vij A, Gupta SK. Need for a hands-on approach to hand-offs: A study of nursing handovers in an Indian neurosciences center. Asian J Neurosurg 2016;11:54-9.
2. Pucher PH, Johnston MJ, Aggarwal R, Arora S, Darzi A. Effectiveness of interventions to improve patient handover in surgery: A systematic review. Surgery 2015;158:85-95.
3. Vardaman JM, Cornell P, Gondo MB, Amis JM, Townsend-Gervis M, Thetford C. Beyond communication: The role of standardized protocols in a changing health care environment. Health Care Manage Rev 2012;37:88-97.
4. Frye KL, Adewale A, Martinez CJM, Montero CM. Cognitive errors and risks associated with provider handoffs. Cureus 2018;10:e3442.
5. Branch J, Hiner D, Jackson V. The impact of communication on medication errors. Agency for Healthcare Research and Quality (AHRQ), US Department of Health and Human Services, 2021.
6. Tregunno D. Know your client and know your team: A complexity inspired approach to understanding safe transitions in care. Nurs Res Pract 2013;2013:305705.
7. Dehghani A, Dastpak M, Gharib A. Barriers to respect professional ethics standards in clinical care viewpoints of nurses. Iran J Med Educ 2013;13:421-30.
8. Manjoghi N, Noori A, Arizi H, Fasihizadeh N. Errors, misconducts, improper hospital conditions, and whistle-blowing by nurses of Isfahan hospitals. Iran J Med Ethics Hist Med 2012;5:51-64.
9. Khammarnia M, Setoodehzadeh F. Medical Error as a Challenge in Iran's Health System. Brieflands; 2017.
10. Mansouri A, Ahmadvand A, Hadjibabaie M, Kargar M, Javadi M, Gholami K. Types and severity of medication errors in Iran; a review of the current literature. DARU J Pharm Sci 2013;21:1-10.

11. Harrison R, Cohen AWS, Walton M. Patient safety and quality of care in developing countries in Southeast Asia: A systematic literature review. Int J Qual Health Care 2015;27:240-54.
12. Bridges DR, Davidson RA, Odegard PS, Maki IV, Tomkowiak J. Interprofessional collaboration: Three best practice models of interprofessional education. Med Educ Online 2011;16:6035.
13. Wang W, Liang Z, Blazeck A, Greene B. Improving Chinese nursing students' communication skills by utilizing video-stimulated recall and role-play case scenarios to introduce them to the SBAR technique. Nurse Educ Today 2015;35:881-7.
14. Campbell D, Dontje K, Implementing bedside handoff in the emergency department: A practice improvement project. J Emerg Nurs 2019;45:149-54.
15. De Lange S, van Eeden I, Heyns T. Patient handover in the emergency department: 'How'is as important as 'what'. Int Emerg Nurs 2018;36:46-50.
16. Di Delupis FD, Mancini N, di Nota T, Pisanelli P. Pre-hospital/emergency department handover in Italy. Intern Emerg Med 2015;10:63-72.
17. Kapadia S, Addison C. Developing clinical handover: What does the literature suggest? Int J Clin Leadership 2012;17:119-22.
18. Galatzan BJ, Carrington JM. Exploring the state of the science of the nursing hand-off communication. Comp Inform Nurs 2018;36:484-93.
19. Davis J, Roach C, Elliott C, Mardis M, Justice EM, Riesenberg LA. Feedback and assessment tools for handoffs: A systematic review. J Grad Med Educ 2017;9:18-32.
20. Starmer AJ, Spector ND, Srivastava R, Allen AD, Landrigan CP, Sectish TC, *et al.* I-pass, a mnemonic to standardize verbal handoffs. Pediatrics 2012;129:201-4.
21. Heilman JA, Flanigan M, Nelson A, Johnson T, Yarris LM. Adapting the I-PASS handoff program for emergency department inter-shift handoffs. West J Emerg Med 2016;17:756-61.
22. Dadashzadeh A, Dehghannezhad J, Heydarpoor Z, Gilani N, Fathollahzadeh A, Rahmani A. Investigating the patient handover process in the emergency department from the perspective of pre-hospital emergency personnel. Nurs Midwifery J 2022;20:459-68.
23. Zumbrunn B, Stalder O, Limacher A, Ballmer PE, Bassetti S, Battegay E, *et al.* The well-being of Swiss general internal medicine residents. Swiss Med Wkly 2020;150:w20255.
24. Linden-Lahti C, Takala A, Holmström A-R, Airaksinen M, What severe medication errors reported to health care supervisory authority tell about medication safety? J Patient Saf 2021;17:e1179.
25. Martínez-Fernández MC, Castiñeiras-Martín S, Liébana-Presa C, Fernández-Martínez E, Gomes L, Marques-Sanchez P. SBAR Method for improving well-being in the internal medicine unit: Quasi-experimental research. Int J Environ Res Public Health 2022;19:16813.
26. Randmaa M, Swenne CL, Mårtensson G, Högberg H, Engström M. Implementing situation-background-assessment-recommendation in an anaesthetic clinic and subsequent information retention among receivers: A prospective interventional study of postoperative handovers. Eur J Anaesthesiol 2016;33:172-8.
27. Dalky HF, Al-Jaradeen RS, AbuAlRrub RF. Evaluation of the situation, background, assessment, and recommendation handover tool in improving communication and satisfaction among Jordanian nurses working in intensive care units. Dimens Crit Care Nurs 2020;39:339-47.
28. Onyemaobi-Agboli A. Use of Standardized Handoff Communication Tool in Post-acute Rehabilitation Unit. Grand Canyon University; 2021.
29. Pakcheshm B, Bagheri I, Kalani Z. The impact of using "ISBAR" standard checklist on nursing clinical handoff in coronary care units. Nurs Pract Today 2020;7(4):266-74.
30. JIPMER J.I.o.P.M.E.a.R. Medication Error Reporting Form, M.E.R. Form, Editor. Jawaharlal Institute of Postgraduate Medical Education and Research: India. 2022.Available at: https://www.scribd.com/document/649396487/Medication-error-reporting-form
31. Alavi N, Khan SH, Saadia A, Naeem T. Challenges in preanalytical phase of laboratory medicine: Rate of blood sample nonconformity in a tertiary care hospital. EJIFCC 2020;31:21-7.
32. Sonmez C, Yıldız U, Akkaya N, Taneli F. Preanalytical phase errors: Experience of a central laboratory. Cureus 2020;12:e7335.
33. Arslan FD, Karakoyun I, Basok BI, Aksit MZ, Celik E, Dogan K, *et al.*, The effects of education and training given to phlebotomists for reducing preanalytical errors. J Med Bioch 2018;37:172-80.
34. Starmer AJ, Sectish TC, Simon DW, Keohane C, McSweeney ME, Chung EY, *et al.* Rates of medical errors and preventable adverse events among hospitalized children following implementation of a resident handoff bundle. JAMA 2013;310:2262-70.
35. Blazin LJ, Sitthi-Amorn J, Hoffman JM, Burlison JD. Improving patient handoffs and transitions through adaptation and implementation of I-PASS across multiple handoff settings. Pediatr Qual Saf 2020;5:e323.
36. Dewar ZE, Yurkonis T, Attia M. Hand-off bundle implementation associated with decreased medical errors and preventable adverse events on an academic family medicine in-patient unit: A pre-post study. Medicine 2019;98:e17459.
37. Zou X-J, Zhang Y-P. Rates of nursing errors and handoffs-related errors in a medical unit following implementation of a standardized nursing handoff form. J Nurs Care Qual 2016;31:61-7.
38. Hada A, Coyer F, Jack L. Nursing bedside clinical handover: A pilot study testing a ward-based education intervention to improve patient outcomes. J Aust Rehabi Nurs Assoc 2018;21:9-18.