



## EFFECTIVENESS OF W.H.O SURGICAL SAFETY CHECKLIST IN REDUCING POST-OPERATIVE COMPLICATIONS

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### ABSTRACT

In 2008 WHO published a surgical safety check list (SSCL) to reduce errors related to surgical procedures involving various levels of a surgical team. In this study the local protocols were evaluated, compared with the WHO SSCL and recommendations were implemented. Finally, results were analysed for postoperative complications. Aim & Objective: To assess the effectiveness of WHO surgical safety checklist in reducing post operative complications. Materials and methods: This prospective observational study was done at Army Hospital R&R and Base Hospital Delhi Cantt from Sep 2011 to Mar 2013. The study involved analysing and comparing the pre and post interventional rates of post-surgical complications in 200 patients, where intervention is in the form of implementation of SSCL. Results: Significant change after implementation of the check list were noted viz. in complication rates, sepsis related mortality and morbidity, post op sepsis. Conclusion: WHO surgical safety checklist is very effective in reducing post op complications.

**KEYWORDS** : Surgical Safety Check List, World Health Organisation

### INTRODUCTION

The notion of surgical team was put to a concept by WHO in late 90s. However when there is a team working there are chances of error at various levels of the team. In 2008 WHO published a surgical safety check list (SSCL). The SSCL had 19 key points. It was lucid, comprehensive and easy to implement. In this study we evaluated the local protocols being used, compared them with the WHO SSCL, made appropriate recommendations and implemented the WHO SSCL. Finally, observations were made to assess any decrease in post-operative complication.

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

**LEGEND 1 : 19 Point WHO Surgical Safety Checklist**

### AIM AND OBJECTIVES

To assess the effectiveness of WHO surgical safety checklist in reducing postoperative complications.

### MATERIAL AND METHODS

This prospective observational study was done at Army Hospital Research & Referral and Base Hospital Delhi Cantt from Sep 2011 to Mar 2013. The study involved analysing and comparing the pre and post interventional rates of post-surgical complications, where intervention is in the form of implementation of SSCL.

### METHODOLOGY

The study was conducted in two phases:

Phase 1: For 3 months the data on safety issues as listed in the SSCL was recorded to identify the common lacunae in the present system. This process was categorised in groups of:

- Sign in
- Time out
- Sign out

Observer ticked the steps of surgical safety checklist that were followed during the process. Post-op patients were followed up for 30 days during which end point of the study were appearance of any complications as a result of the surgery.

Data was collected and documentation done. The discrepancies were noted as per the SSCL and documented along with the complications for each case.

Phase 2: The lacunae in the present system were pointed out. The SSCL was introduced and the OT team was educated in the following manner:

A. The concept of team was introduced to the OT team. They were explained about their roles while implementing the checklist.

B. During "Sign In" before induction of anaesthesia, the SSCL was verbally reviewed with the patient (when possible) about the identity being confirmed, the correctness of procedure and site and consent for surgery.

C. The observer also verbally reviewed with the anaesthesia professional the patient's risk of blood loss, airway difficulty and allergic reaction and whether a full anaesthesia safety check has been completed.

D. For "Time Out", each team member was asked to introduce him or herself by name and role. The team paused immediately prior to the skin incision and confirmed out loud that they were performing the correct operation on the correct patient and site and then verbally reviewed with one another, in turn, the critical elements of their plans for the operation using the Checklist questions for guidance.

E. The team also had to confirm that prophylactic antibiotics have been administered within the previous 60 minutes and that essential imaging is displayed, as appropriate.

F. For the "Sign Out", the team reviewed together the operation that was performed, completion of sponge and instrument counts and the labelling of any surgical specimens obtained. Finally, the team reviewed key plans and concerns regarding postoperative management and recovery before moving the patient from the operating room.

Findings were documented and analysed. SPSS system was used for obtaining a correlation of the factors with the end points; that is if there was any complication or not. Pearson's Chi square test was used to obtain the P value to conclude whether there was any



The results show there is a significant change in the outcome after implementation of the check list. Complication rates were 45% before the use of checklist and it reduced to 15% after introduction of the checklist.  $P < 0.05$  ( $P = 0.015$ ). There were no change in total death rates before and after the use of checklist, but there was a decrease in sepsis related death from 2% to 1%. There was a decrease in surgical site infection from 27% to 12% after using prophylactic antibiotics as a part of implementation of surgical safety checklist. ( $P < 0.01$ ) and also when there was a sterility indicator used or sterility was verbally confirmed by the OT nurse. ( $P < 0.01$ ). Major cases done pre-intervention were 85 and complications were present 40 cases i.e. 47% cases. Whereas in post intervention major cases done were 90 and complications were present only in 10 cases that is 1.1% of cases, hence there was a decrease in rate in complications associated with major cases.

## DISCUSSION

WHO Surgical safety checklist was published in 2008 along with its implementation manual. The pilot study done by Haynes A, Weiser T, Berry W, et al. 1 published in 2009 showed that SSCL was effective in reducing post-operative complications. In our study we have also found that the total complications pre-intervention was 45% which decreased to 15% after use of the SSCL, that is a reduction in complication rates by 30%. The  $P$  value  $< 0.001$  (significant) is similar to the findings of WHO pilot study (table 2). There was no change in mortality as per our study both remained 2% that may be because we have not excluded cases on the basis of age, type of surgery (cardiac / non cardiac) emergency or elective as has been done in the pilot study. But there is a marginal decrease in death due to Post OP sepsis from 2% to 1%. The effectiveness of the WHO checklist for emergency procedures was demonstrated in another study where a significant improvement was found; a 36% relative reduction of the complication rate, from 151 in 842 cases (18.4%) to 102 in 908 cases (11.7%). (similar to our results) Likewise, there was a statistically significant 62% relative reduction in mortality, from 31 in 842 cases (3.7%) to 13 in 908 cases (1.4%) 2-3.

Major cases done pre-intervention were 85 and complications were present in 40 cases (47%). Whereas in post intervention major cases were 90 and complications were seen in 10 cases (1.1%), showing a decrease in rate in complications associated with major cases.

**Table 2 : Comparison of current study with WHO pilot study**

	No of patients	No of patients	Surgical site infections	Surgical site infections	Death	Death	Any complication	Any complication
Site	Before	After	Before	After	Before	After	Before	After
1	524	598	4.0	2.0	1	0	11.6	07
2	357	351	2.0	1.7	1.1	0.3	7.8	6.3
3	497	486	5.8	4.3	0.8	1.4	13.5	9.7
4	520	545	3.1	2.6	1.0	0.6	7.5	5.5
5	370	330	20.5	3.6	1.4	0.0	21.4	5.5
6	496	476	4.0	4.0	3.6	1.7	10.1	9.7
7	525	585	9.5	5.8	2.1	1.7	12.4	8.0
8	444	584	4.1	2.4	1.4	0.3	6.1	3.6
Total	3733	3955	6.2	3.4	1.5	0.8	11.0	7.0
value				$< 0.001$		$0.003$		$< 0.001$
This study	100	100	27	12	2	2	18	3
value				$< 0.01$		$> 0.05$		$< 0.05$

This study also shows there is a significant decrease in the rate of surgical site infection after the use of SSCL from 27% to 12%. ( $P$  value  $< 0.01$ ; similar to the findings of the pilot study.)

Following table shows the comparison of the current study with other studies in reducing post op complications and mortality. (Table 3)

S.NO	STUDY	STUDY DESIGN	SAMPLE SIZE	FINDING
1.	Haynes 2009 (1)	Prospective longitudinal study	842(908)*1/8*2	Reduction of mortality from 1.5% to 0.8% and of complication rate from 11% to 7%
2	Weiser 2010 (10)	Prospective longitudinal study	1750/8	Reduction of mortality from 3.7% to 1.4% and of complication rate from 18.4% to 11.7%
3.	Van Klei 2011/12 (3)	Retrospective cohort study	25513/1	Reduction of mortality, correlation with correct Implementation
4.	Current study	Prospective observational	200	Reduction in complication rate from 45% to 15%

In the current study there was a reduction from 2% to 0 for requirement of unplanned return to OT after the use of SSCL (similar results as pilot study). There was decrease of wrong site surgery from 1% to 0 after implementing SSCL. This can be compared with a study that revealed the use of the SSCL prevented 14.9% of all wrong-side errors.<sup>4</sup>

Antibiotic prophylaxis was strictly adhered to as a part of implementing SSCL and there is significant decrease in the rate of surgical site infection from 27% to 12%. ( $P$  value  $< 0.01$ ). In Sweden, the adoption of the WHO checklist and the appropriate timing of antibiotic prophylaxis improved the decreased infection rates from 57% of the patients in 2007 to 79% of the patients in 2010.<sup>6</sup>

Blood loss requiring transfusion was documented in 4% cases before the implementation of SSCL; no cases required transfusion post SSCL. Studies says that it's difficult to pre calculate blood loss and there is a tendency of surgeons to underestimate the blood loss and anaesthetists to over-estimate the blood loss.<sup>7</sup>

There was complete prevention of surgical error of leaving a foreign body (gauze piece) in the site of surgery (2%) pre-intervention to 0 (post intervention).

There was a case where the patient had major depression requiring medical management which can be attributed to poor communication between the surgical team and the patient in explaining the post OP side effects of surgery, use of checklist also rectifies this problem of failure of communication. The study states Preoperative check does not make patients more worried (100%), but rather reassures them (97%). 5 WHO SSCL also helped in development of a team spirit in the surgical team and helped in increasing the efficiency of the surgical team.

Problems in implementation of SSCL: Few problems faced were:

a) Difficulty in following all the steps in an emergency situation.

b) There may also be economic objections, as it is feared that operations will be prolonged and costs will go up, even though the studies actually showed the contrary.<sup>9</sup>

c) Malfunctioning of equipment in the middle of the surgery unnecessarily increasing the period of surgery.

d) Unavailability of instruments esp. when there is high turnover in OT.

e) Reluctance of the team to follow the checks and its

documentation esp. in the last stage. Similar problem has been shown in different studies in New Zealand.<sup>8</sup>

f) Sometimes there is difficulty in communicating due to presence of Hierarchy barrier of communication.

## CONCLUSION

The study concludes that WHO surgical safety checklist is very effective in reducing post op complications when implemented properly. The use of checklist also improves the communication amongst the surgical team members and creates a safer environment in the OT and improves the team efficacy.

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