# Research Paper: Patient Safety Climate and Its Affecting Factors Among Rehabilitation Health Care Staff of Hospitals and Rehabilitation Centers in Iran-Tehran

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## ABSTRACT

**Objectives:** Hospitals and clinical centers are concerned about patient safety. Safety climate is a perceived value of safety in an organization that could improve the safety of workers and patients. The present research was conducted to study the safety climate of patients in the hospitals and rehabilitation centers affiliated to the University of Social Welfare and Rehabilitation Sciences.

**Methods:** This descriptive-analytical study was conducted on 300 nurses and nurse's aides (healthcare staff) who were selected by stratified sampling method, from two hospitals and three clinics, in 2017. Data collection tools included Patient Safety Climate Scale presented by Kudo and a demographic data questionnaire. The obtained data were analyzed by SPSS using descriptive statics like frequencies and percentages. Furthermore, Mann-Whitney U test and Kruskal-Wallis test were used to analyze the obtained data and compare the mean scores, respectively.

**Results:** The Mean±SD age and work experience of study participants were 36.7±6.79 and 9.46±5.8 years, respectively. The patient safety climate sub-factors were significantly different between males and females ($P<0.05$) except for reporting aspect ($P>0.05$). Patient safety climate was only different in nursing condition ($P=0.013$) among studied healthcare centers. Also, only fatigue reduction was different among various studied wards ($P=0.035$), where intensive care unit had the lowest score (2.12±2.0).

**Discussion:** Overall, the poor condition of patient safety climate was found in the studied rehabilitation centers. Therefore, it is recommended to improve nurses' attitudes with the assistance of hospital managers, to enhance patient safety.

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## Highlights

- The patients' safety concerns are considered a top priority for the healthcare of rehabilitation centers.
- In studied rehabilitation centers, the patients' safety climate is only different with respect to nursing condition.
- The patients' safety climate is good in some areas such as supervisors' attitude, communication between nurses, communication with physicians, and reporting.
- Fatigue reduction, nursing condition, and opportunities for nursing education are not good enough to preserve the appropriate patients' safety climate.

## Plain Language Summary

According to the World Health Organization, patient's safety refers to preventing healthcare accidental injuries. The main objective of healthcare systems with respect to patient's safety is to reduce the incidence and effects of associated complications and improve recovery from such injuries. Safety climate is one of the effective factors on patients' safety in organizations. There are several factors that affect safety climate. To conduct a safe environment for both patients and practitioners, it is critical to improve the assessment and attitudes on safety among different groups of people in healthcare settings. Considering the above-mentioned points, we conducted a study to evaluate the safety of the patients' climate in the hospitals and clinics affiliated to the University of Social Welfare and Rehabilitation Sciences. According to findings, all aspects of patients' safety climate were in appropriate condition. These aspects included feeling sleepy at work, enough time to rest, recreation, physical and mental fatigue in private life, lack of correlation between workload and the number of employees, and an opportunity to understand the patient's condition; other necessary items were also at a moderate level. The patients' safety climate in studied hospitals was not appropriate. Because safety climate is a major indicator of safety performance and recognizing its affecting factors is important, the assessment of this situation can be effective in reducing the incidence of medical errors.

## 1. Introduction

The patient safety concerns are considered as a top priority for healthcare organizations. The patient consequences in care or economic burden could be observed following safety incidents and clinical errors [1]. According to the World Health Organization, patient safety indicates preventing healthcare accidental injuries. The main objective of healthcare systems on patient safety is to reduce the incidence and effects of associated complications and improve recovery from such issues [1].

The occurrence rate of preventable mortality due to the inadequate measures of patient safety was over 97000 in the USA between 2005 and 2007 [2]. Safety climate is one of the effective factors on the safety of patients in organizations [3]. It is often considered as an indicator to determine patient safety because its changes like increased medical errors, can severely and directly affect patient's safety [1]. The staff perception of safety influence their motivation towards occupational safety behaviors [3].

Nurses are the main caregivers of the patients and responsible for many care activities; thus, they are strongly contributed to medical errors. Therefore, assessing nurses' attitudes and perceptions on safety may greatly impact the evaluation and safety climate level [4]. Patient safety climate in the hospital is a key element to increase patient safety, representing the perceived level of safety at a particular time and place [5].

Depression and stress are highly prevalent among nurses especially in rehabilitation and psychiatric settings where nurses provide care for patients with special conditions [6]. Stress has psychosomatics effects on all employers, including nurses [7-9]. Moreover, such psychological factors are correlated with safety climate and can affect patient safety [10]. Furthermore, the frequency of patient safety incidents is extremely high [11]. Therefore, it is necessary to explore healthcare staffs' attitudes about patient safety. Nurses may be aware of their es-

sential role in providing safe care services and that they need to have positive safety attitudes [12].

To conduct a safe environment for both patients and practitioners, it is critical to improve the assessment and attitudes on safety among different groups of people in healthcare settings [13]. Considering the above-mentioned points, this study was conducted in Iran to evaluate the safety climate of patients in the hospitals and clinics affiliated to the University of Social Welfare and Rehabilitation Sciences.

## 2. Methods

This descriptive and analytical research was conducted on healthcare staff (nurses and nurse's aides) in Rofeideh Hospital and Razi Hospital and Nezam Mafi Clinic, Asma, and Akhavan affiliated to the University of Social Welfare and Rehabilitation Sciences, which were selected using stratified sampling method. The final sample size was estimated to be 300 persons. Finally, 57 participants from Rofeyide, 203 from Razi, 17 from Nezam mafi, 13 from Asma, and 10 participants from Akhavan clinic were selected.

The main inclusion criterion was being a nurse or nurse's aide. Respondents completed researcher-made demographic data questionnaire and Patient Safety Climate Scale (PSCS) developed by Kudo et al. [3].

The demographic data questionnaire consisted of age, gender, marital status, educational level, work experience, type of employment, the name of the hospital, and ward. PSCS included 30 items covering safety climate in 7 dimensions, as follows: opportunities for nursing education, communication between nurses, communication with physicians, fatigue reduction, superiors' attitudes, reporting, and nursing condition with responses in a 5-point Likert type scale format.

Data analyses were performed in respect of the obtained mean scores in each dimension, where the total score of each dimension was divided by the number of questions. Scores less than 2.6 indicated an unfavorable level, 2.6 to 4.3 moderate and greater than 4.3, represented an ideal level. The content validity and reliability of the Persian version of the scale were confirmed and Cronbach's alpha of 0.832 was achieved as the internal reliability by previous research [14].

Results were collected and reported after approval by the Ethics Committee of University of Social Welfare and Rehabilitation Sciences. Informed consent forms were obtained from all nurses and nurse's aides; they were also informed that participating and leaving the study was voluntarily. All related information of the study participants were considered confidential.

Obtained data were analyzed using descriptive statistics like frequency and percentage by SPSS. Kolmogorov-Smirnov (K-S) test was applied to assess the normality of data. Then, Mann-Whitney U test and Kruskal-Wallis test were used to compare the mean scores.

## 3. Results

The Mean±SD scores of age and work experience were 36.7±6.79 and 9.46±5.8 years, respectively. The mean score of daily working time was 8.22 hours. In total, 169 (56.34%) participants were female, and 249 (83%) had a university degree. Moreover, 219 (73%) subjects were officially employed. Also, 207 (69%) participants were married. , Furthermore, 79 (26.33%), 62 (20.67%), 57 (19%), 55 (18.33%), and 47 (15.67%) participants were selected from the internal, surgical, emergency, and pediatrics wards, respectively. Distribution of the Mean±SD scores of 7 dimensions of patient safety climate are presented in Table 1.

According to Table 1, all sub-factors of patient safety climate were in appropriate condition. These include feeling sleepy at work, enough time to rest, recreation, physical and mental fatigue in private life, the lack of correlation between workload and the number of employees, and an opportunity to understand the patient's condition; other items of requirements were also at moderate level.

According to the K-S test results, data were not normally distributed ($P<0.05$). Thus, non-parametric tests were applied. Distribution of the Mean±SD of the 7 dimensions of patient safety climate is listed in Table 2 according to the subjects' demographic characteristics.

## 4. Discussion

It is critical to recognize Nurses' attitude on the safety of patients in hospitals. Employees' perception on safety culture are correlated with their performance in clinical centers [15]; thus, the present study was conducted to measure such association. Numerous studies have investigated patient safety climate in general hospitals; however, few studies have addressed rehabilitation and psychiatric settings, in this regard. Therefore, this point can be considered as the novelty and importance of the present study.

According to the obtained results, the level of patient safety climate was not appropriate in the hospitals. Although the study was against Baghaee et al. [16] research, it was similar to some other investigations [4]. Nurses especially in rehabilitation and psychiatric clinics, experience more unusual behaviors and violence by patients [17]. Singer et al. reported healthcare centers with better safety climate had a lower incidence of Patient Safety Indicators (PSIs); also, better safety climate among frontline personnel was associated with the lower risk of facing PSIs [18]. Therefore, lower levels of health outcomes will be expected in the studied organizations [19].

Healthcare organizations with stronger attitudes empower employees and provide psychological safety and comfort to take interpersonal risks, which enables people to prevent, solve, and learn more from problems at the frontlines of care delivery [11]. Mann-Whitney U test results suggested significant differences between males and females. This finding is in line with Vifladt et al. [20], but inconsistent with some others [4, 14].

Kruskal-Wallis test revealed no significant difference between employment status in terms of the mean scores of scale dimensions, except for the healthcare staff conditions (P=0.036). It means females had a better attitude on nursing conditions; in other words, females can better manage different conditions. In addition, nurses in the contract status of employment reported better nursing condition (P=0.034, 2.93). Clinics (except for the clinics of two main hospitals of Rofeyide and Razi) had a better nursing condition in the viewpoints of studied nurses (P=0.013, 3.1).

The obtained results indicated that men had more opportunities to educate in the nursing field (2.96 vs. 2.76). In our study, educational level had no variation effect on any factor (P>0.05). Brasaite et al. illustrated the effects of education on some aspects of patient safety climate like management perceptions but not the safety climate [12]. Females (mean score: 3.28) and males (mean score:3.6) had differences in communication with physicians (P=0.07). It means males can communicate better during nursing duties. Past researches reported that attitudes about patient safety was different among various job groups in hospitals [21].

In terms of wards, nurses working in the emergency department had the lowest mean score (2.34); likewise, Singer et al. reported that emergency department staff perceived lower levels of safety climate than other wards'

**Table 1.** Mean±SD and distribution of patient safety climate items in terms of desirability

| Factor | Main Items | Mean±SD | Desirability |
|---|---|---|---|
| Superiors' attitudes | Courage to error reporting | 2±1.22 | Moderate |
| Superiors' attitudes | Authorities fair reaction in the event of a fault | 3.17±1.2 | Moderate |
| Superiors' attitudes | Proper guidance of supervisors | 3.34±1 | Moderate |
| Superiors' attitudes | Valuing the proposed staff about patient safety | 3.17±1.2 | Moderate |
| Relationships among nurses | Team work of healthcare staff | 3.44±1.11 | Appropriate |
| Relationships among nurses | Good relations between healthcare staff | 3.66±2 | Appropriate |
| Relationships among nurses | Staff cooperating with other sections when required | 3.46±0 | Appropriate |
| Communications with physicians | Proper guidance of nurse by physicians | 3.46±2 | Appropriate |
| Communications with physicians | Good cooperation between healthcare staff and physicians | 3.2±0 | Moderate |
| Communications with physicians | Easy communication with physicians about health issues | 3.24±2 | Moderate |
| Fatigue reduction | Lack of sleep | 2.50±1.10 | Inappropriate |
| Fatigue reduction | Enough time to relax | 2.42±2 | Inappropriate |

| Factor | Main Items | Mean±SD | Desirability |
|---|---|---|---|
| Fatigue reduction | Adequate opportunity for recreation | 2.23±0 | Inappropriate |
| Fatigue reduction | Not feeling mental fatigue | 2.40±2 | Inappropriate |
| Fatigue reduction | Not feeling physical fatigue | 2.35±1.70 | Inappropriate |
| Opportunities for nursing education | Appropriate training programs to improve job skills | 2.88±1.3 | Moderate |
| Opportunities for nursing education | Proper role in healthcare provision | 2.85±1.77 | Moderate |
| Opportunities for nursing education | Training programs for new healthcare staff | 2.77±2 | Moderate |
| Opportunities for nursing education | Specific training programs tailored to the needs of each individual | 2.7±1.67 | Moderate |
| Opportunities for nursing education | Improving the ability of employees | 2.72±2 | Moderate |
| Nursing conditions | Healthcare workers election based on ability | 2.93±1 | Moderate |
| Nursing conditions | Healthcare workers election based on clinical experience | 2.67±1.2 | Moderate |
| Nursing conditions | Sufficient number of health care worker staff | 2.35±1.13 | Inappropriate |
| Nursing conditions | The appropriateness of work load and the number of employees | 2.44±3 | Inappropriate |
| Nursing conditions | Sufficient time to understand the patient's condition | 2.56±0 | Inappropriate |
| Reporting | Positive change in reporting errors | 4.35±1.12 | Moderate |
| Reporting | Increased awareness of patient safety in reporting errors | 3.15±1.10 | Moderate |
| Reporting | Unpredictable nature of the error | 3.12±1.2 | Moderate |
| Reporting | Addressing medical errors | 2.84±0 | Moderate |
| Reporting | Quick action by employees informed as soon as the error occurred | 3.19±1.14 | Moderate |

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**Table 2.** Level of the situation of the dimensions of patient safety climate based on average

| Item | Dimensions | Level of the Situation Based on Average | | |
|---|---|---|---|---|
| | | Undesirable | Moderate | Good |
| 1 | Supervisors' attitude | 26 | 26.6 | 46.4 |
| 2 | Communication between nurses | 15 | 26 | 60 |
| 3 | Communication with physicians | 23 | 31 | 45 |
| 4 | Fatigue reduction | 66.6 | 15 | 17.6 |
| 5 | Opportunities for nursing education | 43 | 31.6 | 24.4 |
| 6 | Nursing condition | 60 | 24.4 | 16.6 |
| 7 | Reporting | 30.4 | 33.6 | 35 |

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**Table 3.** Comparing the domains of patient safety climate between different groups

| Characters | | Item 1 Mean±SD | Sig. | Item 2 Mean±SD | Sig. | Item 3 Mean±SD | Sig. | Item 4 Mean±SD | Sig. | Item 5 Mean±SD | Sig. | Item 6 Mean±SD | Sig. | Item 7 Mean±SD | Sig. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Female | 3.12±0.8 | 0.029 | 3.59±1.0 | 0.011 | 3.28±1.3 | 0.007 | 2.4±0.99 | 0.02 | 2.76±0.91 | 0.03 | 2.66±1.15 | 0.036 | 2±0.93 | 0.039 |
| | Male | 3.32±0.85 | | 3.24±0.8 | | 3.6±3.0 | | 2.62±1.38 | | 2.96±1.12 | | 2.52±0.74 | | 3.25±0.78 | |
| Educational level | Diploma | 3.25±0.92 | 0.14 | 3.66±0.88 | 0.33 | 3.48±0.91 | 0.41 | 2.28±0.88 | 0.31 | 3.0±0.81 | 0.07 | 2.76±0.95 | 0.08 | 3.21±0.93 | 0.06 |
| | Undergraduate | 3.14±1.23 | | 3.65±1.14 | | 3.49±0.92 | | 2.28±0.87 | | 4.0±1.55 | | 2.7±0.8 | | 4.0±0.95 | |
| | BA | 3.11±0.84 | | 3.6±1.0 | | 3.25±1.6 | | 2.49±1.12 | | 2.71±0.91 | | 2.57±2.0 | | 2.0±0.91 | |
| | MS | 3.7±2.0 | | 3.25±0.75 | | 3.7±0.9 | | 2.43±1.0 | | 3.17±0.99 | | 4.15±2.7 | | 3.37±0.76 | |
| Employment status | Official | 3.1±0.94 | 0.37 | 3.64±1.0 | 0.35 | 3.28±1.53 | 0.43 | 2.39±0.97 | 0.53 | 2.74±0.93 | 0.41 | 2.54±2.0 | 0.034 | 3.06±0.96 | 0.4 |
| | Contractual | 3.36±0.98 | | 3.3±0.96 | | 3.4±0.92 | | 2.47±0.001 | | 2.76±2.0 | | 2.53±0.87 | | 3.15±0.94 | |
| | Contract | 3.23±0.73 | | 3.37±0.87 | | 3.41±1.5 | | 2.55±1.28 | | 2.91±0.95 | | 2.93±1.24 | | 3.02±0.77 | |
| Marital status | Single | 2.97±0.79 | 0.022 | 3.37±0.95 | 0.69 | 3.17±0.97 | 0.63 | 2.45±0.001 | 0.82 | 2.84±0.95 | 0.74 | 2.5±1.27 | 0.66 | 2.87±0.83 | 0.039 |
| | Married | 3.22±0.9 | | 3.59±0.89 | | 3.37±1.6 | | 2.43±1.2 | | 2.77±0.94 | | 2.64±2.0 | | 3.12±0.93 | |
| Hospital | Rofeyide | 2.97±2.0 | 0.09 | 3.56±0.98 | 0.76 | 3.32±1.83 | 0.12 | 2.2±0.88 | 0.086 | 2.59±2.0 | 0.37 | 2.43±0.78 | 0.013 | 2.96±0.94 | 0.39 |
| | Razi | 3.22±0.72 | | 3.47±0.85 | | 3.23±1.4 | | 2.44±1.24 | | 2.83±0.87 | | 2.52±0.8 | | 3.14±0.9 | |
| | Other clinics | 3.03±0.83 | | 3.56±0.84 | | 3.53±0.83 | | 2.68±0.94 | | 2.94±0.87 | | 3.1±1.71 | | 3.1±0.92 | |
| Unit | Internal | 3.37±0.85 | 0.07 | 3.49±0.84 | 0.36 | 3.4±1.8 | 0.06 | 2.7±1.35 | 0.035 | 2.86±0.001 | 0.68 | 2.69±0.9 | 0.42 | 3.0±0.8 | 0.27 |
| | Pediatrics | 2.98±0.75 | | 3.53±0.9 | | 3.85±2.7 | | 2.5±0.001 | | 2.83±0.73 | | 2.6±0.93 | | 2.98±2.0 | |
| | Intensive care | 2.87±0.001 | | 3.7±2.0 | | 2.0±1.1 | | 2.12±2.0 | | 2.52±1.0 | | 2.43±0.97 | | 3.14±0.96 | |
| | Surgical | 3.28±0.87 | | 3.6±0.91 | | 3.24±0.92 | | 2.27±0.7 | | 2.9±0.9 | | 2.74±1.36 | | 3.24±0.89 | |
| | Emergency | 2.22±0.6 | | 3.38±0.8 | | 3.23±0.91 | | 2.65±0.92 | | 2.9±0.96 | | 2.65±1.26 | | 2.7±0.81 | |

staff. This finding recommends that the higher levels of risk and complexity, and faster-paced work environment in emergency departments require relatively more consideration to safety issues than other wards [22].

Experience of healthcare staff in a particular ward, type of task, work experience and daily work hours made significant differences in patient safety [23]. Among the 7 items of questionnaire, fatigue reduction differed based on the ward. The internal ward reached the highest score (P=0.035, 2.7). In other words, nurses in internal ward were more aware of their fatigue state and got more time to rest. Meanwhile, the Intensive Care Unit (ICU) had the lowest score (2.12) that probably was due to the higher levels of workload among staff. In addition, married nurses reported more problems than singles (P=0.039, 3.12 vs. 2.87).

It can be explained by their family-related responsibilities and so, report near misses and accidents in the work. Married nurses also had higher scores in the supervisor's attitude aspect (P=0.022, 3.22 vs. 2.97).

Overall, with respect to the vital situation of nursing groups in healthcare, all factors influencing their performance and those leading to errors occurrence need to be identified and controlled. Both organizational and individual factors, such as safety climate, complexity in the organization, work schedule, stress and frustration, must be taken into consideration [24-26]. Furthermore, training healthcare staff in terms of patient safety climate and culture, as well as various structure interventions may improve patient safety and the quality of care [27].

### Supervisor's attitude

The attitude of managers and supervisors is critical to have high levels of safety for both patients and staff. Snijders et al. found that reporting behavior in the neoNatal Intensive Care Unit (NICU) could be promoted by the management support of patient safety, a nonpunitive manner towards mistakes, and the perception of patient safety [28].

### Communication between nurses

Good communication can highly affect the process of patient care and improve patient safety. Open communication should be established among healthcare system personnel to prevent errors by the means of the team work ability of supervisors [29].

### Communication with physicians

Patient care can be improved through appropriate professional relationships. The mutual effect can be observed among the staff due to the dynamic process of relationships. Professional relationships are considered to be important factors to prevent risk; thus, communication plays a principal role in medical practice, which is necessary for patient safety [30].

### Fatigue reduction

Sufficient sleep and rest as well as healthy entertainments are necessary. There was a correlation between sleep deficiency and working at home and having the second job, shift working and excessive working hours [31-35].

### Nursing condition

Importance of suitable proportion between a number of patients, healthcare workers, and nurses' workload to provide adequate time to perform duties is obvious. An insufficient number of workforce in hospitals could lead to a heavy workload in healthcare staff [36]. Inadequate time to manage the patient significantly influenced the performance of hospital personnel [37].

### Opportunities for nursing education

The purpose of educational opportunities is updating clinical information and be aware of changes in healthcare workers' problems and create opportunities to improve their skills. Quality management is effective in determining the educational needs of healthcare workers. In a hospital where total quality management is performed, healthcare workers make efforts to upgrade their knowledge by learning new training techniques and try to succeed in providing healthcare [38, 39].

### Reporting

This part refers to the continuous and accurate reporting of employee's activities and occurred errors. Reasons for the lack of reporting errors were the lack of positive feedback from healthcare staff superiors, focusing on malpractice, lack of other possible factors involved in causing the error (management factors), and fear of the legal issues (fear of the consequences of reporting) [40].

## 5. Conclusion

Patient safety climate in studied hospitals was not appropriate. Considering the fact that safety climate is a major indicator of safety performance and recognizing

its affecting factors; the assessment of situation can be effective in reducing the incidence of errors.

The studied centers need to consider patient safety climate in the daily functioning of the organizations and the routines of individuals. It is recommended to improve nurses' attitude through hospital managers' efforts to increase patient safety. Attention to personnel training is important in patient safety. In spite of the high levels of academic education among the studied subjects, patient safety climate was not desirable. Therefore, it is recommended to provide them safety training courses. However, improving culture is a time-consuming process.

## Ethical Considerations

### Compliance with ethical guidelines

This study was according to general ethical guidelines, and participants were assured of the confidentiality of their information.

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### Authors contributions

All authors contributed in preparing this article.

### Conflict of interest

The authors declare no conflict of interest.

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