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Compliance with WHO safe surgery checklist in operating rooms: A case study in Iran Hospitals



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ABSTRACT

Background: Quality improvement in delivering healthcare services is the main mission of every health system. Safe surgery checklist was introduced by World Health Organization (WHO), and hospitals were required to use it to reduce the risk of surgery-related mortality and morbidity. This study aimed to determine study hospitals' compliance with safe surgery checklist in 2016.

Methods: A retrospective, descriptive study was done in training general hospitals affiliated by Qom University of Medical Sciences from April to June 2016. All surgery checklists in this period were collected, and its use regarding to each operation was mentioned. Data were entered into SPSS version 20 and analyzed through descriptive statistical tests and One-way ANOVA.

Results: A total of 1771 surgeries in six university hospitals performed in three months study period and their related surgery checklists were investigated. The overall use and completion rate of checklists were 74%. Among which the sign-in, time-out, and sign-out items compliance were 58%, 16%, and 26% respectively.

Conclusion: The overall compliance rate of safe surgery checklist was satisfactory except for time-out and sign-out processes. Complimentary training and regular assessment of checklist utilization could be suggested to ensure the positive attitude among operating room's staff about the value of such a safety tool in improving patient safety.

Keywords: Patient safety, surgery, sing-in, time-out, sing-out, compliance

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INTRODUCTION

Quality improvement in delivering healthcare services is the main mission of every health system to ensure patients' recovery and satisfaction properly.¹ One of the fundamental healthcare services is surgical service which probable subsequent is significant both in terms of number and complications.^{2,3} Such undesirable outcomes caused through surgical procedures are common worldwide and lead to considerable cases of mortalities and morbidities among patients. Evidence suggests that most of these complications are preventable, thus implementing quality improvement programs and application of appropriate tools. For example, safe surgery checklist could be beneficial to improve surgical results in a way that patients will benefit from appropriate surgery services and care providers will guarantee the effectiveness of their treatment procedures and increase the chance of patients' recovery without complication.^{4,5}

For the purpose, WHO founded a safe surgery program in which health care institutions were obliged to use and fulfill a safety checklist for each under surgery patient in operating rooms. Such a tool could improve effective communication among clinical staff and lead to patient safety and decreased deaths or adverse events which might arise from

surgical procedures.^{6,7} Since then, hospitals were required to assess and report their congruence rates with safe surgery obligations emphasizing on time-out process by which patient identification and fulfillment of pre-surgical requirements are confirmed.⁸ Literature affirms a variation in use and completion rate of surgery checklist between different hospitals which motivated hospital authorities to audit the adherence rate periodically to find out the reasons for non-conformities.⁹

Many studies have been conducted to investigate hospitals' compliance with safe surgery standards using direct observation or retrospective document review. A study done by Russ et al. (2015) revealed that non-adherence to safe checklist was mainly related to sign-in and time-out process.¹⁰ In another study conducted in British hospitals, such incongruence was relatively observed in similar processes due to the absence of clinical team to check checklist's items.¹¹ A similar study confirmed less conformity in two items of sign-out and time-out of the checklist.¹² The main contributing reasons were mentioned to be the absence of surgeon in the operating room after surgery or existence of reluctant and tired personnel not believing in patient safety.^{12,13} Proper fulfillment of time-out process is

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Table 1 Mean Scores of Compliance with Safe Surgery Checklist in Study Hospitals

Hospital process	A	B	C	D	E	F
Sign-in	7.9 ± 0.4	8.5 ± 0.3	9.5 ± 1.4	0.2 ± 0.01	8.8 ± 1.6	9.3 ± 2.07
Time-out	6.7 ± 0.2	7.6 ± 1.8	8 ± 0.8	0.16 ± 0.08	2.6 ± 0.3	7.3 ± 1.2
Sign-out	7.2 ± 0.7	8.2 ± 0.8	8.6 ± 1.5	0.2 ± 0.01	7.4 ± 3.3	8.6 ± 1.4

Table 2 Compliance Mean Scores for Each Safe Surgery Checklist's Item

Checklist Items	Mean ± SD
Patient Identification	0.68 ± 0.01
Surgery site confirmation	0.66 ± 0.02
Surgery type confirmation	0.65 ± 0.01
Filled-out surgery consent form	0.67 ± 0.01
Marked surgery site	0.68 ± 0.01
Checked out anesthesia machine	0.68 ± 0.01
Checked out pulse oximeter	0.68 ± 0.01
Patient sensitivity examination	0.69 ± 0.03
Aspiration risk examination	0.7 ± 0.01
Risk of blood loss examination	0.7 ± 0.01
Clinical team introduction	0.56 ± 0.02
Patient's name confirmation	0.63 ± 0.01
Surgery site confirmation	0.65 ± 0.03
Surgery type confirmation	0.66 ± 0.01
Checked out for antibiotic prophylaxis	0.59 ± 0.01
Anticipated critical event to surgeon	0.43 ± 0.02
Anticipated critical event to anesthetist	0.54 ± 0.02
Anticipated critical event to nursing staff	0.61 ± 0.01
Displayed essential imaging	0.59 ± 0.03
Checked out the procedure name	0.78 ± 0.02
Needle counts	0.77 ± 0.01
Specimen labeling	0.61 ± 0.02
Equipment problem	0.75 ± 0.01
Key concerns for patient recovery	0.4 ± 0.01
Surgeon signature	0.57 ± 0.01
Anesthetist signature	0.5 ± 0.01
Nurse signature	0.75 ± 0.02

potentially important in reducing the risk of error in surgery by focusing on checking the patient, surgical site, or procedure.¹⁴

In Iran, there are inadequate studies that investigated the compliance with use of safe surgery checklist. Developing more researchers in this field can help us understand the reasons for noncompliance cases and the barriers for effective use of surgery checklist. This would provide necessary support to

resolve any concerns before operative procedures and guarantee patient safety. Therefore the research team conducted a study to investigate the compliance of study hospitals with WHO safe surgery checklist in 2016.

MATERIALS AND METHODS

A retrospective descriptive study was done in general training hospitals affiliated by Qom University of Medical Sciences from April to June 2016. A total of 1771 surgeries in six university hospitals performed in three months study period and their related surgery checklists were collected, and their use or completion was investigated. The checklist contains a total of 25 items which data regarding to each of its three sections including sign-in (before induction of anesthesia), time-out (before skin incision), and sign-out (before the patient leaves the operating room) were gathered. One of the outcome measures of the current study was to investigate if the safe surgery checklist was used for each patient and the second was completion rate of applied checklists. Two trained researchers participated in collecting data on adherence and completion of checklists (sign-in, time-out, and sign-out), type of surgery, and procedure. As study hospitals were not able to extract checklist data automatically based on computerized technology, two researchers had to do it manually. All data were entered and analyzed using SPSS version 20. Descriptive statistical methods and one-way ANOVA were applied to evaluate checklist adherence and completion; also to identify the variations of safety standards compliance among different hospitals. Ethical considerations were observed with the approval of hospital authorities and related medical universities.

RESULTS

Overall 1771 surgery checklists belonged to operating procedures conducted in study hospitals were reviewed. Safe surgery checklist was applied to all surgeries; among which 74% (1310) were complete (all items in three sections were ticked) while 26% (461) were fairly complete. Therefore overall use and completion rate of checklists were 100% and 74%, respectively.

Analysis of Each Three Checklist's Items

Overall 1771 checklists belonging to surgery procedures and 44275 items were analyzed to discover the compliance rate in each of three sections. Analysis results revealed 58% adherence in sign-in, 16% in time-out, and 26% in sign-out process. [Table 1](#) shows mean scores of compliance with safe

Table 3 Missing Items in Safety Surgery Checklist in Study Hospitals

Checklist Section	Checklist Item	Number of Missing Items	Total Missing Percent	Missing Percent per section
Sign-in				
1	Patient Identification	3	27.2	1.088
2	Surgery site confirmation	0	0	0
3	Surgery type confirmation	0	0	0
4	Filled-out surgery consent form	0	0	0
5	Marked surgery site	0	0	0
6	Checked out anesthesia machine	0	0	0
7	Checked out pulse oximeter	3	27.2	1.088
8	Patient sensitivity examination	4	36.6	1.46
9	Aspiration risk examination	1	9	0.36
10	Risk of blood loss examination	0	0	0
Total		11	100	4
Time-out				
1	Clinical team introduction	102	38.2	22.15
2	Patient's name confirmation	0	0	0
3	Surgery site confirmation	0	0	0
4	Surgery type confirmation	0	0	0
5	Checked out for antibiotic prophylaxis	5	2.1	1.31
6	Anticipated critical event to surgeon	0	0	0
7	Anticipated critical event to anesthetist	63	23.5	13.6
8	Anticipated critical event to nursing staff	75	28	16.24
9	Displayed essential imaging	22	8.2	4.7
Total		267	100	58
Sign-out				
1	Checked out the procedure name	22	18.48	4.8
2	Needle counts	39	32.7	8.5
3	Specimen labeling	5	4.38	1.13
4	Equipment problem	6	5.04	1.31
5	Key concerns for patient recovery	47	39.4	10.24
6	Surgeon signature	0	0	0
7	Anesthetist signature	0	0	0
8	Nurse signature	0	0	0
Total		119	100	26

surgery checklist in each of study hospitals in three respective sections.

As data confirm, the highest mean compliance is related to pre-anesthesia process. To achieve a closer examination of the issue, average scores for compliance were reported for each 27 items (including the signature of the surgeon, anesthetist, and nursing staff) as depicted in Table 2.

Data confirmed that the highest and lowest average score of compliance with safe surgery checklist were relatively related to checking out the procedure

name and reviewing the key concerns for recovery and patient management.

Finally, Table 3 addresses the number of missing items in safe surgery checklist. As it is depicted, the great number of missing items were associated with time-out process (58%, 100); while the least number was related to sign-in items with 4%.

As shown in above table, the greatest number of missing items within the sign-in section was related to patient sensitivity examination (4, 36.6%). While there were no missing regarding to risk of blood

Table 4 Comparison of Safe Surgery Compliance among Study Hospitals

Checklist Items		Sum Squares	df	Mean Square	F	sig
Sign-in	Between groups	18595.4	5	3719.09	493.6	0.00
	Within groups	13297.1	1765	7.53		
Time-out	Between groups	16375.3	5	3275.06	599.4	0.00
	Within groups	9620.7	1761	5.46		
Sign-out	Between groups	9920.46	5	3719.09	493.6	0.00
	Within groups	13297.1	1765	7.53		

loss, checked out for anesthesia machine, filled out surgery consent form, surgery type, and surgery site confirmation. Furthermore, in time-out section, most of the missing items were concerned with clinical team introduction (102, 38.2%) and no missing was reported in relation to checking for patient's name, surgery site, surgery type and critical event to the surgeon. Finally, in sign-out item, key concerns for patient recovery got the highest number and rate of missing (47, 10.24%) while no missing was reported in cases of the surgeon, anesthetist and nursing staff signature.

Below table shows the comparison results regarding to safe surgery checklist compliance among study hospitals. As ANOVA analysis affirms, there were significant differences in all three checklist's items in different hospitals (Table 4).

DISCUSSION

This study was conducted to investigate the compliance with safe surgery checklist among training hospitals affiliated by Qom University of Medical Sciences in 2016. As findings confirmed, the utilization rate of the checklist was reported 100%, and its completion was limited to 74%. In similar studies, rate of checklist use was greater than 80% and in one was 100%.¹⁵⁻²² In other research, the completion rate was significantly less than 80% ranging in a wide extent.²³ Among other checklist processes, the sign-in item has got the highest rate of compliance (58%) of which the most significant conformity belonged to the risk of blood loss examination. Literature concluded that compliance rate was higher for sign-in and time-out processes compared to sign out.^{15,19,22,24-26} Similarly, Melekie and Getahun (2015) mentioned sign-in item as the most congruent one but differently regarded anesthetic equipment checking to have the greatest fulfillment.²⁶ Moreover, the same as their study our findings pointed out checking pulse oximeter among frequent cases that must be considered to prevent desaturation of patients in surgery stage.²⁶

In our study in time-out process, the most significant item was clinical team introduction and

their effective communication. The findings were confirmed by literature emphasizing on the necessity of introducing care providers to each other and expressing their roles in a surgical procedure.^{27,28} In this regard, study results showed that 38.2% of clinical staff refused to introduce themselves before skin incision. Findings were compatible with similar research.²⁶⁻²⁸ The probable reason for such non-conformity was noted to be a lack of belief in the usefulness of identification approach among personnel as they felt uncomfortable with the process and mentioned it as a vain or useless activity.

Our findings also revealed non-conformity regarding to sign-out process (26%). A study conducted by Conley et al. (2011) and Lingard et al. (2005) got the same results.^{15,27} They emphasized that high staff workload in operating rooms and necessity to deliver care services right after the surgical procedure have restricted them to take defined responsibilities in sign-out process. In some of the literature, introduction of team members at the beginning of the checklist had an acceptable compliance (more than 80%).²¹ While this measure varied across different studies (from 10% to more than 90%).^{16,25,30} Depicting a lack of awareness or training among operating room staff as possible reasons. Furthermore, most of the literature confirmed patient identification rate to be more than 70% while the minority of them confirmed more than 95% compliance rate.^{16,21,24,25,30,31} Some of the studies also revealed low compliance rate in particular checklist's domains including checking for allergy, blood loss or antibiotic prophylaxis among patients.^{18,21,25}

CONCLUSION

Study findings endorsed that majority of missing items concerning to safe surgery belonged to lack of communication among caregivers, anesthetists, and surgeons. Adverse events are the main undesirable outcomes caused by such shortcomings which are associated with significant morbidity and mortality among under surgery patients. Therefore it is

suggested to reinforce staff motivation to effectively communicate with each other through providing them necessary information about the usefulness of safety approaches such as safe surgery checklist; also promoting patient safety culture in the workplace.

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