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RESEARCH ARTICLE

COMPLIANCE TO THE USE OF SURGICAL SAFETY CHECKLIST IN ELECTIVE SURGERIES

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CDC- Centre for disease control

ICU- Intensive care unit

MRSA- Methicillin resistant staphylococcus aureus

PVCBSI- Peripheral venous catheter related blood stream infections

ABSTRACT

An observational study was conducted to assess the compliance to the use of surgical safety checklist in elective surgeries at JIPMER, Puducherry. **Background:** Surgical service is one of the fundamental health care services given in the health care system. Over 234 million operations performed annually worldwide and this yearly volume now exceeds that of childbirth. The surgical complications are a major cause of morbidity and mortality and pose a major financial burden to the patients and healthcare provider. A strong safety culture that enhances patient safety initiatives has been reiterated in the healthcare system and safety of surgical care is a global concern. As a part of different effort modalities world health organization lunched "safe surgery saves lives campaign". Around 1800 institutions are now reported to be using the checklist worldwide. The potential for surgical safety checklists to improve safety and outcomes and generate substantial cost swings has attracted global interest. The compliance to surgical safety checklist has many positive effects towards attaining a quality patient care. The effectiveness includes a protective patient environment, reduction in mortality and morbidity, a well co-ordinated teamwork and communication among the health care professionals. **Aim:** The present study aims to assess the compliance to the use of surgical safety checklist in elective surgeries. **Method:** The Descriptive Observational design was used in the study with 384 samples of elective surgeries through Convenient Sampling technique. The data was collected in all the Operation Theatres except emergency OT's for a period of 3 months with help of standardized surgical safety checklist. **Results:** From the observation about 22.39% of elective surgeries had excellent usage status of surgical safety checklist, 53.9% had very good compliance, 10.41% had fair compliance and 13.28% had poor compliance on usage of surgical safety checklist. There is a significant association between usage status of surgical safety checklist and type of surgery ($p < 0.05$). From the comparison of overall score of the checklist in relation to type of surgeries, major surgery has greater compliance (with mean score 20.96 ± 2.76) than the minor surgeries (with mean score 19.17 ± 3.00) in usage of surgical safety checklist. The total score of different items in time out (item 6-15) and sign out (item 16-25) were statistically significant (< 0.05). In relation to the major surgeries, time out phase $193(8.6 \pm 3.95)$ and sign out phase $193(8.4 \pm 1.6)$ were observed analytically. There was highly significant difference between sign in items (1-5) with regard to major surgeries $193(3.95 \pm 1.7)$ and minor surgeries $191(4.12 \pm 1.5)$. **Conclusion:** The study revealed that the level of usage of the surgical safety checklist for elective surgeries was very good. Majority of elective surgeries had very good compliance; a few of elective surgeries had fair and excellent compliance to surgical safety checklist. There was the significant association between the usage status with the type of surgery. The usage of surgical safety checklist shows Time out and Sign out phase had significantly associated and were followed mostly in major surgeries.

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INTRODUCTION

An estimated 234 million major surgical operations are performed annually worldwide. As volume and importance of surgery in global healthcare increases, patient safety and quality in surgical care gains more attention (Haynes, 2012). Nearly one in 10 hospitals experience iatrogenic events and more than half of them occur with perioperative care and the complications that occur are avoidable.

Studies in industrialized countries have shown perioperative rate from inpatient surgery is 0.4% to 0.8% and rate of major complication is 3% to 17%. These rates are likely to be much higher in developing countries (Ouro-Bangna Maman, 2005). On the other hand, non compliance to the usage of surgical safety checklist will surely have its ill effects. Non adherence to the surgical safety checklist will lead to nontechnical errors like wrong patient, wrong procedure, wrong site surgery, miscommunication among health care team members which may eventually increase threat and irreparable complications to patients and result in unnecessary patient mortality and morbidity which increases the burden on healthcare systems

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(Makary, 2007). In 2008, the world health organization launched the safe surgery saves lives campaign and produced the surgical safety checklist designed to reduce complications and deaths associated with surgery. It has been observed that the use of surgical safety checklist is associated with development of better safety attitude among operating personnel, improved clinical outcomes. In an international pilot study, the surgical safety checklist intervention resulted in a decrease in mortality (1.5-0.8%) and morbidity (17-11%) (Haynes *et al.*, 2012).

Kasatpibal *et al.* (2012) conducted a study on implementation of the WHO surgical safety checklist at a university hospital in Thailand. The highest compliance rate (91.4%) during the sign-in period was with patient's confirmation of their identity, operative site, procedure, and consent. However, only 19.4% of the surgical sites were marked. In the time out period, surgical teams had introduced themselves by name and role in 79% of the operation. And in 95.7% of cases, the patients name, the incision site, and the procedure has been confirmed. Antibiotic prophylaxis had been given within 60 minutes before the incision in 71% of the cases. For 83% of the operation, the surgeon reviewed crucial events whereas only 78.4% were reviewed by the anesthetists. Sterility had been confirmed by the operating room nurses for every patient, but the essential imaging was displayed at a rate of only 64.4%. In the sign out period, nurses correctly confirmed the name of the procedure orally in 99.5% of the cases. Instrument, sponge and needle count were completed and the specimen was labeled in most cases, 98.8% and 97.6% respectively (Kasatpibal, 2012).

The surgical safety checklists and its compliance can prevent complications, reduction in mortality and morbidity; improve the teamwork among the surgical healthcare professionals and subsequent improvisation in communication systems. These concepts awakened the investigators to do an observational study about the compliance to the surgical safety checklist.

MATERIALS AND METHODS

The objective of the study is to assess the compliance to the use of surgical safety checklist in elective surgeries in JIPMER, Puducherry and to identify the factors associated with the status of the usage of surgical safety checklist in elective surgeries in JIPMER. The Observational descriptive study is used to observe the compliance to usage of surgical safety checklist in elective surgeries using an observational and coaching tool in all Operation theatres in JIPMER hospital. The sample size is 384 elective surgeries performed in Operation theatres in JIPMER from 9 operation theatre's such as Obstetrics and gynecology, General surgery, ENT, PMRC, CTVS, Neurosurgery, Plastic surgery, urology, and pediatric in the presence of investigator. Convenient sampling technique was used to select 384 elective surgeries in all the operation theatres. The instrument used in this study is standardized coaching surgical safety checklist. It contains two parts.

Part 1: Demographic variables consist of Procedure information-Time of incision, Surgery ending time, Procedure performed, Patient disposition. Surgeon information-Surgeon status, Surgeon's Age, Surgeon specialty, Type of surgery, Year of experience. Observer information-Observer age, Gender, Role.

Part 2: Standardized surgical safety checklist coaching tool-Observation of the compliance on usage of surgical safety checklist will be done by using the standardized surgical safety checklist coaching tool. It consists of 25 'Yes' or 'No' items which is related to sign in phase(item 1-50), time out phase(item 6-15) and sign out phase(item 16-25).

Interpretation of score- A total of 25 alternative responses questions in which each 'yes'(used items) answer carries one mark and 'no'(not used) answer carries zero mark. The total score is 25. The observed percentage score is classified according to Jefferson scoring system (1995) as follows, 93-100% - Excellent, 85-92% -Very good, 76-84% - Good, 70-75% - Fair, <70% - Poor. Study was conducted after obtaining ethical clearance and approval from the research committee of "Jawaharlal Institute of Postgraduate Medical Education and Research Institute". Oral and written consent was obtained from concerned Head of Departments.

RESULTS

In the present study, 100% of usage status of surgical safety checklist with regard to awareness of using surgical safety checklist, positioning the patient, antibiotic prophylaxis, discussing post-operative shifting of the patient, labeling of specimen, monitoring the sponge count and equipment count were observed. In relation to the use of surgical safety checklist <50% of compliance were observed in circulatory nurse leaving the operation theatre to find instruments, checklist signing by anesthetist and surgeon (Table: 1). Among 384 elective surgeries, 193 (mean score 20.96 ± 2.76) were major surgeries and 191 (mean score 19.17 ± 3.00) were minor surgeries, in which major surgeries has greater compliance to checklist usage than minor surgeries (Table: 2).

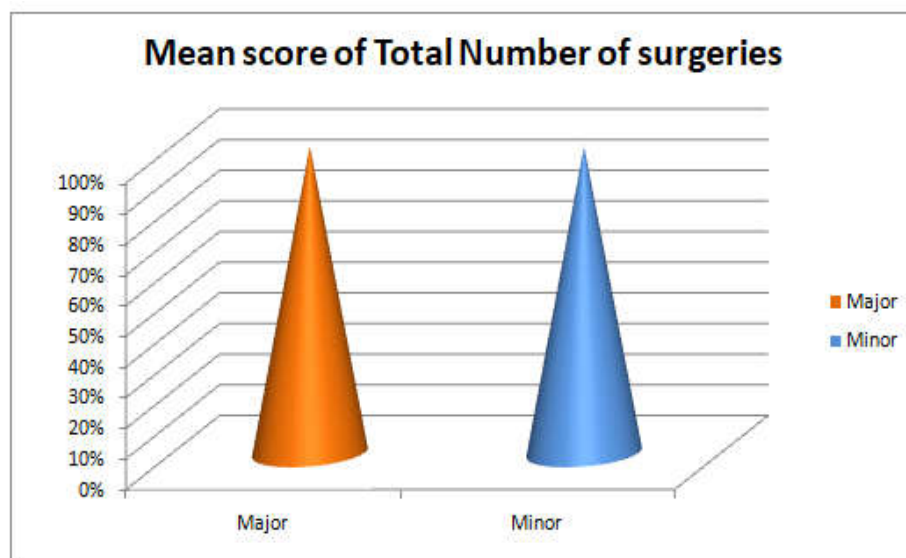
The distribution of the status of the usage of checklist shows that 22.39% of elective operation theatres have excellent compliance on usage of surgical safety checklist, 53.9% has very good compliance, 10.41% operation theatre comes under fair compliance on usage of safety checklist and 13.28% has poor compliance (Table:3). With regard to the usage status of surgical safety checklist in major surgeries had excellent score of 84(43.52%) when compared to minor surgeries and 140(73.29%) had very good compliance in minor surgeries (Table:4). The association of the usage status of the checklist with the type of surgery shows that the trend in the usage status of the checklist with the type of surgery is found to be significantly associated. ($p < 0.05$) (Table: 5). The Comparison of total score in different items in checklist in relation to the type of surgery is shown in the table: 6. It shows that the trend in the total score of different items in time out (item 6-15) and sign out (item 16-25) are statistically significant ($p < 0.05$).

DISCUSSION

The study revealed that the level of usage of the surgical safety checklist for elective surgeries (22.39%) had excellent usage status of the surgical safety checklist, in a maximum of elective surgeries (53.9%) had very good compliance, a few of elective surgeries (10.41%) had fair compliance and a minimum of elective surgeries (13.28%) had poor compliance on usage of surgical safety checklist. Rydenfalt *et al.*, (2012) a quantitative study in Swedish on compliance of surgical safety checklist revealed that there was improved compliance and involvement of whole team with concept of risk and the perceived relevance's of checklist items.

Table 1. Frequency and percentage distribution of the observation on different items in the checklist

S.No	Items	Observation	
		Used (n%)	Not used (n%)
1	Surgical team members are aware of using the surgical safety checklist	384(100%)	0(0%)
2	Patient identity, procedure or operative site before incision is confirmed	304(79.2%)	80(20%)
3	Surgical site is marked	231(60.1%)	153 (39.84%)
4	Preoperative medication given or not	306 (79.6%)	78 (20.3%)
5	Allergies have been ruled or not	306 (79.6%)	78(20.3%)
6	Team members introduce themselves by name and role	334(86.9%)	50(13.02%)
7	Patient is placed in position	384(100%)	0(0%)
8	Surgeon discuss the operative plan	345(89.8%)	39(10.15%)
9	Surgeon stated the duration of procedure	347(90.3%)	37(9.63%)
10	Surgeon communicate the expected blood loss	347(90.3%)	37(9.63%)
11	Nurse discuss sterility	371(96.6%)	13(3.38%)
12	Anesthesia provider discuss the anesthesia plan	371(96.6%)	13(3.38%)
13	Antibiotic prophylaxis	384(100%)	0(0%)
14	All checklist items read aloud	269(70.65%)	115(29.9%)
15	Circulatory nurse leave the OR to find instruments	64(16.6%)	320(83.33%)
16	Surgical team members actively participating in maintaining the checklist	334(86.9%)	50(13.02%)
17	Antibiotic re dosing discussed or not	347(90.3%)	37(9.63%)
18	Checklist signed by concerned nurse	214(55.72%)	170(44.27%)
19	Checklist signed by concerned anesthetist	124(32.29%)	260(67.70%)
20	Checklist signed by concerned surgeon	124(32.29%)	260(60.70%)
21	Postoperative shifting discussed or not	384(100%)	0(0%)
22	Time of wheeling out is mentioned	345(89.8%)	39(10.15%)
23	Specimens have been labeled	384(100%)	0(0%)
24	Sponge count have been monitored	384(100%)	0(0%)
25	Equipment count have been monitored	384(100%)	0(0%)

**Table 2. Comparison of overall score of the checklist in relation with the type of surgery****Table 3. Distribution of the status of the usage of the checklist**

Usage status	Number	Frequency (%)
Excellent (93-100%)	86	22.39
Very good (85-92%)	207	53.9
Good (76-84%)	0	0
Fair (70-75%)	40	10.41
Poor (<70%)	51	13.28

Table 4. Distribution of the usage status in relation to type of surgery

Usage status	Type of surgery		Total
	Major (n %)	Minor (n%)	
Excellent (93-100%)	84 (43.52)	2 (1.047)	86 (22.39)
Very good(85-92%)	67(34.71)	140 (73.29)	207 (53.9)
Good(76-84%)	0 (0)	0 (0)	0 (0)
Fair(70-75%)	27(13.98)	13 (6.8)	40 (10.41)
Poor (< 70%)	15 (7.77)	36 (18.84)	51 (13.28)
Total	193	191	384

Table 5. Association of the status of the checklist usage with the type of surgery

Usage status	Type of surgery		Number	Statistical significance
	Major (n %)	Minor (n %)		
Poor (< 70%)	15	36	51	X ² =118.3 P<0.001
Fair (70-75%)	27	13	40	
Good (76-84%)	0	0	0	
Very good(70-75%)	67	140	207	
Excellent (93-100%)	84	2	86	

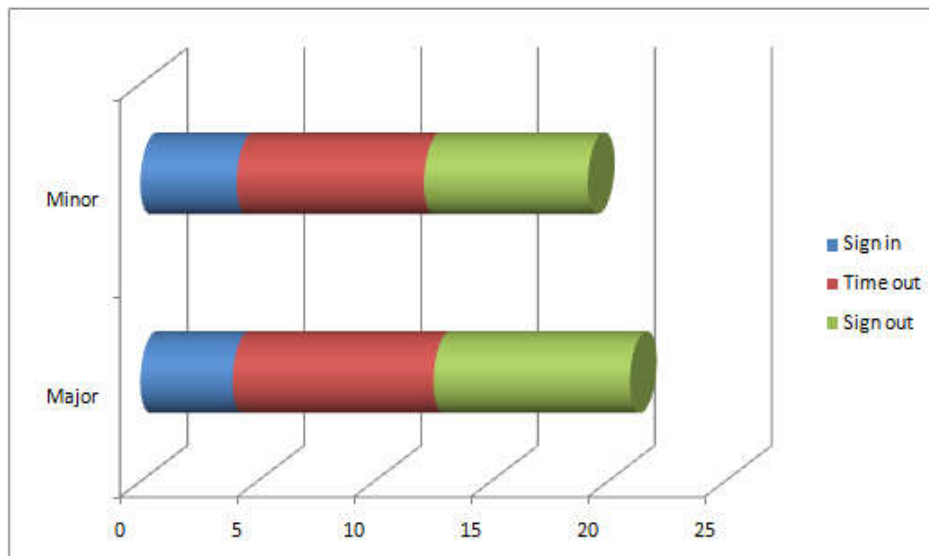


Table 6. Comparison of total score of different items in checklist in relation to the type of surgery

Borchard *et al.* (2012) conducted a retrospective study on systematic review of effectiveness, compliance and critical factors for the implementation of safety checklist in surgeries shows that there was good compliance overall with the surgical team members. There is a significant association with usage status of surgical safety checklist with type of surgery ($p < 0.05$). From the comparison of overall score of the checklist in relation to type of surgeries, major surgery has greater compliance (with mean score 20.96 ± 2.76) than the minor surgeries (with mean score 19.17 ± 3.00) in usage of surgical safety checklist. Similar study findings was also highlighted in Aveling *et al.*, (2013), quantitative study shows that major surgeries (60.2%) had more compliance than minor surgeries (39.8%).

There is a significant association with usage status of surgical safety checklist with phases of surgery. The total score of different items in time out (item 6-15) and sign out (item 16-25) were statistically significant (< 0.05). In relation to the major surgeries, time out phase $193(8.6 \pm 3.95)$ and sign out phase $193(8.4 \pm 1.6)$ were observed analytically. There was highly significant different between sign in items (1-5) with regard to type of surgery includes major surgeries $193(3.95 \pm 1.7)$ and minor surgeries $191(4.12 \pm 1.5)$. Similar study was also highlighted in Hannam *et al.* (2013), administration of surgical safety checklist domain which includes sign in 96%, time out 99% and sign out 22%. This implies time out phase has graded influence on administration of surgical safety checklist. Eventually, patient care and safety improves with improved coordination of surgical team members.

Conclusion

The present study assessed the level of usage of surgical safety checklist for 384 elective cases in JIPMER. This study shows that a) most elective surgeries (22.39%) had excellent usage status of the surgical safety checklist, in a maximum of elective surgeries (53.9%) had very good compliance, a few of elective surgeries (10.41%) had fair compliance and a minimum of elective surgeries (13.28%) had poor compliance on usage of surgical safety checklist. b) Among the factors there was a significant association between the status of the checklist usage with the type of surgery. The result shows that Safety checklists are beneficial for OR teamwork and also motivates the nursing personnel importance of use of the surgical safety checklist to improve the quality of intraoperative care. This may be one mechanism through which complications are prevented and patient outcomes are improved.

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