Patient Safety Culture Based on Medical Staff Attitudes in Khorasan Razavi Hospitals, Northeastern Iran

Rozita DAVOODI¹, *Mahmoud MOHAMMADZADEH SHABESTARI², Afsaneh TAK-BIRI¹, Azadeh SOLTANIFAR¹, Golnaz SABOURI¹, Shaghayegh RAHMANI¹, Toktam MOGHIMAN²

¹. Research Center for Patient Safety, Mashhad University of Medical Sciences, Mashhad, Iran
². Atherosclerosis Prevention Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

*Corresponding Author: Email: Shabestarimdl@gmail.com

(Received 05 Jun 2013; accepted 10 Aug 2013)

Abstract
Background: Since establishing a safety culture in an organization is considered as the first step in patient safety improvement, there is always a need for updated field evaluation to better plan future decisions.

Methods: We performed a cross-sectional, analytic-descriptive study in 25 hospitals related to Mashhad University of Medical Sciences (MUMS) during a 3-month period from April to June 2012. A questionnaire, designed by previous patient safety culture studies with confirmed validity and reliability, was used and distributed among a sample of 922 staff, chosen randomly from the mentioned hospitals. Data were analyzed by SPSS software version 16.

Results: “Organizational learning - continuous improvement” and “teamwork within unit” had the highest percentage of positive results as 79.85 ± 12.03% and 71.92 ± 17.08%, respectively; whereas “non-punitive response” to errors (21.57 ± 6.42) and “staffing” (26.36 ± 16.84) came out as the least important factors. There were no meaningful statistical relation between general features of the understudy hospitals including the number of beds, educational level or proficiency status with the general safety culture score.

Conclusion: Most of the safety culture aspects were reported as low to moderate in terms of importance. If something needs to be modified interventionaly in this respect, “the approach to confront errors” would be a wise choice. This could be achieved by establishing an atmosphere of open communication and continuous learning through elimination of the fear for reporting errors and installing a more acceptable approach in hospitals.

Keywords: Safety culture, Adverse events, Patient safety, Hospital

Introduction

Patient safety is one of the key elements in healthcare systems, which has turned into an important priority for most of such organizations all around the world through the recent decades (1-4). Patient safety means preventing unwanted events or accidents that might happen during the time period of providing healthcare services for patients (5). These mostly preventable events - happening repeatedly – put a considerable financial burden on healthcare units, needless to mention the drawbacks of each death they bring (6-8). The American Institute of Medicine (IOM) report “to err is human” made healthcare and therapeutic service providing organizations improve patient safety (9) and in order to do so, the British National Patient Safety Agency introduced “safety culture establishment” as the first step in its 7-step model (10). Being a subdivision of the general culture of an organization, safety culture arises from attitudes, viewpoints, value perceptions and be-
behavioral patterns of people within work units which determine the style and the proficiency of health care management and organizational safety (11, 12). It was firstly announced in the Chernobyl disaster report in 1986 (13) and many high risk industries such as aviation or nuclear corporations started investigations on the definition and evaluation of safety culture as a pathway to decrease the risk of unwanted events and accidents (14). Healthcare is considered to be a high risk industry based on the morbidity and mortality it is involved in; therefore healthcare providing organizations should establish a safety culture among their staff in consistent with the efforts they make to improve patient safety (15, 16). Indeed communications based on a bilateral trust, common perceptions of safety importance and faith in the efficiency of preventive methods are counted as the major characteristics for safety culture beholder organizations (17, 18).

In order to change a safety culture within an organization, it should first be understood properly and this could not be achieved unless an appropriate safety culture evaluation is performed which helps the organization to better perceive its strength or weakness points. Besides, it makes an ideal opportunity for hospitals to detect their different aspects and it would be a reliable scale for comparisons with other hospitals or performing research studies. Care providing units will also be able to explore their deficiencies in patient safety related duties (19). Although patient safety has attracted more attention in risk management methods after clinical dominancy in Iran, very few studies have been performed to investigate safety culture as the first step in patient safety improvement; therefore we went through this research to estimate the relation between patient safety culture based on three characteristics of the under-study hospitals (number of beds, education condition, and proficiency status) from Mashhad University of Medical Sciences related hospitals staff’s standpoint; and by this we tried to picture a vivid image of the patient safety culture condition in 2012 and to illuminate a route for improving patient safety by knowing our strength and weakness points.

Methods

Study setting

In this cross-sectional analytic-descriptive study, 25 hospitals (all governmental hospitals in Khorasan Razavi Province; 13 hospitals located in Mashhad and 12 in other major cities) affiliated to Mashhad University of Medical Sciences were investigated (the most important medical sciences center in the northeast of Iran). Eleven teaching hospitals versus 14 non-teaching ones; 18 were specialized hospitals while 8 were general hospitals. Number of beds ranged from 23 to 918.

Data collection

In total, 1200 questionnaires were distributed as randomized stratified among clinical staff in 25 under-study hospitals (the sample number of every working group was calculated by the proportion of staff which were spread in various working groups in each hospital). Hospital managers distributed questionnaires among staff in different working shifts. Due to close cooperation of the hospitals’ managers and their enthusiasm towards the safety culture evaluation, 922 questionnaires were returned which showed a response rate of 76%.

Measurement

There were various means to evaluate patient safety culture in both quality and quantity features (20). Among the quantitative means HSOPSC (Hospital Survey On Patient Safety Culture), designed by the American Research And Healthcare Quality Agency in 2004, has an appropriate validity and reliability rate (1,5,7,19,21-24). Translated into several languages it has been used in many countries – including Iran - to investigate patient safety culture; so the questionnaire was used once again to collect data (25). The questionnaire consisted of 42 questions that evaluated staff perception of 12 different patient safety dimensions. These dimensions included: 1. overall perception of patient safety, 2. supervisor/ manager expectations and actions promoting safety, 3. teamwork within units, 4. organizational learning – continuous improvement, 5. Non-punitive response to errors, 6. staffing, 7. management support for patient safety, 8. teamwork across units, 9. handoffs and transitions, 10.
Communication openness, 11. Feedback and communication about errors, 12. Frequency of events reported. Each dimension consisted of 3 to 4 questions that in items 1 to 9 a 5-point frequency scale of Likert was used from “completely agree” to “completely disagree” and for items 10, 11 and 12 it was changed into a 5-point frequency scale from “always” to “never”. “Number of reported accidents having occurred in the last 12 months” and “patient safety status evaluation within work units” were 2 single questions added to those 12 mentioned dimensions.

Analysis of data
By means of “Average positive responses” the data were analyzed through a certain procedure; positive response percentages for each question were calculated individually, then by dividing the summation of positive responses to the number of questions asked in each dimension the “average positive response” was achieved. For those questions asking participants grade of agreement on a certain issue, “totally agree” and “agree” responses were chosen for literally positive meaning questions and “totally disagree” and “disagree” for negative ones which were summed by their percentages. In questions which scale of frequency differed; “always” and “mostly” were considered as responses for literally positive meaning questions while “never” and “rarely” were used for negative phrases and were summed by their percentages and the general score of patient safety culture resulted through calculating the mean of average positive responses of patient safety culture 12 dimensions. Those 2 single questions were also used as average positive response for analysis; “perfect” and “very good” were regarded as a positive response for patient safety score while for number of reported events by staff this positive response was considered as the percentage of staff who reported at least one event during the last 12 months. T test and Pearson correlation were used as statistical tests to investigate the relation between hospital characteristics and patient safety culture.

Results
The number and percentage of personnel who responded to the questionnaires were as follows: Nurses (677; 77%), physicians (87; 10%), laboratory staff (51; 5.9%), radiology staff (30; 3.5%), midwives (29; 2.9%), and operation room staff (3; 0.3%) general managers without any specialty in therapeutic procedures (2; 0.2%). Male participants consisted 30.8% of the cases whereas females accounted for 69.2%. Other characteristics are included in Table 1.

| Characteristics         | Frequency | Relative Frequency |
|-------------------------|-----------|--------------------|
| Age group(year)         |           |                    |
| 20-20                   | 219       | 29.4               |
| 30-39                   | 338       | 45.3               |
| 40-49                   | 165       | 22.1               |
| 50≤                     | 24        | 3.2                |
| Hospital experience (year) |         |                    |
| 1≥                      | 8         | 5.9                |
| 1-5                     | 272       | 33.4               |
| 6-10                    | 202       | 24.8               |
| 11-15                   | 139       | 17.1               |
| 16-20                   | 100       | 12.3               |
| 21-30                   | 54        | 6.6                |
| Working hours per week  |           |                    |
| 20≥                     | 20        | 2.8                |
| 21-30                   | 74        | 10.4               |
| 40-59                   | 415       | 58.2               |
| 60-79                   | 127       | 17.8               |
| Relation with patients  |           |                    |
| Direct                  | 781       | 95.2               |
| indirect                | 39        | 4.8                |
33.6% of participants reported the patient safety score of their ward with “perfect” and “very good” whereas 16% evaluated it as weak and unacceptable. According to Table 2, 53.8% had no report of any events during the last 12 months whereas 46.2% reported at least one single event during the same time period. The average positive response for frequency of reported events was 42.85%, although for the other 11 dimensions it varied from 21.57% to 79.85%.

Generally, most dimensions were mildly low or moderate in terms of the average positive response but 3 of them stranded out with higher percentages. Acknowledging the hospitals strength in the patient safety culture subject, organizational learning continuous improvement (79.85%), team-work within each unit (71.92%), supervisor/manager expectations and acting towards promoting safety (69.53%) were those 3 dimensions with the respectively highest percentages. The least average scores belonged to non-punitive response to errors (21.57%) and staffing (26.35%) which was considered to be the hospitals weakness points alongside with the frequency of events reported (42.85%) and communication openness (45.46%), Table 3.

As it is shown in table 4, no significant relation between safety culture scores and teaching and the specialty status of hospitals was present. Also there was no relation between bed size and safety culture scores.

| Table 2: Last 12 months reported events |
|----------------------------------------|
| Frequency of error reported            |
| 0                                      | 1-2 | 3-5 | 6-10 | 11-20 | 21≤ |
| Relative frequency of error reported   |
| 53.8                                   | 31.9 | 8.9 | 3.2  | 1.3   | 0.9 |

| Table 3: Descriptive of patent safety culture dimensions |
|----------------------------------------------------------|
| Dimensions                                               | Mean of Positive responses percentage | Standard deviation of Positive responses percentage |
| Overall perception of safety                             | 56.56                                   | 21.19                                               |
| Supervisors and managers expectations about patient safety| 69.53                                   | 11.13                                               |
| Team work within units                                   | 71.92                                   | 17.08                                               |
| Non-punitive response to errors                         | 21.57                                   | 6.42                                                |
| Hospital management support to patient safety           | 55.27                                   | 13.46                                               |
| Feedback and communication about errors                  | 51.31                                   | 9.44                                                |
| Frequency of events reported                            | 42.85                                   | 10.94                                               |

**Discussion**

In our study more than half of the personnel (53%) had not reported any medical error in the last 12 months prior to study. Alahmadi in Saudi Arabia declared that 43% of the staff members had not reported any medical errors in the same time duration (5). Similarly, Bodur study in Turkey showed that 84% of the studied personnel had not made any report of a medical error in the last 12 months (7). It is obvious that promotion in the medical error reporting system would be a posi-
tive point in further improving health systems (26) and health care organizations could improve the quality of their services by the use of these reports (27, 28). Therefore the American health association recommends using such reports as a learning opportunity and suggests turning the idea of person based errors to system based errors which would change the culture of reporting (15). Around 34% of our study participants evaluated the quality of patient safety as high level in Mashhad University of Medical Sciences which is still lower than the reports from other countries (5,7,19). Iran is located in the Eastern Mediterranean part of WHO zonal deviation. In Table 5 the results of comparing the safety culture between our country and 2 others has been shown. In most dimensions safety culture scores were higher in Saudi Arabia and Lebanon. In our study organized learning, team work and continuation of improvement outreached other dimensions, similar to the two studies conducted by Alahmadi and Aljeradi (5, 19). According to the questionnaire guide, the domains which the mean percentage of their positive answers were at least 70% will be considered as Strengths part of safety culture, the ones between 50 -70% will be considered neuter and the domains less than 50% will be considered the weakness points of safety culture (5).

Table 4: Relation between safety culture scores and hospital status

| Hospital status | Count | Safety Culture Score | P value |
|-----------------|-------|----------------------|---------|
| Teaching        | 11    | 37.61                | 0.06    |
| Non-teaching    | 14    | 49.53                |         |
| Specialized     | 8     | 41.95                | 0.62    |
| Non-specialized | 17    | 45.39                |         |

Table 5: Comparing safety culture of Iran with Saudi Arabia and Lebanon

| Dimensions                                      | Iran  | Saudi Arabia | Lebanon |
|------------------------------------------------|-------|--------------|---------|
| Overall perception of safety                    | 56.56 | 59           | 72      |
| Supervisors and managers expectations about patient safety | 69.53 | 70           | 66      |
| Organizational learning _ continuous improvement | 79.85 | 87           | 78      |
| Team work within units                          | 71.92 | 84           | 82      |
| Non-punitive response to errors                 | 21.57 | 22           | 24      |
| Personnel work                                  | 26.36 | 27           | 36      |
| Hospital management support to patient safety   | 55.27 | 74           | 78      |
| Teamwork across hospital units                  | 55.09 | 50           | 56      |
| Hospital handoff and transition                 | 51.55 | 61           | 49      |
| Communications opening                          | 45.46 | 60           | 57      |
| Feedback and communication about errors         | 51.31 | 77           | 68      |
| Frequency of events reported                    | 42.85 | 63           | 68      |

Overall consideration revealed that in this survey, the dimensions of Organizational learning _ continuous improvement and team work within units were improved and similar to the results in Saudi Arabia and Lebanon. The dimensions of Overall perception of safety, Supervisors and managers expectations about patient safety, Feedback and communication about errors, Hospital handoff and transition, Hospital management support to patient safety were neuter or relatively improved and the rest of dimensions (Personnel work, Non-punitive response to errors, Communications opening, Frequency of events reported) were weak. Teamwork across hospital units and Hospital handoff and transition were neutered similar to Saudi Arabia and Lebanon studies. Non-punitive response to errors and Personnel work were weak such as the two studies mentioned before. Hospital...
tal management support for patient safety, Feedback and communication about errors were two fields in which our outcome was neutral but Saudi Arabia and Lebanon surveys showed improved results. Quality of health care might be in parts related to the quality of the personnel’s life (29). Roger’s study showed that nurses’ overtime working (more than 12 hours per day or 40 hours per week) had led to an increase in the number of medical errors (30). Nurses who have more free time are more aware about their patients’ condition and could better prevent such errors (31). Although in our study there was no significant relation between safety culture and the hospital status (private, public, teaching…), the agency for research and quality of health care in USA has claimed that smaller and non-educational hospitals have a better safety culture (21). This might be due to cultural differences present.

Regarding the results of our study, it is obvious that planning about patient safety improvement is essential and modifying the medical error reporting process would be very helpful. Spadework should be done to improve the work conditions such as increasing the number of personnel and decreasing the work time. On the other hand, root cause analysis should be considered in studying errors instead of blaming an individual; this could most probably result in reduced feasibility of recurrence in the same situation.

**Conclusion**

Patient safety is one of the important concepts of health care so in the recent years various programs have been performed to promote patient safety and prevent medical errors; one of them is the establishment of safety culture in hospitals. In this paper we evaluated safety culture from the view point of personnel with three different characteristic criteria of hospitals (number of beds, educational and specialty statuses). The results of this study showed that vision of safety culture is at the moderate and low level in many aspects whereas some parts of this culture like team work and supervision have a good performance. Therefore, the hospital policies should be designed toward achieving greater improvement in patient safety by determining and overcoming the existing pitfalls.

**Ethical considerations**

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

**Acknowledgements**

The authors would like to thank the Research Council of Mashhad University of Medical Sciences for financially supporting this study. The authors declare that there is no conflict of interest.

**References**

1. Smits M, Christiaans-Dingelhoff I, Wagner C, Wal G, Groenewegen PP (2008). The psychometric properties of the 'Hospital Survey on Patient Safety Culture' in Dutch hospitals. *BMC Health Serv Res*, 7(8):230.
2. Hindle D, Haraga S, Radu C, Yazbeck A M (2008). What do health professionals think about patient safety? *J Public Health*, 16:87-96.
3. Krein SL, Damschroder LJ, Kowalski CP, Forman J, Hofer TP, Saint S (2010). The influence of organizational context on quality improvement and patient safety efforts in infection prevention: a multi-center qualitative study. *Soc Sci Med*, 71(9):1692-701.
4. Raftopoulos V, Savva N, Papadopoulou M (2011). Safety culture in the maternity units: a census survey using the Safety Attitudes Questionnaire. *BMC Health Serv Res*, 27(11):238.
5. Alahmadi HA. Assessment of patient safety culture in Saudi Arabian hospitals(2010 Oct). *Qual Saf Health Care*, 19(5): 17.
6. Flin R (2007). Measuring safety culture in healthcare: a case for accurate diagnosis. *Safety Science*, 45:653–667.
7. Bodur S, Filiz E (2010 Jan). Validity and reliability of Turkish version of “Hospital Survey on Patient Safety Culture” and perception of patient safety in public hospitals in Turkey. *BMC Health Serv Res*, 28 (10):28.
8. Sanderson J, Cook G (2007). ABC of patient safety. UK: Blackwell, P. 2.
9. Pronovost P, Sexton B (2005 Aug). Assessing safety culture: guidelines and recommendations. Qual Saf Health Care, 14(4):231-3.
10. Monograph on the Internet (2004). National Patient Safety Agency. Seven steps to patient safety the full reference guide: www.npsa.nhs.uk/sevensteps.
11. Hoffmann B, Hofinger G, Gerlach F (2009). Is patient safety culture measurable and if so, how is it done? Z Evid Fortbild Qual Gesundh, 103(8):515-20.
12. Cooper D (2002). Safety culture: A model for understanding and qualifying a difficult concept. Professional Safety, 47(6):30-36.
13. Sorenson J N (2002). Safety culture: a survey of the state-of-the-art. Reliab Engin Syst Saf, 76:189-204.
14. Zhang H, Wiegmann D A, Thaden T I, Sharma G, Mitchell A A(2002). Safety culture: A concept in chaos? In Proceeding of the 46th Annual Meeting of the Human Factors and Ergonomics Society. Santa Monica, CA: Human Factors and Ergonomics Society, 1404-1408.
15. Kohn LT, Corrigan JM, Donaldson MS (1997). To err is human: building a safer health system. Washington, DC, National Academy Press.
16. Kirk S, Parker D, Claridge T, Esmail A, Marshall M (2007 Aug). Patient safety culture in primary care: developing a theoretical framework for practical use. Qual Saf Health Care,16(4):313-20.
17. Amiresmaili M, Tourni S, Barati O (2010). Measuring safety culture and setting priorities for action at an Iranian hospital. Al Ameen J Med Sci, 3(3):237-245.
18. Nieva VF, Sorra J (2003 Dec). Safety culture assessment: a tool for improving patient safety in healthcare organizations. Qual Saf Health Care, 12 (2): 17-23.
19. El-Jardali F, Jaafar M, Dimassi H, Jamal D, Hamdan R (2010 Oct). The current state of patient safety culture in Lebanese hospitals: a study at baseline. Int J Qual Health Care, 22(5):386-95.
20. Deilkas ET, Hofoss D (2008 Sep). Psychometric properties of the Norwegian version of the Safety Attitudes Questionnaire (SAQ), Generic version (Short Form 2006). BMC Health Serv Res, 22(8):191.
21. Sorra J, Famolaro T, Dyer N, et al. (2009 March). Hospital Survey on Patient Safety Culture 2009 comparative database report. Agency for Healthcare Research and Quality (AHRQ).
22. Saturno PJ, Da Silva Gama ZA, de Oliveira-Sousa SL, et al. (2008 Dec). Analysis of the patient safety culture in hospitals of the Spanish National Health System. Med Clin (Barc), 131 (3):18-25.
23. Chen IC, Li HH (2010 Jun). Measuring patient safety culture in Taiwan using the Hospital Survey on Patient Safety Culture (HSOPSC). BMC Health Serv Res, 7(10):152.
24. Hellings J, Schrooten W, Klazinga N, Vleugels A(2007). Challenging patient safety culture: survey results. Int J Health Care Qual Assur, 20(7):620-32.
25. Moghri J, Arab M, Akbari Saari A, et al. (2012). The Psychometric Properties of the Farsi Version of “Hospital Survey on Patient Safety Culture” in Iran’s Hospitals. Iranian J Publ Health,41(4):80-86.
26. Mardan RE, Khanna K, Sorra J, Dyer N, Famolaro T (2010 Dec). Exploring relationships between hospital patient safety culture and adverse events. J Patient Saf, 6(4):226-32.
27. Ricci M, Goldman AP, de Leval MR, Cohen GA, Devaney F, Carthey J (2004 Sep). Pitfalls of adverse event reporting in paediatric cardiac intensive care. Arch Dis Child, 89(9):856-9.
28. Firth-Cozens J (2001 Dec). Cultures for improving patient safety through learning: the role of teamwork. Qual Health Care, 10 (2): 26-3.
29. West E (2001 Mar). Management matters: the link between hospital organization and quality of patient care. Qual Health Care, 10(1):40-8.
30. Rogers AE, Hwang WT, Scott LD, Aiken LH, Dinges DF (2004). The working hours of hospital staff nurses and patient safety. Health Aff (Millwood), 23(4):202-12.
31. Wolosin RJ (2007). Hospital-level relationship between safety culture and service quality. Patient Safety and Quality Healthcare. Available from: http://www.psqh.com/enews/1107feature.html