

Designing and evaluation of patient safety management questionnaire: A mixed method study

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Abstract

Context: Health system managers have a responsibility to prioritize their policies, procedures, and guidelines to ensure patient safety.

Aim: Design and evaluation of patient safety management questionnaire in Shahrekord teaching hospitals.

Settings and Design: This study was a mixed and exploratory research.

Materials and Methods: This study was conducted in 2017–2019 in Shahrekord. To analyze the factor load, the entire study population participated including 450 manager, nurse manager, supervisors, head nurses, and patient safety practitioner.

Statistical Analysis Used: The scope and items of the questionnaire were confirmed by examining the face validity, content, and structure and its reliability by internal consistency and stability. After collecting data, SPSS software version 18 was used to analyze and evaluate the information.

Results: In the qualitative stage and interview professors and experts and reviewing scientific texts, 116 items were extracted in 8 dimension of patient safety management, which after reviewing the face and content validity, 19 items were removed. In the quantitative stage, in the content validity ratio study, two items were removed due to the ratio of < 0.56 and one item in the content validity index review was removed due to the ratio of < 0.78, and 94 items were finalized. Evaluation result of structure validity with Kaiser-Meyer-Olkin index was 0.85 and Bartlett test was 7237.504 ($P < 0.001$).

Conclusions: Result showed that patient safety management questionnaire is an essential tool for use by hospital managers to evaluate patient safety management in the dimensions of planning, guidance and leadership, decision-making, organizing, information, communication, coordination, and control.

Keywords: Factor analysis, Health care, Patient safety, Psychometric, Reliability, Validity

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INTRODUCTION

Medical errors cause harm of patients and impose heavy financial costs on hospitals. The number and impact of errors are now thought provoking. Andel, Davido, Hollander, and Moreno report that more than 200,000 deaths occur each year due to medical errors. Researchers estimate that the annual cost of preventable errors is approximately \$ 38 billion.^[1] Estimation also shows that 7.4% of patients admitted to acute care centers in Canada experience injury or death due to health-care accidents, of which 38% are preventable.^[2] Success in correcting and reducing medical errors indicates an important problem in health care. Therefore, there is a better understanding of the factors that lead to improved process quality and patient safety outcomes in hospitals.^[3]

In order to increase patient safety, we need effective methods for risk management. The purpose of this work was to propose an integrated approach to risk management in the hospital. To improve patient safety, a flexible approach should be considered, in which different aspects of risk and type of information are considered.^[4] To this end, reliable and up-to-date qualitative and quantitative information is essential for health-care leadership. Thus, a framework for measuring safety and monitoring in five dimensions; organizing, leadership, manpower, patients, and families are considered.^[5]

Improving patient safety requires attention to knowledge management, which provides an appropriate and reliable structure for quality improvement.^[6] Recent developments in health care, however, indicate that hospitals do not have good clinical governance and need to be improved. For example, it is important to gather adequate information, patient safety indicators, safety accident reports, patient satisfaction surveys, risk recording, and meetings related to rare safety events.^[7]

Improving patient safety must become an organizational concern, especially in hospitals where care, diagnosis, and treatment are becoming more complex. Thus, the risk of patient injury has become more tangible and a permanent issue for medical institutions.^[8] Therefore, health system managers have a legal and moral obligation to ensure the safety and quality of patient care and to strive to improve care. They also have a responsibility to prioritize their policies, procedures, and guidelines to ensure patient safety. Accordingly, it is clear that health-care managers have an important and clear role in the quality of patient care and safety and are responsible for the results, quality, and safety of the patient.^[9] In providing health care, medical errors

are associated with many harmful, unwanted complications and consequences.^[10] Such errors can occur at any stage of the patient management process, including diagnosis, treatment, and prevention, and may lead to adverse events. Medical errors endanger patients' health and lives and increase the cost of treatment and rehabilitation, leading to 210,000 deaths in the United States. In Australia, 18,000 preventable deaths and at least 50,000 disabled patients are the result of unsafe treatment and care. In Germany, there are 25,000 deaths due to 100,000 medical errors. In developing countries, there is no accurate estimate of deaths and disabilities. However, the rate of medical errors is thought to be very high. In Iran, it is estimated that between 3% and 17% of patients experience complications due to medical errors, of which 30%–70% are preventable.^[11] Thus, health-care leaders around the world have worked to promote and develop patient safety, and steps have been taken to develop a conceptual framework for patient safety research. Among them, we can mention the involvement of physicians in improving the quality and safety of patients in academic medical centers, to reduce the number of injuries.^[6] On the other hand, it should be acknowledged that measuring and evaluating patient's safety is related to the infrastructure of culture and society, and the role of each member of the treatment team can suggest new concepts about patient's safety.^[12] Therefore, according to the studies and their emphasis on the role of planning, leadership, decision-making, organization, information, communication, coordination, and control in patient safety management and that there is no standard questionnaire in this area, designing an appropriate tool for the management evaluation. Patient safety is felt as an unavoidable necessity among managers and those involved in patient safety. Therefore, the present study was conducted to design and evaluate a patient safety management questionnaire.

MATERIALS AND METHODS

Design

This study is a practical, cross-sectional, mixed, and exploratory study that was conducted in 2017–2019 in Shahrekord (Eticla Code: IR.IAU.TMU.REC.1397.288). In the first step, to extract the items, interviews with twenty professors and patient safety experts and review of texts were used, which led to the compilation of 116 items. In the second step, in the quantitative analysis section, face validity, content, and structure of the questionnaire were confirmed through internal consistency. At this stage, 19 items were deleted. Furthermore, in content validity ratio (CVR), two items were removed, and in content validity index (CVI), one item was removed, and the final number of items reached 94. To perform exploratory

factor analysis, the statistical population of the study was 450 people including heads, managers, nursing managers, supervisors, head nurses, and patient safety officials of teaching hospitals who were selected by census method. In this study, a patient safety questionnaire was designed based on the steps proposed by Schwab (2013). Schwab considers three basic steps including item development, scale development, and scale evaluation.^[13]

Item development

In the first step, qualitative content analysis was used to extract the items. In the qualitative method, researchers formulate items based on experts' responses and review of texts that reflect their feelings and behaviors. The answers are then organized based on their type and content in different categories and dimensions. Qualitative data analysis at this stage was performed using conventional content analysis method and based on Graneheim and Lundman method.^[14] The steps are as follows: the interviews were transcribed into words to obtain a clear questionnaire of the experts' thoughts, behaviors, ideas, and experiences. Scientific texts were read several times so that researchers could identify data and statements. These items were compiled using continuous data comparison. The selected items were carefully controlled and examined by the researchers. Similar items became themes or subcategories and were assigned to a single domain. The first stage involves the development of unique items, so due to the extensive knowledge that exists about patient safety, in this study, the reduction method has been used.^[15] Furthermore, in this study, searches were made on library and electronic resources such as ISI (WOS), PubMed, Scopus, Google Science Direct, OVID, and Google Scholar to gain knowledge about patient safety frameworks and questionnaires. For searching the patient safety management content using keywords such as patient safety management, patient safety, patient safety monitoring and patient safety model in databases.

Combining concepts, using keywords, topic titles, synonymous keywords, being careful to link concepts correctly, and regularly evaluating search results to ensure focus on the topic was the strategy of searching in databases.

Scale development

At this stage, three important steps were taken to develop the questionnaire.

1. Items were combined to design the questionnaire.^[16] (The items extracted from the qualitative stage of the study were combined to go through a psychometric process in the form of a questionnaire)

2. Researchers determined the adequacy of the number of variables. Cox (2019) describes drafts and plans as the main points for developing the questionnaire. Regular classification of variables makes it easier for people to respond^[17]
3. The 5-point Likert scale (strongly agree, agree, somewhat agree, disagree, and strongly disagree) was considered. A score of 5 was given for a strongly agree answer and a score of 1 was given for a strongly disagree answer.

Scale evaluation

This step includes determining the validity (face, content and structure) and reliability of the questionnaire, providing the characteristics of the research community and the method of Collecting, and analyzing quantitative data.

Face validity

Face validity can be measured both qualitatively and quantitatively. Qualitatively, the measurement criterion is how the questionnaire items relate to measurable variables. Quantitatively, face validity is determined by the score and through the following formula.

$$(\%) \times \text{Frequency} = \text{Impact Score}$$

Items with a score equal to or >1.5 were retained and other items were omitted.^[18] In this study, to determine face quality validity, twenty professors and experts who were familiar with the concept of patient safety were asked to comment on the difficulty, appropriateness, ambiguity, and complexity of each item. Quantitative face validity was also determined by evaluating the importance and scoring of items.

Content validity

In this study, qualitative and quantitative methods have been used to examine the validity of the content. In the qualitative method, grammar, the use of correct words and sentences, and the placement of items in the appropriate place were done by professors and experts. CVR and CVI were measured in a quantitative method.

Content validity ratio

Lawshe's developed a content validity questionnaire that is provided to experts to comment on the need for its items.^[19] In this study, a questionnaire was presented to twenty professors and patient safety experts and they were asked to rate the questionnaire items on a 3-part Likert scale (not necessary, useful but not necessary, and it is necessary) to evaluate. The obtained results were compared with the criteria of Lawshe's table.

Content validity index

CVI is the ratio of experts' agreement to the relationship and importance of each variable.^[20] In this study, professors and experts were asked to determine the degree of relevance of each item to a four-part spectrum (unrelated, requires major revision, relevant but requires revision, and fully relevant). We divided the experts who chose options 3 and 4 by the total number of experts. Items larger than 0.79 were accepted.

Structure validity

In this study, the validity of the structure was determined by heuristic factor analysis. In exploratory factor analysis, the researcher does not expect much from the number or nature of structures or underlying factors.^[21] Before factor extraction, Kaiser-Meyer-Olkin (KMO) sample adequacy test and Bartlett test were performed to ensure the suitability of domain components for principal component analysis. Bartlett test was also used to answer the question whether the obtained correlation matrix is different from zero and based on which factor analysis can be justified. It was found that among items of the questionnaire have sufficient integrity. In the exploratory factor analysis, 450 people in the target community, including heads, managers, nursing managers, supervisors, head nurses, and hospital safety officials, completed the designed questionnaire. Initially, the sample size adequacy index and the Bartlett test result showed that factor analysis could be used to analyze the data.

Reliability

In this study, internal stability was used to assess reliability. The most common method for assessing internal stability is to measure the Cronbach's alpha coefficient, which provides an indicator to determine the correlation between the items in the questionnaire.^[22] To assess the stability of a criterion, the questionnaire is administered by the same people in two different situations.^[23] In this study, to determine the reliability of the questionnaire, twenty professors and experts were asked to complete the final questionnaire within 2 weeks. Then, the internal correlation of the questionnaire domains was calculated.

Scoring method

In most cases, the format specified determines the overall scoring method. If the items are answered using the Likert scale, the total score is usually calculated by adding scores.^[24] In this study, by collecting the answers, the total score was calculated. The questionnaire ranged from 94 to 470, with a higher score indicating greater safety for the patient.

Data analysis

For this purpose, by reviewing the texts, variables, and items of the questionnaires and different patient safety

frameworks, the questionnaire was extracted, and its scope was summarized. In this study, the condition for transferring the studies to the table of comparative studies was the sharing of at least two variables of the questionnaire with each of the questionnaires and frameworks [Table 1].

In the quantitative part, after completing the questionnaires, the data were analyzed using SPSS version 18 software (SPSS software version 18, SPSS Inc, Chicago, Illinois). Absolute and relative frequencies of quantitative and qualitative variables were calculated. Spearman correlation coefficient was used to investigate the relationship between variables. Cronbach's alpha values range from 0 (no stability) to 1 (complete stability). A minimum level of 0.7 was considered for Cronbach's alpha.^[25]

Values between 0.10 and 0.50 were considered for the mean correlation of variables,^[26] and a significance level of $P < 0.001$ was considered. To calculate the validity ratio, Lawshe's table (2014) with a minimum acceptance of 0.62 was used.^[27] The minimum acceptable value for KMO was 0.6.^[28] In exploratory factor analysis, a factor load of 0.4 and higher was considered.^[29]

RESULTS

In this study, eight dimensions of patient safety management including planning (12 items), guidance and leadership (13 items), decision-making (11 items), organizing (15 items), information (14 items), communication (9 items), coordination (8 items), and control (12 items) were counted in the form of a questionnaire with a total of 94 items. Qualitative findings from the perspective of professors and experts in the field of formal and content narration showed items are simple, appropriate, and free from any ambiguity and complexity. Moreover, grammatically, the use of correct words and sentences and the placement of items in the relevant dimensions were appropriate. Quantitative results of face validity and CVR and CVI were also determined by evaluating the importance and scoring of items [Table 2].

The results of determining the Cronbach's alpha coefficient for each domain showed that the structure of the questionnaire has acceptable internal consistency, and the Cronbach's alpha coefficient for different domains is between 0.85 and 0.95 [Table 3].

In exploratory factor analysis, and in the demographic characteristics section, the result showed that, in the highest percentage, 86% of the study population were women, 87% were experts, 39.9% had 1–7 years of work experience, and 82.7% were shift responsible [Table 4].

Table 1: Comparative study of prescription pattern for patient safety management

Variables questionnaire, patterns and framework	Planning	Leadership	Decision making	Organizing	Information	Communication	Coordination	Control
PCMH	-	√	-	√	√	√	√	√
COPA	√	√	√	√	√	√	-	-
WHO safety-friendly hospitals	√	√	√	√	√	√	-	-
Parameters of patient safety culture	√	√	√	√	√	√	-	-
TQM	√	√	√	√	-	-	-	√
Clinical governance	-	-	√	-	-	√	√	√
AHP	√	√	√	-	-	-	√	-
Swiss cheese	-	-	-	√	√	√	-	√
HFMEA	-	-	√	√	√	-	-	√
6-sigma	√	-	-	-	√	-	-	√
EFQM	√	√	-	√	-	-	-	-
H-R model	-	√	-	-	√	√	-	-
Charles vincent	-	√	-	-	-	√	-	-
MIMPS	-	-	-	-	√	√	-	√
Donabedian	√	-	-	√	-	√	-	√
SEIPS	-	-	-	√	√	-	-	-
SBAR	-	-	-	-	√	√	-	-
Safety performance model	-	√	√	-	√	√	-	-
Effective internal audit	-	-	-	√	√	-	-	√
Framework of interpersonal relations and performance in healthcare teams	-	-	√	-	-	√	√	-
Root cause analysis	-	√	-	√	√	√	-	-
Advances in patient safety model	√	-	√	√	-	√	-	-
Integrated model of team effectiveness for patient safety	-	√	-	√	√	√	√	-
Patient safety and human factors model	√	√	-	√	√	√	√	-
Measurement monitoring of safety framework	√	-	-	√	√	-	-	√
Improving patient safety framework	√	-	√	-	√	-	-	√

PCMH: Patient-centered medical home, SBAR: Situation-background-assessment-recommendation, HFMEA: Healthcare failure mode and effect analysis, AHP: Analytical hierarchy process, TQM: Total quality management, SEIPS: Systems Engineering Initiative for Patient Safety, MIMPS: Minimal Information Model for Patient Safety, EFQM: European Foundation for Quality Management, COPA: Competency Outcomes and Performance Assessment Model

Table 2: Content validity ratio, content validity index, and face validity

Instruments	Item number	Scale-CVI (total)	Scale-CVR (range)	Scale-face validity (total)
Planning domain	12	0.90	1-0	1.68
Leadership domain	13	0.81	0.83-0	1.81
Decision making domain	11	0.86	1-0	1.73
Organizing domain	15	0.91	1-0.5	1.69
Information domain	14	0.89	1-0.16	1.57
Communications domain	9	0.89	1-0.75	1.77
Coordination domain	8	0.86	1-0	1.64
Control domain	12	0.76	0.83-0.66	1.98

CVR: Content validity ratio, CVI: Content validity index

Table 3: The Cronbach's alpha coefficients of variables

Row	Variable	Cronbach's alpha coefficient
1	Planning	0.81
2	Leadership	0.71
3	Decision making	0.72
4	Organizing	0.79
5	Information	0.76
6	Communications	0.84
7	Coordination	0.74
8	Control	0.77

The results of exploratory factor analysis in the items section to determine the factor load indicated that the minimum factor load obtained is 0.50, while the minimum factor load in this study was considered 0.4. The results for

the percentage of variance and the practical load of each item are shown in Table 5.

DISCUSSION

The purpose of this study was to design and evaluation of patient safety management questionnaire in Shahrekord Teaching Hospitals, which led to the identification of dimensions and items of patient safety. These dimensions included planning, guidance and leadership, decision-making, organizing, information, communication, coordination, and control, which were outlined as components of patient safety. The results in the field of planning showed that the key items are planning to replace human resources in

Table 4: Demographic characteristics of participants in the study (n=450)

Characteristics	Group	n (%)
Gender	Male	63 (14)
	Female	387 (86)
Education level	Bachelor	392 (87)
	Master	33 (7.4)
	Ph.D	25 (5.6)
Job experience (years)	1-7	180 (39.9)
	8-14	166 (37.1)
	15-21	82 (18.2)
	>22	22 (4.8)
Position	Shift officer	371 (82.7)
	Head nurse	28 (6.1)
	Supervisor	20 (4.4)
	Nursing manager	6 (1.3)
	Hospital heads and professionals involved in the patient safety program	25 (5.5)

emergency situations, developing patient safety culture, patient-centeredness, cooperation and teamwork, formulating strategy and policy, correcting, and designing patient safety program and use. Practical models were prioritized for any risk. Titzer *et al.* have defined programming variables as prioritizing action variables in the form of a documented program as a framework and guide for hospitals' participation in patient safety.^[30,31] Weaver *et al.* and Lenburg CB *et al.* also stated that patient safety planning can improve patient safety through staff empowerment, scientific care, and promoting patient safety culture in hospitals,^[32,33] which is consistent with the items identified in this study.

In the field of guidance and leadership, staff training, qualified staff, commitment of senior hospital management to improve patient safety, clinical risk management before an accident, comprehensive understanding of patient safety, development of professional skills. Patient attention, management discipline, human resource review, ensuring access to human resources, equipment and information, and focus on management values were counted, which is consistent with the statements obtained by Khana *et al.* and Boama *et al.* They consider the variables, determining the role and training of each member of the health team, goal sharing, good and appropriate communication, mutual support, measurable results, transformation in patient safety management, and supporting the professional behavior of employees.^[34-36] Therefore, leaders make health-care decisions by carefully calculating clinical variables and interpreting their results correctly.^[37]

In the field of decision-making, the points of using quality management, creating opportunities for discussion and decision-making, developing critical thinking skills, integrating knowledge and skills for effective decision-making, deciding whether to respect patients' treatment instructions, community participation in the

implementation of patient safety and the use of collective wisdom in decision-making were determined.

Hughes *et al.* concluded that, in the decision-making process, patients' rights are also respected and enable them to participate in their care decisions. Joint decision-making has an intrinsic value for patient satisfaction and increasing the quality of health care. In addition to improving health care, this approach will increase patient satisfaction and reduce health-care costs.^[38] The results of Hughes study are consistent with this study in terms of treatment and care decisions, respect for patients' rights, and opportunity for decision-making.

In the field of organizing, items of appropriate, transparent and accountable organizational structure, accurate job descriptions, performance in accordance with patient safety goals, knowledge-based and standardized organization, staff empowerment, development of staff abilities and skills, Understanding the responsibility and role of employees and optimal use of resources and ensuring high productivity were obtained. Hosseini Iran *et al.* In a study entitled: A Study of Patient Safety Management Patterns in the Field of Organization,

Setting goals, participating in teamwork, sharing information for patient care, understanding the role and responsibility, optimal use of resources, high productivity, hiring skilled personnel, organizing care based on knowledge and standards, organizing medicine and blood transfusion, organizing medical equipment, organizational learning, organizing human resources, and improving the structure of patient safety management have been declared important, which is consistent with the results of this study.^[39]

In the field of information, information exchange during shift delivery, patient referral to the care team, recording and reporting of actions, consultation on emergency care,

Table 5: Factors of the patient safety questionnaire after varimax rotation

Domain (cumulative percentage=88.2%)	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	
Planning (percentage of variance=55.39%)	In planning for patient safety management, the use of performance patterns and practical patterns to do safe work is recommended	0.83								
	A safety improvement plan for each risky situation must be formulated	0.82								
	Planning for collaborative teamwork is one of the key principles of patient safety management	0.80								
	One of the most important planning-related points is the formulation of strategies and policies for patient safety management	0.79								
	In patient safety management, a plan for practicing and documenting, correcting, and designing a plan is recommended	0.79								
	A prerequisite for patient safety management is planning for human resources and equipment	0.78								
	Designing patient care is one of the planning processes for patient safety	0.76								
	Flexibility and innovation are two of the characteristics of planning for patient safety	0.75								
	In patient safety management, patient-centred planning plays a leading role	0.75								
	Planning for patient safety management should be based on the weight of the safety risks	0.75								
	In emergencies, for the sake of patient safety, it is necessary to anticipate alternative and substitute staffing	0.49								
	Developing a patient safety culture requires a thorough and scientific planning	0.48								
	Leadership (percentage of variance=53.14%)	Having qualified staff ensures patient safety		0.62						
		Developing the professional capability of staff is important for managing patient safety		0.61						
		Attention to patient dignity leads to the promotion of patient safety management		0.61						
Style of and attitudes to management play role in managing patient safety			0.58							
A comprehensive understanding of patient safety is an important indicator of leadership and leadership skills			0.58							
Patient safety is a product of paying attention to management values			0.57							
In patient safety management, clinical risk management is required before an accident occurs			0.56							
Ensuring access to human resources, equipment and information is essential for patient safety management			0.52							
Flexibility in guidance and leadership continues to improve patient safety management			0.52							
Investing in human resources in patient safety management is one of the basic principles of guidance and leadership			0.50							
Adequate training of staff on patient safety is a requirement of patient safety			0.48							
The low motivation of staff is adversely affects patient safety			0.41							
The hospital's top management commitment leads to improvement of patient safety			0.40							

Contd...

Table 5: Contd...

Domain (cumulative percentage=88.2%)	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	
Decision making (percentage of variance=60.66%)	Developing critical thinking skills helps to make decisions about patient safety			0.81						
	Patient safety management should consider community participation in patient safety activities			0.81						
	Ensuring patient safety depends on deciding to how take care of the patient			0.79						
	For effective decision-making regarding patient safety management, correlation between knowledge and practice correlations is required			0.79						
	Scientific exploration is important for future decision making for patient safety			0.78						
	The use of collective wisdom in patient safety decisions is a key constituent of patient safety management			0.78						
	Opportunity to discuss and make decisions about performance is effective in patient safety			0.77						
	The decision to act on patient safety must be evidence-based			0.77						
	The patient rights charter is one of the criteria for making decision for patients			0.76						
	Explaining problems and identifying patients' needs plays a role in patient safety management			0.81						
	The decision to implement quality management and patient safety improves patient satisfaction			0.76						
	Organizing (percentage of variance=58.47%)	The organization of care in patient safety management should be based on knowledge and standards				0.82				
		Defects in organizational, human and equipment factors are threatening factors for patient safety				0.81				
		Employee competencies and skills must be consistently developed to ensure patient safety				0.80				
Staff's understanding of responsibility and role is inevitable in managing patient safety					0.79					
Optimal utilization of resources and high productivity are the results of a coherent organization for patient safety management					0.79					
Physical characteristics, knowledge and skills of health care providers are effective on patient safety					0.77					
A detailed job description is important to ensure patient safety					0.77					
Improving patient safety management is conditional on empowering hospital staff					0.76					
Team performance, including organizational goals, is key to managing patient safety					0.76					
Proper organizational structure leads to increased productivity in the organization					0.75					
Patients' organizational excellence and confidence in providing safe health services is ensured by staff training					0.75					
Indicators of organizational culture and patient safety culture are essential components in the organizational structure of the hospital					0.75					
Patients' satisfaction with health services is due to the consistent quality of health services					0.72					
Staff performance must be consistent with patient safety goals					0.72					
Proper organizational structure enhances transparency and accountability regarding patient safety				0.71						

Contd...

Table 5: Contd...

Domain (cumulative percentage=88.2%)	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Information (percentage of variance=56.14%)	The analysis of the information obtained is essential for patient safety management					0.80			
	The deliverer team's recommendations about urgent care are among the prerequisites for patient safety management					0.79			
	Sharing information during shift change improves patient safety					0.78			
	It is important to take advantage of modern information techniques such as electronic data recording to improve patient safety					0.78			
	Continuous training of staff helps to improve their knowledge and practice in managing patient safety					0.77			
	Introducing the patient to the receiver's medical staff plays an important role in managing patient safety					0.76			
	Reports, observations of high-risk file review processes are important information sources in patient safety management					0.75			
	The recording and reporting of actions taken for the patient play a role in ensuring patient safety					0.74			
	Sharing information among hospital staff helps to manage patient safety					0.73			
	Measures taken to ensure patient safety must be shared					0.72			
	Transparency of ways of information contributes to patient safety management					0.71			
	Evaluation of patients' current condition and clinical examination are essential for managing patient safety					0.69			
	Inadequate knowledge and application of clinical techniques and practices threatens patient safety management					0.69			
	An examination of the patient's history provides the context for the basis of patient safety management					0.62			
	Communication (percentage of variance=61.94%)	One of the important aspects of health care is communicating with patients to examine their problems and concerns						0.82	
Communicating with the patient and considering him or her as a partner in the care and treatment process improves patient satisfaction and safety							0.82		
Common language use, communication with patience and sufficient accuracy are involved in the patient safety process							0.81		
Effective speech and audio communication with colleagues and patients must exist							0.81		
Efficient people, without effective communication, form an inefficient team							0.80		
There should be active debates among staff over patient safety							0.80		
To ensure patient safety, patient's access to and enjoying information are essential							0.78		
It is important to encourage patients to critique and express their views on patient safety management							0.74		
A prominent factor in the occurrence of medical errors stems from weak communications							0.65		

Contd...

Table 5: Contd...

Domain (cumulative percentage=88.2%)	Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
Coordination (percentage of variance=63.03%)	Getting information from the environment and anticipating needs is essential for patient safety							0.86	
	Coordination among members of the health care team to ensure patient safety is one of the most important management tasks							0.83	
	Positive and constructive coordination between staff and patients and their families plays a role in patient safety							0.82	
	The gradual improvement of patient safety is achieved through coordination between the health care providers in the hospital							0.82	
	In risky situations, coordination is essential for patient safety							0.82	
	Constructive and positive interaction between employees plays a role in patient safety							0.81	
	Sharing patient safety experiences is a factor for greater coherence and coordination							0.81	
	In the management of patient safety, coordination should be done for the proper transfer and dispatch of the patient							0.81	
	Control (percentage of variance=59.7%)	Inadequate and poor monitoring increases clinical error rates							
Control measures and criteria should be defined for patient safety management									0.82
Ensuring that no errors occur should not be considered as the endpoint of monitoring and control									0.82
Instant monitoring of the performance and control of clinical processes is important in managing patient safety									0.80
Continuous evaluation of staff is needed to maintain patient safety indicators									0.79
The accuracy of health services is the result of a continuous monitoring program									0.79
In managing patient safety, it is useful to use irrelevant feedbacks and incompatible audits for monitoring and control									0.79
Evaluation and measurement of the outcomes of actions taken for the patient are necessary to modify processes related to patient safety									0.78
It is necessary to obtain the consent of the senior management of the hospital to pursue corrective action in patient safety management									0.77
The control of the patient's position and safety status should be taken into account in daily management visits									0.76
The daily rounds of the patient safety management team should be performed with a standard checklist									0.75
Special supervision and control on patient safety management should be done by the clinical supervisor at all shifts									0.50

review of patient history, sharing of medical procedures, information analysis, transparency in information, and the use of modern information methods have been identified that are consistent with some of the items recorded in the Minimum Patient Safety Information Framework that provide a set of patient safety information sets.^[40] Feldman also showed that automated information recall and alerting are essential and supports safe and effective clinical decision-making, with the use of this process,

leading to a 22% increase in child safety management and a 22% reduction in medication errors.^[41]

In the field of communication, discussion about patient safety, communicating with colleagues and patients, encouraging patients to criticize and express their views, patient access and use of information, communicating with patients to evaluate their concerns and problems, communicating with patients as partners in the care

process. Weaver *et al.* analyzed 258 surgical errors that resulted in injury to the patient and showed that, in 24% of cases, a communication disorder occurred.^[32] In his study, Bagian and Paul considered inadequate or misleading information, lack of patient safety culture, unsuccessful communication methods, inappropriate communication, and inadequate feedback between sender and receiver, interruption, or distraction. Moreover, the lack of standard procedures in communication stated that it is consistent with the results of this study.^[42]

In the field of coordination, constructive and positive interaction between staff and patients and their families, coordination in patient transfer and dispatch, coordination in dangerous situations, anticipation of needs, use of experiences for more coordination, and coordination between members. The health-care team was obtained with the results of the study of Michel *et al.*, which included team communication, team interventions, team effectiveness, and role-playing in team building and collaboration, is consistent.^[40] Therefore, the quality and safety of the patient depends on technical management, diagnosis, prevention, rehabilitation, coordination, continuity of care, and patient-centeredness.^[43]

In the field of control, items of inspection and control by the clinical supervisor in all shifts, instantaneous performance monitoring, control of clinical processes, use of noncompliant feedback and audits in control, determination of performance control indicators, continuous control of care measures, and daily round. The patient safety management team was counted.

Francis's report presents 29 variables for patient safety, the most important of which is control. In other words, control is an absolute priority for health-care providers.^[12] In a way, this can lead to professional development and improvement of patient safety indicators.^[44] Today, patient safety is considered as one of the main dimensions of quality. Therefore, monitoring, controlling, evaluating, and improving patient safety, especially in intensive care units, is a major problem for health care that requires hospital officials to pay attention to these variables.^[45] Therefore, the findings of these studies are consistent with the results of this study.

CONCLUSIONS

The findings of this study emphasize the importance of planning, leadership, decision-making, organizing, information, communication, coordination, and control in patient safety. Therefore, its results can help to continue

applied research and increase patient safety knowledge. On the other hand, patient safety is one of the most important components of the health system today. Moreover, the need to pay attention to it by managers and staff of hospitals to improve patient safety is inevitable.

Conflicts of interest

There are no conflicts of interest.

Authors' contribution

L R, M R, S J H I, and A K involved in the study conception/design. L R, M R, S J H I, and A K contributed to the data collection/analysis. L R, M R, and S J H I drafted the manuscript. L R, R M, S J H I, and A K involved in critical revisions for important intellectual content and administrative/technical/material support. L R, R M, and S J H I supervised the work.

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