

# A Study to Assess the Surgical Safety Compliance in an Operation Theater of Tertiary Care Hospital

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**Abstract**— traumatic injuries, unnecessary surgical deaths, and medical error continues to raise .The main aim of this paper is to assess the surgical safety compliance in an operation theatre of Tertiary care hospital.

This paper is focused on study of all the surgical safety compliance in an operation theatre complex. The data was collected by observing Anaesthetists, Surgeons and operation theatre nurses who are all involved in the surgical procedures in the various operation theatres in the tertiary care teaching hospital.

Collected data was analyzed by using frequency, percentage and is presented in the form of table and diagrams. The difference in the percentages among the various categories of the items such as Sign in (100% compliance with confirmation of patient identity and 98% with confirmation of the site of operation, patient confirmation of procedure in 95% of cases and 100% check by Anesthetists for patient safety), Time out (confirmation of the procedure in 94.4% of cases, 100% consistency in the verification of instrument sterility by nurses, the equipment issues were addressed well (99%), the antibiotic prophylaxis given within 60 minutes (100%) and Sign out (Equipment was addressed well (99%),100% labelling of specimen was done accurately) has been calculated. This paper shows the surgical safety compliance in an operation theatre and provides suggestions for improving the compliance.

**Key Words:** Surgical Safety Compliance, Surgical Safety Checklist, Operation Theatre, Operating room, Sentinel events.

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## I. INTRODUCTION

The World Health Organization (WHO) in 2008 launched the Surgical Safety Checklist as an instrument to enhance safety in operations for operating personnel and to reduce unnecessary surgical deaths and problems. The checklist was designed following international consultation with anesthetists, nurses, surgeons, patient safety specialists and patients, to support the safety practices and better communication and to encourage team work between clinical authorities [1].

Surgical care has been a necessary part of the health care over the world for a century. As the occurrence of cardiovascular disease, major injuries, and cancers continue to increase, the effect of surgical involvement on general health systems has been increasing. Each year in the world, 234 million surgical procedures are performed. On assessing all surgical operations, the problems usually occur in 3% to 16% of cases[2].

To 'err' is human, but a small medical error can prove fatal. Clinical experts say this is high time that suitable steps are taken to minimize the scope of mistakes in medical treatment, especially in the Operation Theatres over the world. This amounts to around 1 operation per 25 people and indicates that patient safety is more important in public health. The plan for the hospital to design their infrastructure and surgical procedures mainly around patient safety and comfort needs to be tightly managed [3].

The Operation Theatre can be a hazardous place for healthcare staffs and patients alike. For example, plastic surgeons need a better knowledge of different pre-operative aspects like confirmed identity, site, procedure and consent to reduce these risks. As the significance of team work becomes more evident, direct communication skills, intra-operatively, preoperatively and postoperatively become an equally important factor. [4]

**II. LITERATURE REVIEW**

The current studies have revealed that operative complication can be reduced, if safety checklist is used. The hospital under study has adopted the WHO safety checklist. This is administered in 3 phases on arrival of the patient into the Operation Theatre namely, before skin incision phase, time-out and after skin incision phase. The means (ranges) of the compliance to the checklist items was 57% (28-100%) before skin incision, 68% (34-100%) for Time Out, and 45% after skin incision. Limitation of this study: High-turnover theatres were given preference and this means that specialties such as neurosurgery which have a predominance of longer cases were not represented in the audit.[5] Another study was conducted in tertiary care hospital study on communication failure in operation theatres. Study demonstrated that ineffective group communication is usually the cause of clinical mistakes. The objective of the study was to describe the reasons for failure of communication in an operation theatre and to divide the outcomes.[6] A study was conducted involving two hospitals, each of which had a current root-cause analysis and wrong-site surgery incident reporting system. The study revealed that the surgical safety checklists contribute to developing surgical patient safety. When asked about the 8 particular elements of the time-out checklist, the percentage of respondents who believe the element was “very significant” varied widely, from to highs of over 80 percent for correct procedure, correct side, and patient identity to a low of 14 percent for the introduce the team members [7]. A global study conducted to compare the patient outcome pre and post implementation of the WHO Safety Checklists, show a overall reduction in the after surgery problems and mortality. These findings were reproduced in another study conducted in more than one medical centre contributing to the conclusion that concerns are growing related to surgical safety in an operating room [8].

**III. METHODOLOGY**

**Study design:** A descriptive study design

**Participants:** All the surgeons, anesthetists and Operation Theater nurses who are currently working in the tertiary care hospital were taken as the participants for the data collection.

**Sampling:** Data collection was for one month in the Operation Theater of the tertiary care hospital. A sample

size of 450 surgeries, each in General Surgery, Orthopedics, Ophthalmology, Obstetrics, Gynecology and Urology departments were selected using purposive sampling technique for observational study. The very first and last surgery of the day, as per the schedule in the Operation Theatre, was observed by the investigator till the sample size was covered.

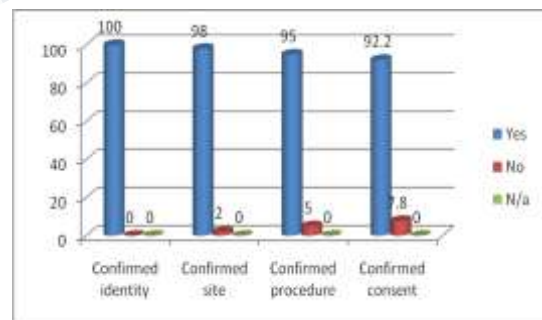
**Tools and Techniques:** Collected data was analyzed by using frequency, percentage and presented in the form of table and diagrams. The difference in the percentages among the various categories of the item- Sign in, Time out and Sign out is calculated.

**IV. RESULTS AND ANALYSIS**

**Section—a Sign-in:**

**Table 4.1 Compliance to “Confirmation of the patient site, procedure, identity and consent”**

Patient has confirmed	Frequency				Percentage (%)			
	Yes	No	N/a	Total	Yes	No	N/a	Total
Confirmed identity	100	0	0	450	100	0	0	100
Confirmed site	441	9	0	450	98	2	0	100
Confirmed procedure	428	22	0	450	95	5	0	100
Confirmed consent	415	35	0	450	92.2	7.8	0	100



**Figure 4.1 Compliance to “Confirmation of the patient site, procedure, identity and consent”**

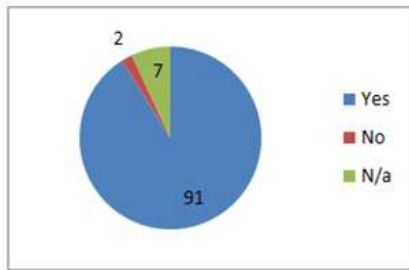
**Results**

Table 4.1 and Figure 4.1 illustrate Compliance to “Confirmation of Patient identity, Site, Procedure and

Consent". It shows out of 450 surgical cases 100%of them have confirmed identity, 98% (441) patients have confirmed operation sites and 95% (428) of the patient have confirmed the procedure. The confirmation of the consent by patient during sign in procedure was 92.2%(415).

**Table 4.2**Percentage compliance for site marking

	Frequency	Percentage (%)
<b>Yes</b>	<b>409</b>	<b>91</b>
<b>No</b>	<b>10</b>	<b>2</b>
<b>N/a</b>	<b>31</b>	<b>7</b>
<b>Total</b>	<b>450</b>	<b>100</b>

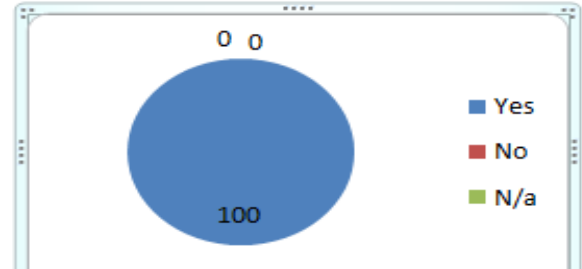


**Figure 4.2** the data for site marking

Table 4.2 and figure4.2 show the data recorded for site marking of 450 different patients. It was only in 91% (409)of patients that site marking was done. Site marking was not applicable for 7%(31)of patient.

**Table 4.3** Percentage of cases with completed Anaesthesia safety check

	Frequency	Percentage (%)
<b>Yes</b>	<b>450</b>	<b>100</b>
<b>No</b>	<b>0</b>	<b>0</b>
<b>N/a</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>

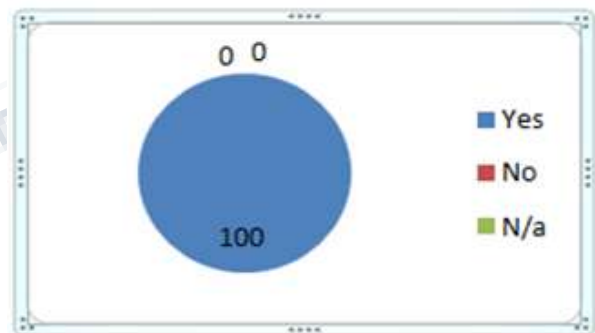


**Figure 4.3** Percentage of cases with completed Anaesthesia safety check

Table 4.3 and figure 4.3 showthe anaesthesia safety check was 100%and it is thoroughly met in all the departments.

**Table 4.4** Pulse oxymeter on patient and functioning

	Frequency	Percentage (%)
<b>Yes</b>	<b>450</b>	<b>100</b>
<b>No</b>	<b>0</b>	<b>0</b>
<b>N/a</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>

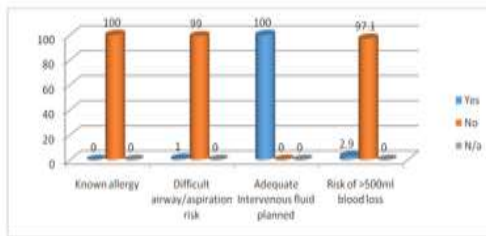


**Figure 4.4** Pulse Oxymeter on Patient and functioning

Table 4.4 and figure 4.4 Reveals the pulse oxymeter was used for every patient who underwent surgery and all the pulse oxymeter were functional during operative phases 100%.

**Table 4.5: Risk management assessed:**

Does patient have	Frequency				Percentage (%)			
	Yes	No	N/a	Total	Yes	No	N/a	Total
Known allergy	0	450	0	450	0	100	0	100
Difficult airway/aspiration risk	4	446	0	450	1	99	0	100
Adequate Intravenous fluid planned	450	0	0	450	100	0	0	100
Risk of >500ml blood loss	13	437	0	450	2.9	97.1	0	100



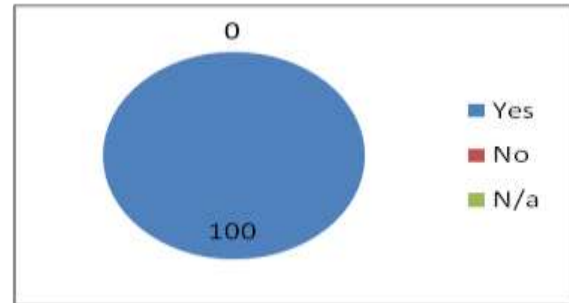
**Figure 4.5 Risk management assessed**

Table 4.5 and figure 4.5 Show the risk management assessed. It is seen that risks associated with known allergy, different airway aspiration, blood loss and adequacy of iv fluid were assessed in all 450(100%) cases.

**Section --B Time out:**

**Table 4.6 Introduction of team members by name and role:**

	Frequency	Percentage (%)
Yes	450	100
No	0	0
N/A	0	0
Total	450	100

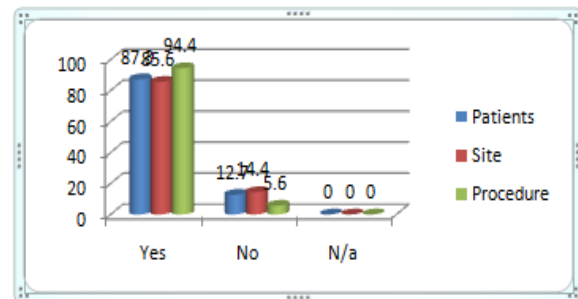


**Figure 4.6 Introduction of team members by name and role**

Table 4.6 and figure 4.6 it is evident that introduction of the surgical team members including surgeons, anaesthetist and nurses before taking up the surgery is 100%.

**Table 4.7 Verbal confirmations by surgeons, Anaesthesia professionals and nurse about patient, site and procedure:**

Verbal confirmation of	Frequency				Percentage (%)			
	Yes	No	N/a	Total	Yes	No	N/a	Total
Patients	393	57	0	450	87.3	12.7	0	100
Site	385	65	0	450	85.6	14.4	0	100
Procedure	425	25	0	450	94.4	5.6	0	100

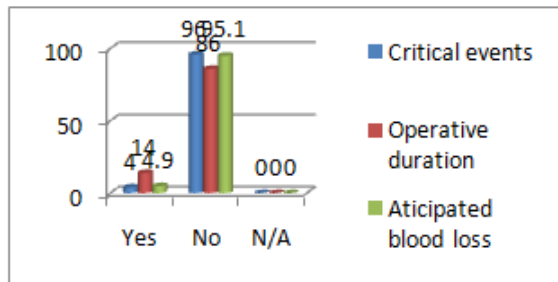


**Figure 4.7 Verbal confirmations by Surgeons, Anaesthesia Professionals and Nurse about Patient, Site and Procedure:**

Table 4.7 and figure 4.7 describe that the surgeons, anaesthesia professionals and nurse verbally confirm patients in 393(87.3%) of cases and do not confirm 57(12.7%), confirm the site in 385(85.6%) and not confirm the site in 65 (14.4%) and confirm the procedure in 425 (94.4%) and do not confirm the procedure in 25(5.6%).

**Table 4.8 Anticipated critical events-surgeon review:**

Surgeons reviews	Frequency				Percentage (%)			
	Yes	No	N/A	Total	Yes	No	N/A	Total
Critical events	18	432	0	450	4	96	0	100
Operative duration	63	387	0	450	14	86	0	100
Anticipated blood loss	22	428	0	450	4.9	95.1	0	100



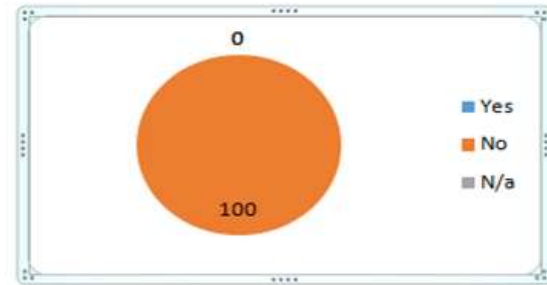
**Figure: 4.8 Anticipated critical events-surgeon review**

Table 4.8 and figure 4.8 show the anticipated events as per surgeons review was in about 18 cases(4%), operative duration assessed by surgeon's review was done in 63(14%) cases and anticipated blood loss was shown in 22(4.9%) cases.

**Table 4.9 Anaesthesia team reviews: are there any patient specific concern**

	Frequency	Percentage (%)
Yes	0	0
No	450	100
N/a	0	0

<b>Total</b>	<b>450</b>	<b>100</b>
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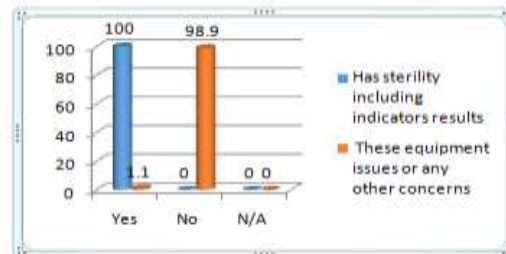


**Figure 4.9 Anaesthesia team reviews; are there any patient specific concern**

Table 4.9 and Figure 4.9 Show there was no specific concern found among 450 patients as per Anaesthesia team reviews.

**Table 4.10: Nursing team reviews**

Nursing Reviews on	Frequency				Percentage (%)			
	Yes	No	N/A	Total	Yes	No	N/A	Total
Has sterility including indicators results	450	0	0	450	100	0	0	100
These equipment issues or any other concerns	5	445	0	450	1.1	98.9	0	100



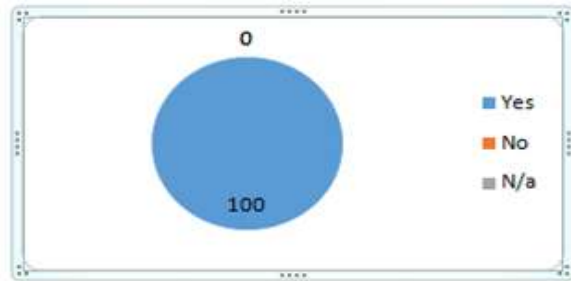
**Figure 4.10 Nursing team reviews**

Table 4.10 and figure 4.10 make the nursing team reviews on confirmation of sterility indicator results has been confirmed to 100% the confirmation of the equipment issue was found to be in 5(1.1%) cases.

**Table 4.11 Details Antibiotic prophylaxis given during the last**

*60minutes*

	Frequency	Percentage(%)
<b>Yes</b>	<b>450</b>	<b>100</b>
<b>No</b>	<b>0</b>	<b>0</b>
<b>N/a</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>

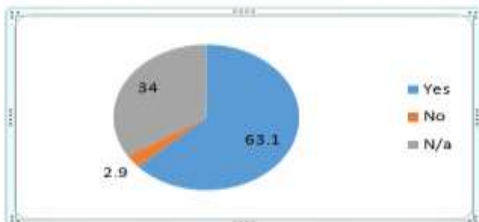


**Figure 4.11** Details of Antibiotic Treatment given during the last 60 minutes

Table 4.11 and Figure 4.11, in all the 450 cases, before the start of surgical procedure. Antibiotic prophylaxis had been given in the last 60 minutes.

**Table 4.12** Details about essential imaging been displayed

Details about essential imaging displayed		
	Frequency	Percentage (%)
<b>Yes</b>	<b>284</b>	<b>63.1</b>
<b>No</b>	<b>13</b>	<b>2.9</b>
<b>N/a</b>	<b>153</b>	<b>34</b>
<b>Total</b>	<b>450</b>	<b>100</b>



**Figure 4.12** Details about essential imaging been displayed

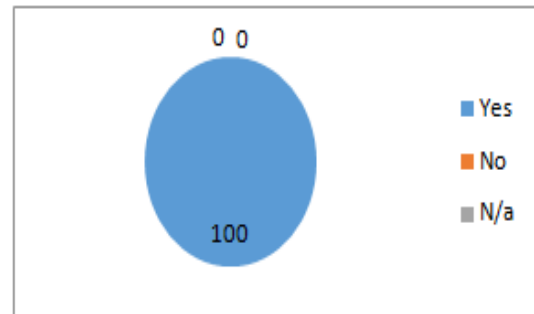
Figure 4.12 and Table 4.12 reveals that among 450 patients, the essential images were displayed for 284(63.1%)

cases. In case of 13(2.9%), radiological images were not displayed and remaining 153(34%) radiological images were not applicable.

*Section -- C sign – out*

**Table 4.13** Nurse verbally confirmed with the team

	Frequency	Percentage(%)
<b>Yes</b>	<b>450</b>	<b>100</b>
<b>No</b>	<b>0</b>	<b>0</b>
<b>N/a</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>



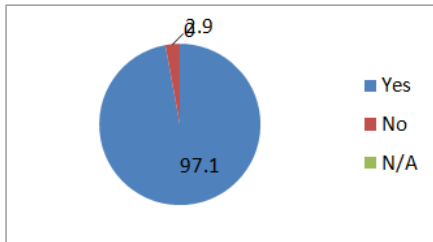
**Figure 4.13** Nurse verbally confirmed with the team of Surgeons and anesthetist

Table 4.13 and figure 4.13 Shows the Nurse verbally confirmed with the team of Doctors and Anesthetist 100%.

**Table 4.14** Name of procedure is stated as recorded

	Frequency	Percentage (%)
<b>Yes</b>	<b>437</b>	<b>97.1</b>
<b>No</b>	<b>13</b>	<b>2.9</b>
<b>N/A</b>	<b>0</b>	<b>0</b>

<b>Total</b>	<b>450</b>	<b>100</b>
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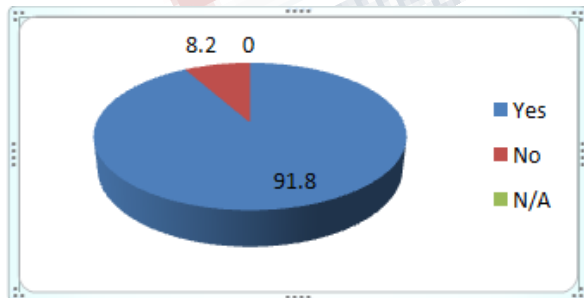


**Figure: 4.14** Name of procedure is stated as recorded

As per Figure 4.14 and Table 4.14 describe that out of 450 cases, the name of the procedure are recorded in 437(97.1%) cases and do not record only in 13(2.9%) cases.

**Table 4.15** The instrument sponge and needle count are correctly recorded

The instrument sponge and needle count or correct		
	Frequency	Percentage (%)
<b>Yes</b>	<b>413</b>	<b>91.8</b>
<b>No</b>	<b>37</b>	<b>8.2</b>
<b>N/A</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>

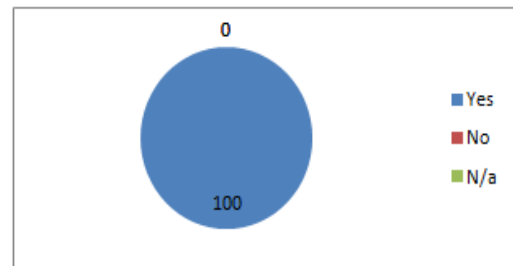


**Figure 4.15** the instrument sponge and needle count are correctly recorded

Table 4.15 and figure 4.15 we can observe that, during 413 (91.8%) cases, the needle, sponge and instrument counts were correct, and during 37(8.2%) cases there were incorrect count.

**Table 4.16** Confirmation that the specimen (if any) is correctly labeled

How the labelling of the specimen( including patient name	Frequency	Percentage (%)
<b>Yes</b>	<b>450</b>	<b>100</b>
<b>NO</b>	<b>0</b>	<b>0</b>
<b>N/A</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>

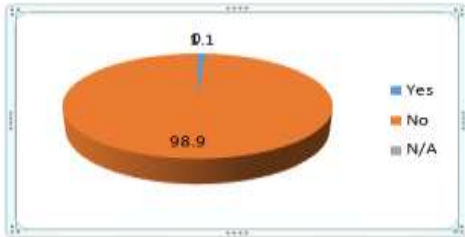


**Figure 4.16** Confirmation that the specimen (if any) is correctly labeled

Table 4.16 and figure 4.16 Highlights that the specimen taken for the histopathological diagnosis during the surgical procedure was labeled correctly 100%.The labels put on the specimen indicated the name, age, and inpatient department number.

**Table 4.17** whether there is any instrument risk to be addressed

Whether there any equipment problem to be addressed		
	Frequency	Percentage (%)
<b>Yes</b>	<b>5</b>	<b>1.1</b>
<b>No</b>	<b>445</b>	<b>98.9</b>
<b>N/A</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>

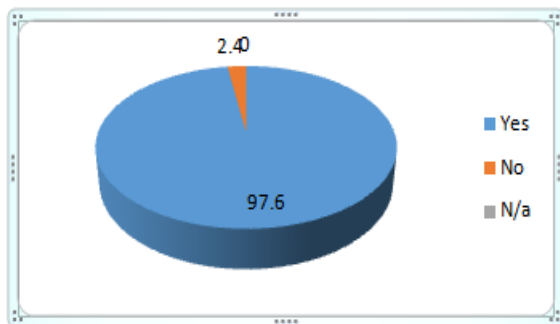


**Figure: 4.17** whether there is any instrument risk to be addressed

Table 4.17 and Figure 4.17 show the out of 450 patients, only 5(0.1%) of them were seen with those concerns and rest of 445(98.9%) were without any issue.

**Table 4.18** Anaesthesia professional, Nurse and Surgeon review the key concerns for retrieval and management of the patient

	Frequency	Percentage (%)
<b>Yes</b>	<b>439</b>	<b>97.6</b>
<b>No</b>	<b>11</b>	<b>2.4</b>
<b>N/a</b>	<b>0</b>	<b>0</b>
<b>Total</b>	<b>450</b>	<b>100</b>



**Figure 4.18** Surgeon's, Anesthetist's and Nurses enumerates or deny any key concerns for the recovery and care of the patient

**V. FINDINGS**

As per the lists of table 4.18 in all the 450 cases anesthetist, nurse and Surgeon review the key concerns for healing and care of the patient in 439 (97.6%) cases.

- ❖ 'There was a high rate of administration of the Sign In, Time Out and sign out 3 phases' also
- ❖ The best compliance was within items relating to patient procedure, consent, identity and, where valid, side or site of operation ,
- ❖ Anaesthetistsafety check for the patient Completed,
- ❖ Checking for the Pulse oxymeter on patient and functioning good.
- ❖ Introduction of team members and their role done. Verbal confirmation by surgeons,
- ❖ Anesthetists and nurses about patient's anticipated critical events done.
- ❖ Antibiotic prophylaxis given 60 minutes before the procedure in all cases.

**VI. RECOMMENDATIONS AND SUGGESTIONS**

*Study has Highlighted Suggestions That could improve the use of Checklist in Operating Theaters.*

- ❖ Audits should be performed on a weekly basis to improve the functioning of the operation theater.
- ❖ Surgeons should be taken a stronger role in time out and sign out phases.
- ❖ Newly joined staffs had been "introduced" to the surgical safety checklist by personal heads "before joining" the surgical team.
- ❖ Multidisciplinary training should be conducted for operation theater staffs and to improve communication may increase the rates of compliance with the checklist.
- ❖ Prepare the checklist in a poster, whiteboard or other more participatory format so all theatre personnel can follow the checks and engage in the process.

**VII. CONCLUSION**

In Healthcare system, the concept of using a surgical safety checklist in surgical practice was encouraged by publication by WHO Surgical Safety Checklist. It was believed that by routinely checking common safety issues and by better team communication morbidity and mortality could be addressed consistently.

The present study indicates that surgical safety checklist can contribute to improve patient safety.



Adherence to the checklist helps in detecting the instances of human error, equipment malfunction and helps in identifying areas that need strengthening and streamlining. To develop safety of surgical operating procedures, key safety checks by all personnel at the following stages is necessary:

- ❖ Before taking the patient into operating room
- ❖ Prior to skin incision and
- ❖ Before the operating personnel leave the operation theater after surgery.

#### ACKNOWLEDGEMENT

Hence there are many instinctive clear benefits to the use of surgical safety checklist including the prevention of wrong patient/wrong site surgery. Use of surgical safety checklist is important, and the focus should be on supporting local implementation efforts.

Marvellous success can be achieved only through the guidance of well-experienced and qualified persons. Firstly, I would like to thank Dr Sarala K.S. Assistant Hospital Administrator Dissertation Supervisor, for her excellent guidance and kind cooperation during the entire Dissertation period.

It is my responsibility to extend my thanks to Professor Nagesha H N, Dissertation Supervisor, for extending his support and cooperation in completing my project work.

#### REFERENCE

1. Zegers-Hochschild et al (2009). The international committee for monitoring assisted reproductive technology (ICMART) and the world health organization (WHO) revised glossary on ART terminology, 2009. *Human Reproduction*, p.dep343.
2. Borchard et al (2012). A systematic review of the effectiveness, compliance, and critical factors for implementation of safety checklists in surgery. *Annals of surgery*, 256(6), pp.925-933.
3. Ball P.J et al. (2001).E-health: transforming the physician/patient relationship. *International journal of medical informatics*, 61(1), pp.1-10.
4. McDonald et al (2006).Rules, safety and the narrativisation of identity: a hospital operating theatre case study. *Sociology of health & illness*, 28(2), pp.178-202.
5. Biffi, W.L.et al.(2015). Suboptimal compliance with Surgical Safety Checklists in Colorado: A prospective Observational Study Reveals Differences Between Surgical Specialties. *Patient Safetyinsurgery*, 9(1),p.1.6.
6. Cullati, et al. (2014). Implementation of the Surgical Safety Checklist in Switzerland and perceptions of its Benefits: Cross-sectional Survey. *Ploys one*, 9(7), p.e101915.
7. Eshun, N. and Shunt, P.et al.(2013). Attitudes of Preoperative Personnel: Comparative Research on Safety Culture and Usage of Surgical Safety Checklist.
8. Fourcade A. et al (2011)Barriers to staff adoption of a Surgical Safety Checklist. *BMJ quality & safety*, pp.bmjqs.
9. Haynes, A.B.(2011)Changes in safety attitude and relationship to decreased postoperative morbidity and mortality following implementation of a checklist-basedsurgicalsafety intervention. *BMJquality&safety*, 20(1), pp.102-107