Determining Factors That Influence Nurses’ Perceptions of Quality Implementations Conducted in Hospitals in Turkey

Emel GÜR1* • Dilek EKICI2

Introduction

Organizational structure, technical infrastructure, and labor force insufficiency have been identified as the most important factors affecting medical errors (Ekici, Cerit, Gür, Mert, & Türkmenn, 2016; Kohn, Corrigan, & Donaldson, 2000; Pizzi, Goldfarb, & Nash, 2001; World Health Organization [WHO], 2015). Patient safety is a critical factor in providing and maintaining high-quality health services; it comprises the precautions taken by management and healthcare providers to prevent harm to patients. A 5-year study by the WHO (2013) covering five countries concluded that patient safety is the responsibility of individual institutions, and hospitals should make it a priority and handle it comprehensively. Furthermore, generalization and adoption of evidence-based practices, improvement of professional implementation with in-service training, determination of the process for investigating errors, utilizing electronic recording systems, and fostering a culture of patient safety for both managers and employees are very important (WHO, 2013). All healthcare personnel should participate in a culture of patient safety in line with institutional philosophy, report any factors and medical errors that threaten patient and employee safety, and perform diagnosis, treatment, and care without harming the patient (Pizzi et al., 2001; Singla, Kitch, Weissman, & Campbell, 2006).

A culture of patient safety is an important indicator of quality management in health services. Total quality management (TQM) in health services is defined using the target

Background: Quality management program implementations in health services are team endeavors that involve all health service personnel. Because they are direct providers of care, nurses are best able to evaluate the influence of quality management program implementations on the health services and quality of care provided by hospitals.

Purpose: The aim of this study was to develop an instrument to determine how nurses perceive the implementation of quality management programs in hospitals. Furthermore, the nurses’ perceptions of the influence of these implementations on the quality of patient care and their job satisfaction were examined.

Methods: A descriptive, comparative, cross-sectional online survey was conducted using a convenience sample (N = 388) of practicing nurses working at public and university hospitals where quality management programs were implemented. Nurses’ perceptions of the implementations were analyzed using confirmatory factor analysis, whereas the influence of nurses’ perceptions of quality management implementations on patient care and job satisfaction was measured using structural equation modeling approaches.

Results: This study revealed that the instrument is valid and reliable for the measurement of participant perceptions of quality management program implementations. Nurses’ perceptions were generally negative, and they exhibited negative attitudes toward the implementation of quality management in the institutions where they work. However, the quality management program implementations had little influence on perceptions of the quality of patient care. Participant job satisfaction was lower than average, and the quality management program implementations conducted in the hospitals negatively affected job satisfaction. On the other hand, participants who worked at university hospitals perceived quality management program implementations more affirmatively; patient care quality and job satisfaction were viewed more positively as well.

Conclusions/Implications for Practice: Because nurses do not participate effectively in quality management program implementations, they perceive these efforts as unnecessary and the responsibility of the quality control department. It is very important to ensure that all care-service providers participate to effectively implement quality management programs in hospitals and to encourage the adoption of a culture of patient safety in all institutions.
of continuous improvement in patient care, the systematic participation of the healthcare provider team, a determination of the underlying causes of undesired consequences during and after health service provision, and the implementation of corrective and preventive measures. TQM is a program in which the institution integrates continuous improvement and development efforts with management philosophy to generate high-quality services (van Schoten, de Blok, Spreeuwenberg, Groenewegen, & Wagner, 2016).

Various institutions have developed health service standards. Health institutions may apply to standardization programs such as Joint Commission International, European Foundation for Quality Management Excellence Model, and International Organization for Standardization (ISO) to align the quality of their health services with these internationally recognized models. The standards institution measures and assesses service quality and may either approve or disapprove based on established criteria. Similarly, since 2008, quality management program implementations at all health institutions in Turkey must include “Transformation in Health” in their scope. A subsidiary agency of the Ministry of Health assesses and approves the service quality of all health institutions based on Quality System in Health Standards (Health Quality Standards [SCS]). Thus, in Turkey, quality standards related to health services have been in effect for 9 years. As part of this process, the Ministry of Health performs quality audits at hospitals.

The health service standards in Turkey focus on quality management and on the development of quality management systems in hospitals. Related studies in the literature have noted that quality management is related to multiple factors, including organizational behavior and culture, organizational structure, leadership style, teamwork and participation, quality management process, resource management, customer satisfaction, and training and education (Öyvretveit, 2000; Talib, Rahman, & Azam, 2011; Wardhani, Utarini, van Dijk, Post, & Groothoff, 2009). When successfully implemented in healthcare institutions, TQM has improved patient and employee satisfaction, the quality and performance of healthcare, and patient safety (Talib et al., 2011).

The WHO suggests that the implementation of quality management at hospitals significantly improves the quality of patient care and safety (WHO, 2015). Because of their responsibility for patient care and clinical experience, nurses have significant roles in ensuring patient safety and care quality (Draper, Felland, Liebhaber, & Melichar, 2008; Stanton, 2004; Stimpfel & Aiken, 2013). Therefore, the perceptions of nurses are important indicators of the quality of patient care (McHugh & Stimpfel, 2012). Various instruments have been developed to measure healthcare service quality (Al-Shdaifat, 2015). However, no study has examined the perception of nurses toward quality implementation in their institutions. The aim of this study was, first, to develop an instrument to determine how nurses perceive the implementation of quality management programs at hospitals and, second, to examine whether the implementations at different institutions varied significantly in terms of nurse perceptions, resulting quality of patient care, and job satisfaction. Thus, the research hypotheses are the following:

H1: Quality management program implementations have a significant and positive effect on the quality of care that patients receive.

H2: Quality management program implementations have a significant and positive effect on the job satisfaction of nurses.

H3: Nurses who work at public hospitals and university hospitals, respectively, hold different perceptions regarding patient care quality.

H4: Nurses who work at public hospitals and university hospitals, respectively, hold different perceptions regarding quality implementation.

H5: Nurses who work at public hospitals and university hospitals, respectively, hold different perceptions regarding job satisfaction.

Methods

Research Design

A descriptive, comparative, cross-sectional design with a self-report survey among a convenience sample of participants was used for this study.

Instruments

The study questionnaire was composed of three parts. The first included nine questions on demographic characteristics, including age, gender, education, tenure, and institution type, as well as the quality certification held by the respondent’s institution, information on quality management program implementations, participation in these implementations, and whether an effective error reporting system was used at the institution. The second part was designed to assess the perception of “quality of patient care” using a score ranging from 0 = dangerously low to 10 = very high. The job satisfaction level of the respondent was measured on a scale of 1–10, with 0 = not satisfied at all and 10 = highly satisfied. Finally, to assess quality management program implementations in the health sector, related studies in the literature were reviewed to assess the perceptions, attitudes, beliefs, and behaviors of the participants based on an item pool of 28 statements. A focus group study was conducted with six participants to collect ideas and opinions on quality management program implementations. Information from the focus group and study findings were used to compose survey items. Some statements based on the results of the literature review were constituted as follows: “I believe that the quality management program implementations conducted in this institution increase the quality of the care given to patients” (DelliFraine, Langabeer, & Nembhard, 2010; Stanton, 2004); “In the institutions where quality management program implementations are conducted, the personnel consider patient safety as a priority issue”
(Stanton, 2004); and “Quality management program implementations are the duty of the ‘Quality Department’ only” (Alimo-Metcalfe, Alban-Metcalfe, Bradley, Mariathasan, & Samele, 2008; Draper et al., 2008). Patients consider quality certifications such as ISO, Joint Commission International, and SCS an important factor when selecting institutions at which to receive healthcare services (Øvretveit, 2000). Fourteen of the statements were positive, and 14 were negative. These items were prepared using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree).

These statements were sent to six specialists to analyze the content validity of the 28 items and to solicit opinions. The specialists assessed each item using one of the following statements: “not relevant,” “somewhat relevant” (item or statement needs revision), “quite relevant” (relevant, but some minor changes are required), and “highly relevant.” On the basis of the assessment results, the validity index for the questionnaire was determined as .94. As this value is higher than the minimum acceptable value of .80, the 28 items were accepted as the draft form of the questionnaire (Davis, 1992).

Sample, Setting, and Data Collection
A personalized cover letter was mailed electronically to 932 bedside nurses at public (n = 478) and university (n = 454) hospitals in Turkey where quality management program implementations had been conducted using e-mail addresses acquired from hospital Web sites. These emails explained the purpose of the study and provided a consent form, with a request for the recipient to participate in the study. Returning the completed consent form was considered agreement to participate. The Participant Information Form and study questionnaire were sent to the participants via a second e-mail. Data were collected from 388 participants (response rate: 42%). Study populations must be at least five times higher than the number of items subject to factor analysis (Child, 2006). Therefore, the sample size was sufficient for analysis in this study, which was conducted from March to December 2017.

Ethical Considerations
An application indicating the objective and scope of the study was submitted to the ethics committee of Gazi University; approval was provided on October 2, 2017 (reference: 77082166:302.08.01).

Data Analysis
Statistical analysis of the data was performed using IBM SPSS Statistics Version 20.00 (IBM, Inc., Armonk, NY, USA) and LISREL Version 8.80 (Scientific Software International, Lincolnville, IL, USA). Age, gender, tenure, presence of a quality department, certificates held by the hospital, participation in quality management program implementations, and perceptions of patient care and job satisfaction of the participants were analyzed using descriptive statistical methods (M and SD), and the independent t test was used to analyze the differences between public and university hospitals.

Exploratory factor analysis (EFA) was used to determine the component structure of developed instrument, and confirmatory factor analysis was performed to show evidence for construct validity. Goodness-of-fit indices (GFIs) were used to determine the sufficiency of the tested structure. Frequently used GFIs in confirmatory factor analysis are as follows: chi-square goodness ($\chi^2$), GFI, comparative fit index (CFI), normed fit index (NFI), nonnormed fit index (NNFI), and root mean square error of approximation (RMSEA). Reliability, which indicates the internal consistency of a structure, was tested using both structural reliability and the Cronbach’s alpha coefficient. Finally, after the instrument was developed, structural equation modeling was used to assess the causality between exogenous variables.

Results

Demographic Data
The average age of the participants was 32.97 (SD = 7.62) years. More than two thirds (79%, n = 307) were female, and 57% (n = 220) worked at a public hospital. The average duration of employment at their current hospital was 7.26 (SD = 6.89) years.

“Is there any Quality Department in your hospital?” received a “yes” response of 99% (n = 385); 372 of the participants (96%) reported that there was no efficient error reporting system at their institution. “What quality certifications does your hospital possess?” was answered with ISO certificate (68%, n = 262) and SCS (32%, n = 126). Furthermore, 17% of the participants (n = 66) stated that they actively participated in quality management program implementations, 29% (n = 112) stated that they partially participated, and 54% (n = 210) stated that they did not participate. Finally, 31 participants (8%) answered the open-ended question asking about the quality implementations in which they participated. In summary, most of the participants stated that they were involved in TQM issues.

Patient Care
The influence of quality management program implementations on participant perceptions of the quality of patient care was tested using structural equality modeling (Figure 1). According to the results, quality management program implementations conducted in the institutions had a positive and low influence on participant perceptions of the quality of patient care by 2.6% (Table 1). Furthermore, a low-level (.16) correlation was found between the quality management program implementations conducted in the institutions and the perceptions of the quality of patient care (Figure 1). When the created model was assessed using goodness-of-fit criteria (NFI = .94, NNFI = .95, CFI = .96, GFI = .92), acceptable fit was found (Schermelleh-Engel, Moosbrugger, & Müller, 2003). According to the results, quality management program
implementations influenced the quality of patient care, albeit at a low level (2.6%). This finding partially confirmed H1.

Job Satisfaction

The influence of quality management program implementations on job satisfaction was tested using structural equality modeling (Figure 2). It was determined that quality management program implementations conducted in the hospitals had a negative influence on job satisfaction (−16%; Table 1). Accordingly, the coefficient between quality implementations conducted in the institution and job satisfaction was −.41. When the model was assessed using goodness-of-fit criteria (NFI = .94, NNFI = .96, CFI = .96, GFI = .92), an acceptable fit was found (Schermelleh-Engel et al., 2003). Thus, H2 was rejected.

Differences Between Public and University Hospitals

The independent sample t test was performed to assess institution-based differences in perceptions of quality management program implementations. Statistically significant differences were found between favorable beliefs (M = 2.99, SD = 0.81; t = −3.656; p < .001), unfavorable beliefs (M = 2.53, SD = .93; t = −3.132; p < .01), and total beliefs and attitudes toward quality management program implementations (M = 2.88, SD = 0.65; t = −3.610, p < .001). According to the results, participants who worked at public hospitals had less favorable perceptions of quality management program implementations. On the other hand, no statistically significant difference was found for the unfavorable reaction dimension (p > .05). Thus, H3 was accepted.

An independent sample t test was conducted to assess the difference between patient care quality of the nurses and job satisfaction. A statistically significant difference between patient care quality and job satisfaction was found between the participants at public and university hospitals, respectively (p < .001). Perceptions of the participants working at public hospitals were low with respect to both patient care quality (M = 6.02, SD = 2.22; t = −4.843) and job satisfaction (M = 4.25, SD = 2.43; t = −5.527). Accordingly, H4 and H5 were accepted.

Discussion

An item pool composed of 28 items was created using the implementations that were initially conducted. Both positive and negative behaviors, perceptions, beliefs, and attitudes of the nurses were handled in this item pool. The construct validity of the developed items was reviewed using EFA. First, principal component analysis was performed to test the compliance of the size of the working group for factoring, and the Promax rotation method was used for conversion (Costello & Osborne, 2005; Matsunaga, 2011). Structural analysis to determine the factor structures was made using principal axis factoring. Promax was used for rotation, and principal axis factoring was used to set the latent factors underlying the data to zero (Matsunaga, 2011). On the basis of the analysis results, items greater than 1 eigenvalue were gathered under seven components, and their total

Figure 1. Structural equation modeling of patient care quality. FB = favorable belief; UFB = unfavorable belief; UFR = unfavorable reaction; QPC = quality of patient care. $\chi^2 = 265.03, df = 101, p < .001, \text{RMSEA} = .065.$

| Variable                  | Standard Error | $R^2$ | $\lambda$ |
|---------------------------|----------------|-------|-----------|
| Quality of patient care   | .32            | .026  | .16       |
| Job satisfaction          | .42            | .160  | −.41      |

Note. Quality of patient care = $\lambda$ quality; job satisfaction = $\lambda$ quality.
A Kaiser–Meyer–Olkin value of .887, with $w^2(378) = 3711.907, p < .01$, was determined during the analysis. The overlapping and factor load values of the items were assessed with respect to whether they meet the acceptance level or not. Ten items that overlap and have a low factor load (< .40; DeVellis, 2003) were excluded from the instrument (Items 5, 8, 9, 10, 18, 17, 12, 21, 20, and 23). These items included “I am willing to actively participate in quality implementations in the institution,” “Results of quality implementations are shared with all employees,” and “I think quality implementations increase employee satisfaction.” Second, an EFA of the remaining 18 items was made using principal axis factoring, with the Promax rotation method used for rotation (Matsunaga, 2011). As a result of these analyses, three more items with a low factor load were excluded from the analysis, including Item 4 (the workload resulting from quality implementations prevent me from providing efficient care to my patients), Item 7 (I think employees meet the standards determined within the scope of quality implementations), and Item 11 (I will be angry if I have to work overtime due to quality implementations). The remaining 15 items, grouped under three components, constitute the survey instrument. GFS suggested by Schermelleh-Engel et al. were used in the assessment of the theoretical model. In fit-wellness measurements of the proposed theoretical model, $\chi^2$ (with associated degrees of freedom [df] and p value), relative $\chi^2 (\chi^2/df \leq 3.0)$, RMSEA ≤.08, GFI ≥ .90, CFI ≥ .95, and NFI ≥ .95 were used (Schermelleh-Engel et al., 2003). In this research, $\chi^2/df = 2.31$, GFI = .94, NFI = .95, NNFI = .96, CFI = .97, and RMSEA = .058 values indicate that the compliance of the theoretical model in terms of both structure and data was acceptable (Table 2).

Cronbach’s alpha reliability and structural reliability were assessed for internal consistency of the data obtained from this instrument. The reliability levels for each dimension were higher than .70, proving the reliability of measurement results (Nunnally & Bernstein, 1994). The Cronbach’s alpha value of the instrument was found to be .86. Furthermore, the structural reliability of the three components of the instrument was found to vary between .79 and .81.

Although various methods are available to measure patient care quality in a hospital, nurses are widely accepted as valid and reliable informants for providing opinions related to the quality of patient care (McHugh & Stimpfel, 2012). Furthermore, nurses have opinions about non-documented medical records and about the positive and negative results of implementations. It is suggested that quality management program implementations at hospitals increase the levels of patient care quality and patient safety significantly (WHO, 2015). However, this research found that quality implementations had little influence (2.6%) on participant perceptions of care quality (Figure 1).

Aiken et al. (2012) found that 11%–35% of nurses assessed the level of patient care quality and patient safety at hospitals in 12 countries as poor or fair. Similarly, Cho et al. (2016) found that 65% of Korean nurses perceived the level of patient care quality in South Korea as poor or fair. McHugh and Stimpfel (2012) found that 29% of a sample of nurses in the United States defined the patient care quality in their hospitals as excellent. In this study, the participant perceptions of patient care quality were slightly higher than average (good; $M = 6.47, SD = 2.14$). However, 96% of the participants stated that there was no efficient error-reporting system in their institution, whereas 83% stated that they participate in quality improvement implementations either partially or never. Although error reporting systems do not improve the quality of health services, being aware of errors is important to preventing recurrence (WHO, 2008). The American Association of Nurse Executives states that a culture of patient safety should be established by a manager to identify and remedy errors as soon as possible (Vogelsmeier & Scott-Cawiezell, 2007). However, statements of the participants such as “There is no efficient error reporting system in Figure 2. Structural equation modeling of job satisfaction. FB = favorable belief; UFB = unfavorable belief; UFR = unfavorable reaction; JS = job satisfaction. $\chi^2 = 255.15, df = 101, p < .001$, RMSEA = .063.
their institution” and “They participate in quality improvement implementations either partially or never” indicate that their perception about patient care quality as “good” may not be realistic and that the obtained result as the influence on patient care quality is by 2.6% reflects their positive beliefs in quality implementations. On the other hand, unfavorable beliefs and attitudes such as “I am not interested in quality implementations” and “I find applied quality implementations are unnecessary” do not serve to improve the quality of patient care (Table 2). This situation suggests that nurses are not actively included in quality management program implementations and that these programs do not achieve their stated goals.

Nurse satisfaction has been identified in the literature as a factor that increases the quality of patient care (Aiken et al., 2011). However, this study revealed lower-than-average job satisfaction among participants ($M = 4.85, SD = 2.54$) and that quality management program implementations negatively influenced job satisfaction ($-16\%$). Accordingly, H2, which posits that quality management program implementations have a positive and significant effect on job satisfaction, was rejected.

A study conducted in hospitals across 12 countries in Europe and the United States that investigated perceptions of care quality and job satisfaction levels among nurses found job satisfaction levels that were between 11% and 56% (Aiken et al., 2012).

In this research, workload increase after quality management program implementations, decreased willingness to work because of heavy work flows, and the high frequency of quality audits were perceived negatively. In other respects, some of them stated that they found “the applied changes related to quality implementations to be unnecessary,” “quality implementations require a lot of procedures,” “quality implementations are the duty of the quality department,” and “we are not interested in the quality implementations” and other negative reactions. Therefore, the results of this study indicate that quality management program implementations decrease job satisfaction in nurses and that program implementations conducted in Turkish hospitals by top management result in an undesirable situation for employees.

Participants from university hospitals in this study approached quality management program implementations

### TABLE 2.

**Confirmatory Factor Analysis Results of the Instrument**

| Factor | $M$  | $SD$ | Standard Loads | Error Variance | t    | $R^2$ |
|--------|------|------|----------------|----------------|------|-------|
| Favorable belief |      |      |                |                |      |       |
| FB1. I believe that quality implementations conducted in this institution increase the quality of the care given to patients. | 3.29 | 1.15 | .77 | .40 | 16.61 | .60 |
| FB3. In the institutions where quality implementations are conducted, they support professional development of the personnel. | 3.44 | 1.13 | .73 | .47 | 15.31 | .53 |
| FB5. The institutions where quality implementations are conducted provide good opportunities for their personnel. | 2.79 | 1.13 | .64 | .59 | 12.93 | .41 |
| FB6. In the institutions where quality implementations are conducted, the personnel consider patient safety as a priority issue. | 3.36 | 1.10 | .61 | .62 | 12.29 | .38 |
| FB2. Patients place importance on quality certifications such as ISO, JCI, and SCS when selecting institutions at which to receive health services. | 2.50 | 1.15 | .57 | .67 | 11.31 | .33 |
| FB4. I believe quality implementations increase patient satisfaction. | 3.36 | 1.09 | .53 | .72 | 10.28 | .28 |

| Unfavorable Belief |      |      |                |                |      |       |
| UFB4. I believe quality implementations increase my work load. | 2.54 | 1.14 | .83 | .32 | 18.25 | .68 |
| UFB3. Frequently conducted quality audits conducted by the quality department bother the employees. | 2.57 | 1.09 | .77 | .40 | 16.71 | .60 |
| UFB1. Due to intense quality implementations, my willingness to work decreases. | 2.43 | 1.05 | .71 | .50 | 14.93 | .50 |

| Unfavorable reaction |      |      |                |                |      |       |
| UFR4. Each implementation conducted due to quality implementations shall bother me since each implementation shall be based on a standard. | 3.14 | 1.10 | .74 | .45 | 15.50 | .55 |
| UFR3. I find applied quality implementations are unnecessary. | 3.34 | 1.05 | .72 | .48 | 14.99 | .52 |
| UFR5. I think quality implementations require a lot of procedures. | 2.85 | 1.18 | .72 | .48 | 14.95 | .52 |
| UFR1. I am not interested in quality implementations. | 3.24 | 1.18 | .58 | .67 | 11.36 | .33 |
| UFR2. Quality implementations are the duty of the “Quality Department” only. | 2.68 | 1.10 | .47 | .78 | 9.04 | .22 |

*Note. $\chi^2 = 201.22\,(df = 87), \chi^2/df = 2.31; \text{RMSEA} = .058; \text{NFI} = .95; \text{NNFI} = .96; \text{CFI} = .97; \text{GFI} = .94. \text{ISO} = \text{International Organization for Standards; JCI} = \text{Joint Commission International; SCS} = \text{Health Quality Standards; FB} = \text{favorable belief; UFB} = \text{unfavorable belief; UFR} = \text{unfavorable reaction.}
more affirmatively and had more positive views of patient care quality and job satisfaction. In research conducted by Al-Shdaifat (2015), an instrument was developed to assess the perceptions of nurses regarding TQM implementations at private, university, military, and public hospitals in Jordan. As a result, a relationship between the Jordanian hospitals type and implementing TQM was found. It was revealed that nurses who were working at private hospitals had higher levels of perception, which consisted of continuous improvement, teamwork, training, top management commitment, and customer focus, than their peers who were working at other types of hospitals (Al-Shdaifat, 2015). The perceptions, attitudes, and behaviors of hospital managers directly influence the culture of patient safety and quality implementations (van Schoten et al., 2016). Results indicate that differences between hospital types are rooted in the differences in the attitudes and behaviors of top managers in these institutions.

Limitations
The most important limitation of this study is that the research data were collected only from nurses working in Turkey and thus reflect country-specific cultural and proficiency group characteristics. As the study sample was small, the findings may not be generalizable to all healthcare professionals. Furthermore, the findings of the research were limited to the answers of the participants.

The findings of this study indicate that the job satisfaction level of participants was negatively affected (~16%) by the quality management program implementations at their respective hospitals in Turkey. Research findings are limited by the data that were collected. Other factors that may influence the job satisfaction of nurses should be determined and addressed.

Conclusions
According to the findings, the instrument was found to be valid and reliable for measuring participant perceptions of quality implementations. In general, the participants reported negative perceptions of institutional quality management program implementations and little impact (2.6%) on perceptions of care quality. Furthermore, job satisfaction levels of the participants were found to be lower than median (M = 4.85, SD = 2.54; score range: 1–10), with a negative correlation between the quality management program implementations and nurse job satisfaction (~0.41).

Implications for Practice
Because nurses do not participate in quality management program implementations, they are likely to perceive these implementations as unnecessary and quality management as the responsibility of the quality department. However, it is very important to make all care-service providers participate to effectively implement quality management programs in hospitals and to adopt a culture of patient safety across an institution. Therefore, TQM implementations should be initially adopted by top management and all managers before being conducted together with all employees.

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Data collection: All authors
Data analysis and interpretation: All authors
Drafting of the article: All authors
Critical revision of the article: All authors

References
Aiken, L. H., Cimiotti, J. P., Sloane, D. M., Smith, H. L., Flynn, L., & Neff, D. F. (2011). Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments. Medical Care, 49(12), 1047–1053. https://doi.org/10.1097/MLR.0b013e318233066e
Aiken, L. H., Sermeus, W., Van den Heede, K., Sloane, D. M., Busse, R., McKee, M., … Kutney-Lee, A. (2012). Patient safety, satisfaction, and quality of hospital care: Cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. BMJ, 344, e1717. https://doi.org/10.1136/bmj.e1717
Alimo-Metcalfe, B., Alban-Metcalfe, J., Bradley, M., Mariathasan, J., & Samele, C. (2008). The impact of engaging leadership on performance, attitudes to work and wellbeing at work: A longitudinal study. Journal of Health Organization and Management, 22(6), 586–598. https://doi.org/10.1108/14777260810916560
Al-Shdaifat, E. A. (2015). Implementation of total quality management in hospitals. Journal of Taibah University Medical Sciences, 10(4), 461–466. https://doi.org/10.1016/j.jtumed.2015.05.004
Child, D. (2006). The essentials of factor analysis (3rd ed.). London, England: Continuum.
Cho, E., Lee, N. J., Kim, E. Y., Kim, S., Lee, K., Park, K. O., & Sung, Y. H. (2016). Nurse staffing level and overtime associated with patient safety, quality of care, and care left undone in hospitals: A cross-sectional study. International Journal of Nursing Studies, 60, 263–271. https://doi.org/10.1016/j.ijnurstu.2016.05.009
Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment Research & Evaluation, 10(7), 1–9.
Davis, L. L. (1992). Instrument review: Getting the most from a panel of experts. *Applied Nursing Research, 5*(4), 194–197. https://doi.org/10.1016/S0897-1839(05)80008-4

DelliFraine, J. L., Langabeer, J. R., II, & Nembhard, I. M. (2010). Assessing the evidence of six sigma and lean in the health care industry. *Quality Management in Health Care, 19*(3), 211–225. https://doi.org/10.1097/QMH.0b013e3181eb140e

DeVellis, R. F. (2003). *Scale development: Theory and applications* (2nd ed.). Thousand Oaks, CA: Sage.

Draper, D. A., Felland, L. E., Liebhaber, A., & Melichar, L. (2008). The role of nurses in hospital quality improvement. *Research Brief, 3*, 1–8.

Ekici, D., Cerit, K., Gür, E., Mert, T., & Türkmen, S. (2016). *Analysis of managerial failures in healthcare*. Ankara, Turkey: Sim. (Original work published in Turkish)

Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). *To err is human: Building a safer healthcare system*. Washington, DC: National Academy Press.

Matsunaga, M. (2011). How to factor-analyze your data right: Do’s, don’ts, and how-to’s. *International Journal of Psychological Research, 3*(1), 97–110. https://doi.org/10.21500/20112084.854

McHugh, M. D., & Stimpfel, A. W. (2012). Nurse reported quality of care: A measure of hospital quality. *Research in Nursing & Health, 35*(6), 566–575. https://doi.org/10.1002/nur.21503

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York, NY: McGraw-Hill.

Øvretveit, J. (2000). Total quality management in European healthcare. *International Journal of Health Quality Assurance, 13*(2), 74–80. https://doi.org/10.1108/09526860010319523

Pizzi, L. T., Goldfarb, N. I., & Nash, D. B. (2001). Promoting a culture of safety. In K. G. Shojaiania, B.W. Duncan, K. M. McDonald, & R. W. Wachter (Eds.), *Making health care safer: A critical analysis of patient safety practices*. Evidence report/technology assessment. Retrieved from http://158.132.155.107/posh97/private/culture/promoting-Pizzi.pdf

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Online Methods of Psychological Research, 8*(2), 23–74.

Singla, A. K., Kitch, B. T., Weissman, J. S., & Campbell, E. G. (2006). Assessing patient safety culture: A review and synthesis of the measurement tools. *Journal of Patient Safety, 2*(3), 105–115. https://doi.org/10.1097/01.jps.0000235388.39149.5a

Stanton, M. W. (2004). Hospital nurse staffing and quality of care. *Agency for Healthcare Research and Quality, 14*(4-0029), 1–12. Retrieved from https://archive.ahrq.gov/research/findings/factsheets/services/nursestaffing/nursestaff.pdf

Stimpfel, A. W., & Aiken, L. H. (2013). Hospital staff nurses’ shift length associated with safety and quality of care. *Journal of Nursing Care Quality, 28*(2), 122–129. https://doi.org/10.1097/NCQ.0b013e3182725f09

Talib, F., Rahman, Z., & Azam, M. (2011). Best practices of total quality management implementation in health care settings. *Health Marketing Quarterly, 28*(3), 232–252. https://doi.org/10.1080/07359683.2011.595643

van Schoten, S., de Blok, C., Spreeuwenberg, P., Groenewegen, P., & Wagner, C. (2016). The EFQM model as a framework for total quality management in healthcare results of a longitudinal quantitative study. *International Journal of Operations & Production Management, 36*(8), 901–922. https://doi.org/10.1108/IJOPM-03-2015-0139

Vogelsmeier, A., & Scott-Cawiezell, J. (2007). A just culture: The role of nursing leadership. *Journal of Nursing Care Quality, 22*(3), 210–212. https://doi.org/10.1097/01.NCQ.0000277776.97276.0b

Wardhani, V., Utarini, A., van Dijk, J. P., Post, D., & Groothoff, J. W. (2009). Determinants of quality management systems implementation in hospitals. *Health Policy, 89*(3), 239–251. https://doi.org/10.1016/j.healthpol.2008.06.008

World Health Organization. (2008). *World alliance for patient safety: Forward programme*. Retrieved from https://apps.who.int/iris/bitstream/handle/10665/70460/WHO_IER_PSP_2008.04_eng.pdf?sequence=1&isAllowed=y

World Health Organization. (2013). *The high 5s project: Interim report*. Retrieved from http://www.who.int/patientsafety/implementation/solutions/high5s/High5_InterimReport.pdf

World Health Organization. (2015). *Patient safety tool kit*. Retrieved from http://applications.emro.who.int/dsaf/EMROPUB_2015_EN_1856.pdf