

Influence of Training on Patient Safety Culture: a Nurse Attitude Improvement Perspective

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Abstract

Background and Objectives: Medical Errors and adverse events have recently turned into one of the predominant concerns of health-policy makers and health services providers. Promoting safety culture is fundamental to sustainable safety improvement in healthcare settings. The purpose of this study was to examine the effect of training on nurses' attitudes towards safety culture.

Methods: A cross-sectional study was conducted over the period of April to September 2011. The nursing staff in Shahid Modarres Hospital were invited to participate in the study (n = 143). A Persian version of Safety Attitude Questionnaire (SAQ) was developed and used for measuring safety culture. To evaluate the effect of training on nurses' safety attitudes, the safety culture survey was carried out twice on the sample, ones before training and once after training and the results were compared. The training course contained material on causes of failure in safety systems, harms due to unsafe medical conditions and their outcomes, and concepts and dimensions of safety culture. The second safety culture measurement was carried out three months after the end of the training course. The results of the two evaluations were compared using analytical statistics.

Findings: Significant improvement in nurse attitudes towards most safety culture dimensions was observed after training. While the highest improved dimension was Perception of Management (43.3%), Stress Recognition showed the lowest increase (7%) following the training. The training was found to enhance the average nurses' safety attitudes by 44%. Meanwhile, the results of path analysis showed a similar pattern of interrelations between safety attitude dimensions and overall measure of safety culture before and after training.

Conclusions: Training is an effective strategy for improving nurse attitudes towards safety.

Keywords: Patient Safety, Safety Culture, Training, Attitude, Hospital

Background and Objectives

In recent years, medical errors and adverse events have become a serious concern for health policymakers and healthcare providers. According to annual statistics, around 98000 patient mortality cases reported in the United States alone due to medical errors [1]. A five-year Surveillance Program by Baldo et al. (2002) [2] revealed that nurses are responsible for 78% of the adverse events. Studies show that negative work-place factors such as job contradictions, long work hours, and difficulty of care responsibilities play an important role in

this problem [3]. Jajvandian et al. (2007) identified work fatigue, high stress, lack of safety facilities, and crowded hospital wards as major injury-causing factors [4]. Faghihi and Mansoori (2007) believe that the best approach to prevent hospital accidents is to exert maximum control on physical pivots, equipment, and behaviors of people in charge of healthcare systems [5].

Traditional approach to support patient safety is based on establishing mortality committees, scrutinizing accidents, and reorganizing health service providing systems [6]. Meanwhile, the major health benefactor organizations including the World Health Organization (WHO) [7], National Patient Safety Foundation (NPSF) [8], Joint Commission International (JCI) [9], and Institute for Health Care Improvement (IHI) [10] increasingly encourage healthcare organizations to develop a culture of safety as an effective strategy for sustainable safety

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improvement. A growing body of evidence supports the notion that the rate of medical errors and adverse events are associated with healthcare professionals' attitudes towards safety. [11]. Hereupon, most developed countries have realized that in addition to exploiting modern technology and advanced managerial systems, high safety and reliability achievement is contingent on improving personnel safety behaviors through integrating safety attitudes to their values, beliefs and practices (i.e. establishing a "culture of safety") [12]. According to UK Department of Health, the role of safety culture in adverse event control can be mainly attributed to the fact that a positive safety culture allows the organization to learn from percent adverse incidents [13].

Nursing staff one of the most – if not the most – important part of health human resources. The nurses' close relationship with patients and their major contribution to processes of patient care provide them with a profound insight into patient safety problems as well as potential solutions to cope with them. Realization of this potential is, however, contingent on availability of an efficient system of encourage and support and a nonpunitive and blame-free culture that allows the nurses to contribute to safety improvement without any fear of unfair punishment [14].

Neil and Griffon showed that nurses with sufficient knowledge and understanding of safety issues, would be more cooperative in error reporting and alerting the upcoming events [15]. An efficient strategy to enhance nurses' safety attitudes is to train nursing staff at all organizational levels. Lingard showed that training programs, with the aim of improving safety culture, have positive influence on occupational safety and individuals' safety behavior [15]. Considering the important role of training on nurses' safety attitudes, this study aimed to provide insight into the effect of training on nurses' safety attitude improvement.

Methods

Measurement

Our study was a semi-empirical research conducted during April to September 2011 in Shahid Modarres Hospital in Tehran, Iran. To identify a suitable measurement tool for our study, the available patient safety culture questionnaires were investigated regarding their measures, number of items, reported reliability and validity, and their relative advantages [16]. We identified the Safety Attitude Questionnaire (SAQ) the most appropriate scale for our study. The questionnaire was, therefore, selected and translated into Persian using back-translation method [17]. To evaluate the validity of the survey, a number of independent experts were asked to express their opinion on whether the scale could measure the intended construct. Responses

Table 1 Demographic and professional characteristics of the participants

Variable	Number	Percent
Gender		
Female	118	82.5
Male	25	17.5
Age		
< 30 years old	43	30.1
30-34 years old	16	11.2
35-39 years old	34	23.8
40-44 years old	32	22.4
>= 45 years old	18	12.6
Marital Status		
Never married	46	32.2
Married	97	67.8
Education		
Associate	17	11.9
Bachelor	118	82.5
Master	8	5.6
Experience in current job		
< 5 years	26	18.2
5-9 years	29	20.3
10-14 years	42	29.4
15-19 years	26	18.2
>= 20 years	20	14
Tenure		
< 5 years	58	40.6
5-9 years	17	11.9
10-14 years	38	26.6
15-19 years	18	12.6
>= 20 years	12	8.4

were reviewed and used in preparing the final version of the survey.

The Persian version of SAQ comprises the same six dimensions of safety culture as described by Sexton et al. [18]: Teamwork Climate, Safety Climate, Job Satisfaction, Stress Recognition, Perception of Management, and Work Conditions. Each item was scored according to Likert five-grade scale (1= strongly agree, 2= agree, 3= neutral, 4= disagree, 5= strongly disagree). After data collection, the scores of the negatively worded items were reversed to ensure that all responses are in positive direction. The Likert-type scale was converted to a 100-point scale (1 = 100, 2 = 75, 3 = 50, 4 = 25, 5 = 0) before data analysis. The scores equal or above 60 were considered to represent a positive attitude towards a given safety culture dimension.

Table 2 Comparison of the nurse attitudes towards safety culture before and after participating in safety culture training course

Dimension	Perceptions towards Patient Safety Culture				
	Before training		After training		Significance of the difference (P-value)
	Number	Percent	Number	Percent	
Team work climate	93	65	135	94.4	0.001
Safety climate	86	60.1	138	96.5	0.001
Job satisfaction	60	42	119	83.3	0.001
Stress recognition	31	21.7	38	26.6	0.016
Perception of management	39	27.3	101	70.6	0.001
Work conditions	89	62.2	131	91.6	0.001
Total	67	46.9	130	90.9	0.001

Reliability and Validity

In order to measure internal reliability, a pilot study was carried out by inviting 24 randomly selected individuals to complete the questionnaire. The participants of the pilot study were excluded from sampling. The reliability analysis of the survey yielded an average Chronbach's alpha of 87% for each dimension and 94% for all items, indicating sufficient internal consistency. The external reliability of the survey was examined by test-retest method. The questionnaires were sent twice to the same individuals after a 10-day period, and then the correlation of the two datasets was calculated. An obtained Pearson correlation of 94% indicated that the survey had a high external reliability.

Sampling

The pilot study identified the lowest score of attitudes to safety culture dimensions for 'Stress Recognition' (20%). Sample size was calculated for detection of an anticipated improvement of 35% for attitudes towards this dimension with a confidence of 95% and 80% power. An initial sample size of 133 was calculated to compensate a predicted 10% non-response rate, 143 people were eventually recruited for the study.

Training Course

In order to enhance nurses' safety attitudes, a training course was conducted for the nurses working in the hospital. During the course, individuals were firstly familiarized with the causes of failure in safety systems such as disbelief in the usefulness of safety practices, lack of familiarity with risk control methods, inefficiency of laws and regulations, lack of executive support for legislations, the weakness in supervisory systems, insufficiency of

skilled workers, and inefficiency of educational system. Participants were then presented with statistics and information about harms due to unsafe conditions within health settings and their medical and financial outcomes. The nurses were then requested to express one of their important experiences on work hazards and share ideas on how hazardous situations and adverse events can be controlled. The training course then covered the emerging global attitudes towards human error and the importance of developing a nonpunitive climate and a safety culture to enhance both personnel and patient safety in healthcare environments. Finally, the dimensions of safety culture were outlined according to Sexton et al. [18] and examples were provided in each section.

Statistical Analysis

Three months after training, the nurses' attitudes towards safety culture were re-evaluated using the same method as in the first assessment. To analyze and compare results, the following statistical methods were applied: McNemar test to compare the nurses' attitudes before and after training; t-test to examine the effects of training on attitudes towards each safety dimension; and the path analysis to evaluate the interrelations of all dimensions and their correlations with the overall attitudes towards safety. All, statistical analyses were carried out using SPSS Software Version 14.

Results

Characteristics of the Sample

Table 1 presents the demographic characteristics of the participants. Of the total participants, 82.5% were female, 30.1% below 30 years of age, 67.8% were married and

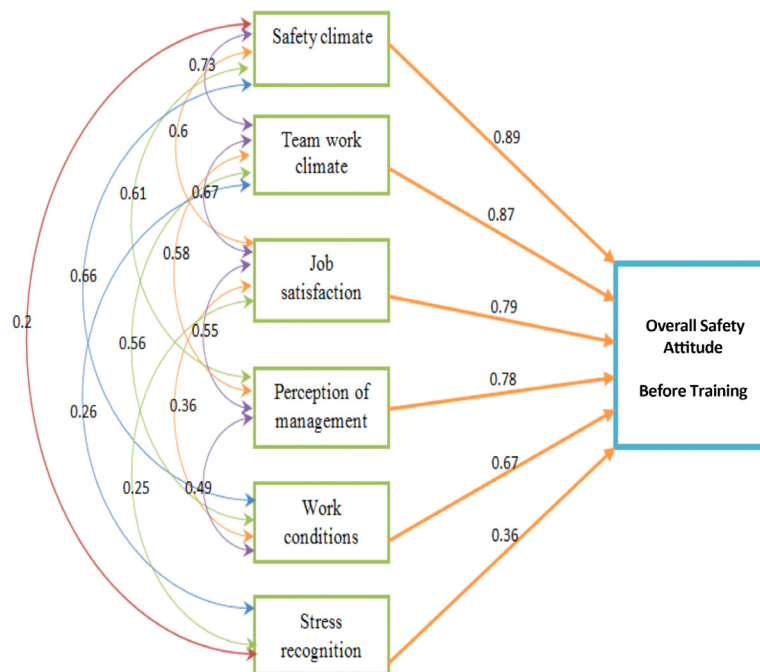


Figure 1 Path analysis of between safety culture dimensions and overall safety attitude before training

81.9% had a university-level education. The majority of the participants had an experience of over 10 years in their current job and virtually half of them had tenure at hospital of higher than 10 years.

Table 2 compares nurses' attitudes towards patient safety culture dimensions before and after training. With the exception of Stress Recognition which shows a marginal improvement, a considerable improvement can be observed for all other dimensions. The highest improvement in attitudes towards patient safety is observed as regard to Perception of Management (43.3%) followed by Job Satisfaction (41.3%) and Safety Climate (36.4%). The average grade of safety attitudes shows an increase of as high as 44%.

Figure 1 and Figure 2 display the results of path analysis between patient safety factors and overall attitude toward safety before and after training, respectively. The standardized path coefficient between the dimensions and overall safety attitudes remained roughly unchanged before and after training. Regarding interrelations of the dimensions, no exceptionally high alteration in path coefficients was observed following the training course.

For Teamwork Climate, Safety Climate and Job Satisfaction, significant correlations were observed with all other safety attitude dimensions both before and after training. However, no significant correlation was observed between Stress Recognition and Perception of Management and between Stress Condition and Work Conditions before and after training.

Discussion

The purpose of this study was to examine the effect of training on nurse attitudes towards safety. The results show that all safety culture attitudes have significantly improved, though with different magnitudes. The fact that the highest improvement was related to Perception of Management indicates that training has increased the nurses' awareness of management role in promoting safety culture. On the other hand, the respondents showed the second highest safety attitude improvement in terms of Job Satisfaction. Such a result implies that higher nurses' awareness of safety and safety culture importance is coincident with their higher perception of job satisfaction role in supporting safety. This provides recommendation for the administrators of the studied hospital to take steps towards higher job satisfaction in order to achieve enhanced safety attitudes. Our result also identified Safety Climate among the highest improved safety culture factors following the training course. This finding support the notion that training has a direct influence on nurses' attitudes toward safety related components of organizational climate.

At the same time, it was found that attitudes towards Stress Recognition were not remarkably affected by training. This can be explained by the fact that work stress is a complex organizational factor that is induced by contribution of several factors such as high workload, high job demand, work-family conflict, shortage of resources, and

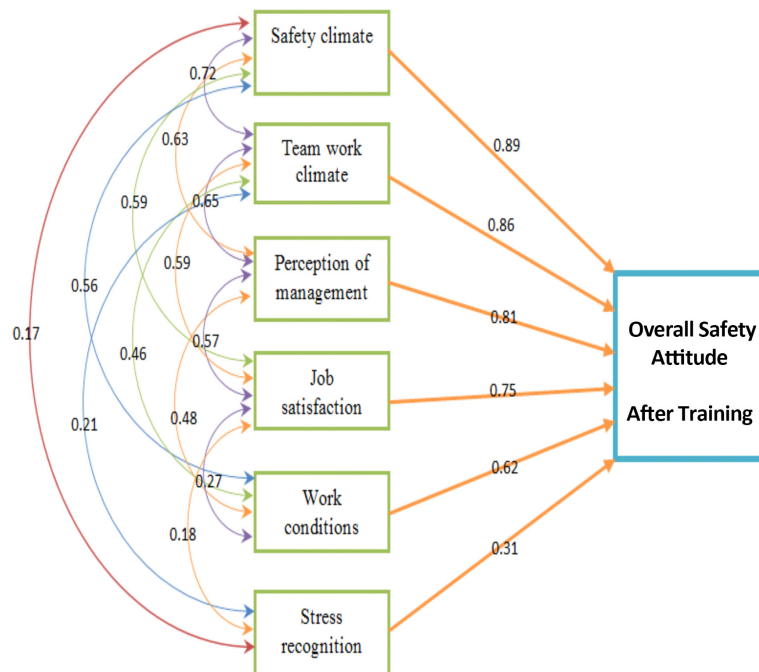


Figure 2 Path analysis of between safety culture dimensions and overall safety attitude after training

responsibility for patient outcomes [19]. These factors are mostly influenced by work conditions and organizational climate rather than employees' knowledge on general aspects of safety culture. This postulation is supported by the observation that nurse' attitude to Work Conditions was the second lowest improved factor following training on safety issues. Regarding that these two dimensions were found to be less affected by training alone, further intervention strategies may be needed.

The results of this study showed both similarity to and deviation from the findings of precedent studies. While Job Satisfaction and Stress Recognition scored lower in our study before training as compared with the studies by Relihan et al. (2009) [20], Modak et al. (2007) [21], and Singh et al. (2007) [22], Work Conditions was rated higher in our survey. Conversely, our finding that Perception of Management, Safety Climate and Work Conditions improve by training is consistent with influence of training on employees' perceptions of management support, leader expectations and actions for promoting safety, organizational learning and overall perception of safety as reported by Donnelly et al. (2009) [23].

Conclusions

This study examined the influence of training on improvement of nurses' attitudes towards patient safety culture. Our results indicated that training has a significant positive impact on nurses' safety attitudes. The magnitude of

impact, however, can vary among different safety culture dimensions. While Perception of Management, Job Satisfaction, and Safety Climate was found to dramatically improve by training, Stress Recognition showed only marginal changes. Our results also indicated that the contribution of safety attitude dimensions to the overall perception of safety culture may not be influenced by training.

Competing Interests

The authors declare that they have no competing interest.

Authors' Contributions

SJT and MRM jointly designed the study and determined the settings. LM contributed to data collection and analysis, interpretation of the results, and editing the draft manuscript. AAN and MM were involved in statistical analysis and interpretation of the results. LM and MRM revised and finalized the manuscript. All authors read and approved the final manuscript.

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