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Patient safety management systems, activities and work environments related to hospital-level patient safety culture

A cross-sectional study

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Abstract

Improvement in patient safety culture requires constant attention. This study aimed to identify hospital-level elements related to patient safety culture, such as patient safety management systems, activities and work environments.

Two questionnaire surveys were administered to hospitals in Japan in 2015 and 2016. The first survey aimed to determine which hospitals would allow their staff to respond to a questionnaire survey. The second survey aimed to measure the patient safety culture in those hospitals. Patient safety culture was assessed using the Hospital Survey on Patient Safety Culture (HSOPS). The relationship of hospital-level patient safety culture with the aforementioned elements in each hospital was analyzed.

The response rate to the first survey was 22% (721/3270), and 40 eligible hospitals were selected from the respondents. The second survey was administered to healthcare workers in those 40 hospitals, and the response rate was 94% (3768/4000). The proportion of respondents who had 7 or more days off each month was related to the scores of 7 composites and the Patient Safety Grade of HSOPS. Both the presence of a mission statement describing patient safety and the proportion of respondents who participated in in-house patient safety workshops at least twice annually were related to the scores of 5 composites and the Patient Safety Grade of HSOPS.

Our study suggests that the number of days off each month, the presence of a hospital patient safety mission statement, and the participation rate in in-house patient safety workshops might be key factors in creating a good patient safety culture within each hospital.

Abbreviations: AHRQ = agency of healthcare research and quality, GLM = generalized linear model, HSOPS = hospital survey on patient safety culture, JQ = Japan Council for Quality Health Care, RCA = root cause analysis, TeamSTEPPS = team strategies and tools to enhance performance and patient safety.

Keywords: accreditation, education, organizational policy, rest, root cause analysis, safety management, workload

1. Introduction

Patient safety culture is one of the core components of high-quality healthcare. Hospitals have improved their patient safety management systems and implemented several patient safety management activities, but the effects of these efforts on patient safety culture remain to be elucidated. Patient safety culture is defined as the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior, which determine the commitment to, and the style and proficiency of, an organization's health and safety management.[1] Previous studies have identified factors related to patient safety culture. These include job roles, unit type, long working hours, occupational stress, employee satisfaction, patient satisfaction, and infection control.[2–10] Physicians and administrators perceive their institution to have a better patient safety culture than the frontline employees' perception.[2] Unit-level patient safety culture varies among different unit types, with some units exhibiting an unfavorable patient safety culture.[3] Long working hours, occupational stress, or burnout may lead to deterioration in patient safety culture among nurses.[4–6] A positive patient safety culture has been shown to improve both patient and employee satisfaction[7,8] and to reduce surgical site and central line-associated bloodstream infections.[9,10] Team strategies and

Editor: Phil Phan.

This study was supported by a Health, Labour, and Welfare Sciences Research Grant (grant number: H27-iryo-ippan-007).

The authors report no conflicts of interest.

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How to cite this article: Fujita S, Wu Y, Iida S, Nagai Y, Shimamori Y, Hasegawa T. Patient safety management systems, activities and work environments related to hospital-level patient safety culture: A cross-sectional study. Medicine 2019;98:50(e18352).

Received: 1 July 2019 / Received in final form: 31 October 2019 / Accepted: 13 November 2019

http://dx.doi.org/10.1097/MD.0000000000018352

tools to enhance performance and patient safety (TeamSTEPPS) or crew resource management, are effective interventions.[11–13] However, patient safety culture can be improved further, and additional investigations may lead to the identification of promising interventions for this improvement. Hospital-level elements, such as a clear hospital mission statement on patient safety, the organization of in-house patient safety workshops, or a better management of the workload of frontline employees, might affect hospital-level patient safety culture. However, these elements have not been extensively investigated.

This study aimed to identify hospital-level elements related to patient safety culture, such as patient safety management systems, activities, and work environment.

2. Methods

Two questionnaire surveys were administered to hospitals in Japan in 2015 and 2016. The first survey was an attempt to understand patient safety management systems and the activities in hospitals in Japan and to determine which hospitals would allow their employees to be surveyed. The second survey attempted to measure the patient safety culture in those hospitals.

2.1. Subjects

The first survey was administered to personnel responsible for the patient safety management in 3270 hospitals, selected via stratified random sampling according to the number of beds. They accounted for 38% of all hospitals in Japan. To reduce confounding factors of patient safety management, the participating hospitals for the second survey had at least 300 beds and an electronic medical record system. University hospitals were excluded because their regulations and resources for patient safety management were different from those in others. Whereas university hospitals are obligated to appoint full-time patient safety managers consisting of at least 1 physician, a nurse, and a pharmacist, other hospitals are not.

In the second survey, questionnaires were distributed to 66 members of the nursing staff, 16 technicians or therapists, 12 physicians, and 6 pharmacists specifically selected by a patient safety manager in each hospital. The distribution by profession reflects the percentage of medical professionals in Japanese hospitals. Hospitals were asked to distribute the questionnaire evenly among subjects based on their position, section, years of experience, and degree of involvement in patient safety activities.

2.2. Questionnaire

The first survey included basic demographic questions for each hospital, such as the number of beds, average length of stay, description of the patient safety mission statement, use of root cause analysis (RCA) for events, and accreditation status by the Japan Council for Quality Health Care (JQ).

The second survey asked each respondent about Patient Safety Alerts, participation in in-house patient safety workshops, working hours per week, number of night shifts each month, number of days off each month, and patient safety culture. For the working hours, number of night shifts, and number of days off, Likert scales with 6-point, 5-point, and 4-point response options were used, respectively. The JQ maintains a nationwide adverse event and near-miss reporting system that includes approximately 1500 hospitals and issues Patient Safety Alerts every month. The alerts are sent to approximately 70% of the hospitals in Japan through facsimile, and they can be downloaded from the JQ website.[14] Hospitals are requested to organize in-house patient safety workshops at least twice annually, in which all healthcare workers are expected to participate. However, the contents of the workshops are not standardized. Patient safety culture was measured using the Japanese version of the Hospital Survey on Patient Safety Culture (HSOPS) developed by the Agency of Healthcare Research and Quality (AHRQ).[1,15] The internal reliability and construct validity of the Japanese version, HSOPS, has already been validated.[15] HSOPS consists of 42 items grouped into 12 composites. There are also 2 questions that ask respondents to provide an overall grade for patient safety (Patient Safety Grade) and clarify the number of events reported in the past 12 months. For the items that assessed patient safety culture, Likert scales with 5-point response options for agreement (1: Strongly disagree to 5: Strongly agree), frequency (1: Never to 5: Always), Patient Safety Grade (1: Failing to 5: Excellent), and number of events reported (from 1: No events to 5: 21 events or more) were used.

2.3. Analysis

A hospital-level data set was generated from the survey data for healthcare workers in each hospital. The proportions of respondents who read the Patient Safety Alerts regularly or occasionally, participated in in-house patient safety workshops twice a year, worked less than 40 hours per week, worked for 4 or fewer nights per week, and had at least 7 days off per month were calculated for each hospital. The average percent-positive scores for each composite of HSOPS, average score of all 12 composites, the proportion of positive responses for the Patient Safety Grade, and proportion of respondents who had submitted one or more event reports in the past 12 months were calculated for each hospital based on AHRQ definitions. The composite-level average percent-positive response ranged from 0 to 1, with higher scores indicating a more positive patient safety culture.

The respondent-level data set was converted to a hospital-level data set, which was then used for statistical analysis. Missing data were excluded from the analysis. The composite-level average percent-positive scores in each hospital were compared by t test. Pearson correlation coefficient was used to determine the relationships between the composite-level average percent-positive scores in each hospital and the proportion of respondents to several variables. A generalized linear model (GLM) with identity link was used to analyze the relationships of the scores of HSOPS with patient safety management systems, activities, and work environments in each hospital. In the model, the response variables were the scores of HSOPS such as the composite-level average percent-positive scores and the average score across all 12 composites. The explanatory variables were the patient safety management systems, activities, and work environments in each hospital. Separate GLMs were used on each score of HSOPS using the hospital-level data set.

This study was approved by the Ethics Committee of Toho University School of Medicine (No. 27045).

3. Results

The response rate for the first survey was 22% (721/3270). Among the 721 responding hospitals, 147 agreed to conduct the second survey, and 54 met the inclusion criteria. When

Table 1

Characteristics of hospitals and respondents.

	Mean	SD	Min	Max
Basic data for each hospital				
Number of beds	461	116	300	749
Bed occupancy rate (%)	81	10	54	98
Average length of stay (days)	13	2	10	19
Number of staff	823	306	422	1941
Annual number of discharged patients	9266	3558	3438	17683
Respondents in each hospital				
Nurses (%)	63	6	49	83
Physicians (%)	10	3	0	14
Pharmacists (%)	6	1	3	9
Other occupations (%)	21	5	12	33
Female (%)	72	6	57	88
<30 years old (%)	31	13	6	60
30–39 years old (%)	28	6	17	40
40–49 years old (%)	24	10	6	51
≥50 years old (%)	14	7	2	33
No answer for age (%)	3	2	0	11
Respondents who read Patient Safety Alerts from the JQ regularly or occasionally* (%)	53	17	14	92
Respondents who participated in in-house patient safety workshops twice a year or more (%)	49	19	13	91
Respondents who worked fewer than 40 h per week (%)	30	8	15	47
Respondents who worked four or fewer nights per month (%)	63	15	29	95
Respondents who had 7 or more days off per month (%)	85	6	65	94

* JQ (Japan Council for Quality Health Care) is an accreditation body for hospitals in Japan.

recontacted, 40 hospitals agreed to participate, and all of these hospitals allocated a full-time patient safety manager, usually a nurse.

The questionnaires of the second survey were distributed to 100 healthcare workers in each hospital. The response rate was 94% (3768/4000), with a range of 66% to 100%. The characteristics of the responding hospitals and their participants are presented in Table 1. Patient safety was included in the mission statements of 85% of the hospitals, 80% were accredited by the JQ, and 73% used RCA to analyze adverse events. There was no missing data in the hospital-level data set (n = 40).

The results for composite-level scores, responses to 2 questions on patient safety culture, and results of the correlation analysis are presented in Table 2. The score for "Teamwork within units" was the highest among the 12 composites, and that of "Handoffs & transitions" was the lowest. The scores of 6 composites in hospitals with a mission statement on patient safety were higher than those in hospitals without such a statement. The proportion of respondents who participated in in-house patient safety workshops twice a year or more exhibited a modest correlation (r = 0.47–0.53) with the scores of 5 composites and one question on the Patient Safety Grade. The proportion of respondents who read Patient Safety Alerts from the JQ either regularly or occasionally also displayed a modest correlation (r = 0.41–0.57) with the scores of 3 composites. The proportion of respondents who had 7 or more days off per month was moderately correlated (r = 0.41) with the scores of 2 composites, but it did not correlate with the composite score of "Staffing."

The results of the GLM are presented in Table 3. The proportion of respondents with 7 or more days off per month was positively correlated with the scores of 7 composites and the Patient Safety Grade. The presence of mission statements on patient safety and the proportion of respondents who participated in in-house patient safety workshops were positively correlated with the scores of 5 composites and the Patient Safety Grade. Hospital accreditation was positively correlated with the scores for "Supervisor/manager expectation & actions promoting patient safety" and "Non-punitive response to errors." The utilization of RCA was positively correlated with the score for "Non-punitive response to errors" and the number of events reported. The proportion of respondents who read Patient Safety Alerts from the JQ regularly or occasionally was positively correlated with the score for "Feedback & communication about error." The average score across the 12 composites was positively correlated with the presence of mission statements on patient safety, the proportion who participated in in-house patient safety workshops, who worked for 4 or fewer nights per month, and who had 7 or more days off per month.

4. Discussion

Work environment, as well as the number of working hours per week, appears to be closely related to patient safety culture. The number of days off correlated positively with the scores of more than half of the composites. Our previous study found that long working hours might cause patient safety culture to deteriorate among nurses; however, the number of days off may have a greater effect on patient safety culture than the number of working hours.[4] Previous studies have found relationships among long working hours, burnout, low staff well-being, and increased errors.[16–18] Fewer days off might cause the well-being of healthcare workers to deteriorate and lead to a deterioration of patient safety culture. Improving low staff well-being due to long working hours or fewer days off may reduce errors and improve patient safety culture.[5,6,16,17,18]

The presence of a hospital mission statement on patient safety correlated positively with the scores of 5 composites and the Patient Safety Grade. More than half of the hospitals in the United States place a greater emphasis on quality than on access, cost, or community benefit in their mission statements.[19]

Table 2

Relationship between patient safety culture and the characteristics of the hospitals and respondents.

	All samples	Patient safety is included in the mission statement of the hospital		The hospital is accredited by the JQ[§]		Root cause analysis has been used to analyse the causes of adverse events		Proportion of respondents who read Patient Safety Alerts from the JQ regularly or occasionally[§]	Proportion of respondents who participated in in-house patient safety workshops twice a year or more	Proportion of respondents who worked fewer than 40 h per week	Proportion of respondents who worked 4 or fewer nights per month	Proportion of respondents who had 7 or more days off per month
(Number of hospitals)	(40)	Yes (34)	No (6)	Yes (32)	No (8)	Yes (29)	No (11)	(40)	(40)	(40)	(40)	(40)
	M	M	M	M	M	M	M	r	r	r	r	r
Twelve composites of patient safety culture												
Teamwork within units	0.76	0.77	0.72	0.76	0.75	0.76	0.76	0.02	0.14	0.04	0.14	0.41[†]
Supervisor/manager expectations & actions promoting patient safety	0.70	0.70	0.68	0.71	0.67[*]	0.70	0.69	0.11	0.27	0.09	0.28	0.20
Organisational learning—continuous improvement	0.58	0.59	0.52[*]	0.59	0.55	0.57	0.60	0.44[†]	0.53[‡]	0.07	0.21	0.20
Management support for patient safety	0.61	0.62	0.55[*]	0.61	0.58	0.60	0.62	0.41[†]	0.51[‡]	0.11	0.27	0.29
Overall perceptions of patient safety	0.59	0.60	0.53[*]	0.59	0.56	0.58	0.59	0.20	0.48[†]	0.05	0.14	0.31[*]
Feedback & communication about error	0.66	0.67	0.57[*]	0.66	0.64	0.65	0.67	0.57[‡]	0.53[‡]	0.06	0.04	0.21
Communication openness	0.57	0.58	0.53	0.57	0.58	0.57	0.57	0.10	0.16	0.11	0.28	0.32[*]
Frequency of events reported	0.71	0.71	0.68	0.72	0.68	0.71	0.72	0.31	0.47[†]	−0.02	0.04	0.15
Teamwork across units	0.49	0.50	0.42[*]	0.49	0.47	0.49	0.50	0.24	0.32[*]	0.04	0.24	0.15
Staffing	0.42	0.42	0.43	0.42	0.41	0.42	0.42	−0.13	0.04	0.44[†]	0.48[†]	0.23
Handoffs & transitions	0.35	0.36	0.30[*]	0.35	0.34	0.35	0.36	0.17	0.25	−0.17	0.12	0.41[†]
Non-punitive response to errors	0.51	0.51	0.50	0.51	0.47	0.52	0.48	−0.18	−0.10	−0.06	0.20	0.35[*]
Average score across 12 composites	0.58	0.59	0.54[*]	0.58	0.56	0.58	0.58	0.27	0.40[†]	0.08	0.26	0.35[*]
Two questions on patient safety culture												
Proportion of respondents who rated Patient Safety Grade as excellent or very good	0.46	0.48	0.36[†]	0.47	0.43	0.45	0.49	0.37[*]	0.47[†]	−0.12	0.11	0.34[*]
Proportion of respondents with one or more reported events	0.78	0.78	0.79	0.79	0.76	0.80	0.73[*]	−0.04	−0.08	−0.15	−0.15	0.06

Mean scores of composites were compared by *t* test. Pearson's correlation coefficient was used to show the relationships between the proportions of respondents and the composite scores.

M = Mean; r = Correlation coefficient.

[*] $P < .05$.

[†] $P < .01$.

[‡] $P < .001$.

[§]JQ (Japan Council for Quality Health Care) is an accreditation body for hospitals in Japan.

Table 3

Factors relevant to patient safety culture.

Explanatory variables	Patient safety is included in the mission statement of the hospital	The hospital is accredited by the JQ[§]	Root cause analysis has been used to analyse the causes of adverse events	Proportion of respondents who read Patient Safety Alerts from the JQ regularly or occasionally[§]	Proportion of respondents who participated in in-house patient safety workshops twice a year or more	Proportion of respondents who worked fewer than 40 h per week	Proportion of respondents who worked 4 or fewer nights per month	Proportion of respondents who had 7 or more days off per month	Akaike information criterion (AIC)
Response variables									
Teamwork within units	0.05*	0.00	0.00	−0.05	0.07	0.03	0.04	0.38†	−106.00
Supervisor/manager expectations & actions promoting patient safety	0.01	0.04†	0.02	0.02	0.07	−0.05	0.14†	0.14	−124.06
Organisational learning—continuous improvement	0.05*	0.03	0.00	0.08	0.14†	0.04	0.11	0.23	−112.24
Management support for patient safety	0.04	0.03	0.02	0.11	0.16†	0.05	0.16*	0.38†	−106.09
Overall perceptions of patient safety	0.07†	0.02	0.01	−0.05	0.19‡	0.05	0.05	0.32†	−115.02
Feedback & communication about error	0.08†	0.01	0.02	0.21†	0.17†	0.25	−0.03	0.37*	−92.88
Communication openness	0.04	−0.01	0.01	−0.02	0.07	0.06	0.09	0.29*	−108.40
Frequency of events reported	0.02	0.03	0.01	0.04	0.14*	−0.03	0.05	0.15	−104.52
Teamwork across units	0.07*	0.02	0.00	0.01	0.12	0.01	0.12	0.18	−91.65
Staffing	0.00	0.01	0.01	−0.03	0.04	0.19	0.18†	0.23	−103.36
Handoffs & transitions	0.05	0.01	0.00	−0.02	0.10	−0.17	0.09	0.43†	−101.06
Non-punitive response to errors	−0.01	0.05*	0.05*	−0.02	0.00	−0.24	0.19†	0.34*	−98.56
Average score across 12 composites	0.04*	0.02	0.01	0.02	0.11†	0.02	0.10*	0.29†	−131.04
Proportion of respondents who rated Patient Safety Grade as excellent or very good	0.10†	0.02	−0.01	0.02	0.21†	−0.11	0.10	0.51‡	−90.38
Proportion of respondents whose number of events reported was one or more	−0.03	0.04	0.08*	0.07	−0.03	−0.19	−0.01	0.08	−60.10

Estimates of generalized linear models (GLMs) are noted. Separate GLMs were used on each composite and 2 questions on patient safety culture. JQ (Japan Council for Quality Health Care) is an accreditation body for hospitals in Japan.

* $P < .05$.

† $P < .01$.

‡ $P < .001$.

§ JQ (Japan Council for Quality Health Care) is an accreditation body for hospitals in Japan.

However, healthcare workers rarely consider hospital mission statements in their decision-making or behavior as they are generally not aware of the statements.[20,21] Unit managers should be required to act as role models who consider the hospital's mission statement regarding patient safety in their decision-making or behavior.[20,22] Effective implementation and communication methods regarding mission statements must also be ensured.

The participation rate of in-house patient safety workshops correlated positively with the scores of 5 components and the Patient Safety Grade. Several educational interventions have been demonstrated to improve patient safety culture, and our study revealed the importance of participation rate in the workshops.[23–25] Patient safety culture may improve if the participation rate of these workshops increases, but a causal relationship and effective educational interventions need further study.

Hospital accreditation may have changed the attitudes of supervisors and managers toward their staff, because it was related to the scores for "Supervisor/manager expectations & actions promoting patient safety" and "Non-punitive response to errors." Other studies have also found that accreditation improved the scores for non-punitive response to errors or mistakes.[26,27] However, a systematic review identified scant evidence supporting the effectiveness of accreditation.[28] Additional research is needed to determine the relationship between accreditation and patient safety culture.

In hospitals using RCA, the staff member involved may be treated in a non-punitive manner because RCA does not aim to punish but to prevent the recurrence of the event.[29] However, only hospitals with a non-punitive atmosphere may be able to introduce RCA successfully. The causal relationship between RCA and the score for "Non-punitive response to errors" needs to be examined in the future.

If Patient Safety Alerts are read by healthcare workers, then the composite of "Feedback & communication about error" may improve. Supervisors/managers will have an opportunity to communicate the risk of adverse events with their staff if these alerts are regularly distributed to each unit. Patient Safety Alerts can initiate discussions about errors on the unit. However, there is little evidence supporting the effectiveness of these alerts, and further investigation is needed for confirmation.[30]

In the second survey, the hospitals and respondents with good patient safety culture may have been selected due to the sampling method. Therefore, the generalizability of our data should be interpreted carefully; however, it should not affect the results related to patient safety culture. Proportion of nurses in the respondents was 63%, and the hospital-level patient safety culture may be greatly influenced by the nurses' patient safety culture. Key factors for creating a good patient safety culture can vary by profession. Participating hospitals in this study were limited to acute-care hospitals with 300 beds or more, an electronic medical record system, and full-time patient safety managers. Healthcare workers in other hospitals may have different characteristics regarding patient safety culture, and the effects of various factors on patient safety culture may differ from those in our study. This was an exploratory analysis, and the power of each test was not considered.

5. Conclusion

Our study suggests that the number of days off, the presence of a hospital mission statement on patient safety, and the participation rate for in-house patient safety workshops might be key factors in creating a good patient safety culture. The effects of work–life balance on patient safety culture need further investigation, and a standardized, effective in-house patient safety workshop should be developed in the future.

Author contributions

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References

[1] Agency for Healthcare Research and Quality. AHRQ Hospital Survey on Patient Safety Culture: User's Guide. Available at: https://www.ahrq.gov/sops/surveys/hospital/index.html. [accessed date June 28, 2019].
[2] Hickner J, Smith SA, Yount N, et al. Differing perceptions of safety culture across job roles in the ambulatory setting: analysis of the AHRQ Medical Office Survey on Patient Safety Culture. BMJ Qual Saf 2016;25:588–94.
[3] Fujita S, Seto K, Kitazawa T, et al. Characteristics of unit-level patient safety culture in hospitals in Japan: a cross-sectional study. BMC Health Serv Res 2014;14:508.
[4] Wu Y, Fujita S, Seto K, et al. The impact of nurse working hours on patient safety culture: a cross-national survey including Japan, the United States and Chinese Taiwan using the Hospital Survey on Patient Safety Culture. BMC Health Serv Res 2013;13:394–400.
[5] Halbesleben JR, Wakefield BJ, Wakefield DS, et al. Nurse burnout and patient safety outcomes: nurse safety perception versus reporting behavior. West J Nurs Res 2008;30:560–77.
[6] Asefzadeh S, Kalhor R, Tir M. Patient safety culture and job stress among nurses in Mazandaran, Iran. Electron Physician 2017;9:6010–6.
[7] Sorra J, Khanna K, Dyer N, et al. Exploring relationships between patient safety culture and patients' assessments of hospital care. J Nurs Adm 2014;44:S45–53.
[8] Alves DF, Guirardello EB. Safety climate, emotional exhaustion and job satisfaction among Brazilian paediatric professional nurses. Int Nurs Rev 2016;63:328–35.
[9] Fan CJ, Pawlik TM, Daniels T, et al. Association of safety culture with surgical site infection outcomes. J Am Coll Surg 2016;222:122–8.
[10] Weaver SJ, Weeks K, Pham JC, et al. On the CUSP: Stop BSI: evaluating the relationship between central line-associated bloodstream infection rate and patient safety climate profile. Am J Infect Control 2014;42:S203–8.
[11] Mayer CM, Cluff L, Lin W, et al. Evaluating efforts to optimize TeamSTEPPS implementation in surgical and pediatric intensive care units. Jt Comm J Qual Patient Saf 2011;37:365–74.
[12] Gore DC, Powell JM, Baer JG, et al. Crew resource management improved perception of patient safety in the operating room. Am J Med Qual 2010;25:60–3.
[13] Szekendi MK, Barnard C, Creamer J, et al. Using patient safety morbidity and mortality conferences to promote transparency and a culture of safety. Jt Comm J Qual Patient Saf 2010;36:3–9.
[14] Japan Council for Quality Health Care. Medical safety information. Available at: http://www.med-safe.jp/contents/english/index.html. [accessed date June 28, 2019].
[15] Ito S, Seto K, Kigawa M, et al. Development and applicability of Hospital Survey on Patient Safety Culture (HSOPS) in Japan. BMC Health Serv Res 2011;11:28.

[16] Hall LH, Johnson J, Watt I, et al. Healthcare staff wellbeing, burnout, and patient safety: a systematic review. PLoS One 2016;11: e0159015.
[17] Dewa CS, Loong D, Bonato S, et al. The relationship between physician burnout and quality of healthcare in terms of safety and acceptability: a systematic review. BMJ Open 2017;7:e015141.
[18] Hu NC, Chen JD, Cheng TJ. The associations between long working hours, physical inactivity, and burnout. J Occup Environ Med 2016;58:514–8.
[19] Cronin CE, Bolon DS. Comparing hospital mission statement content in a changing healthcare field. Hosp Top 2018;96:28–34.
[20] Desmidt S, Prinzie A, Heene A. The level and determinants of mission statement use: a questionnaire survey. Int J Nurs Stud 2008;45:1433–41.
[21] Vandijck D, Desmidt S, Buelens M. Relevance of mission statements in Flemish not-for-profit healthcare organizations. J Nurs Manag 2007;15:131–41.
[22] Singer SJ, Vogus TJ. Safety climate research: taking stock and looking forward. BMJ Qual Saf 2013;22:1–4.
[23] Kirkman MA, Sevdalis N, Arora S, et al. The outcomes of recent patient safety education interventions for trainee physicians and medical students: A systematic review. BMJ Open 2015;5:e007705.
[24] Kristensen S, Christensen KB, Jaquet A, et al. Strengthening leadership as a catalyst for enhanced patient safety culture: a repeated cross-sectional experimental study. BMJ Open 2016;6:e010180.
[25] Woodhouse KD, Volz E, Bellerive M, et al. The implementation and assessment of a quality and safety culture education program in a large radiation oncology department. Pract Radiat Oncol 2016;6:e127–34.
[26] Wagner LM, McDonald SM, Castle NG. Relationship between nursing home safety culture and Joint Commission accreditation. Jt Comm J Qual Patient Saf 2012;38:207–15.
[27] Al-Awa B, Al Mazrooa A, Rayes O, et al. Benchmarking the post-accreditation patient safety culture at King Abdulaziz University Hospital. Ann Saudi Med 2012;32:143–50.
[28] Brubakk K, Vist GE, Bukholm G, et al. A systematic review of hospital accreditation: the challenges of measuring complex intervention effects. BMC Health Serv Res 2015;15:280.
[29] Shaqdan K, Aran S, Daftari Besheli L, et al. Root-cause analysis and health failure mode and effect analysis: two leading techniques in health care quality assessment. J Am Coll Radiol 2014;11:572–9.
[30] Rhodes P, Giles SJ, Cook GA, et al. Assessment of the implementation of a national patient safety alert to reduce wrong site surgery. Qual Saf Health Care 2008;17:409–15.