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Achievements and Challenges in Implementation of WHO Surgical Safety Checklist in Operation Theatre at a Tertiary Care Hospital.

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Abstract

The World Health Organization (WHO) introduced Surgical Safety Checklist (SSC) in 2008 to reduce the number of surgical deaths and complications. This study was delineated to assess the knowledge, attitude and perception of operation theatre staffs about SSC.

Average age of our respondents was 38.68±9.99 years with average work experience of 10.64±8.57 years. About 85% participants had good knowledge about SSC. Most of the subjects were adhered to rules and clinical guidelines in their operating room. Almost all participants accepted the importance of SSC in operation theatre and agreed that using checklist will make them more confident. Majority of participants suggested that nurses and a dedicated staff would be suitable person to handle SSC.

Lack of commitment from the Management (35.42%), lack of interest/will/attitude of health worker (62.50%), shortage/lack of manpower (43.75%), lack of team spirit (64.58%) etc were pointed out by the participants as possible challenges that can affect the implementation of the safe surgery checklist in their operating theatres.

Many of the participants believed that the support of Administrative Heads e.g. CMD (33.33%), CMAC (22.92%), head of departments and consultants in surgery (72.92%), anesthesiology (75.00%), nursing (66.67%) and operating theatre manager (52.08%) would enhance the implementation of the safe surgery checklist in this hospital to a large extent. There is also need for training and frequent re-training of all the surgical team members; this will foster a good understanding and implementation of the SSC.

Contributors

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Keywords: Surgical Safety Checklist, Surgery, Awareness, Implementation, Operation Theatre and Challenges.

Introduction

Worldwide, there are an estimated 234 million surgical procedures performed every year. [1] Out of them millions

of patients suffer disabling injuries or death because of unsafe medical care. A systematic review of over 74 000 patient records found a incidence of in-hospital adverse events was 9.2% with approximately half of those events being operation or drug-related, and 43% deemed preventable[2] using the long-standing medical principle of **"first, do no harm".**

The World Health Organization (WHO) introduced Surgical Safety Checklist (SSC) in 2008 to reduce the number of surgical deaths and complications.(3) The checklist was also tagged **"safe surgery saves lives"** initiative which aims to reduce the number of surgical deaths and complications by good operating theatre practices, by improving team communication in operating rooms, and by empowering all members of the surgical team to flag up concerns. The checklist is based on successful program which incorporates **validated checklists to be reviewed by surgical team before induction of anaesthesia - sign in, before skin incision - time out, and before the patient leaves the operating room - sign out.** Adherence to the checklist program leads to team members working together, communicating well, and can quickly detect avoidable errors thereby leading to reduction in postoperative complications. So it is prudent to assess the awareness and implementation of the safety majors in our operation theatre.

Aim: Our study was aimed to find out "Achievements and challenges in implementation of WHO Surgical Safety Checklist on the basis of awareness and perception of Doctors and Paramedical staff working in Operation Theatre at Indian Spinal Injuries Centre, Vasant Kunj, New Delhi.

Objectives

1. To assess current knowledge of Surgeons, Anaesthetists, Nurses and Technicians working in Operation Theatre regarding WHO Surgical Safety Checklist using questionnaires.

2. To suggest majors to improve the knowledge, attitude and perception of Operation Theatre staff and Compliance of the WHO Surgical Safety Checklist

Methodology

Population

The project work was conducted in Operation Theatre at Indian Spinal Injuries Centre tertiary, New Delhi. Operation Theatre Users which include Surgeons, Anaesthetists, Residents, Nurses were participated in the study.

This was a descriptive, cross-sectional, an observational type study which involved the use of pre-tested questionnaires targeted to operation theatre users.

Data Collection

Data was obtained by using pre-tested, structured questionnaires prospectively.

All (160) theatre users were given the questionnaire, however only 96 completed the questionnaires.

Pre-testing and Validation of Questionnaires: Pre-test of the questionnaires was carried out using 5 peri-operative nurse tutors who were also theatre users from other hospitals.

All information obtained from this study has been kept confidential and will not be linked to the participants in anyway.

Data analysis: SPSS version 20.0 was used for data analysis. Descriptive statistics has been used to summarize the data while Chi square was used to test association between categorical variables, all analysis were done at a 5% level of significance ($p < 0.05$) with 95% confidence interval.

(DATA COLLECTION AND COMPILATION)

Characteristics of the study population:

A total of 96 questionnaires were filled and returned out of160 that were distributed among participants.

Table: 1 Characteristics of the study population:

Gender	**Gender**	**Frequency**	**Percentage**
	Male	68	70.8
	Female	28	29.2
Mean age in years	**Mean age in years**	**Mean**	**Standard deviation**
	Male	41.47	10.26
	Female	31.92	4.93
Mean years of experience	**Years of experience**	**Mean**	**Standard deviation**
	Male	12.64	9.14
	Female	5.78	4.19
Subjects distribution as per department	**Department**	**Frequency**	**Percentage**
	Orthopaedics	34 (Male 34, Female 0)	35.4
	OT Nursing	32(Male 10, Female 22)	33.3
	Anaesthesia	20(Male 16, Female 4)	20.8
	General Surgery	4(Male 4, Female 0)	4.2
	OT Technician	4(Male 4, Female 0)	4.2
	OT Manager	2(Male 0, Female 2)	2.1
Subjects distribution as per department and qualification	**Department**	**Frequency**	**Percentage**
	Orthopaedics Surgeon, MS	30	31.25
	Orthopaedics Surgeon,MS, MHA	4	4.17
	Nursing-BSc	26	27.08
	Nursing GNM	6	6.25
	Anaesthetist-MD	16	16.67
	Anaesthetist-MD, MHA	4	4.17
	General Surgeon-MS	4	4.17
	OT Technician-Diploma	4	4.17
	OT Manager-MBA	2	2.08

Gender

Out of 96 respondents 68 (70.8%) were male and 28 (29.2%) were female participants.

Age:

The mean age of the study population was 38.68±9.99. Mean age of males was (41.47±10.26) and mean age of females was (31.92±4.93).

Distribution of subjects according to department

About 34(35.4%) respondents were orthopaedic surgeons, 32 (33.3%) were peri-operative nurses, 20 (20.8%) were anesthesiologists. 4 (4.2%) were general surgeon, 4(4.2%) OT technicians and 2 (2.1%) OT manager participated in this project work.

According to qualification Department wise

Out of 34 Orthopaedic surgeons, 4 (4.17%) were MS,MHA and rest were MS. Out of 32 nurses 26 (27.08%) nurses were BSc nursing and 6 (6.25%) nurses had done GNM course. Out of 20 Anaesthesiologists 4(4.17%) had done MHA along with their MD degree and rest 16 (16.67%) were MD in Anaesthesiology. General surgeons (4.17%) were MS in general surgery. OT technicians (4.17%) had done diploma in OT Technician course.

Work Experience

Males are working in OT for last 12.64±9.14 years and females are working for last 5.78±4.19 years. However the overall (mean)experience of all respondents was 10.64±8.57 years.

1. Knowledge and awareness of the surgical safety checklist among the respondents:

Table: 2

	Variables	Frequency
1.	**Subjects who had ever heard about surgical safety checklist:**	
	Yes	**94(97.92%)**
	No	**2(2.08%)**
2	**If Yes, Sources from where subjects had heard about SSC**	
	a). Literature on the internet:	**10 (10.420)**
	b). From colleagues:	**32 (33.33)**
	c). Publicity at the hospital:	**34 (35.42)**
	d) Training course:	**32 (33.33)**
	e). From books:	**8 (8.33)**
	f) Cannot say/No response:	**2 (2.08)**
	g) Multiple responses:	**22 (22.92)**
3	**Subjects who had ever seen SSC:**	
	Yes	**94(97.92%)**
	No	**2 (2.08%)**
4	**If Yes, Place where they hadseen**	
	ISIC	**70**
	Previous hospital	**20**
	Training centre	**4**
	Academic presentations	**2**
	Internet	**0**
	Books	**0**
5	**Knowledge of respondents on the SSC:**	
	Good (>5)	**82 (85.42%)**
	Poor (<4)	**14 (14.58%)**

Most (97.92%) of the participants had heard about Surgical Safety Checklist. Maximum34 (35.4%) respondents heard about SSC from publicity at the hospital, 32 (33.3%) from colleagues and 32 (33.3%) during training course. Many people 22 (22.88%) had heard about SSC from multiple sources.

Most of the respondents (97.92%) had ever seen the surgical safety checklist anywhere in their carrier. Most of the respondents (72.92%) had seen the SSC in the Indian Spinal Injuries Centre only. About 20.8% participants in previous hospital, rest in training centre and academic presentations.

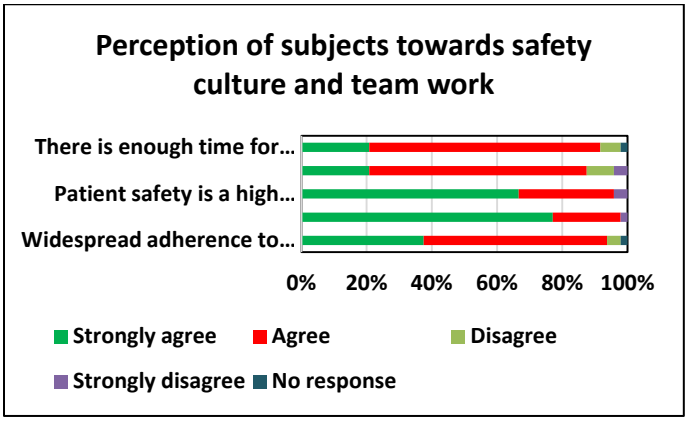
Their knowledge about SSC was assessed using 10 questions which cut across the content, utilization, implementation and application of the SSC. Correctly answered questions were marked and scored on a 10-point scale. This was further graded into good and poor knowledge. Poor knowledge was for correct responses between 1-4, while good knowledge was given to anyone who correctly answered between 5–10 questions. Generally, majority (85.42%) had good knowledge while a lesser quartile (14.58%) had poor knowledge.

2. Perception of the participants towards safety culture and team work:

Table: 3

Variable	Strongly agree	Agree	Disagree	Strongly disagree	No response
Widespread adherence to rules in our operating room	36 (37.5%)	54 (56.25%)	4 (4.17%)	0	2 (2.08%)
Patient safety is responsibility of all staff	74 (77.08%)	20 (20.83%)	0	2 (2.08%)	0
Patient safety is a high priority	64 (66.67%)	28 (29.17%)	0	4 (4.17%)	0
We know all our staff by first and last name	20 (20.83%)	64 (66.67%)	8 (8.33%)	4 (4.17%)	0
There is enough time for safety preparation in our operating room	20 (20.83%)	68 (70.83%)	6 (6.25%)	0	2 (2.08%)

Figure 1: Component bar diagram showing perception of subjects towards safety culture and team work



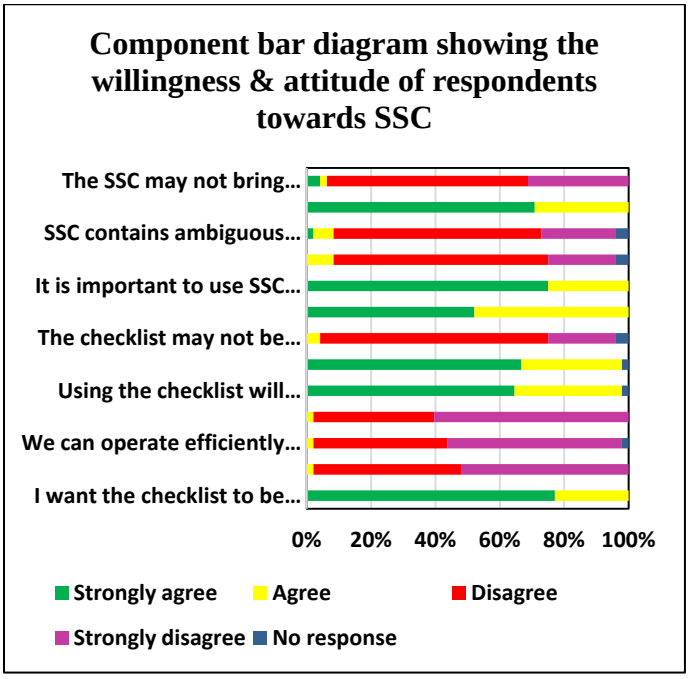
A greater number (93.75%), (97.92%) and (95.83) indicated that there was widespread adherence to rules and clinical guidelines in their Operating room, Patient safety is the responsibility of all operating room staff and Patient safety is a high priority in their operating rooms. Most of the participants mentioned that they were well known to each other. About 91.67% fully agree that they had enough time for safety preparation in their operating room.

3. Willingness and attitude of participants to use the SSC:

Table: 4

Variables	Strongly agree	Agree	Disagree	Strongly disagree	No response
I want the checklist to be used for all surgical procedures	74 (77.08%)	22 (22.92%)	0	0	0
The checklist seems to be unnecessary tick-box	0	2 (2.08%)	44 (45.83%)	50 (52.08%)	0
We can operate efficiently without this checklist	0	2 (2.08%)	40 (41.67%)	52 (54.17%)	2 (2.08%)
SSC might waste time and can make our OT less efficient	0	2 (2.08%)	36 (37.50%)	58 (60.42%)	0
Using the checklist will make us more confident	62 (64.58%)	32 (33.33%)	0	0	2 (2.08%)
The checklist will improve communication and collaboration in OR	64 (66.67%)	30 (31.25%)	0	0	2 (2.08%)
The checklist may not be very important as it has its own handicaps	0	4 (4.17%)	68 (70.83%)	20 (20.83%)	4 (4.17%)
Checklist is easy to use	50 (52.08%)	46 (47.92%)	0	0	0
It is important to use SSC in every case	72 (75%)	24 (25%)	0	0	0
SSC cause irritation to staff members	0	8 (8.33%)	64 (66.67%)	20 (20.83%)	4 (4.17%)
SSC contains ambiguous statement	2 (2.08%)	6 (6.25%)	62 (64.58%)	22 (22.92%)	4 (4.17%)
Implementing the SSC is a good decision	68 (70.83%)	28 (29.17)	0	0	0
The SSC may not bring extra value to existing safety procedures in theatre	4 (4.17%)	2 (2.08%)	60 (62.50%)	30 (31.25%)	0

Figure 2: Component bar diagram showing the willingness & attitude of respondents towards SSC

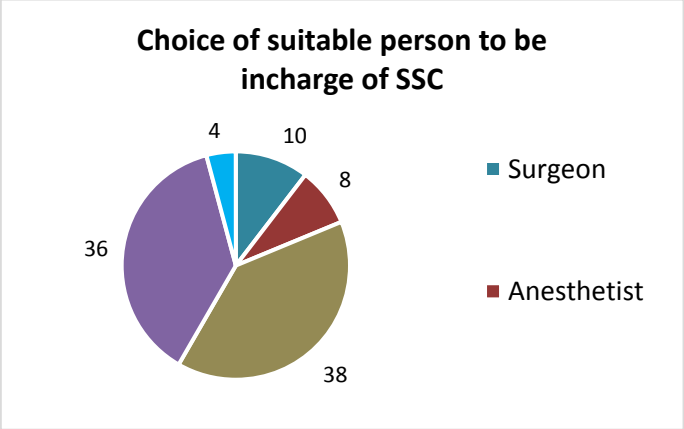


All participants (100%) indicated that they wanted the checklist to be used for all their own surgical procedures. Almost all (97.91%) disagreed with the fact that the checklist seems like an unnecessary tick box and they can operate efficiently without having to use the checklist. Almost all (97.91%) and (97.92%) said using the checklist will make them have more confidence and also improve their communication and collaboration between operating room staff. Majority of participants (91.66%) disagreed with the statement that the checklist may not be very important as it has its own handicaps. All (100%) agreed that the checklist is easy to use and important in every case. Majority of respondents (93.75%) rejected the statement that checklist may not bring any extra value to existing safety procedures already in place in the theatre before its implementation.

Table 5: Most suitable person for taking charge of SSC:

Person suitable to be in-charge of SSC	Frequency
Surgeon	10 (10.42%)
Anesthetist	8 (8.33%)
Nurse	38 (39.58%)
A dedicated theatre staff	36 (37.5%)
Anybody available at given time	4 (4.17%)

Figure 3: Diagram showing suitable person to handle SSC as per study subjects:



Many (39.58%) indicated that the Nurses would be more suitable in taking charge of the checklist. Many subjects (37.5%) suggested that a dedicated theatre staff should be there for implementation of SSC. Some others (8.33%-10.42%) were of the opinion that Anaesthetists or Surgeons would be more suitable.

5. Possible challenges/advice/suggestion towards the implementation of the safe surgery checklist in operating theatres:

Table 6: Challenges which may affect the implementation of checklist:

Challenges	Frequency (n)
Administrative bottleneck/bureaucracy	12(12.50%)
Lack of awareness or knowledge	70 (72.92%)
Lack of commitment of staff to duty	78 (81.25%)
Lack of Co-operation among staff	52 (54.17%)
Inadequate supply of consumable instruments/other equipment/facilities	20 (20.83%)
Inadequate time to carry out the checklist	32 (33.33%)
Lack of commitment from the Management	34 (35.42%)
Lack of incentive among theatre workers	28 (29.17%)
Lack of interest/will/attitude of health work	60 (62.50%)
Shortage/lack of manpower	42 (43.75%)
Lack of team spirit	62 (64.58%)
Corruption	12 (12.50%)
Lack of good communication	60 (62.50%)
Multiple responses included	36 (37.5%)

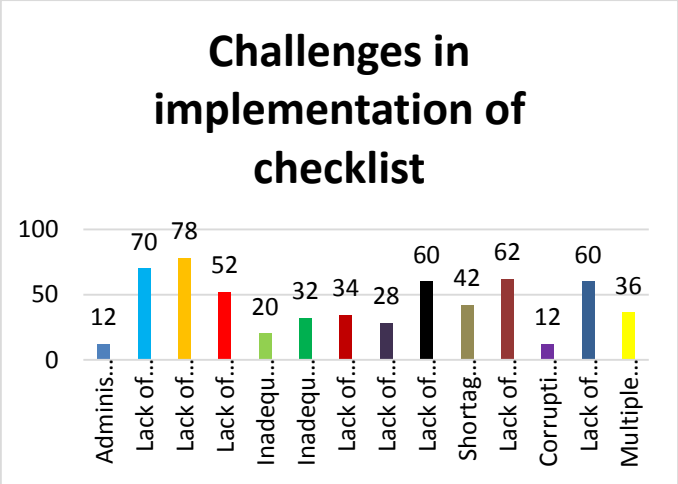


Figure 4: Bar diagram showing various challenges affecting the implementation of checklist.

Lack of commitment from the Management (35.42%), Lack of interest/will/attitude of health worker (62.50%), Shortage/lack of manpower (43.75%), Lack of team spirit (64.58%) and Inadequate supply of consumable, equipment/facilities (20.83%) were the pointed out as possible challenges in implementation of the safe surgery checklist. Most (81.25%) of the participants pointed out the lack of commitment of staff to duty as a biggest challenge towards implementation of SSC.

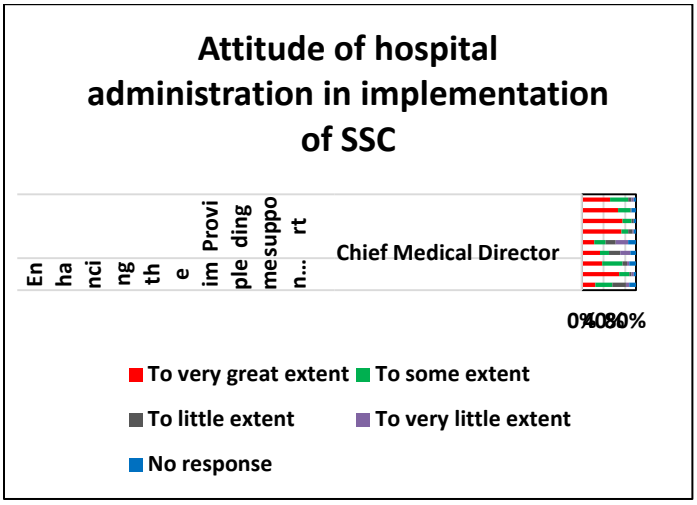
6. Attitude towards role of hospital administration and management in implementation and use of the SSC:

Table 7:

In your opinion, to what extent will the following enhance the implementation of the safe surgery checklist in this hospital?	To very great extent	To some extent	To little extent	To very little extent	No response
1. Having the Administrative Heads (e.g. CMD, CMAC, ADNS) as leaders of the implementation team.	24 (25.00%)	30 (31.25%)	24 (25%)	6 (6.25%)	12 (12.50%)
2. Having the Clinical staff (those engaged in day to day running of the theatre) as leaders of the implementation team.	66 (68.75)	18 (18.75%)	4 (4.17%)	4 (4.17%)	4 (4.17%)

3. Giving a mandatory date/time to commence the use of the checklist by management	36 (37.50%)	36 (37.50%)	8 (8.33%)	4 (4.17%)	12 (12.50%)
Support of the following					
4. Chief Medical Director	32 (33.33%)	16 (16.67%)	2 (2.08%)	18 (18.75%)	10 (10.42%)
5. Chairman Medical Advisory Committee	22 (22.92%)	20 (20.83%)	18 (18.75%)	22 (22.92%)	14 (14.58)
6. Head of Department and Consultants in Surgery Department	70 (72.92%	12 (12.50%)	8 (8.33%)	2 (2.08%)	4 (4.17%)
7. Head of Department and Consultants in Anaesthesiology Department	72 (75.00%)	16 (16.67%)	4 (4.17%)	0	4 (4.17%)
8. Head of Nursing Department.	64 (66.67%)	22 (22.92%)	2 (2.08%)	0	8 (8.33%)
9. Operation Theatre Manager.	50 (52.08%)	32 (33.33%)	6 (6.25%)	4 (4.17%)	4 (4.17%)

Figure 5: Component bar diagram regarding attitude of hospital administration in implementation of SSC.



Participants' attitude towards the role of hospital administration and management in implementation and use of the checklist was also assessed. About (25.00%) participants indicated that having the Administrative Heads (e.g CMD, CMAC, ADNS), Clinical staff (68.75%) and giving a mandatory date/time to commence the use of the checklist by management (37.50%) would enhance the implementation of the safe surgery checklist in this hospital to a large extent. In the same vein, many of the participants, also believed that the support of the CMD (33.33%), CMAC (22.92%), Head of Departments and Consultants in Surgery (72.92%), Anesthesiology (75.00%), Nursing (66.67%) and Operating Theatre Managers (52.08%) would also enhance the implementation of the safe surgery checklist in this hospital to a large extent.

Discussion

Knowledge and awareness of the safe surgery checklist among the respondents:

In our study, participants had high awareness of the SSC, similar to that in previous study in the Guatemala (Hurtado et al., 2012)[4] and UK (Watts et al., 2010).[5] The publicity at the hospital, training courses and from colleagues were the most mentioned source of information, this could be explained by the recent increase in awareness regarding quality control to meet NABH

requirements to set a standard and maintain stability in corporate culture. Development in information technology and social networking may be other reasons for increase in knowledge and it proves that the theatre staff has good knowledge-seeking behavior. This should be encouraged. However most of the participants 82 (85.42%) were aware of three stages of SSC but few 14 (14.58%) could not mention at least one objective of SSC.

Perception of the participants towards safety culture and team work:

The participants are widely adhered to clinical guidelines, this shows the readiness of the staff to embrace new principles including the SSC in clinical practice. This result is similar to findings (Abdel-Galil et al., 2010),[6] Gueguen, 2011,[7] Patterson et al., 2009).[8]

Attitude of respondents towards the safety of patients were recommendable, this shows good disposition of participants about the interest of their clients.

However team work needed some improvement, about 87.50% respondents knew their staff members by first and last names, this is opposite the study in Texila American University, South America, (by Sunday Yohanna Dangyangs, Chinenye Afonne, 2016)[9], this may be because of our department is very compact and most of the people are working for long time in this institute. People are very friendly also in their professional work. Most of the respondents showed good team spirit among them, their physicians and nurses work together with good co-ordination. This is a good example of interaction and social understanding among the theatre staff. Better friendliness and associations among the staff help to bridge the gap between different professional categories and fosters co-operation which are essential for better service delivery.

In this study our finding suggest that there is enough time for safety preparation in their operating room which is different from the some studies by Cullati et al., 2013[10] and Pickering et al., 2013[11],this may be because of we have two nursing staff in operation theatre at any time especially at the time of induction of anaesthesia and start of surgery one of them takes care of SSC (As per our protocol with the entry of patient in OT first things to happen are connection of monitors and conduction of surgical safety checklist).

Willingness and attitude of participants towards SSC:

In our study, almost all the surgical team members of ISIC are willing for the use of SSC, they believe that the clinical outcomes would improve and have positive attitude towards SSC. All (100%) participants said they would want the SSC to be used for their own surgery. Our study is also supported by the study in Texila American University, South America, (by Sunday Yohanna Dangyangs, Chinenye Afonne, 2016[9] Majority (93.75%) of the respondents agreed that SSC may bring additional value to existing safety procedures already in place operation theatre. It means the full benefits and components of the SSC in terms of safety is fully understood by the majority of the participants. Similar result was observed from another similar study (Cullati et al., 2014) [12]. Majority 38(39.58%) were of the opinion that Nurses would be more suitable in taking charge of the checklist than any other operating room staff, although 36(37.5%) respondents suggested for a dedicated staff for taking charge of SSC. In our study almost all (97.92%) subjects agreed that the checklist will improve communication and collaboration between staff in the operating room. Our study is also supported by the study done by Enne E. Pugel MD, Vlad V. Simianu MD et.al. (University of Washington USA, 2015)[13]

Possible challenges/suggestions towards the SSC implementation in operating theatres:

Lack of awareness/knowledge, lack of commitment of staff, lack of team spirit, conflicts and disagreements among doctors, and other health professionals were major challenge identified, these may negatively affect medical service and health care delivery. Many times strikes and slowdowns have led to shutting down government hospitals for long periods which has led to deaths which could have been prevented. As being a serious challenge, majority of the participants in this study has pointed out this issue. This might also affect the implementation of the safe surgery checklist in hospital operating theatres.

Lack of good communication, lack of interest/will/attitude of health worker and lack of co-operation amongst health employees were indicated as the next major challenges. Inadequate consumables, time and shortage of manpower were also indicated as the challenges, without the structures, instruments and staff, the SSC would be difficult to implement; these findings are in line with prior results from a previous study (Thomassen, et al. 2011). [14]

Lack of commitment from the Administration or Management unit greatly influence the implementation of new policies and strategies in an establishment. The leadership of any establishment plays a major role in adoption of new ideas, this is also supported by the results in a previous studies (Kariyoi et al.[15], 2013, Vats et al, 2010 [16] and Edmondson, 2003).[17]

Attitude towards role of hospital administration in implementation of the checklist:

In terms of management and administration, majority of respondents supported the Clinical staff (who are engaged in day to day running of the theatre) as leaders of the implementation team as compared to having the administrative heads or proposed mandatory policy by the hospital management. This indicate that it is very important to ensure the partnership and involvement of the staff or professionals who will actually apply the strategy, however the administrative or management unit of a hospital has an influence on the implementation of new strategies or policies (in this case the SSC checklist). Thus the need to involve all those engaged in the day to day running of the theatre from the planning to the implementation of SSC is very important so that the strategy will be well accepted and properly infused into surgical practice. This could also be the reason for the participants to think about operating theatre manager and the Head of Departments (Anaesthesiology, Surgery and Nursing), as more influential towards the implementation of the safe surgery checklist in this hospital. Other reasons can be further looked in to; previous studies have highlighted similar issues ((Kariyoi et al. [15], 2013, Vats et al, 2010[16] and Edmondson, 2003). [17]

Conclusion

Awareness and knowledge of the SSC among the surgical team members of ISIC is good, however components and application needs to be improved. Efforts should aim to have complete knowledge on why and how the checklist should be used. Patient safety was high priority however team work can be refined. All operation theatre users had positive attitude towards the implementation of the strategy. Solutions for challenges highlighted should be sorted out to reduce these problems, otherwise the implementation of new strategies like the SSC would remain unachievable.

There should be a collaboration of all unit heads particularly the nursing unit and operating management for a successful implementation. There is also need for training and frequent re-training of all the surgical team members for good understanding and implementation of the SSC.

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