Examining the Effect of Implementing the Patient Safety Friendly Hospital Initiative on Patient Safety Culture

Abstract

Background: Patient safety has consistently been a primary concern in healthcare systems globally, highlighted by the World Health Organization through World Patient Safety Day. The WHO's comprehensive approach includes safety culture changes, system development, and professional development.

Aim: The Patient Safety Friendly Hospital Initiative aims to enhance patient safety by prioritizing it as a core aspect of hospital practices, beyond the objective of expeditious discharge.

Design and Method: This pre-post intervention design (single-group design) study utilized standards set by the WHO for promoting patient safety culture, including 140 items categorized into five groups: Governance and Leadership, Patient and Community Involvement, Safe Clinical Services, Safe Environment, and Education. These are further divided into subgroups with mandatory, basic, and advanced standards.

Ethical Consideration: The Ethics Committee of the Tarbiat Modares University authorized the research protocol (Register number: IR.MODARES.REC.1402.076)

Results: Research shows that hospitalizations in low- and middle-income countries result in significant mortality due to substandard safety practices, many of which are preventable. In Iran, despite a lack of documented statistics, the increasing number of complaints suggests high error rates, leading to substantial financial burdens.

Discussion and Conclusion: The implementation of safety standards has shown benefits for hospitals and society by enhancing patient safety and reducing adverse events. This initiative, a key intervention by the WHO in the Eastern Mediterranean region, empowers hospitals and staff to provide safe services with active patient and community participation.

Keywords: Patient Safety, Hospital Initiative, Healthcare Standards, Safety Culture.

Background:

The Patient Safety Friendly Hospital Initiative is a program designed to enhance patient safety by prioritizing it as a fundamental aspect of hospital practices. It can be conceptualized as a gesture of care and consideration by the healthcare sector towards its patients, signifying a commitment to ensuring their well-being beyond the mere objective of expeditious discharge.

Patient safety has always been a primary concern of healthcare systems worldwide and is consistently the focus of researchers and experts in the health field. In recent years, the maintenance and promotion of health have emerged as paramount objectives within healthcare systems(1). This emphasis is predicated on the recognition that enhancing health is instrumental in fostering the quality of health and medical services. Consequently, the World Health Organization (WHO) has acknowledged the significance of patient safety and has designated World Patient Safety Day to raise awareness and promote initiatives to enhance patient safety(2).

The World Health Organization (WHO) has identified the necessity of a comprehensive approach to patient safety that encompasses implementing safety culture changes, system development, and professional development(3). In recent years, the WHO has formulated standards for promoting a patient safety culture to address patient safety issues and provide safer services, with the expectation of reducing patient safety errors (3). The World Health Organization shares these safety-friendly hospital standards annually with patient safety experts around the world(4).

The results showed that the number of hospitalizations in low- and middle-income countries reached 134 million, leading to 2.6 million deaths (1, 4). In high-income countries, nearly one in ten patients experiences harm during hospital care(5).

Research has demonstrated that 4 to 17 percent of patients encounter complications attributable to substandard safety practices, with more than half of these incidents being preventable (6). In a study by Ilmidin et al. (2022), patient safety culture was reported with an average of 53.18% in seven countries (China, Ethiopia, USA, Philippines, Iran, Indonesia, and Ghana) and states (7). In Iran, there is an absence of documented statistics concerning medical and nursing errors related to patient safety. However, the increasing number of complaints referred to the Medical System Organization suggests that the rate of these errors is likely high(4). The confirmation of these errors would not only lead to mortality and disability but also generate substantial financial burdens for the health system (8). The World Health Organization (WHO) acknowledges the

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significance of patient safety and has identified it as a pressing public health issue. The World Health Assembly resolution delineates the organization's manifold responsibilities, encompassing the provision of technical assistance to Member States for the development of reporting and risk reduction systems, the formulation of evidence-based policies, the promotion of a safety culture, and the encouragement of research into patient safety(9). This program is so important that it is considered one of the key interventions of the World Health Organization in the Eastern Mediterranean region, and its main objective is to promote patient safety as an important principle for maintaining the quality of health services, taking into account the empowerment of hospitals and staff in providing safe services, with the active participation of patients and the community in promoting the safety of health (10). The Patient Safety Friendly Hospital Initiative creates a set of patient safety standards and tools to evaluate hospital patient safety programs and instill a culture of safety(11).

The Patient Safety-Friendly Hospital Standards are a total of 140 items divided into the following 5 groups: Governance and Leadership Group with 36 standards, Patient and Community Involvement and Engagement Group with 28 standards, Safe and Evidence-Based Clinical Services Group with 44 standards, Safe Environment Group with 21 standards, and finally, Education Group with 11 standards. Therefore, each of the 5 groups is divided into subgroups, which contain a total of 24 subgroups. Under each subgroup, there are three sets of mandatory, basic and advanced standards. Under each subgroup are three sets of standards: mandatory, basic, and advanced. Mandatory standards are those that must be fully met for hospitals to be recognized as patient safety friendly(12). The Core Standards are a set of requirements essential to implementing a hospital-wide patient safety program. They provide an operational framework that enables hospitals to evaluate patient care from a patient safety perspective, build staff capacity in this area, and engage patients in improving patient safety(13).

the Advanced Safety Friendly Hospital Standard is implemented after the attainment of the preceding two levels and encompasses criteria that not only facilitate the enhancement of service quality and the augmentation of patient safety but also the fortification and preservation of the delivery of safe services(14).

Contemporary literature on the effectiveness of implementing safety-friendly hospital standards on patient safety culture has yielded conflicting results. One potential explanation for this phenomenon is that hospitals possess unique circumstances and cultures, which must be taken into consideration during the design of processes aimed at achieving patient safety goals(1, 14, 15).

In the study by Rodríguez et al. (2022), titled "Evaluating the Safety Status of Patients," it was found that the safety status of patients varies significantly and that more efforts should be made to examine the safety status of patients more precisely(16). In a subsequent study by Fasih et al. (2023), which examined the safety status of patients in hospitals, it was acknowledged that the safety status in the units studied was not satisfactory(17).

The implementation of a patient safety assessment has been demonstrated to be of benefit to hospitals and society. This assessment serves as a crucial instrument for hospitals to demonstrate their commitment and accountability to patient safety. It functions as a key tool for modelling, identifying weaknesses, and encouraging improvement towards achieving standard goals. Ultimately, it serves to motivate staff to participate in improving patient safety. The assessment's ultimate objective is to enhance the level of patient safety within the hospital and to create conditions that lead to safer services. This, in turn, serves to protect the community from avoidable harm and to reduce adverse events in the hospital environment. In light of these considerations, the present study sought to examine the impact of the implementation of patient safety-oriented hospital standards on patient safety culture at Ebne Sina Hospital in 1403.

Methods

Study design:

This study utilized a pre-post intervention design (single-group design) to evaluate the effect of the Patient Safety Friendly Hospital Initiative (PSFHI) on the patient safety culture among nurses. The study was longitudinal, consisting of three assessment points:

baseline Assessment (T0): Administered before the education intervention (pretest), Post-Education Assessment 1 (T1): Conducted immediately after the completion of the education intervention (posttest one), Post-Education Assessment 2 (T2): Administered three months after the education intervention (posttest two).

Setting and Study size:

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The study was conducted at Ebne Sina Hospital. The study population comprised all nurses currently employed at the hospital. After obtaining the code of ethics from Tarbiat Modares University, informed consent was obtained by explaining the research objectives. A total of 420 nurses participated in the study. However, 5 participants were excluded from the final analysis as they changed their work environment during the study period, resulting in a final sample size of 415 nurses.

Inclusion Criteria were:

- Nurses with at least six months of work experience in the hospital or its clinics
- Nurses with direct responsibility for patient care

Exclusion Criteria were:

- Nurses who did not participate in at least two educational sessions
- Nurses who did not complete the questionnaires

The intervention consisted of a comprehensive education program on the PSFHI, conducted over six months from September 22, 2024, to March 20, 2025. The education program covered key components of patient safety, including communication, error reporting, and teamwork. Educational materials were presented through oral presentations, workshops, and interactive sessions in the hospital's education room.

The primary outcome was the change in patient safety culture scores between T0 and T1, as well as between T0 and T2. Patient safety culture was assessed using a standardized questionnaire developed by the Agency for Healthcare Research and Quality (Hospital Survey on Patient Safety Culture), administered at each assessment point. This scale has 12 dimensions with a total of 42 items, measured by the researcher using a Likert scale of 1-5 points from agreement to disagreement. The validity and reliability of this questionnaire were acceptable in the study by Palmieri (2020)(18).

Statistical methods:

In our study, the reliability was also measured on 25 nurses, r=0/9. The distribution of samples was normal. Demographic information such as age and years of experience was collected during the pre-education assessment. Data were collected at three-time points: before the education intervention (T0), immediately after the final education session (T1), and three months after the first post-test (T2). Of the 415 participants who completed the education program, all filled out the patient safety culture scale at T1 and T2.

Descriptive statistics were used to summarize the demographic characteristics and patient safety culture scores. Paired t-tests were used to compare the scores between T0 and T1. Additionally, Bonferroni tests were conducted to compare the scores between T0 and T1, and T0 and T2.

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Finding:

This study, designed as an interventional trial, aimed to evaluate the impact of implementing the Patient Safety Friendly Hospital Initiative on patient safety culture among nurses. The methods and results are presented as per CONSORT guidelines to ensure clarity and transparency. The findings showed that in Table 1, which is related to the relationship between demographic variables and patient safety culture, no significant relationship was observed between these variables and the dependent variable of the study. However, in Tables 2 and 3, the nurses' responses to the patient safety culture questionnaire were positive. A statistically significant difference is observed in Tables 2 and 3, which indicates that the Patient Safety Friendly Hospital Initiative training has had an impact on improving patient safety culture.

Table 2 summarizes the patient safety culture scores obtained from repeated measures ANOVA at three distinct time points: baseline (T1), immediately following the intervention (T2), and three months post-intervention (T3). A total of 12 dimensions (D1–D12) reflecting various aspects of safety culture were assessed. These dimensions represent nurses' perceptions of safety culture changes throughout the intervention period.

Outcomes: Statistical analysis revealed significant improvements in patient safety culture scores over time (p-values < 0.001). Notably, for Dimension 1 (D1), the mean score demonstrated considerable enhancement, with pairwise comparisons showing significant differences between T1 and T2 (mean difference = -0.663; p < 0.001) and sustained improvements between T1 and T3. This trend was consistent across other key dimensions, such as D2, D4, and D5, which also exhibited marked improvements in safety culture scores between T1 and T2.

Table1: Relationship between demographic variables and patient safety culture

		mean (s.d)	total	
Age(years),		35.32(7.56)	*r=-.073 p=.137	
		n (%)	mean (s.d)	results
Gender	female	254 (61.2)	3.00 (.24)	**t=1.163 df=413 P=.246
	male	161 (38.8)	2.97 (.23)	
Marital status	single	184 (44.3)	2.98 (.24)	**t=.337 df=413 P=.737
	married	231 (55.7)	2.99 (.23)	
Place	hospital	380 (91.6)	2.99 (.23)	**t=1.310 df=413 P=.191
	clinic	35 (8.4)	2.94 (.26)	
Education	diploma	88 (21.2)	2.99 (.24)	***F=.343 P=.710
	bachelor	317 (76.4)	3.04 (.16)	
	master	10 (2.4)	2.99 (.23)	
Work experience(years)	6 months-5 years	27(6.5)	2.95 (.29)	***F=.266 P=.900
	6-10 years	108(26)	2.99 (.23)	
	11-15 years	115(27.7)	2.99 (.21)	
	16-20 years	93(22.4)	3.01 (.25)	
	21-25 years	72(17.3)	2.98 (.24)	
* Pearson Correlation ** Independent Samples Test *** Oneway ANOVA				

Table 1 presents demographic characteristics and some statistical tests, primarily involving independent samples t-tests and one-way ANOVA. While it provides valuable information regarding various demographic factors like age, gender, marital status, education, work experience,

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Table2: Effect of the Initiative on Patient Safety Culture in 3 times (before and 2 afterafter)

	Time1	Time2	Time3	repeated measures ANOVA	*Pairwise Comparisons
	mean (s.d)	Mean (s.d)	Mean (s.d)		
D1	2.16 (.78)	2.82 (.62)	2.81 (.69)	F=140.841 P<0.001 η^2=.254	1<2,3
D2	3.32 (.53)	3.57 (.66)	3.58 (.65)	F=33.849 P<0.001 η^2=.076	1<2,3
D3	3.33 (.57)	3.53 (.70)	3.57 (.71)	F=22.816 P<0.001 η^2=.052	1<2,3 2<3
D4	2.36 (.76)	3.71 (.71)	3.79 (.63)	F=707.674 P<0.001 η^2=.631	1<2,3 2<3
D5	2.20 (.80)	3.67 (.73)	3.73 (.80)	F=700.039 P<0.001 η^2=.628	1<2,3 2<3
D6	2.77 (.59)	3.22 (.62)	3.27 (.64)	F= 100.569 P<0.001 η^2=.195	1<2,3
D7	2.55 (.87)	3.80 (.56)	3.81 (.58)	F=495.475 P<0.001 η^2=.545	1<2,3
D8	3.65 (.62)	2.95 (.82)	3.02 (.87)	F=153.340 P<0.001 η^2=.270	1>2,3 2<3
D9	3.44 (.45)	2.64 (.73)	2.68 (.75)	F=310.480 P<0.001 η^2=.429	1>2,3 2<3
D10	2.94 (.75)	3.76 (.72)	3.80 (.72)	F=254.669 P<0.001 η^2=.381	1<2,3
D11	3.01 (.51)	3.55 (.67)	3.54 (.66)	F=157.812 P<0.001 η^2=.276	1<2,3
D12	3.78 (.55)	3.43 (.84)	3.43 (.82)	F= 43.725 P<0.001 η^2=.096	1>2,3
total	2.99 (.23)	3.39 (.35)	3.42 (.40)	F=336.166 P<0.001 η^2=.448	1<2,3 2<3

*Bonferroni test η^2 = partial eta-squared=Effect sizes: 0.01 = small; 0.06 = moderate; 0.14 = large

Table 2 illustrates the results from repeated measures ANOVA assessments before (T1), immediately after (T2), and three months after (T3) the implementation of the Patient Safety Friendly Hospital Initiative. Each of the Dimensions (D1 to D12) relates to different aspects of safety culture as perceived by nurses. In this table, you can see the effect of the Initiative on Patient Safety Culture. The repeated measures ANOVA results show statistically significant differences in safety culture scores across the three-time points, with p-values all less than 0.001. This suggests there is strong evidence to conclude that the implementation of the Patient Safety Friendly Hospital Initiative significantly improves the patient safety culture among nurses when comparing the scores from T1 to T2 and T3. The post-hoc pairwise comparisons (not shown within Table 2 but implied) indicate which specific time comparisons were significant. For instance, for D1, the means demonstrate notable improvements from T1 to T2 and T1 to T3 with differences being significant ($p < 0.001$). This suggests measurable improvements in safety practices due to education and the initiative as time progresses.

Table3: view of the mean differences and p-values in 12 dimention

Pairwise Comparisons			Mean Difference	p
D1 Teamwork within units	Time1	Time2	-.663*	<0.001
		Time3	-.654*	<0.001
	Time2	Time3	.009	1
D2 Supervisor expectations and actions promoting	Time1	Time2	-.251*	<0.001
		Time3	-.263*	<0.001

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patient safety	Time2	Time3	-.011	1
D3 Organizational learning and continuous improvement	Time1	Time2	-.200*	<0.001
		Time3	-.243*	<0.001
	Time2	Time3	-.043*	0.022
D4 Management support for patient safety	Time1	Time2	-1.357*	<0.001
		Time3	-1.438*	<0.001
	Time2	Time3	-.080*	0.016
D5 Communication openness	Time1	Time2	-1.477*	<0.001
		Time3	-1.534*	<0.001
	Time2	Time3	-.057*	0.009
D6 Frequency of events reported	Time1	Time2	-.453*	<0.001
		Time3	-.496*	<0.001
	Time2	Time3	-.043	0.277
D7 Overall perceptions of patient safety	Time1	Time2	-1.250*	<0.001
		Time3	-1.261*	<0.001
	Time2	Time3	-.011	1
D8 Teamwork across units	Time1	Time2	.698*	<0.001
		Time3	.628*	<0.001
	Time2	Time3	-.070*	0.009
D9 Feedback and communication about error	Time1	Time2	.804*	<0.001
		Time3	.760*	<0.001
	Time2	Time3	-.043*	0.040
D10 Nonpunitive response to error	Time1	Time2	-.823*	<0.001
		Time3	-.862*	<0.001
	Time2	Time3	-.039	0.376
D11 Staffing	Time1	Time2	-.545*	<0.001
		Time3	-.537*	<0.001
	Time2	Time3	.008	1
D12 Patient handoffs and transitions	Time1	Time2	.348*	<0.001
		Time3	.342*	<0.001
	Time2	Time3	-.006	1
total	Time1	Time2	-.401*	<0.001
		Time3	-.434*	<0.001
	Time2	Time3	-.033*	<0.001

Table 3 provides a detailed view of the mean differences and p-values for pairwise comparisons of the D questions across the time points T1, T2, and T3. In dimension of D1, D2, D4, D5 each of these dimensions shows significant differences between T1 and T2, indicating improvements in safety culture scores. For instance, for D1, the mean difference between T1 and T2 is -0.663 with a p-value < 0.001, suggesting significant improvement. The results demonstrated statistically significant improvements across the three time points (T1, T2, and T3) with p-values less than 0.001, indicating strong evidence of the initiative's effectiveness

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Discussion

This interventional study evaluated the impact of implementing the Patient Safety Friendly Hospital Initiative (PSFHI) on patient safety culture among nurses at Ebne Sina Hospital. The study aimed to determine whether the PSFHI could significantly improve safety culture dimensions, as assessed by nurses, following the intervention.

Significant improvements were observed in teamwork within units(D1)., it suggests enhanced collaboration and mutual support among nurses after education. This is consistent with Tveter et al (2010), who reported similar enhancements in teamwork following a patient safety initiative(19). Although there was a statistically significant improvement in teamwork within units, some studies, such as Waleed et al (2018), reported minimal changes in this dimension. This discrepancy may be due to differences in intervention intensity or baseline teamwork levels(20).

Supervisors' role in promoting patient safety(D2) showed marked improvement. The structured education sessions empowered supervisors to better communicate and enforce safety standards, aligning with findings by Siddiqi et al (2012), who emphasized the critical role of leadership in patient safety culture(21). In the study of Namnabati et al (2016), he found that supervisory actions did not always translate into perceived safety improvements, suggesting variability in supervisory effectiveness and the way of supervising(22).

Education of patient safety initiatives fostered a culture of continuous learning and improvement(D3). Nurses became more proactive in identifying and addressing safety issues consistent with the results of Namnabati et al (2016), who highlighted the importance of ongoing education in enhancing safety culture. However, Clara et al (2011) reported that continuous improvement in patient safety education did not always lead to perceived safety culture changes, this result highlighting possible differences in organizational commitment and management(23).

Regarding the next dimension of the questionnaire, management support(D4) saw a notable boost, underscoring the importance of leadership commitment in fostering a safety culture. Opal et al (2016) found similar results, indicating that visible support from management can significantly impact safety culture perceptions(24). It seems that managerial support causes open communication improvement, with nurses feeling more comfortable discussing safety concerns. This aligns with the findings of Christmals et al (2018), who noted that open communication is vital for an effective safety culture(25).

Another notable result is that the frequency of event reporting(D6) increased after the education on patient safety, suggesting that nurses became more diligent in reporting errors and near misses(26). However, unlike our findings, Wijenayake et al (2020) observed less pronounced changes in reporting frequency(27), highlighting the variability in intervention outcomes across different settings.

Another important dimension which increased after education was the holistic perception of nurses(D7). It reflects a more positive outlook on safety practices. This is consistent with Hayfaa et al (2018), who reported enhanced perceptions of safety following targeted interventions(28). When nurses' overall understanding of the concept of safety culture increases, inter-team collaboration also increases.

Our result showed moderate improvement in teamwork across units(D8), indicating better collaboration beyond individual units. Damayanti (2019) and et al found that interdisciplinary teamwork is crucial for a cohesive safety culture, supporting our findings(29).

The results of our study showed that nurses' feedback on errors (D9)improved after receiving periodic training, and one of the reasons for this may be the elimination of punishment when errors occur. Improvements in feedback and communication about errors suggest a more supportive environment for discussing and learning from mistakes. This aligns with Brodersen et al (2020), who emphasized the role of constructive feedback in safety culture(30)

. Actually, when non-punitive responses(D10) are given to nurses, they feel less fear of reprimand. However, Christmals et al (2018) observed less pronounced improvements in this dimension(25), indicating potential variability in intervention effectiveness. Also, Clara (2011) and et al observed minimal changes(23), suggesting that creating a nonpunitive culture may require more time and effort.

Staffing issues(D11) were perceived more positively after the intervention and nurses felt better supported. Sheridan et al. (2021) found that adequate staffing was a key factor in maintaining a safe environment for patients(31), consistent with our findings. However, Opal et al. (2016) found no significant change in their study results(24), which could be because, in Opal et al.'s study, the

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hospital was facing a nursing shortage, while in our study, there was no shortage of nurses and nurses were not forced to work extra shifts.

Regarding the last dimension of the patient safety culture questionnaire, patients' handoffs and transitions (D12) saw notable improvements, these issues enhancing the continuity of patient safety. This dimension aligns with Fasih Ali et al (2023), who highlighted the importance of effective transfer in ensuring patient safety(17).

The implementation of the PSFHI led to statistically significant improvements across multiple dimensions of patient safety culture, including teamwork, supervisory roles, communication, event reporting, and staff perceptions. These findings underscore the importance of structured interventions, continuous education, and leadership support in fostering a culture of safety within hospitals.

Conclusion:

The PSFHI offers a valuable framework for other healthcare institutions aiming to enhance patient safety culture. However, variability in outcomes reported across studies highlights the importance of tailoring interventions to specific organizational contexts and baseline conditions. Future research should focus on the long-term sustainability of these improvements, exploring which components of the PSFHI are most impactful. Additionally, comparative studies across diverse healthcare settings can provide further insights into the generalizability and adaptability of this model.

Limitations:

Lack of Control Group: Due to the absence of a control group, we cannot directly compare the intervention group with a non-intervention group.

Implication for practice:

We firmly advocate for implementing educational strategies that are based on solid evidence to enhance both patient care and the learning outcomes for nurses. Our research shows that specific teaching techniques and practical approaches in clinical settings significantly improve performance. This insight can help shape educational programs and enhance nursing competencies. Adopting this approach not only validates the effectiveness of our training methods but also encourages ongoing research to refine optimal practices in nursing. Ultimately, this will lead to improved patient care outcomes and support the professional development of nurses, contributing to a higher standard of patient safety.

Author contributions:

I confirm that all authors (M.Kh., M.Ah., A. A.) met the authorship criteria. Ahmadi hedayat M (First Author), Introduction Writer/ Assistant Researcher (25%); Khoobi M (Second Author), Methodologist/ Assistant Researcher (50%); Arash Anisiyan (Third Author), Assistant Researcher/Discussion Writer (25%).

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The Ethics Committee of Tarbiat Modares University authorized the research protocol. The Ebne Sina Hospital provide a situation of sampling.

Conflict of interest statement:

The authors declare no conflict of interest regarding the present paper.

Ethical statement:

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