Implementation of Patient Safety and Patient-Centeredness Strategies in Iranian Hospitals

Asgar Aghaei Hashjin1,2*, Dionne S. Kringos1, Jila Manoochehri3, Hamid Ravaghi2, Niek S. Klazinga1

1 Department of Public Health, Academic Medical Center (AMC)/University of Amsterdam, Amsterdam, the Netherlands, 2 Department of Health Services Management, School of Health Services Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran, 3 Department of Quality Improvement, Tehran Heart Center Hospital, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Objective: To examine the extent of implementation for patient safety (PS) and patient-centeredness (PC) strategies and their association with hospital characteristics (type, ownership, teaching status, annual evaluation grade) in Iran.

Methods: A cross-sectional study through an adapted version of the MARQuIS questionnaire, eliciting information from hospital and nursing managers in 84 Iranian hospitals on the implementation of PS and PC strategies in 2009–2010.

Results: The majority of hospitals reported to have implemented 84% of the PS and 72% of the PC strategies. In general, implementation of PS strategies was unrelated to the type of hospital, with the exception of health promotion reports, which were more common in the Social Security Organization (SSO), and MRSA testing, which was reported more often in nonprofit hospitals. MRSA testing was also more common among teaching hospitals compared to non-teaching hospitals. The higher grade hospitals reported PS strategies significantly more frequently than lower grade hospitals. Overall, there was no significant difference in the reported implementation of PC strategies across general and specialized hospitals; except for the provision of information in different languages and recording of patient’s diet which were reported significantly more often by general than specialized hospitals. Moreover, patient hotel services were more common in private compared to public hospitals.

Conclusions: Despite substantial reporting of PS and PC strategies, there is still room for strengthening standard setting on safety, patient services and patient-centered information strategies in Iranian hospitals. To assure effective implementation of PS and PC strategies, enforcing standards, creating a PS and PC culture, increasing organizational responsiveness, and partnering with patients and their families need more attention.

Introduction

Despite the considerable developments in health care, patient safety (PS) and patient-centeredness (PC) still remain a topic of concern in health care systems world-wide [1]. Patient complaints, unsafe patient care, medical errors and adverse events are still prevalent in most health care systems, and the risk of patient harm and complications remain unacceptably high and costly in both developed and developing countries [2–4]. The risk of hospital related infections in some developing countries is reported to be 20 times higher than in developed countries and unsafe injections have been reported as high as 70% [5]. Up to 18% of hospitals’ inpatient admissions are associated with patient harm and 3% of them have been reported to result to death or permanent disability in some Eastern Mediterranean Region’s countries. In the United States, serious adverse events occurred in 3.7% of the hospitalizations [6]. Some countries report that patient related complications annually cost the health care budget billions [7].

Less information is available concerning PS and patient-related complaints in Iran. Over the years reports of patient harm, adverse events, medical error, unsafe injections, hazardous treatments threaten the safety of patients and result in iatrogenic complications. The Institute of Medicine estimated that up to 98,000 Americans die from medical errors annually, and hospital-associated infections cause or contribute to 99,000 deaths each year in the United States [6], [8]. An estimated 24,500 people die annually due to medical errors in Iran [9], [10]. The prevalence of hospital acquired infections is reported as high as 8–10% in Iranian hospitals [11]. A lack of attention to patients, patient involvement and the limited implementation of patient rights principles was also reported [12].

In response to the existing PS and PC problems, the Iranian Ministry of Health and Medical Education (MOHME) developed and implemented various strategies in recent years in several stages. The political agenda is currently paying more attention to the reduction of patient harm, ensuring quality, safety and the
improvement of PC. To reach this mission, the MOHME statutorily implemented hospital licensing, annual hospital performance evaluations and routine inspections for all hospitals since 1997 [13]. Moreover, the MOHME compiled the Patients’ Bill of Rights in 2002 to improve patient-centered care and assed it by the Policy Council in 2009. It obliged all hospitals to implement

Table 1. The characteristics of study population.

| Hospitals | Ownership | Teaching status | Annual evaluation grade |
|-----------|-----------|-----------------|-------------------------|
|           | Gov. PFP | SSO PNP Total   | Non-tea. 4 Tea. Res.    | Total Ex. 1 2 3 Total |
| General   | 35 11 21 5 72 | 35 33 4 | 72 4 59 5 1 69 |
| Specialized| 11 1 0 0 12 | 1 8 3 | 12 0 12 0 0 12 |
| Total     | 46 12 21 5 84 | 36 41 7 | 84 4 71 5 1 81 |

Gov. = Governmental, PFP = Private for-profit, PNP = Private nonprofit, SSO = Social Security Organization, Non-tea. = Non-teaching, Tea. = Teaching, Res. = Research, Ex. = Excellent.
doi:10.1371/journal.pone.0108831.t001

Table 2. The extent of overall reported implementation of patient safety strategies by the type of hospitals.

| Strategy                       | The reported implementation level of patient safety strategies by the type of hospitals n (%) | p-value |
|-------------------------------|-----------------------------------------------------------------------------------------------|---------|
| Assigning responsibility      |                                                                                               |         |
| Responsible personnel for hospital infection control | 79 (100) 67 (100) 12 (100) | – |
| Responsible personnel for patient safety | 51 (68.9) 42 (67.7) 9 (75) | 0.559 |
| Responsible personnel for blood transfusion | 64 (84.2) 56 (86.2) 8 (72.7) | 0.528 |
| Responsible personnel for antibiotic use policy | 56 (71.8) 47 (70.1) 9 (81.8) | 0.723 |
| Responsible personnel for prevention of decubitus | 50 (66.7) 40 (63.5) 10 (83.3) | 0.406 |
| Responsible personnel for clinical waste management | 68 (86.1) 58 (86.6) 10 (83.3) | 0.295 |
| Responsible personnel for health promotion | 68 (86.1) 56 (83.6) 12 (100) | 0.318 |
| Specific strategies for standard setting | Policies in place to prevent falls | 33 (43.4) 26 (40.6) 7 (58.3) | 0.523 |
| Hand washing policy | 49 (62.8) 42 (63.6) 7 (58.3) | 0.328 |
| MRSA testing | 20 (26) 17 (26.2) 3 (25) | 0.688 |
| Identifying patients in the emergency room | 13 (15.9) 11 (15.7) 2 (16.7) | 0.984 |
| Identifying admitted patients | 21 (25) 18 (25) 3 (25) | 0.701 |
| Availability of clinical guidelines/protocols | 75 (89.3) 63 (87.5) 12 (100) | 0.432 |
| Ratified clinical guidelines | 54 (71.1) 46 (71.9) 8 (66.7) | 0.096 |
| Updating of clinical guidelines | 39 (56.5) 33 (55.9) 6 (60) | 0.058 |
| Drug storage locked | 67 (81.7) 55 (78.6) 12 (100) | 0.207 |
| High risk drugs storage separately | 71 (86.6) 62 (87.3) 9 (81.8) | 0.624 |
| Checking drug expiration date routinely | 82 (98.8) 70 (98.6) 12 (100) | 0.679 |
| Reporting strategies on outcomes | Reports on control of hospital infections | 79 (100) 67 (100) 12 (100) | – |
| Reports on patient safety | 46 (61.3) 38 (60.3) 8 (66.7) | 0.650 |
| Reports on blood transfusion policies | 58 (75.3) 50 (75.8) 8 (72.7) | 0.605 |
| Reports on antibiotic use policy | 47 (62.7) 41 (64.1) 6 (54.5) | 0.439 |
| Reports on prevention of decubitus | 49 (64.5) 39 (60.9) 10 (83.3) | 0.212 |
| Reports on clinical waste management | 65 (85.5) 56 (86.2) 9 (81.8) | 0.827 |
| Reports on health promotion | 59 (75.6) 53 (79.1) 6 (54.5) | 0.208 |

doi:10.1371/journal.pone.0108831.t002
and post the Bill in a place where it is visible to the public [12]. In addition, in 2009, the MOHME implemented “Clinical Governance” principles as a framework to improve quality of care, PS and PC in all hospitals. The MOHME also started to pilot the “Patient Safety Friendly Hospital Initiative (PSFHI)” plan for the first time in a limited number of hospitals in 2010, which was in line with WHO plans. The ambition was that these hospitals should try to obtain the first level of PSFHI standards by meeting “critical standards” [14]. Most recently, in 2011, the MOHME revised the “national hospital evaluation program” based on PS and PC principles and compiled the “Hospital Accreditation Standards in Iran” to ensure safety and improve patient-centeredness in hospitals.

Although there have been some efforts to improve PS and PC in Iranian hospitals, there is very few information available on the actual implementation of specific strategies. This study therefore aims to explore:

Table 3. The extent of overall implementation level of patient-centeredness strategies by the type of hospitals.

| Strategy                                      | The reported implementation level of patient-centeredness strategies by the type of hospitals n (%) | P-value |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------|---------|
|                                                | Total | General hospitals | Specialized hospitals |     |
| **Patient services**                          |       |                  |                       |     |
| Possibility to contact with family or friends by patient | 50 (62.5) | 43 (63.2) | 7 (58.3) | 0.660 |
| Possibility to contact with family doctor or GP by patient | 48 (60.8) | 41 (61.2) | 7 (58.3) | 0.618 |
| Providing meals for family and relatives of patients | 67 (81.7) | 57 (81.4) | 10 (83.3) | 0.875 |
| Providing room/bed for family and relatives of patients | 56 (67.5) | 50 (70.4) | 6 (50) | 0.245 |
| Offering single room upon request              | 40 (48.8) | 36 (51.4) | 4 (33.3) | 0.269 |
| Access to internet in or outside the room      | 15 (18.1) | 13 (18.3) | 2 (16.2) | 0.907 |
| Access to tel. in the room with instructions in other languages | 54 (65.1) | 45 (63.4) | 9 (75) | 0.672 |
| Access to TV and satellite in the room         | 68 (82.9) | 56 (80) | 12 (100) | 0.235 |
| Providing daily newspaper for patients         | 12 (14.5) | 9 (12.7) | 3 (25) | 0.434 |
| Access to smoking room                         | 11 (13.4) | 9 (12.9) | 2 (16.7) | 0.865 |
| Having coordinator for patients affairs        | 46 (55.4) | 40 (56.3) | 6 (50) | 0.650 |
| Having coordinator for discharge of patients   | 44 (53) | 39 (54.9) | 5 (41.7) | 0.389 |
| Having transport services for patients         | 17 (20.5) | 14 (19.7) | 3 (25) | 0.894 |
| Providing medicines if needed after discharge  | 73 (88) | 62 (87.3) | 11 (91.7) | 0.355 |
| Recording of patient’s diet preferences        | 82 (97.6) | 71 (98.6) | 11 (91.7) | 0.045 |
| Offering a choice of the meals to patients     | 19 (22.6) | 16 (22.2) | 3 (25) | 0.764 |
| Offering a choice in the timing of the meals   | 13 (15.5) | 12 (16.7) | 1 (8.3) | 0.502 |
| Visits of patients by family or relatives      | 80 (96.4) | 69 (95.8) | 11 (100) | 0.788 |
| **Patient information, involvement and empowerment** |       |                  |                       |     |
| Written policy for patient involvement in decision making | 58 (69.9) | 51 (71.8) | 7 (58.3) | 0.625 |
| Possibility to give information to patients in their language | 67 (79.7) | 57 (79.1) | 10 (83.3) | 0.470 |
| Having a procedure for the requirements before admission | 40 (48.8) | 35 (49.3) | 5 (41.7) | 0.408 |
| Possibility to contact with the patient’s doctor before admission | 12 (14.3) | 9 (12.5) | 3 (25) | 0.227 |
| Patients and their family involvement in care decision making | 51 (60.7) | 43 (59.7) | 8 (66.7) | 0.856 |
| Providing written information regarding to patient’s treatment | 43 (51.2) | 35 (48.6) | 8 (66.7) | 0.264 |
| Written policy for informed consent to interventions/treatments | 74 (89.2) | 63 (88.7) | 11 (91.7) | 0.763 |
| Have patient rights department                 | 61 (73.5) | 51 (71.8) | 10 (83.3) | 0.631 |
| Written policy regarding confidentiality of patient information | 78 (92.9) | 66 (91.7) | 12 (100) | 0.584 |
| Written policy for patients’ privacy           | 79 (95.2) | 67 (94.4) | 12 (100) | 0.701 |
| Written policy for patients’ access to their health record | 80 (96.4) | 68 (95.8) | 12 (100) | 0.468 |
| Written policy for appropriate religious support | 75 (90.4) | 64 (90.1) | 11 (91.7) | 0.425 |
| Patient rights posted in a place visible to all patients and visitors | 83 (98.8) | 71 (98.6) | 12 (100) | 0.681 |

doi:10.1371/journal.pone.0108831.t003
Pilot and sampling

The study questionnaire

Methods

This is a descriptive cross-sectional study based on a self-reported questionnaire survey. A questionnaire was distributed to hospital and nursing managers in a purposive sample of Iranian hospitals eliciting information on the implementation of PS and PC strategies in 2009 and 2010.

The study questionnaire

Data was collected by using an existing validated (from the MARQuIS - Methods of Assessing Response to Quality Improvement Strategies – project) questionnaire [16]. We translated the questionnaire from English into Persian (Farsi). We then adapted the questions to the Iranian health care situation and added some questions on the characteristics of hospitals. We did not re-validate the questionnaire due to time and financial constraints. The questionnaire included in total 57 questions regarding the implementation of PS and PC strategies. The PS and PC strategies were categorized both in three groups. Each group included relevant detailed questions. Four questions on the characteristics of hospitals which are known to be influential in the implementation of PS and PC strategies were included in the questionnaire. They related to the type of hospital (multi-specialty/general, or single specialty/specialized); ownership status of hospitals (university (governmental), Social Security Organization (SSO), private for-profit and private nonprofit (including military and charity organizations); teaching status (non-teaching, non-teaching and teaching, or non-teaching, teaching and research); and the obtained annual evaluation grade (ranging from excellent, 1, 2 to 3).

Pilot and sampling

After verifying the content of the translated and adapted questionnaire, it was piloted in 5 hospitals (including 3 public governmental, 1 private for-profit and 1 SSO hospital). Necessary changes and further improvements were made based on the responses received from the pilot hospitals. Subsequently, the questionnaires were distributed among 145 general and specialized hospitals across the country. These hospitals were selected by using a purposive sampling method and based on hospitals’ willingness to be involved in this research project.

Statistics

We examined the extent of implementation of the selected PS and PC strategies based on the positive responses received from the respondents for specific strategies. To examine the relationship between the extent of implementation and characteristics of hospitals we conducted cross tabulations in SPSS. We applied Cramer’s V coefficient based on Pearson chi-squared test to measure association between the variables. Our criterion for the statistical differences was p<0.05.

The study was approved by the Deputy of Research and Technology of the Iran University of Medical Sciences (Code: 958/1635996).

Results

Study population

Of the 145 hospitals that initially participated in this study, we received questionnaires from 102 hospitals (70.3% response rate). We excluded 18 questionnaires from the final analysis due to incomplete or unreliable answers. This resulted in a total of 84 questionnaires from 72 general and 12 specialty hospitals on which we based our analysis. The characteristics of the included hospitals are shown in table 1.

The majority of hospitals were owned either by university (government) (55%) or by the SSO (25%). Forty three percent of hospitals (n = 36) were non-teaching, forty nine percent (n = 41) of them non-teaching and teaching hospitals and only seven hospitals were involved in research areas besides their non-teaching and teaching activities. Eighty five percent of hospitals were given the second highest rating in the annual evaluation program and 5% the highest rating. There is only one participating hospital that received the lowest rating (grade 3). The hospitals have on average 206 beds (range: 32–620 beds; SD = 137).

The implementation of patient safety and patient-centeredness strategies in general

Patient safety strategies. From the total number of 25 PS strategies, 21 items were reported to have been highly implemented in the majority of the participating hospitals (see table 2). All hospitals acknowledged having assigned infection control personnel and to reporting hospital infections regularly. Ninety nine

Table 4. The associations between implementation of patient safety and patient-centeredness strategies and the type of hospitals.

| Strategy                          | Extent of reported implementation level of patient safety and patient-centeredness strategies by the type of hospitals n (%) | P-value (Cramer’s V coefficient) |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                                  | Total | General hospitals | Specialized hospitals |                                  |
| Patient safety                   | -     | -                | -                   |                                  |
| Patient-centeredness             | Providing information in different languages | 67 (79.8) | 60 (83.3) | 7 (58.3) | 0.016 (0.31) |
|                                  | Recording of patient’s diet preferences | 82 (97.6) | 71 (98.6) | 11 (91.7) | 0.045 (0.27) |

doi:10.1371/journal.pone.0108831.t004
percent (82) of hospitals reported having a system to routinely check drug expiration dates. In contrast, a number of specific strategies for standard setting have been reported to be less implemented in hospitals. For example, few hospitals reported to have specific policies to prevent patients’ falling (43%), and MRSA testing was compulsory in only 26% of hospitals. Sixteen percent of hospitals reported to have procedures in place for patient identification in the emergency department and 25% for identifying patients admitted.

Patient-centeredness strategies. There was large variation in the reported level of implementation of various PC strategies (ranging from 13–99%). Twenty-three PC strategies (out of 32) were reported to be implemented in the majority of hospitals (see table 3). The strategies related to patient rights had the highest reported implementation rate (>89%). The least implemented strategy in this group was having a separate patient rights department, which was present in 74% of the hospitals. The provision of some patient and family hotel services (including access to internet, daily newspaper, smoking room, transport services, and choice and timing of the meals) were rarely implemented in hospitals (<23% reported implementation rate). In contrast, some other hotel services such as access to telephone and TV in the room were more common among hospitals and teaching and research hospitals (65% and 83% respectively). The differences in the implementation rates of the majority of PS strategies were not associated with differences in hospital grades. However, the hospitals with a higher grade reported significantly more often to having responsible personnel available for clinical waste management and health promotion. Higher grade hospitals reported more often to have clinical waste management procedures in place and to perform health promotion activities than lower grade hospitals (see table 7).

| Strategy | Extent of reported implementation level of patient safety and patient-centeredness strategies by the ownership of hospitals n (%) | P-value (Cramer’s V coefficient) |
|----------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Patient safety | Reports on health promotion | Total 59 (75.6) University 26 (65) | SS 11 (91.7) PFP 4 (44.4) | PNP 4 (44.4) | 0.015 (0.31) |
| | MRSA testing | Total 20 (52.6) University 10 (22.2) | SS 4 (44.4) PFP 12 (100) | PNP 2 (22.2) | 0.031 (0.33) |
| Patient-centeredness | Providing room/bed for family and relatives of patients | Total 15 (18.1) University 8 (17.4) | SS 1 (11.1) PFP 2 (18.2) | PNP 2 (22.2) | 0.012 (0.31) |
| | Access to internet | Total 15 (18.1) University 8 (17.4) | SS 1 (11.1) PFP 2 (18.2) | PNP 2 (22.2) | 0.012 (0.31) |
| | Having coordinator for patients affairs | Total 46 (57.4) University 22 (47.8) | SS 13 (13.5) PFP 5 (10.9) | PNP 4 (44.4) | 0.020 (0.30) |
| | Possibility to contact with the patient’s doctor before admission | Total 19 (22.6) University 6 (13) | SS 13 (13.5) PFP 6 (13) | PNP 1 (11.1) | 0.012 (0.31) |
| | Offering a choice of the meals to patients | Total 13 (15.5) University 6 (13) | SS 13 (13.5) PFP 1 (11.1) | PNP 1 (11.1) | 0.012 (0.31) |
| | Offering a choice in the timing of the meals | Total 13 (15.5) University 6 (13) | SS 13 (13.5) PFP 1 (11.1) | PNP 1 (11.1) | 0.012 (0.31) |

The association between implementation of patient safety or patient-centeredness strategies and characteristics of hospitals

Patient safety strategies and characteristics of hospitals. The implementation of PS strategies appears unrelated to the type of hospital (table 4). However, the SSO hospitals reported implementation of reports on health promotion significantly more often than the total average reported rates. The hospitals owned by nonprofit organizations reported MRSA testing significantly more often than the total average rate of all hospitals (table 5). The hospitals that are not involved in teaching and research activities, reported the presence of the antibiotic use policy significantly more often than the hospitals involved in teaching and research activities. In contrast, table 6 shows MRSA testing is reported significantly more often by hospitals involved in research, besides their teaching and therapeutic activities. The differences in the implementation rates of the majority of PS strategies were not associated with differences in hospital grades. However, the hospitals with a higher grade reported significantly more often to having responsible personnel available for clinical waste management and health promotion. Higher grade hospitals reported more often to have clinical waste management procedures in place and to perform health promotion activities than lower grade hospitals (see table 7).

Patient-centeredness strategies and characteristics of hospitals. There is no significant difference between general and specialized hospitals in the reported implementation rates of PC strategies with the exception of providing information in different languages and recording of the patient’s diet preference. The general hospitals reported significantly more often to have implemented these strategies than specialized hospitals (see table 4). The patient services strategies including provision of a room/bed for the relatives of patients, possibility to contact the patient’s family doctor/specialist before admission, offering a choice of meals and timing of meals to patients, were reported to be implemented significantly more often in private (both for-profit and nonprofit) hospitals compared to the total average rate of all
hospitals (as shown in the table 5). The association was strongest (Cramer’s V = 0.50) in case of offering a choice of the meals to patients in the private hospitals (83% compared to average rate of 23%). It seems that the rate of implementation of PC strategies is unrelated to the annual evaluation grade of hospitals.

Discussion

This is the first study to our knowledge that provides comprehensive insight in the (reported) implementation of PS and PC strategies in Iranian hospitals. However, the study has some limitations. First, the authors tried to include a representative sample of hospitals in the study as much as possible. Although the sample size of the study was relatively small especially with regard to the limited number of hospitals with lower annual evaluation grades (grade 2 and 3) and the hospitals owned by nonprofit organizations, the total number of these groups of hospitals is limited in the country. Another limitation concerns the validity of the questionnaire. Due to time and funding constraints, the questionnaire was not re-validated, which seems acceptable given the minor changes that were made compared to the original validated version. Another limitation of the study was the 30% non-response and those who had to be excluded from the final analysis due to incomplete or unreliable data. Finally, the study was based on a purposive sampling method and a self-reported questionnaire; potentially producing biased results.

Our study identified that the strategies related to assigning responsibilities, outcomes reporting, patient rights and the majority of patient services were reported to be most often implemented by all hospitals. However, the specific strategies which were related to standard setting and some patient hotel services were reported less commonly in Iranian hospitals. These findings are mostly in line with the MARQuIS study [17, 18] which reported similar results concerning the implementation of PS and PC strategies in hospitals in European countries (Belgium, the Czech Republic, France, Ireland, the Netherlands, Poland, Spain, UK). Surprisingly, this study also reported that MRSA testing and choice of timing of the meals were less common in practice. The evidence from the relevant literature shows that the reported implementation rate and the effectiveness of strategies for improving safety and PC in hospitals. These strategies have been reported in a few countries [17–19]. There is a concern about suboptimal implementation rates. More attention needs to be given to the improvement of these strategies to complete the cycle of PS and PC care in hospitals. These strategies have been reported in other studies to be important factors in improving safety and PC in hospitals. They have also been identified as the main PS and PC issues in hospitals around the world [20–24].

Emphasize the effectiveness of strategies in practice

Although the overall reported implementation rate of the majority of the PS and PC strategies was relatively high, a continuous debate concerning the actual impact of these strategies for improving safety and PC in hospitals. A gap remains between the reported implementation rate and the effectiveness of strategies in practice. The evidence from the relevant literature shows that the strategies in some cases have not been effectively implemented. For instance, although 100% of hospitals in our study reported

Table 6. The associations between implementation of patient safety and patient-centeredness strategies and the teaching and research status of hospitals.

| Strategy                  | Extent of reported implementation level of patient safety and patient-centeredness strategies by the teaching status of hospitals n (%) | P-value (Cramer’s V coefficient) |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Patient safety            | Reports on antibiotic use policy                                                                                                 | 47 (62.7) 23 (76.7) 21 (53.8) 3 (50) 0.020 (0.28) |
| MRSA testing              | 20 (26) 6 (19.4) 10 (25.6) 4 (57.1) 0.001 (0.35)                                                                                   |
| Patient-centeredness      | Providing daily newspaper for patients                                                                                           | 12 (14.5) 4 (11.4) 4 (9.8) 4 (57.1) 0.021 (0.26) |
| Having coordinator for patients affairs | 46 (55.4) 26 (74.3) 18 (43.9) 2 (28.6) 0.002 (0.32) | Having transport services for patients | 17 (20.5) 7 (20) 6 (14.6) 4 (57.1) 0.007 (0.29) |

doi:10.1371/journal.pone.0108831.t006
having responsible personnel and routinely reports for infection control in place, several studies identified that the hospital infection rate in Iran is still remarkably higher than the infection rate in European countries (8–10% compared to 5%) [25], [26]. In addition, almost all hospitals reported to having posted the Patients’ Bill of Rights and to implementing the patient rights principles. Some report that patient rights principles are not fully implemented by all health care providers [27]. Our study thus suggests that reporting a higher rate of strategies implementation does not guarantee safety and better patient care. Such efforts should be supported by legal embedding and enforcement of strategies, creating an organizational responsiveness and culture of safety and PC [28–30]. Truly partnering with patients and their families can also be effective [2], [30], [31], [32].

How is the implementation of patient safety and patient-centeredness strategies associated with characteristics of hospitals?

Our study showed that there are meaningful associations between the implementation of PS and PC strategies and the characteristics of hospitals, which is in line with related research in this field. A study has revealed that the hospital characteristics may predict the implementation of PS and PC strategies [33]. In our study the implementation rates of patient hotel services were reported significantly more often in the private (for-profit and nonprofit) hospitals. This may suggest that private hospitals in Iran are more service-oriented and thus more interested in implementation of hotel services. The financial incentives for hospitals clearly play a role in the implementation of PC strategies especially with regard to hotel services. The results showed that the hospitals were involved in teaching and research activities besides non-teaching activities, reported higher implementation of some specific PS strategies (i.e. MRSA testing). Although it is difficult to speak of a pattern because of the limited number of the hospitals involved in both non-teaching, teaching and research activities, these hospitals appear to be more safety-oriented.

Finally, our results revealed that the hospitals with higher evaluation grades, reported a significantly higher implementation rate of the strategies compared to the lower grade hospitals. Hospitals in our study reported a higher implementation rate with regard to obligatory PS strategies which were subjected to the Iranian hospital evaluation program. The commitment to PS strategies by the higher graded hospitals is required in order to achieve a higher evaluation grade. The obligation of hospitals to implement specific strategies can be a potential incentive for planning and implementing PS or PC strategies.

**Conclusion**

Although the implementation of a number of PS and PC strategies were widely reported by Iranian hospitals, there is room for improvement and strengthening of the implementation of specific strategies related to standard setting and patient services. The association of PS and PC strategies with characteristics of hospitals (type, ownership, teaching status and annual evaluation grade) provides a mixed picture. The implementation of PS and PC strategies are influenced by the characteristics of these hospitals. The safety strategies which are statutorily obligated by the government were more frequently implemented in the higher grade hospitals. The PC strategies were more common in the private (for-profit and nonprofit) hospitals, which appear to be more service-oriented. Despite the reporting of relatively high implementation rates for the majority of strategies, the effectiveness of PS and PC strategies in hospitals still needs improvement.

### Table 7. The associations between implementation of patient safety and patient-centeredness strategies and the annual evaluation grade of hospitals.

| Strategy | Total | Excellent Grade 1 | Grade 2 | Grade 3 | P-value (Cramer's V coefficient) |
|----------|-------|-------------------|---------|---------|---------------------------------|
| Patient safety |       |                   |         |         |                                 |
| Reports on clinical waste management | 65 (85.5) | 4 (100) | 58 (86.8) | 3 (75) | 0 (0) | 0.022 (0.31) |
| Reports on health promotion | 65 (85.5) | 4 (100) | 58 (86.8) | 3 (75) | 0 (0) | 0.003 (0.36) |
| Availability of clinical guidelines/protocols | 73 (90.1) | 2 (50) | 66 (93) | 4 (80) | 1 (100) | 0.042 (0.28) |
| Patient-centeredness |       |                   |         |         |                                 |
| – | – | – | – | – | – |

**doi**:10.1371/journal.pone.0108831.t007

Patient Safety and Patient-Centeredness in Hospitals
An effective implementation of PS and PC initiatives may depend on the legal embedding and enforcement of standards, creating an organizational responsiveness to demands of patients, creating a PS and PC culture in hospitals and partnering with patients and their families.

Acknowledgments

The authors are grateful to Dr. Mehdi Jafari, Dr. Seyed Hesam Seyedin, Mr. Saeidreza Azamy and Mrs. Seyran Naghdi for facilitating the data collection for this study. The authors would also like to thank Professor Dr. Karien Stronks for supporting this research project at the Department of Public Health, Academic Medical Center (AMC) - University of Amsterdam.

Author Contributions

Conceived and designed the experiments: AAH NSK DSK. Performed the experiments: AAH HR NSK JM. Analyzed the data: AAH NSK DSK. Contributed reagents/materials/analysis tools: AAH NSK HR JM. Contributed to the writing of the manuscript: AAH NSK DSK.

References

1. World Health Organization (WHO) (2013) Patient safety assessment manual. Available: http://applications.emro.who.int/dsafari/emropub_2011_12413.pdf. Accessed 9 August 2013.
2. Australian Commission on Safety and Quality in Health Care (ACSQHC) (2010) Patient-centred care: improving quality and safety by focusing care on patients and consumers, Discussion paper draft for public consultation, September. Available: http://www.podiatrywa.com.au/news/1/46-Patient-CentredCarePaperweb.pdf. Accessed 13 February 2013.
3. Institute for Patient- and Family-Centered Care website (2013) Available: http://www.ipfcc.org. Accessed 7 July 2013.
4. Wong J, Begharyan H (2004) Strategies for Hospitals to Improve Patient Safety. A Review of the Research February, The Change Foundation, Available: http://www.providence.on.ca/wp-content/uploads/2012/03/Change-Foundat-Improve-Patient-Safety.pdf. Accessed 14 February 2013.
5. World Health Organization (WHO) (2013) 10 facts on patient safety. Available: http://www.who.int/features/aktuell/le/patient_safety/en/index.html. Accessed 8 June 2013.
6. James JT (2013) A New, Evidence-based Estimate of Patient Harms Associated with Hospital Care. Journal of Patient Safety: September; Volume 9 - Issue 3 - p 122-129 doi: 10.1097/PTS.0b013e31825291a9
7. World Health Organization (WHO): Patient safety (2013) Available: http://www.emro.who.int/entity/patient-safety/. Accessed 7 June 2013.
8. Pollack A (2010) Rising Threat of Infections Unfazed by Antibiotics. New York Times, Feb. 27.
9. Zargarzadeh AH (2013) Medication Safety in Iran. J Pharm Care; 1(4): 125–126.
10. Sheikhtaheri A, Sadjoughi F, Ahmadi M, Moghaddasi H (2013) Developing Iranian patient safety indicators: an essential approach for improving safety of health care. Asian Biomedical Journal; Vol: 7 No 3, 365–373, doi: 10.5472/1903-7415.0703.188.
11. Zahraei SM, Esfarai B, Masoumi Ash H, Peshueki Z (2012) Epidemiology of Four Main Nosocomial Infections in Iran during March 2007–March 2008 based on the Findings of a Routine Surveillance System. Arch Iran Med; 15(12): 764–766.
12. Jokarae S, Hajighahaei F (2012) Patient rights in Iran: A review article. Nurs Ethics 19: 45 originally published online 2 December 2011, doi:10.1177/0969733011412100.
13. Aghaie Hashjin A, Delgoshaei B, Kringos DS, Tabatabai SM, Amini AR, et al. (2014) Implementation of hospital quality assurance policies in Iran. Submitted for publication in 2014.
14. World Health Organization (WHO): Patient safety friendly hospitals (2013) Community-associated meticillin-resistant Staphylococcus aureus. Lancet; 375: 1557–1568.
15. Askari E, Soleymani F, Arianpoor A, Tabatabai SM, Amini AR, et al. (2012) Epidemiology of meticillin-resistant Staphylococcus aureus (MRSAs) in Iran: A Systematic Review and Meta-analysis. Iranian Journal of Basic Medical Sciences Sep-Oct; 15(3): 1010-1019.
16. Grundmann H, Aires-de-Sousa M, Royce J, Tiemersma E (2006) Emergence and resurgence of methicillin-resistant Staphylococcus aureus as a public-health threat. Lancet; 368: 874–85.
17. Zahraei SM, Esfarai B, Masoumi Ash H, Peshueki Z (2012) Epidemiology of Four Main Nosocomial Infections in Iran during March 2007–March 2008 based on the Findings of a Routine Surveillance System. Arch Iran Med; 15(12): 764–766.
18. Wagner C, Smits M, Sorra J, Huang CC (2013) Assessing patient safety culture in hospitals across countries. International Journal of Quality in Health Care Jul; 25(5): 213–21 doi: 10.1093.
19. Askarian M, Gooran NR (2003) National nosocomial infection surveillance system-based study in Iran: additional hospital stay attributable to nosocomial infections. American Journal of Infection Control, Dec; 31(8): 465–8.
20. Jokarae S, Hajighahaei F (2012) Patient rights in Iran: A review article. Nurs Ethics 12, 19: 45 DOI: 10.1177/0969733011412100.
21. Askarian M, Gooran NR (2003) National nosocomial infection surveillance system-based study in Iran: additional hospital stay attributable to nosocomial infections. American Journal of Infection Control, Dec; 31(8): 465–8.
22. Wagner C, Smits M, Sorra J, Huang CC (2013) Assessing patient safety culture in hospitals across countries. International Journal of Quality in Health Care Jul; 25(5): 213–21 doi: 10.1093.
23. Aghaie Hashjin A, Ravaghi H, Kringos DS, Ogbo UC, Fischer C, et al. (2014) Using Quality Measures for Quality Improvement: The Perspective of Hospital Staff. PLOS ONE, January 25, DOI 10.1371/journal.pone.0080614.
24. Groene O, Sunol R, Klazinga NS, Wensing M, Dersarfskissian M, et al. (2014) Involvement of patients or their representatives in quality management functions in EU hospitals: implementation and impact on patient-centred care strategies, Int J Qual Health Care first published online March 9, doi:10.1093/ijqc/mzt087.
25. Groene O, Sunol R, Klazinga NS, Wissing M, Desarfskissian M, et al. (2014) Hospital Accreditation Standards in Iran. Tehran.
26. World Health Organization (WHO): Patient safety friendly hospitals (2013) Community-associated meticillin-resistant Staphylococcus aureus. Lancet; 375: 1557–1568.
27. Askari E, Soleymani F, Arianpoor A, Tabatabai SM, Amini AR, et al. (2012) Epidemiology of meticillin-resistant Staphylococcus aureus (MRSAs) in Iran: A Systematic Review and Meta-analysis. Iranian Journal of Basic Medical Sciences Sep-Oct; 15(3): 1010-1019.
28. Grundmann H, Aires-de-Sousa M, Royce J, Tiemersma E (2006) Emergence and resurgence of methicillin-resistant Staphylococcus aureus as a public-health threat. Lancet; 368: 874–85.
29. Zahraei SM, Esfarai B, Masoumi Ash H, Peshueki Z (2012) Epidemiology of Four Main Nosocomial Infections in Iran during March 2007–March 2008 based on the Findings of a Routine Surveillance System. Arch Iran Med; 15(12): 764–766.
30. Wagner C, Smits M, Sorra J, Huang CC (2013) Assessing patient safety culture in hospitals across countries. International Journal of Quality in Health Care Jul; 25(5): 213–21 doi: 10.1093.
31. Aghaie Hashjin A, Delgoshaei B, Kringos DS, Tabbibi SJ, Manoochehri J, et al. (2014) Implementation of hospital quality assurance policies in Iran. Submitted for publication in 2014.
32. Groene O, Sunol R, Klazinga NS, Wissing M, Desarfskissian M, et al. (2014) Hospital Accreditation Standards in Iran. Tehran.
33. Groene O, Sunol R, Klazinga NS, Wissing M, Desarfskissian M, et al. (2014) Involvement of patients or their representatives in quality management functions in EU hospitals: implementation and impact on patient-centred care strategies, Int J Qual Health Care first published online March 9, doi:10.1093/ijqc/mzt087.
34. Groene O, Sunol R, Klazinga NS, Wissing M, Dersarfskissian M, et al. (2014) Involvement of patients or their representatives in quality management functions in EU hospitals: implementation and impact on patient-centred care strategies, Int J Qual Health Care first published online March 9, doi:10.1093/ijqc/mzt087.
35. Hrisos S, Thomson R (2013) Seeing It from Both Sides: Do Approaches to Involving Patients in Improving Their Safety Risk Damaging the Trust between Patients and Healthcare Professionals? An Interview Study. PLOS ONE, November 06, DOI: 10.1371/journal.pone.0080759.
36. Longo DR, Hewett JE, Ge B, Schabert S (2007) Hospital patient safety: characteristics of best-performing hospitals. Journal of Healthcare Management May-Jun; 52(3): 188–204; discussion 204–5.