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Patient safety culture in hospitals of Iran: a systematic review and meta-analysis

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Abstract

Background: Nowadays, for quality improvement, measuring patient safety culture (PSC) in healthcare organizations is being increasingly used. The aim of this study was to clarify PSC status in Iranian hospitals using a meta-analysis method.

Methods: Six databases were searched: PubMed, Scopus, Google Scholar, Cochrane Library, Magiran, SID and IranMedex using the search terms including patient safety, patient safety culture, patient safety climate and combined with hospital (such as "hospital survey on patient safety culture"), measurement, assessment, survey and Iran. A total of 11 articles which conducted using Hospital Survey on Patient Safety Culture (HSOPSC) questionnaire initially were reviewed. To estimate overall PSC status and perform the meta-analyses, Comprehensive Meta-Analysis (CMA) software v. 2 was employed.

Results: The overall PSC score based on the random model was 50.1%. "Teamwork within hospital units" dimension received the highest score of PSC (67.4%) and "Non-punitive response to error" the lowest score (32.4%). About 41% of participants in reviewed articles evaluate their hospitals' performance in PSC as 'excellent/very good'. Approximately %52.7 of participants did not report any adverse event in the past 12 months.

Conclusion: The results of this study show that Iranian hospitals' performances in PSC were poor. Among the 12 dimensions of HSOPSC questionnaire, the "Non-punitive response to error" achieved the lowest score and could be a priority for future interventions. In this regard, hospitals staff should be encouraged to report adverse event without fear of punitive action.

Keywords: Patient safety, Culture, Quality improvement, HSOPSC questionnaire, Iranian hospitals, Meta-analysis.

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Introduction

Quality in healthcare has different dimensions and elements (1-4), of which patient safety (PS) is one of the most important dimensions (5). PS is a serious global challenge and a very important dimension of healthcare quality (6-8). According to WHO, in low and middle income countries (LMIC) one out of ten patients is harmed while receiving health services (9). Institute of Medicine (IOM) report entitled "To Err Is Human" showed that more than 98 thousand patients die in the United States every year as a result of medical errors (10). For

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this reason PS has received considerable focus from policy-makers and other stakeholders (11).

Patient Safety Culture (PSC) is an important factor of PS in healthcare system (12). The IOM offers that the very important challenge to achieve a safer healthcare system is to improve the PSC (13). Measurement of PSC is a top priority aim to improve quality of PS (14-20). Neiva and Sorra (15) defined PSC as: "the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of, an organization's safety management". Previous studies results show that there is a positive relationship between high PSC and safety performance in hospitals (good PS) (14,21).

Globally, several international organizations attempted to promote PSC: the World Alliance for Patient Safety (WAPS), the National Patient Safety Agency (NPSA), the Agency for Healthcare Research and Quality (AHRQ) and the Australia Commission of Safety and Quality (ACSQ) (22-24). In this regard, several instruments have been developed to measure PSC (25-27). The Hospital Survey on Patient Safety Culture (HSOPSC) of AHRQ is a valid and reliable instrument to measure PSC in the hospitals (28-31). This tool is translated to many languages and validated psychometrically (32-34).

A review of the literature showed that PSC status in Iranian hospitals is not satisfactory (35). Thus, the aim of the current study was to clarify PSC status in Iranian hospitals through a meta-analysis of studies which used HSOPSC instrument in Iran.

Methods

A Meta-Analysis study was conducted in 2014, and the required data were collected searching following keywords: patient safety, patient safety culture, patient safety climate and its combination with hospital (such as "hospital survey on patient safety culture"), measurement, assessment, survey, and Iran, in Google Scholar, PubMed, Scopus, Cochrane Library, Magiran, Iranian scientific information (SID) and IranMedex. Manual journal and website searching was also conducted. To increase confidence level of identification of the articles, the reference lists of the selected articles were also searched through. Articles published from 2000 to 2014 were recruited.

The inclusion criteria for the study were: articles published in Persian and English languages, articles that measured PSC in hospital, and articles that measured PSC using HSOPSC instrument. Exclusion criteria included: articles that measured overall safety culture, articles that measured PSC in primary healthcare, articles that not measured all dimension of HSOPSC instrument, conference presentations, case reports, and interventional and qualitative studies. Two reviewers evaluated the articles according to the checklist of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (Appendix 1).

Of 961 retrieved articles, 11 articles were entered in the study (Fig. 1). After accurately studying and extracting the required data, the extracted data were summarized in the extraction table. Excel 2010 software was used to draw graphs. Endnote X5 software was used for organizing titles and abstracts and also identification of duplication studies (36). To calculate the overall PSC score, Comprehensive Meta-Analysis (CMA) software v. 2 and to report the results, forest plot were used. In forest plot, the size of each square shows sample size and lines on each side of the square show confidence interval.

PSC score was calculated based on random model with 95% confidence interval. In random models either all or some of the variables are treated as if they are from random causes. Random model was in contrast to fixed model that demonstrate the observed quantities in regard of explanatory variables which are treated as if the variables are not random.

HSOPSC questionnaire was designed by AHRQ. This instrument has 3 parts, 12 dimensions, 44 items and 2 single questions (Box. 1). All of questions are in the 5-point

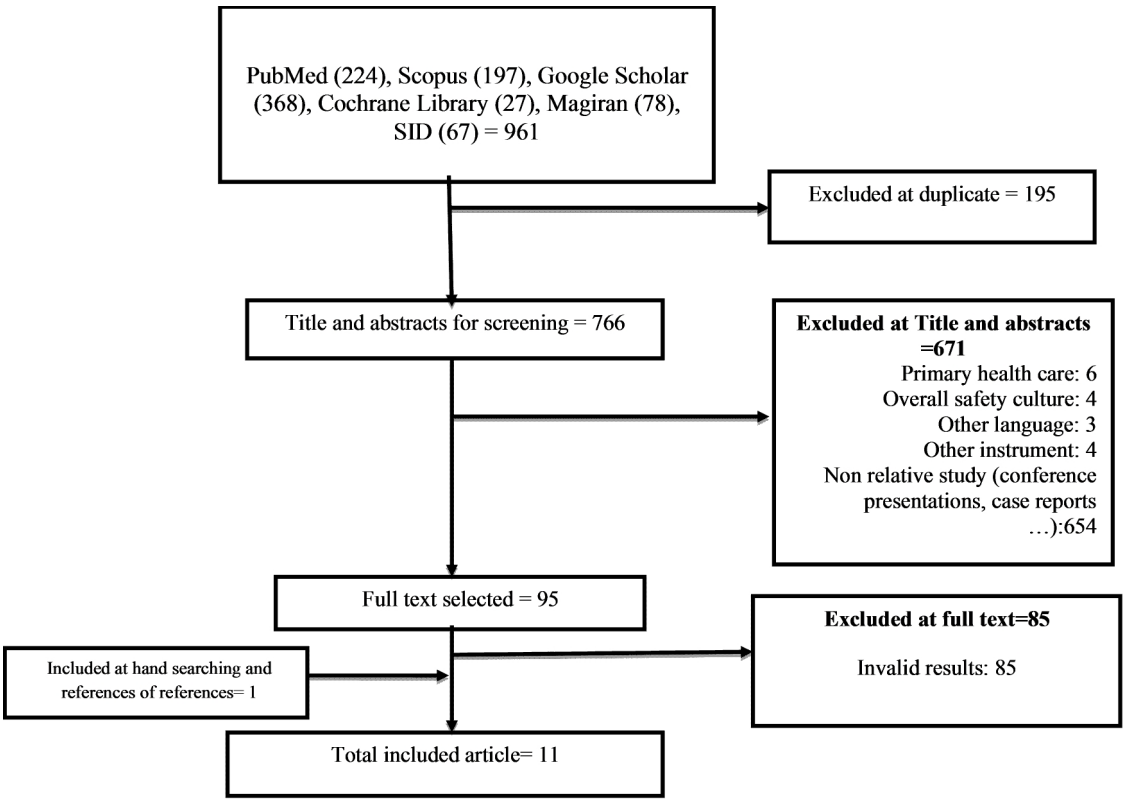

Fig. 1. Literature review and retrieval flow diagram

Likert scale ("Strongly disagree" to "Strongly agree") or frequency ("Never" to "Always") (37, 38).

Results

A total of 11articles initially were reviewed (39-49).The characteristics of the reviewed articles are shown in Table 1. The overall numbers of participants were 2972 (270 each study).

The PSC score based on the random effect model was determined to be 50.1% (95% confidence interval, lower limit= 43.4%, upper limit= 56.9%, I^2= 99.8, Q-value= 5716.2, df = 10, and p< 0.001) (Fig. 2).

In this study due to high heterogeneity, sensitive analysis was done by excluding one of the studies (Abdi et al, 2010). Finally,

Box 1. HSOPSC instrument dimensions (n = 12)

Dimensions	Number of Items
Outcome measure	
1. Overall perception of safety	4
2. Frequency of incident reporting	3
Unit level	
3. Supervisor/manger expectations and actions promoting safety	4
4. Organizational learning — continuous improvement	3
5. Teamwork within hospital units	4
6. Communication openness	3
7. Feedback and communication about error	3
8. Non punitive response to error	3
9. Staffing	4
Hospital level	
10. Hospital management support for patient safety	3
11. Teamwork across hospital units	4
12. Hospital handoffs and transitions	4
Number of incidents reported (last 12 month)	1
Patient safety grade	1

Table 1. Characteristics of PSC studies that used HSOPSC in Iran

References	Sample size	1*	2	3	4	5	6	7	8	9	10	11	12	Mean±SD
Ravaghi et al;2012	216 staff	49.2	65	53.8	62.8	14.8	12.2	44.3	45.8	57.2	37.3	45.4	40.5	44±16.5
Ebadi fard azar et al;2010	145 staff	64	66	66	67	51	57	62	62	61	63	63	61	61.9±4.3
Abdi et al: 2010	311 staff	15	19.5	27.5	47.2	17.8	35	24	18.2	19.9	29.7	19.9	14.1	23.9±9.5
Agharahimi et al:2012	94 staff	62	70.6	72.8	67.6	68.8	59.4	62.2	61.4	59.4	56.4	63.8	63.4	64±4.9
Boghaei et al.:2010	500 staff	59	69	67	80	31	36	49	55	62	45	56	42	54.25±14.3
Izadi et al.;2012	196 staff	67	73	76	75	54	48	65	62	69	68	70	66	66±8.2
Arabloo et a; 2012	145 staff	60	62	61	65	44	47	54	53	60	53	56	58	56.08±6.2
Moghri et al;2013	725 staff	53	62	55	65	23	35	43	42	48	42	44	46	47±10.3
Adibi et al; 2012	90 staff	44.6	67.9	51.9	69.8	21.9	26	29.6	29	46.3	50.9	65.9	50.3	46.2±16.6
Yaghobi Far;2012	207 staff	58.3	69.1	54.15	73.6	13	22.3	52.5	52.6	56.3	37.2	47.4	43.6	48.3±3.6
Moghri etal; 2012	343 staff	55	66	54	69	18	23	34	40	47	39	41	42	44±5.4

*1- Overall perception of safety, 2- Organizational learning/continuous improvement, 3- Supervisor/manager expectations & actions promoting safety,4- Teamwork within hospital units, 5- Non-punitive response to error, 6- Staffing, 7- Hospital management support for patient safety, 8- Teamwork across hospital units, 9- Hospital handoffs & transitions, 10- Communication openness, 11- Feedback & communication about error, 12- Adverse event reporting & recording, **including wide range of health care provider in hospital such as: physicians, nurses, clinical and non-clinical staff, pharmacy and laboratory staff, supervisors and hospital managers.

after excluding this study, the PSC score changed to 52.8% (95% confidence interval, lower limit= 48%, upper limit= 57.6%, I^2=96.8, Q-value= 3456.2, df = 9, p< 0.001)

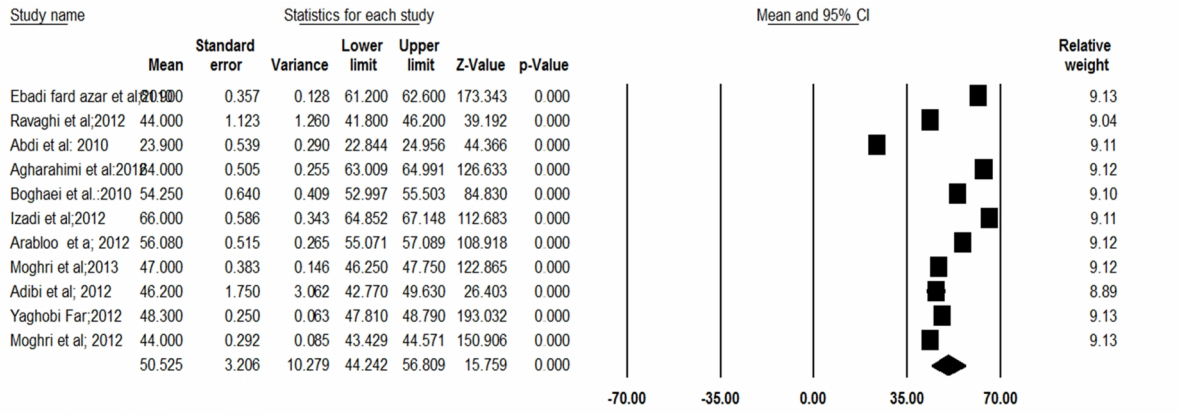

Fig. 2. Patients' safety culture score in the evaluated studies with 95% CI (based on random model)

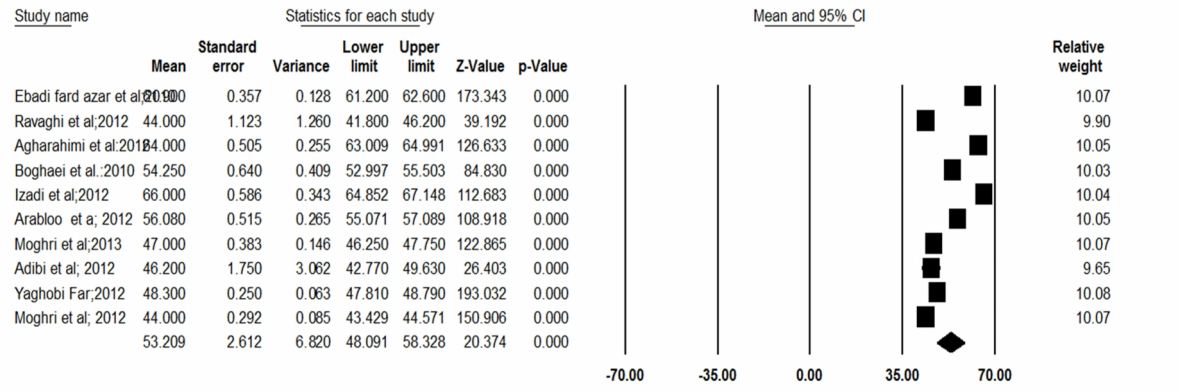

Fig. 3. Patients' safety culture score in the evaluated studies with 95%CI (based on random model) after sensitive analysis (Abdi et al: 2010)

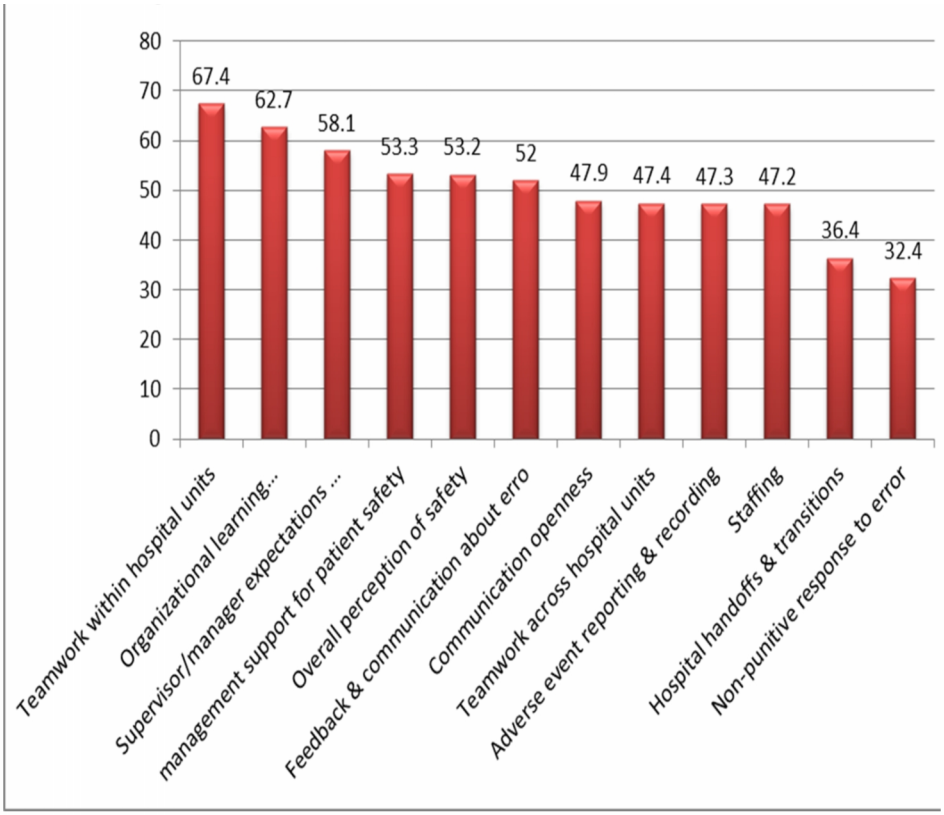

Fig. 4. Mean of 12 dimensions of HSOPSC in Iran

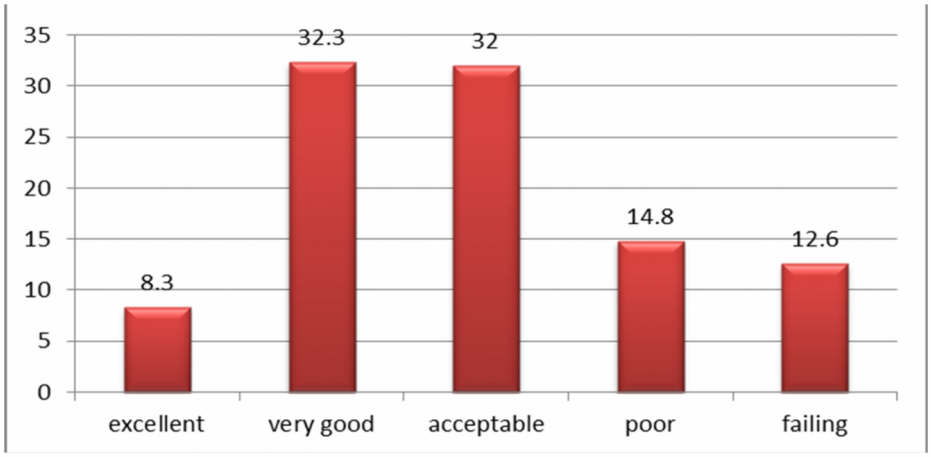

Fig. 5. Average percentage of respondents giving their PSC grade

(Fig. 3). Mean of dimensions of HSOPSC questionnaire are shown in Fig. 4.

As shown in Fig. 4, "Teamwork within hospital units" dimension has the highest score of PSC (67.4%) and "Non-punitive response to error" has the lowest score (32.4%).

Mean of PSC status (excellent, very good, acceptable, poor, failing) in HSOPSC questionnaire are shown in Fig. 5. Accordingly, "very good" grade has the highest mean (%32.3) and "excellent" the lowest (%8.3).

Mean of reporting number of adverse events in the past 12 months are shown in Fig. 6, which shows that approximately %52.7 of participants did not report any adverse event in the past 12 months.

Funnel plot of PSC shows that there is no symmetry in gathered data (Fig. 7).

Discussion

The HSOPSC questionnaire has been used

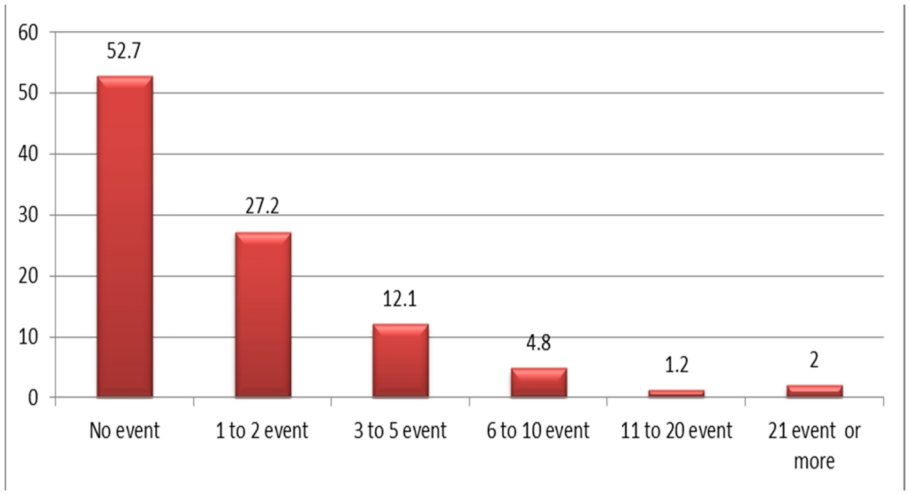

Fig. 6. Average percentage reporting events in the past 12 months

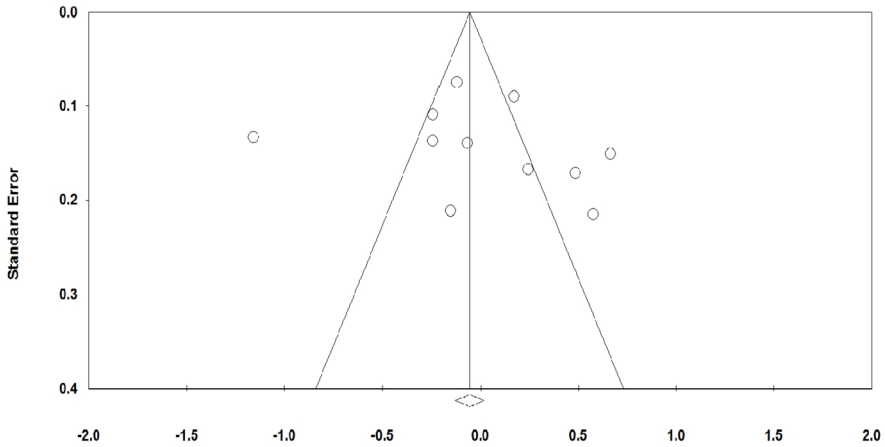

Fig. 7. Funnel plot of Patients' safety culture studies in Iran

to measure PSC in the High Income Countries (HICs), especially, the United States. In present study, we systematically reviewed the PSC status in Iran using studies that administered HSOPSC tool.

Overall, the mean response rate for the 12 PSC dimensions of the HSOPSC questionnaire in Iranian hospitals was 50.5%. This was lower than many of other previous studies, especially in HICs (15,16,50-54). Also mean response rate in some studies in LMIC was higher compared to that of current study (55-57).

Furthermore, the findings of this study demonstrated that "non-punitive response to error" dimension has lowest score among 12 dimensions of the HSOPSC questionnaire. Similar results were found in previous studies (57-59). van Geest and Cummings' study showed that absence of a non-punitive response system to errors is an important barrier for identifications and reduction of errors in healthcare setting (60).Non-punitive response system defined as "the extent to which personnel feel that their mistakes are not held against them and that mistakes are not recorded in their personnel document" (61). Punitive response system can lead to underreporting adverse events in hospitals. Unreserved system is an effective method for risk reduction in hospitals, which can start with adverse event reporting without punishing, and continue with encourage to report and learning from adverse events.

The present study revealed that about 41% of participants evaluate their hospitals' PSC status as 'excellent /very good'. El-Jardali and colleagues study in Lebanese hospitals demonstrated that about 70% of participants evaluated their hospitals PSC status as 'excellent/very good' (55). One study reported a higher 'excellent/very good' for PSC than

this study (62,63).

According to the reviewed articles in this study, about 52% of participants did not report any adverse event in the past 12 months. Contrary to this study, El-Jardali and colleagues showed that about 60% of participants did not completed any event in the past 12 months (55). Also, Jasti and colleagues showed that 64% of internal medicine house staff in academic teaching hospital did not report an adverse event in the past 12 months (62). Possible reasons for lower rate of reporting adverse events in current study might be the followings: no adverse event occurred in the hospitals during this period; or, staff did not report adverse events due to punishment system in the hospitals. The first reason seems to be impossible due to frequent reports of adverse events or medical errors in the hospitals (64-66). Therefore, hospitals managers better off to change current punishment system into participating system for improvement of PS. Hospital managers should try to remove scold, fear and silence from their system (67).

According to published years of reviewed articles in this study (from 2010 to 2013), it revealed that PSC is a very new concept in Iranian hospitals and unfortunately this issue has been neglected. In Iran, the PSC received attention due to PS friendly hospital initiatives since 2010, which was started in 10 hospitals and recently, Ministry of Health and Medical Education (MOHME) has decided to expand this program to 50 more hospitals (68). Also from 2009 in Iranian healthcare system, Clinical governance has been introduced as a framework to quality improving of hospitals services (69,70). These and other similar programs such as hospital accreditation are very useful and important for PSC improvement, but, it should be noted that improvement of PSC in hospitals and other organizations is highly related to Continues Quality Improvement (CQI) culture, organization leadership commitment, creating learning atmosphere in hospitals and a customer-oriented culture in hospitals in long-run.

The present study has some limitations such as no access to some of databases, and that, included articles were conducted only in hospitals.

Conclusion

Nowadays, measuring PSC in healthcare organizations is being increasingly welcome, especially in the HICs, and by Iranian hospitals. In this regard, review of related studies showed that Iranian hospitals' performance in PSC filed is weak. Hence, improving PSC should be prioritized in Iranian hospitals. In this regard hospitals staff should be encouraged to report adverse events without fear of punishment.

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Apendix1

STROBE Statement-checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of participants (b)Cohort study—For matched studies, give matching criteria and number of exposed and unexposed Case-control study—For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) Cohort study—If applicable, explain how loss to follow-up was addressed Case-control study—If applicable, explain how matching of cases and controls was addressed Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses
Result		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) Cohort study—Summarize follow-up time (eg, average and total amount)

Outcome data	15*	Cohort study—Report numbers of outcome events or summary measures over time Case-control study—Report numbers in each exposure category, or summary measures of exposure Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	Summarize key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalizability	21	Discuss the generalizability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org