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ORIGINAL ARTICLE

Exploring the Link between Total Quality Management and Patient Safety Culture: A Nursing Perspective at Shahid Sadoughi Hospital, Yazd (2024)

Seyed Masood Mousavi [1], Ehsanollah Barikzehi [2], Amirali Ameryoun [2], Maryam Karimi [2*]

[1] Health Policy and Management Research Center, Department of Health Management and Economics, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
[2] Department of Health Management and Economics, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

A B S T R A C T

Background: Delivering high-quality services is essential for the success of service-oriented organizations. In today's competitive global environment, organizations are increasingly focused on enhancing the quality, efficiency, and capabilities of their services and products. The healthcare sector, being a critical component of any society, places a strong emphasis on patient safety, which is a core aspect of care quality. This research investigates how nurses at Shahid Sadoughi Hospital in Yazd perceive the relationship between the implementation of total quality management (TQM) strategies and the prevailing culture of patient safety.

Methods: This applied, descriptive-correlational study was carried out in the year 1403 across multiple departments of Shahid Sadoughi Hospital. A total of 260 nurses working various shifts were randomly selected to participate. Data collection involved standardized questionnaires assessing total quality management and patient safety culture. The results were analyzed using Spearman's correlation coefficient with $SPSS_{27}$.

Results: Among the 260 nurses surveyed, 85.83% were female, and the largest age group was 40–50 years (35.77%). Descriptive analysis indicated that there was no statistically significant relationship between total quality management (TQM) and the culture of patient safety. The mean score for TQM stood at 3.69 with a standard deviation of 0.52, whereas patient safety culture was rated lower, with an average of 2.59 ± 0.34. Among the various TQM components, "senior management leadership" achieved the highest average score (3.90 ± 0.65), while the "employee relationships" dimension recorded the lowest (3.32 ± 0.67). In the domain of patient safety culture, "manager/supervisor actions and expectations regarding patient safety" had the highest score (2.76 ± 0.46), while "organizational learning and continuous improvement" received the lowest (2.41 ± 0.52).

Conclusion: The findings indicate that both total quality management and patient safety culture are at a relatively satisfactory level in Shahid Sadoughi Hospital. However, the absence of a significant correlation between them suggests that additional factors may be contributing to the development of patient safety culture and the implementation of TQM practices safety culture and total quality management.

Keyword: Hospital, Nursing Staff, Total Quality Management, Safety Culture

Introduction

The healthcare sector is considered one of the most critical pillars of service in any society, with hospitals playing a central role in delivering these services (1). Total Quality Management (TQM), a management approach that emerged in the 1950s, gained widespread adoption starting in the early 1980s. TQM replaced several traditional management concepts, including management by

Corresponding Author: Maryam Karimi
Email: Karimi0987m@gmail.com
Tel: +98 914 0680980
Department of Health Management and Economics, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

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objectives, participatory management, quality circles, value-added processes, and performance evaluations (2).

At its core, TQM involves coordinating human resources with organizational management systems. Since quality improvement represents a form of organizational change, ensuring its sustainability depends on two key elements: "human resources" and "organization." These two factors must constantly interact and evolve. In hospitals, the primary focus of TQM is on addressing the needs, expectations, and views of patients. Achieving patient satisfaction and meeting their needs is thus a cornerstone of this approach (3).

Implementing a TQM system could potentially resolve many of the challenges currently faced by hospitals in the country (4). The term "safety culture" was first officially introduced by the International Atomic Energy Agency in 1986 in its report on the Chernobyl disaster. Safety culture refers to the collective beliefs, norms, motivations, roles, and practices that minimize exposure to hazardous conditions for employees, managers, consumers, and the public (5).

Philip Kotler defines total quality management as an ongoing effort to enhance the quality of an organization's processes, products, and services (6). Benjamin Sutherland, a key figure in the British automotive industry's quality movement, views TQM as a management philosophy focused on efficiently controlling human resources and raw materials to achieve organizational goals (7).

Patient safety is a vital element and indicator of healthcare quality (8). Today, ensuring patient safety has become a priority for healthcare systems aiming to improve the quality of care (9). Effective TQM implementation offers significant benefits to organizations, and in a rapidly changing world, adopting it is essential for organizational survival and success (10, 11).

Research from various countries shows that between 2.9% and 16.6% of patients in acute care hospitals experience at least one adverse event, half of which are preventable (12). Experts agree that improving healthcare quality and safety requires hospitals not only to develop and implement essential programs but also to nurture a culture of patient safety among staff (13). As a fundamental element of healthcare quality, patient safety has become an area of growing interest among scholars and researchers. Experts assert that safety culture is a fundamental factor influencing patient safety in hospitals. A lack of a strong safety culture signals weak patient safety practices within a healthcare institution (14).

Since TQM in hospitals primarily focuses on the needs, expectations, and perspectives of patients, meeting these needs and ensuring patient satisfaction remains a core principle (15). In TQM, the quality of healthcare services is defined as the ability to provide the best, easiest, most efficient, and comprehensive care, all of which aim to satisfy patient needs and expectations and secure their genuine satisfaction (16).

The World Health Organization views patient safety as the prevention of avoidable or potential harm associated with healthcare services (17). Safety culture emerges from the collective values, attitudes, perceptions, competencies, and behavioral patterns within an organization, reflecting its commitment to managing safety. Patient safety culture is characterized by prioritizing safety and considering it a shared organizational value (18).

Establishing a culture of safety within healthcare organizations begins with an assessment of the existing safety culture. Such evaluations not only highlight current challenges but also enhance managerial insight into staff attitudes and behaviors concerning patient safety(19).

Given the importance of TQM and patient safety culture, and the limited studies conducted in this area, the current study aims to examine the relationship between TQM and patient safety culture from the perspective of nurses at Shahid Sadoughi Hospital in Yazd, conducted in 2024.

Materials and Methods

In this study, out of the 260 nurses who participated, the majority were female, comprising 85.83% of the

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total sample. Additionally, a considerable proportion of the participants (35.77%) fell within the 40–50 age range.

The descriptive statistics of the research variables demonstrated that there was no statistically significant association between total quality management (TQM) and the culture of patient safety. The average score for TQM at Shahid Sadoughi Hospital in Yazd was calculated as 3.69±0.52, while the mean score for patient safety culture stood at 2.59±0.34.

Among the TQM components, the "leadership" aspect achieved the highest average score (3.90±0.65), whereas the "employees' relations" component recorded the lowest (3.32±0.67). Similarly, in terms of patient safety culture dimensions, the "manager/supervisor expectations and actions for patient safety" category received the highest mean (2.76±0.46), while "organizational learning and continuous improvement" scored the lowest (2.41±0.52).

$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{(\frac{1}{2}\, ln\, \frac{1+r}{1-r})^2} + 3$$

$$\begin{Bmatrix} Z_{1-\frac{\alpha}{2}} = 1.96 & 95\% & For\ Confidence \\ Z_{1-\beta} = 1.28 & 80\% & \text{For Power} \end{Bmatrix}$$

R= .02

$$n = \frac{(1/96 + 1/28)^2}{(\frac{1}{2}\, ln\, \frac{1+0.2}{1-0.2})^2} + 3 = 260$$

The measurement tools for the variables in this research included TQM questionnaire and the Hospital Survey on Patient Safety Culture (HSOPSC).

TQM

The Total Quality Management questionnaire consists of two sections: the first section pertains to demographic information about the participants, and the second section includes 19 specialized questions designed to assess the respondents' opinions in the field. The questionnaire is based on a five-point Likert scale (1 = very low and 5 = very high). This questionnaire comprises four components:role of top management (6 questions) , management process (4 questions), data reporting (5 questions), and employees relations (4 questions).

Farah and Hosseini psychometrically validated this instrument and assessed its construct validity through exploratory and confirmatory factor analysis. The reliability of the questionnaire was also evaluated using Cronbach's alpha test, with an alpha coefficient of above 0.7, which indicated good reliability.These questions collectively form the final questionnaire for the TQM variable.

Patient Safety Culture

This questionnaire includes specialized questions aimed at assessing the opinions of respondents in the field. It is designed based on a four-point Likert scale (1 = strongly disagree and 4 = strongly agree).

In this study, data were collected using the standardized HSOPSC questionnaire, specifically the hospital version developed by the Agency for Healthcare Research and Quality (AHRQ) in 2004. This tool has been widely used to evaluate patient safety culture in hospitals worldwide. In Iran, Moustafayi et al (26) conducted a psychometric evaluation of this instrument, assessing its construct validity through exploratory and confirmatory factor analysis. To confirm the reliability of the questionnaire, the test-retest method was employed, yielding a Cronbach's alpha coefficient of 88%, which indicated good reliability.

This questionnaire comprises 42 questions and covers 12 dimensions of patient safety culture, including:open communication channels ,feedback and communication about errors, frequency of reporting adverse events, handover of critical patient information, management support for patient safety ,non-punitive response to errors ,organizational learning—continuous improvement ,general perception of patient safety ,work-related issues concerning staff ,manager/supervisor expectations and actions for patient safety ,teamwork across hospital units , and teamwork within hospital units.

The collected data was entered into $SPSS_{27}$

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software, version 27. Descriptive indices such as frequency, percentage, mean, and standard deviation, along with Spearman's correlation coefficient, were used to describe and analyze the obtained data at a 95% confidence level.

Statistical Analysis

In this study, out of the 260 nurses who participated, the majority were female, comprising 85.83% of the total sample. Additionally, a considerable proportion of the participants (35.77%) fell within the 40–50 age range.

The descriptive statistics of the research variables demonstrated that there was no statistically significant association between total quality management (TQM) and the culture of patient safety. The average score for TQM at Shahid Sadoughi Hospital in Yazd was calculated as 3.69±0.52, while the mean score for patient safety culture stood at 2.59±0.34.

Among the TQM components, the "leadership" aspect achieved the highest average score (3.90±0.65), whereas the "employees' relations" component recorded the lowest (3.32±0.67). Similarly, in terms of patient safety culture dimensions, the "manager/supervisor expectations and actions for patient safety" category received the highest mean (2.76±0.46), while "organizational learning and continuous improvement" scored the lowest (2.41±0.52).

Results

According to Table 1, the majority of the nurses in the study were women, accounting for 218 individuals (83.85%). Additionally, the highest percentage of educational qualifications included bachelor's degrees, comprising 249 individuals (77/95%). The most represented age group among the studied nurses was 40-50, with 93 individuals (77.35%), and the highest percentage of related work experience was more than 10 years, accounting for 128 individuals (23/49%).

Table 1. Distribution of absolute and relative frequency of demographic variables of nurses at Shahid Sadoughi Hospital,Yazd.

	Variable	Frequency	Percent
Gender	Man	42	16.15
	Woman	218	83.85
Degree	High school diploma	0	0
	Associate degree	0	0
	Bachelor's degree	249	95.77
	Master's or Doctral degree	11	4.23
Age	Under 30 Years Old	89	34.23
	30 – 40 Years Old	78	30.00
	40 – 50 Years Old	93	35.77
	Over 50 Years Old	0	0
Work experience (years)	Under 1 year	35	13.46
	3-5 years	49	18.85
	5 – 10 Years	48	18.46
	Over 10 Years	128	49.23

According to Table 2, the overall mean score for TQM is 3.69 ± 0.52. Additionally, the highest mean score pertains to the "role of top management" dimension(3.90 ± 0.65), while the lowest score is related to the "employees' relations" dimension (3.32 ± 0.67).

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Table 2. Mean scores of the dimensions of TQM

	$\bar{X}$± SD	Min	max	IQR
Top management	3.90±0.65	1	5	3.90
Management process	3.72±0.65	1	5	3.72
Data reporting	3.81±0.68	1	5	3.81
Employee relation	3.32±0.67	1	5	3.32
Total		4	20	
Overall mean score	3.69±0.52	1.69	5	3.69

According to the table 3, the overall mean score for patient safety culture is 2.59 ± 0.34. Additionally, the highest mean score belongs to the dimension of "manager/supervisor expectations and actions for patient safety" (2.76 ± 0.46), while the lowest score relates to the dimension of "organizational learning and continuous improvement (2/41 ± 0/52).

Table 3. Mean scores of the dimensions of patient safety culture

	$\bar{X}$± SD	Min	Max	IQR
Frequency of reporting adverse events	2.55 ± 0.51	1	4	2.55
Overall perception of patient safety	2.46 ± 0.57	1	4	2.46
Manager/supervisor expectations and actions for patient safety	2.76 ± 0.46	1	4	2.76
Organizational learning and continuous improvement	2.41 ± 0.52	1	4	2.41
Teamwork across hospital units	2.71 ± 0.54	1	4	2.71
Openness of communication channels	2.69 ± 0.57	1	4	2.69
Feedback and communication about errors	2.56 ± 0.55	1	4	2.56
Non-punitive response to errors	2.69 ± 0.50	1	4	2.69
Staffing issues	2.52 ± 0.57	1	4	2.52
Management support for patient safety	2.71 ± 0.63	1	4	2.71
Teamwork within hospital units	2.60 ± 0.57	1	4	2.60
Handover of critical patient information	2.42 ± 0.49	1	4	2.42
Total		12	48	
Overall mean score	2.59 ± 0.34	1	4	2.59

Additionally, the results of the Pearson test indicated that P-value is greater than 0.05 (Table 4) . Consequently, the null hypothesis is rejected, and there is no relationship between total quality and comprehensive safety.

Table 4. The third specific objective

Correlations			
		TQM	Safety culture
TQM	Pearson correlation	1	.04
	Sig. (2-tailed)		.43
	N	260	260
Safety culture	Pearson correlation	.04	1
	Sig. (2-tailed)	.43	
	N	260	260

Discussion

In the current study, 260 nurses were surveyed, with the majority being women (85.83%). The data indicated that a significant portion of the nurses belonged to the 40-50 age group (35.77%), and nearly half had over 10 years of work experience (49.23%). Additionally, most nurses (95.77%) held a bachelor's degree, while a smaller portion had a

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master's degree (4.23%).

Regarding the descriptive analysis of the research variables, the mean scores revealed no significant correlation between Total Quality Management (TQM) and patient safety culture. The average TQM score at Shahid Sadoughi Hospital was 3.69±0.52, while the patient safety culture score was 2.59±0.34. The findings further indicated that, within the TQM dimensions, "leadership" had the highest average score (3.90±0.65), and "employee relations" had the lowest (3.32±0.67). Similarly, in the patient safety culture dimensions, "manager/supervisor expectations and actions for patient safety" scored the highest (2.76±0.46), while "organizational learning and continuous improvement" had the lowest score (2.41±0.52).

In general, the mean TQM score was 3.69±0.52, and the mean patient safety culture score was 2.59±0.34, both indicating satisfactory conditions. Although research on the connection between TQM and patient safety culture is limited, several studies have explored these topics separately in hospitals, both domestically and internationally.

To answer the study's research questions:

For the first question ("What is the mean score of TQM from the perspective of nurses at Shahid Sadoughi Hospital in 1403?"), the mean score was 3.69±0.52, reflecting a satisfactory implementation of TQM at the hospital. The "employee relations" dimension received the lowest mean score among all TQM dimensions.

The study by Dehghani et al. (20), titled "Investigating Barriers to Implementing Total Quality Management in Educational and Non-Educational Hospitals," found that the major barriers were related to cultural and employee-related aspects. Similarly, in this study, "employee relations" scored the lowest, suggesting significant barriers in this area, such as cultural shifts, lack of trust, and resistance to change.

Soheila Zamani Kotnaei's study, "Investigating the Effect of TQM on Customer Satisfaction in Vocational Technical Training Centers of Mazandaran Province" (2019), concluded that TQM implementation significantly improved customer satisfaction.

Similarly, Majid Fattahi and Mahmoud Maleki's study titled "Exploring the Relationship Between Total Quality Management and New Product Development" indicated that TQM elements like leadership, employee management, and customer focus are linked to new product development.

Regarding the second question ("What is the mean score of patient safety culture from the perspective of nurses at Shahid Sadoughi Hospital in 2024"), the mean score for patient safety culture was 2.59±0.34, which, like TQM, is considered satisfactory. Among the twelve dimensions of patient safety culture, the "organizational learning and continuous improvement" dimension had the lowest mean score.

A comparable study titled "Evaluation of Patient Safety Culture from the Perspective of Hospital Staff in Selected Hospitals of Tehran University of Medical Sciences" reported that “teamwork within hospital units” and “frequency of event reporting” received the highest ratings, whereas “overall perception of patient safety” and “non-punitive response to errors” had the lowest scores.

Regarding the third research question — whether a relationship exists between total quality management (TQM) and patient safety culture from the nurses’ perspective at Shahid Sadoughi Hospital in the year 2024 — the Pearson correlation test yielded a p-value of 0.48. Since this value exceeds the 0.05 significance threshold, the null hypothesis was accepted, indicating no statistically significant association between TQM and patient safety culture.

Conclusion

The present study, titled "Examining the Relationship Between Total Quality Management and Patient Safety Culture from the Perspective of Nurses in Shahid Sadoughi Hospital, Yazd, in 2024," was conducted to investigate these important dynamics.

Based on the findings, the overall mean scores for

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TQM and patient safety culture at Shahid Sadoughi Hospital, as perceived by nurses, were in a satisfactory range. However, according to Pearson's correlation coefficient obtained in the test, no significant relationship was found between TQM and patient safety culture.

According to the results of the questionnaires, the lowest mean score among the dimensions of TQM belonged to the "employees relations" dimension. Within this dimension, the lowest-scored question pertained to "the absence of teamwork opportunities in hospital activities," indicating inter-departmental communication challenges within the hospital. Conversely, the highest mean score within the TQM dimensions was for the "leadership" dimension, with the highest-rated question being "managers directly and actively intervene and participate in quality improvement," reflecting the active and committed involvement of the supervisors in various departments of Shahid Sadoughi Hospital.

Among the dimensions of patient safety culture, the lowest mean score was for the "organizational learning and continuous improvement" dimension, highlighting the need to enhance the capabilities and awareness of nurses and staff in the field of patient safety. Additionally, given that the mean scores of the various dimensions of patient safety culture were relatively close to one another, another dimension with a low mean score was "teamwork between hospital units." This suggests that improving relationships among the staff of different hospital departments and strengthening the organizational learning framework could significantly contribute to the establishment of TQM and a robust patient safety culture.

Based on the responses received in these questionnaires, future research could focus on inter-departmental relationships and the impact of working hours and staff numbers on patient safety culture.

Ethical considerations

This study was approved by the Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd, under the ethical code IR.SSU.REC.1403.123. Throughout all stages of the study, participants were assured that all information would remain confidential, and the research was conducted in compliance with ethical principles.

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Author's Contribution

SM.M, E.B, A.A and M.K contributed as the main authors through planning the study. SM.M contributed to the study design. E.B gathered data. A.A performed the statistical analysis and interpreted the data. M.K wrote the manuscript. All authors read and approved the final manuscript.

Conflict of Interest

The authors declared no conflict of interests.

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