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Experience of Implementing the Checklist in a Standard Teaching Hospital for Extraction of Third Molars.

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ABSTRACT

Background: To check the effectiveness of checklist in increasing surgical safety of patients in dept. of Oral and Maxillofacial surgery. And To measure the frequency of checklist components completion in cases with use of checklist. Study Design: Our study was a prospective study of pre-intervention and post-intervention periods at MARDC Department of Oral and maxillofacial surgery, participating as a pilot site under the "Safe Surgery Saves Lives" program. **Methods**: This was a prospective study of pre-intervention and post-intervention to check the effectiveness of checklist in increasing surgical safety of patients in dept. of Oral and Maxillofacial surgery and to measure the frequency of checklist components completion in cases with use of checklist. The incidence of various errors was calculated before and after intervention (Seminar) and test of significance was applied to determine whether the difference was statistically significant. **Results**: Pre-intervention and post-intervention groups consisted of 52 patients each. In pre-intervention group Mean age of males was 32.92 yrs and mean age of females was 32.29 yrs. Overall mean age is 32.59 yrs (SD = 9.91) In post intervention group patient's ages ranged from 18 yrs to 58 yrs. Mean age of males was 29.75 yrs and mean age of females was 27.81 yrs . Overall mean age was 28.73 yrs. In post intervention group the confirmation of identity of the patient was done in all patients (100%) while in pre-intervention group it was done only in 17 (32.7%) patients. Intra-oral irrigation was done in 31 and 52 patients in pre-intervention and post-intervention groups respectively. There was statistically significant difference in intra oral irrigation between the two groups being significantly higher in the post intervention group. Knowledge of planned measures and side of operation was significantly influenced by intervention and in the post intervention group the percentage was 100% while in pre-intervention group this percentage was 55.8% and 80.8% respectively. Also there was statistically significant difference in sterility and functioning of surgical equipment between the two groups being significantly higher in the post intervention group. The surgical equipments present on the trolly was not statistically influenced by intervention (P=0.0558). Statistically significant difference was found in data on counting instrument as a process measure, between the two groups. It increased from 7.7 % to 100%. There was no statistically significant difference in Communication between Members of Surgical Team during Operation. There was a significant difference between pre-intervention and post intervention group in access to emergency drugs, functioning of instruments and use of prophylactic antibiotics while no statistically significant association was found in between pre-intervention and post-intervention group was concerned in availability of radio Figures (Due to department protocol), history of allergy, medical history, teeth extracted, Pederson's difficulty index, use of local anesthetics, adverse effects and duration of procedure. **Conclusion:** On classifying errors according to "Preventable" and "Possibly Preventable", it was found out that there was a statistically significant decrease in Preventable errors as well as in possibly preventable errors. This study proves that the pre-intervention phase without the use of checklist followed by the intervention programme followed by the implementation of checklist significantly reduces surgical errors.

Keywords: Intervention, checklist, Preventable, possibly preventable.

INTRODUCTION

Since the advent of surgery, mankind has made great progress in terms of diagnosis and treatment.[1] Treatments have been standardized, protocols have been set, diagnostic tests and images are now available, which have made the science of medicine much more structured. A lot of previously undiagnosed diseases have now been identified and classified. The ninth edition of the World Health Organization's international classification of diseases has grown to distinguish more than thirteen thousand different diseases, syndromes, and types of injury. And, for nearly all of them, science has given us things we can do to help.[2]

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If we cannot cure the disease, then we can usually reduce the harm and misery it causes. But for each

condition the steps are different and they are almost never simple. Clinicians now have at their disposal some six thousand drugs and four thousand medical and surgical procedures, each with different requirements, risks, and considerations. It is a lot to get right.[3] The surgical field requires the use of technology and involves highly specialized professional teams, and deal daily with risk and uncertainty. Surgeons are responsible for the lives and safety of others. Human errors are inevitable in such settings.

Two large studies, one conducted in Colorado and Utah and the other in New York, found that adverse events occurred in 2.9 and 3.7 percent of hospitalizations, respectively. In Colorado and Utah hospitals, 6.6 percent of adverse events led to death, as compared with 13.6 percent in New York hospitals. In both of these studies, over half of these adverse events resulted from medical errors and could have been prevented.[4]

Such deaths and undue admissions are eventually translated into monetary losses. A study conducted on the data of Utah and Colorado states lost income, lost household production, disability and health care costs of preventable adverse events (medical errors resulting in injury) are estimated to be between $17 billion and $29 billion, of which health care costs represent over one-half.[5]

But not all the costs can be directly measured. Errors are also costly in terms of loss of trust in the system by patients and diminished satisfaction by both patients and health professionals. Patients who experience a longer hospital stay or disability as a result of errors pay with physical and psychological discomfort. Health care professionals pay with loss of morale and frustration at not being able to provide the best care possible. Employers and society, in general, pay in terms of lost worker productivity, reduced school attendance by children, and lower levels of population health status.[8] No such study is found in the field of dentistry but, it being a part of healthcare, the outcomes can be assumed to be similar. Literature pertaining to errors in medicine is available in plenty, notable studies are particularly strong methodologically but we do not yet have a complete picture of the epidemiology of errors.[6]

As a part of this initiative, the World Alliance for Patient Safety launched the 'Surgical Safety Checklist' in June 2008. This checklist was proposed as a simple, easy-to-use tool to ensure that key patient safety measures are implemented. The development of this checklist was based on three principles: simplicity, widespread applicability and measurability.[7]

After this data emerged, in 2007, the World Alliance for Patient Safety (which forms part of the World Health Organization) established the 'Global Patient Safety Challenge: Safe Surgery Saves Lives as its second central objective. For this WHO came up with a comprehensive checklist. This WHO Checklist consists of 20 items, which focus on teamwork, communication, adherence to good practice, and anticipation of adverse events. Importantly, ten of the items relate to preparations before the induction of anesthesia, and another five before an incision is made. Central to the checklist are the basic repeated elements of confirming the patient's identity and the location and nature of the procedure. Such checks are not done universally and accurately will shock patients, and show the need for such a list. But to improve outcomes, the checklist questions will need to be participatory, rather than rhetorical, and their stress on teamwork translated into practice that promotes a collective responsibility for safety.[8]

Our study was aimed at implementing the WHO Checklist modified specially for the ambulatory oral surgery in the standard teaching hospital setting in India. In this study we hypothesized that, a program conducted in our department to implement a surgical safety checklist would reduce error and thereby complications associated with ambulatory oral surgery. It aims at implementing the modified W.H.O prescribed checklist in ambulatory patients undergoing surgical extraction of third molar and measure its adaptability and efficacy in reducing errors and post-operative complications.

MATERIALS AND METHODS

The 2 main objectives were to check the effectiveness of checklist in increasing surgical safety of patients in dept. of Oral and Maxillofacial surgery and to measure the frequency of checklist components completion in cases with use of checklist. Incidents were classified as preventable and possibly preventable depending upon whether they had a direct correspondence to one or more checklist items or when the incidents were noted as only one step of the error chain. Moreover The SSC was printed and distributed to the assistants for 50 cases. Prior to the implementation, the second year PGs, Third year PGs attended a 45-minute lecture on how and the reasons for using the checklist. The attending nursing staff was appointed as checklist co-ordinators. The primary investigator aided the assistant and surgeon verbally if there was any doubt. The intervention consisted of a 45 minutes seminar. The data was analyzed to assess the effect of intervention.

RESULTS

In this study a total of 50 patients in the Pre intervention and Post intervention were included. In the Pre intervention phase the patient's ages ranged from 18 years to 58 yrs. Mean age of males was 32.92 years (SD=10.97) and mean age of

females was 32.29 years (SD = 9.02). Overall mean age was 32.59 years (SD = 9.91)In the post intervention phase the patient's ages ranged from 18 years to 58 yrs. Mean age of males was 29.75 years (SD=8.32) and mean age of females was 27.81 years (SD = 6.54). Overall mean age is 28.73 years (SD = 7.34).

Table 1: Age and Gender Distribution of Pre intervention Patients.

Age (Yrs)	Number of patients				Total	
	Male		Female			
	No.	%	No.	%	No.	%
18 - 27	10	19.2	9	17.3	19	36.5
28 – 37	8	15.4	13	25.0	21	40.4
38 - 47	4	7.7	3	5.8	7	13.5
48 - 58	3	5.8	2	3.8	5	9.6
TOTAL	25	48.1	27	51.9	52	100

Table 2: Age and Gender Distribution of post intervention Patients.

Age (yrs)	Number of patients				Total	
	Male		Female			
	No.	%	No.	%	No.	%
18 – 27	9	17.3	12	25.0	21	40.4
28 – 37	12	23.1	14	26.9	26	50.0
38 – 47	2	3.8	1	0.0	3	5.8
48 – 58	1	1.9	1	1.9	2	3.8
TOTAL	24	46.2	28	53.8	52	100

There were a total of 6 assistants (Second MDS Students) and 6 surgeons (Third MDS Students) with the mean age of 26 ± 0.9&27 ± 1.1 respectively.

Confirmation of identity.

There was statistically significant (p value = 0.000) difference in confirmation of identity between the two groups. It was significantly higher in the post intervention group. The assistants were taught to confirm the identity of the patient as per the WHO Checklist implementation guide. This resulted in a systematic confirmation between the assistant and the operator (Not present in a systematic manner during the pre-intervention phase). This resulted in the significant statistical difference.

Table 3: Confirmation of Identity of Patients.

Confirmation done	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	17	32.7	52	100.0
No	35	67.3	0	0.0
Total	52	100	52	100

Asepsis of the surgical site

As per the WHO Checklist implementation guide recommendations, Intra oral irrigation was done with chlorhexidine (0.2% a.q). Our department did not have this protocol in place. Thus, there was statistically significant (p value = 0.000) difference in intra oral irrigation between the two groups being significantly higher in the post intervention group.

Table 4: Asepsis of the surgical site data.

Intra oral irrigation	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
YES	31	59.6	52	100.0
NO	21	40.4	0	0
TOTAL	52	100	52	100

Knowledge of Planned Operation Measures

Knowledge of planned operation measures were observed for the surgeon and the assistant. Effective communication is one of the process measures of the Checklist. Its implementation led to increase in discussion amongst the operator and the assistant. There was statistically significant (p value = 0.000) difference in knowledge of planned operation measures between the two groups being significantly higher in the post intervention group. It was also observed that, in the initial Post intervention cases, surgeons were having a difficulty discussing the case with their assistants (as per the WHO Checklist Implementation Guide). But the initial ineptness was overcome in the subsequent cases.

Table 5: Knowledge of the planned operation measures.

Knowledge	NUMBER OF PATIENTS			
	Pre Intervention (n=52)		Post Intervention (n=52)	
	No.	%	No.	%
YES	29	55.8	52	100.0
NO	23	44.2	0	0.0
TOTAL	52	100	52	100

There was statistically significant difference in knowledge of planned side between the two groups being significantly higher in the post intervention group. This result also substantiated the above conclusion.

Table 6: Knowledge of Planned Side

Knowledge	NUMBER OF PATIENTS			
	Pre Intervention (n=52)		Post Intervention (n=52)	
	No.	%	No.	%
Yes	42	80.8	52	100.0
No	10	19.2	0	0.0
Total	52	100	52	100

Effective Sterilization

Our department followed the protocol of sterilizing instruments at 15 psi and 121ºC for 15 minutes. But there was no Standardized certification of sterility. It was done by autoclaving the instruments in sterilization pouches having sterility indicators. Thus there was statistically significant difference in sterility of surgical equipment between the two groups. It being significantly higher (p value = 0.000) in the post intervention group.

Table 7: Sterility of Surgical Equipment

Sterility	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	2	3.8	52	100.0
Not Available	50	96.2	0	0.0
Total	52	100	52	100

Surgical Equipment Available on the Trolley

As per the department protocol the circulating nurse arranges the surgical trolley. At times due to increased work load, few instruments are not kept on the trolley. In such scenarios, the nurse is called for to get the instrument. This results in wastage of surgical time. This scenario happened twice in the pre intervention phase and once in the post intervention phase. Though the checklist reduced the frequency of error; there was no statistically significant difference.

Table 8: Surgical equipment available on trolley.

All Equipment available	NUMBER OF PATIENTS			
	Pre Intervention (n=52)		Post Intervention (n=52)	
	No.	%	No.	%
Yes	51	98.1	50	96.2
No	2	3.8	1	1.9
Total	52	100	52	100

Counting of Instruments

Counting of instruments and equipment like (gauze, needles etc.) is a process component of the checklist. It was not followed as a protocol in the department. Pre intervention data shows that the instruments were counted only 4 times after the surgery by the assistant. It could be attributed to personal habit of the assistants. After the implementation of checklist programme, number reduced to zero. Assistants neither forgot to count the instruments nor did they skip the process. There was a statistically significant difference (p value = 0.000) in data on counting instrument as a process measure, between the two groups. It increased from 7.7 % to 100%.

Table 9: Counting of Surgical Equipment

Data on counting of instruments	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
YES	4	7.7	52	100.0
NO	48	92.3	0	0.0
TOTAL	52	100	52	100

Communication

Communication is defined as exchange of professional and appropriate information. The Operating Surgeon and the assistant exchanged information invariably during the procedure .They often discussed various steps intra- operatively regarding incision, guttering, point of elevation etc. As the process measure was being implemented, pre intervention data shows high percentage in compliance. It did increase marginally post-intervention. There was no statistically significant difference in Communication between Members of Surgical Team during Operation between the two groups though it was higher after intervention [77% and 89% respectively].

Table 10: Communication between Members of Surgical Team during Operation

Communication	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	40	76.9	46	88.5
No	12	23.1	6	11.5
Total	52	100	52	100

Functioning of instruments

A routine surgical procedure requires various equipment such as micro motor, surgical hand piece, burs, suction machine. There were 18 incidences in the pre intervention group which resulted in failure of functioning of equipment. They include burs breakage, suction malfunction and interrupted function of micro motor.

In the post intervention phase, the assistant checked the equipment prior to the surgery. In spite of this the equipment malfunctioned 4 times. There was statistically significant difference in Functioning of Surgical Equipment during Operation between the two groups. The functioning of equipment increased from 65% to 92%.

Table 11: Functioning of equipment

Functioning of equipment's	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	34	65.4	48	92.3
No	18	34.6	4	7.7
Total	52	100	52	100

SURGEON'S PROFILE AND REPORT

Verification of identity

At the beginning of the case the surgeon was aware of the patients name almost all the time. Thus, there was no statistically significant difference in

Verification of identity between the two groups as it was 100% in both groups

Table 12: Verification of identity

Verification of identity	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	52	100.0	52	100.0
No	0	0.0	0	0.0
Total	52	100	52	100

Asepsis of surgical site

WHO Implementation Guide states that asepsis of the surgical site is a mandatory process measure. This was achieved by using 0.2% chlorhexidine mouthwash pre operatively. This was not a protocol in the department thus, there was statistically significant (p value = 0.000) difference in asepsis between the two groups being significantly higher in the post intervention group.

Table 13: Asepsis of the surgical site

Asepsis	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	0	0.0	52	100.0
No	52	100.0	0	0.0
Total	52	100	52	100

Availability of Radiographs

The department protocol mandated the need of preoperative Radiographs. There was no statistically significant difference in Radiographs data as there was 100% compliance in both groups.

Table 14: Radiographs Data.

Radiographs	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	52	100.0	52	100.0
No	0	0.0	0	0.0
Total	52	100	52	100

Preoperative consent

The department protocol mandated the need of preoperative consent. There was no statistically significant difference in consent between the two groups as consent was high in both groups. In spite of the protocol in place there was incidence of 1 case in each group, in which consent was not signed by the patient. Though not significant statistically, it can have huge medico-legal repercussions.

Table 15: Data on preoperative consent

Consent	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	51	98.1	51	98.1
No	1	1.9	1	1.9
Total	52	100	52	100

Sterilization of instruments

Our department followed the protocol of sterilizing instruments at 15 psi and 121oC for 15 minutes. But there was no Standardized certification of sterility. It was done by autoclaving the instruments in sterilization pouches having sterility indicators. Thus there was statistically significant difference in sterility of surgical equipment between the two groups. It being significantly higher (p value = 0.000) in the post intervention group.

Table 16: Data on sterilization label.

Sterilization label	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Yes	0	0.0	52	100.0
No	52	100.0	0	0.0
Total	52	100	52	100

Preoperative compliance

Pre-operative compliance indicates the patient's obedience at taking prophylactic antibiotics. The patients in the pre intervention phase, had no pre-operative compliance except those who were medically compromised. All the patients in the post intervention group took prophylactic antibiotics as directed. There were three patients who did not take the medication at home. They were made to wait for one hour before the surgery. There was statistically significant difference in pre-operative compliance between the two groups being significantly higher in the post intervention group

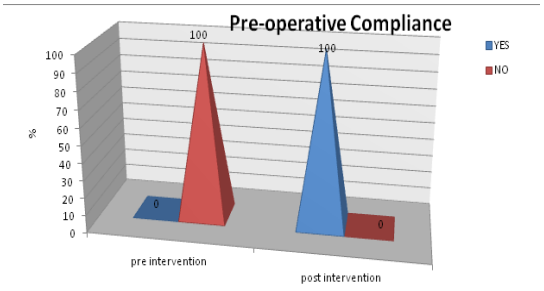

Figure 1: Pre-operative compliance

Access to emergency drugs

In the pre intervention phase, access to the emergency drugs was not accounted for on case-by-case basis, even though the medications were in an accessible location. In the Post intervention data, the access was assessed on case-by case basis. Thus there was a statistically significant difference in pre-operative access of emergency drugs between

the two groups being significantly higher in the post intervention group.

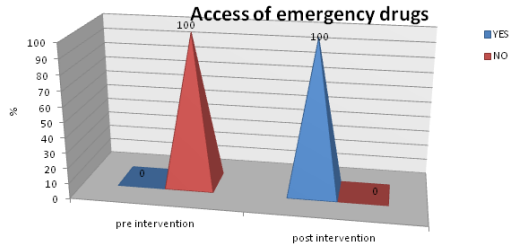

Figure 2: Access to emergency care

Functioning of instruments

In the post intervention phase, the assistant checked the equipment prior to the surgery. In spite of this the equipment malfunctioned 4 times. There was statistically significant difference in Functioning of Surgical Equipment during Operation between the two groups. The functioning of equipment increased from 65% to 92%. There was statistically significant difference in Functioning of Surgical Equipment during Operation between the two groups being significantly higher in the post intervention group.

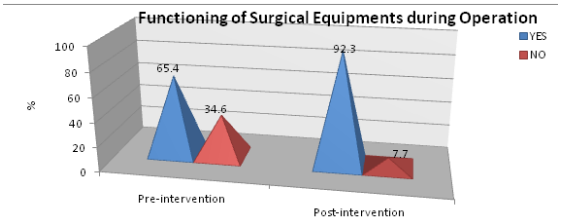

Figure 3: Functioning of Surgical Equipment's during Operation.

Evaluation of patient history

Allergy

A through pre-operative history was taken by the surgeon in all of the operated cases. Any history of allergy was noted, such patients were excluded from the study. There was no statistically significant difference in Allergies between the two groups.

Table 17: History of allergy

Allergies	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
YES	0	0.0	0	00.0
NO	52	100.0	52	100.0
TOTAL	52	100	52	100

Medical history

All the patients were evaluated for any medical history. Diabetes, hypertension, Hyperthyroidism, and Asthma were the most prevalent disorders. Lactating mothers were also included in this group. There was no statistically significant difference in Medical History between the two groups.

Table 18: Medical history

Medical history	Number of patients			
	Pre intervention (n=52)		Post intervention (n=52)	
	No.	%	No.	%
Diabetic	7	13.5	7	13.5
Hypertensive	2	3.8	3	5.8
Hyper thyroid	1	1.9	1	1.9
Lactating Mother	1	1.9	1	1.9
Asthmatic	0	0.0	1	1.9
No	41	78.8	39	75.0
Total	52	100	52	100

Teeth extracted

In the pre intervention total thirty one 38 and eighteen 48 were extracted and in Post intervention phase total of twenty four 38 and twenty eight 48 were extracted. There was no statistically significant difference in Extraction between the two groups [Table 24a & Figure 24b].

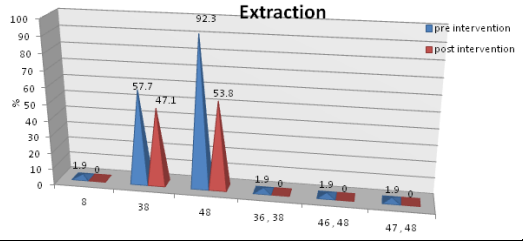

Figure 4: Tooth extracted.

Pederson difficulty index

Pederson's Difficulty Index was used to asses each third molar prior to the extraction of third molars. There was no statistically significant difference in Difficulty Index between the two groups.

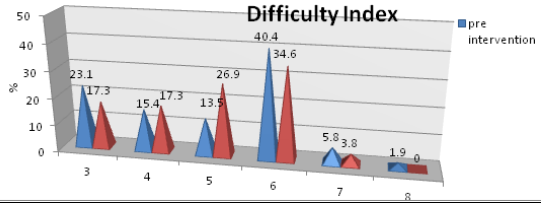

Figure 5: Pederson difficulty index.

Local anaesthesia

The use of LA was dependent on the medical status of the patient. LA without Adrenaline was used in Hypertensive, Patients with Hyperthyroidism and Asthmatics. All other patients were given LA+ Adrenaline (1:20000) there was no statistically significant difference in use of only L.A. between the two groups.

Adverse effect

Syncope was the only prevalent adverse effect noticed in the pre and post intervention phases. There were 4 instances of syncope in each group. There was no statistically significant difference in

between the two group's w.r.t adverse events. [Table 27a & Figure 27b] Though adverse events could not be avoided, they were appropriately recorded.

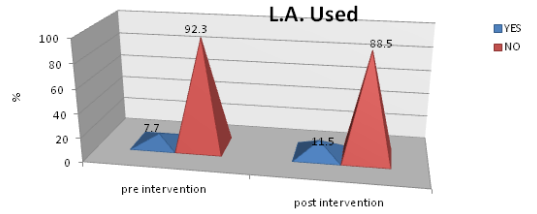

Figure 6: local anesthetics used

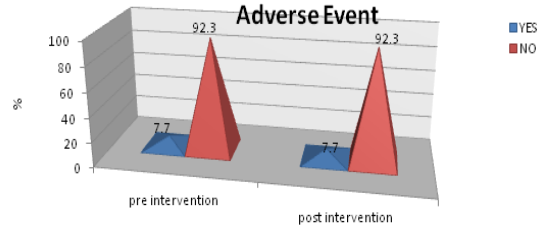

Figure 7: Adverse effects data

Duration of procedure

Though the checklist helped in streamlining the surgical procedure, there was no statistically significant difference in between the two groups w.r.t. Duration of procedure. Availability of instruments did reduce the surgical time in few cases; it was not seen statistically significant. The average time of surgical procedure was 50-69 minutes.

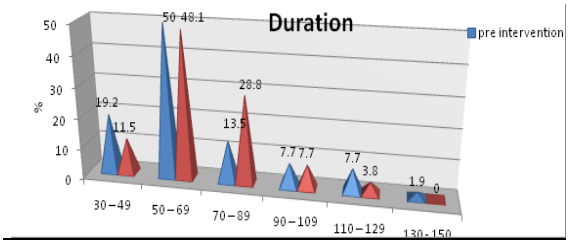

Figure 8: Duration of procedure

Prophylactic antibiotics

WHO Checklist Implementation Guide recommends giving prophylactic antibiotics 1 hour before the surgery. We gave the patient's 1 gm Amoxicillin 1 hour before the surgery. As this was not a protocol in the department, there was statistically significant difference in prophylactic antibiotics administration between the two groups being better after intervention. In the pre intervention phase it was given only in diabetics (n=6).In the Post intervention phase it was given for all the patients.

Materials left behind

The Surgeons were interviewed, for any material left behind on a case-by case basis; there were 4 instances in the pre intervention phase of small pieces of gauze or bone pieces or root pieces left behind. Though in the post intervention phase there was only one incidence, there was no statistically significant transformation because of the use of checklist.

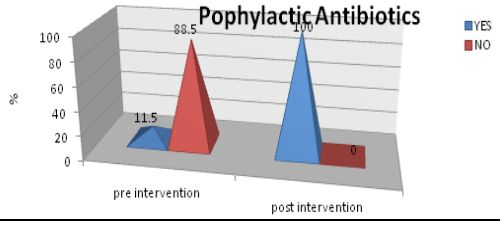

Figure 9: Use of prophylactic antibiotics

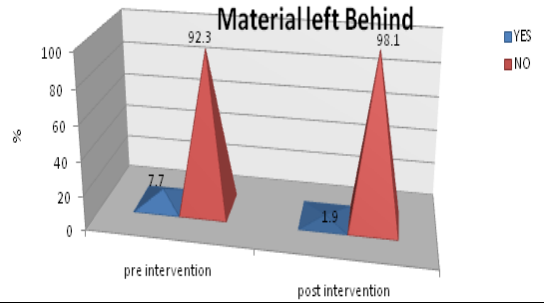

Figure 10: Materials Left Behind

Post-operative recording of surgical events

The department protocol mandated recording of all intra operative procedures, thus there was no statistically significant difference in recording procedures between the two groups.

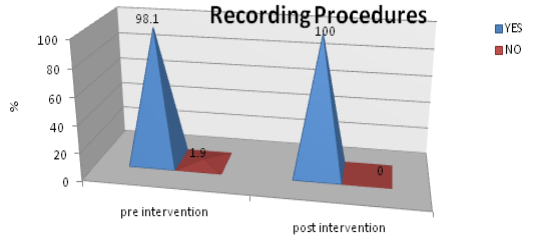

Figure 11: Recording Procedure

Post-Operative instructions

As per the department protocol it was mandatory for the surgeon to give post- operative instructions to the patient. It happened only once, when the patient was not given instructions in the pre-intervention phase. There was no statistically significant difference in post-operative instructions given to the patient between the two groups.

Duration of antibiotic administration

There was statistically significant difference in Antibiotic administration duration between the two groups, in the pre intervention phase the antibiotics

were administered for 5 days. In the post intervention phase the antibiotics were administered for 4 days.

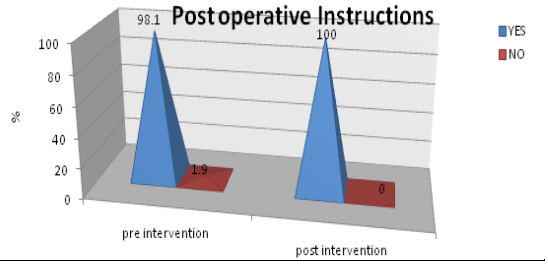

Figure 12: Post-operative Instructions

Immediate post-operative complications

Root fracture, displaced roots, socket fracture, and hemorrhage were the immediate post-operative complications that were assessed. In the Pre intervention phase there were 21%, 3.3%, 3.3% incidence of each complication respectively. Though the complication rate reduced to 17%, 1.9%, 1.9% respectively. There was no statistically significant difference in post-operative complications (immediate) between the two groups.

Pain during suture removal

The Patients when reported back for suture removal were asked to mark on the VAS scale about the pain in the previous week. There was no statistically significant difference in Post Operative Evaluation of Pain (During suture removal) between the two groups.

Assessment after 8 days

When the patient reported for suture removal, they were assessed for trismus, flap dehiscence, periostitis, dry socket, nerver injury and delayed healing.

It was 23%, 0%, 5.8%, 11.5%, 3.8%, and 1.9% in the pre intervention phase. In the post intervention phase it was 21.2%,0%,5.8%,11.5%,3.8%,1.9% . There was no statistically significant difference in Post -Operative event Evaluation (During suture removal) between the two groups, though intervention might have reduced.

Infection

No patients reported with any in the pre intervention phase as well as post intervention phase.

Mean incidence of error after the use of checklist

On classifying errors according to "Preventable" and "Possibly Preventable", it was found out that there was a statistically significant decrease in Preventable errors as well as in possibly preventable errors. The preventable errors decreased from 44.09% to 0.3%. And the possibly preventable errors decreased from 9.6% to 6.16%.

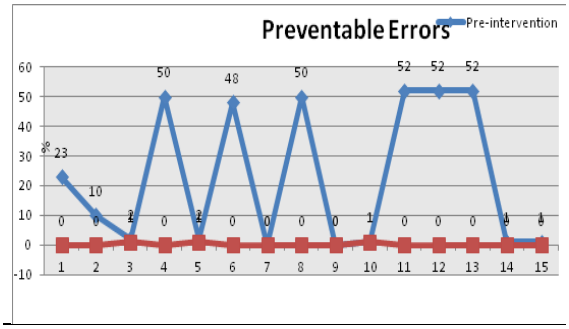

Figure 13: Preventable errors

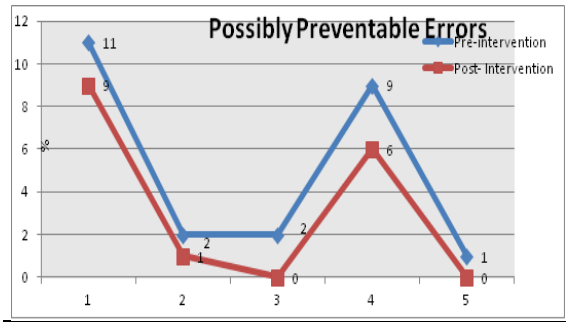

Figure 14: possibly preventable errors.

Table 19: Comprehensive Evaluation after use of checklist

Parameters	Pre intervention N=52	Post intervention N=52
Demofigureic data:		
	Mean ±SD	**Mean ±SD**
AGE (yrs)	32.59 ± 9.91	28.73 ± 7.34
GENDER	25 : 27 (M:F)	24 : 28 (M:F)
Assistant's report:		
	Yes	**Yes**	**P- Value**
Confirmation	32.7%	100%	0.000
Intra oral irrigation	59.6%	100%	0.000
Knowledge of Planned Operation measures	55.8%	100%	0.000
Knowledge of planned side	80.8%	100%	0.000
Sterility of surgical equipments	3.8%	100%	0.000
Data on Counting of Instruments	7.7%	100%	0.000
Functioning of Surgical Equipments during Operation	65.4%	92.3%	0.000
Surgeon's evaluation report			

Asepsis Data	0.0%	100%	0.000
Sterilization label	0.0%	100%	0.000
Pre-operative compliance	0.0%	100%	0.000
Access of Emergency Drugs	0.0%	100%	0.000
Prophylactic Antibiotics	11.5%	100%	0.000

Table 20: Preventable errors and their incidence in the study

Sr. No.	Category assessed	Example of 'Preventable Error'	Pre-intervention (n=52)		Post-Intervention(n=52)	
			No.	%	No.	%
1	Knowledge of planned operation measures	Not knowing the procedure before start of surgery (according to Pederson's difficulty index)	23	44.2	0	0.0
2	Knowledge of planned side	Not knowing the side of operations before the surgery	10	19.2	0	0.0
3	Surgical equipment available	All equipment not available on the trolley, calling for instrument during the procedure.	2	3.8	1	1.9
4	Sterility of Instruments	Autoclaving the instruments without pouches.	50	96.2	0	0.0
5	Instruments in working condition	Micro-motor stopping during surgery, intra operative burs breakage	2	3.8	1	1.9
6	Counting instruments and gause	Gauze pieces not counted while arranging the trolley, not checking for discarded needles	48	92.3	0	0.0
7	Verification of identity	Wrong person operated, injected with L.A	0	0.0	0	0.0
8	Asepsis	No Intra-oral mouth- wash before the surgery.	50	96.2	0	0.0
9	Radio Figure availability	Wrong radio Figure interpreted, radio Figure not available prior to surgery	0	0.0	0	0.0
10	Consent	Wrong side consent taken, Consent not signed by the patient	1	1.9	1	1.9
11	Pre -operative compliance	Antibiotics not taken one hour before surgery.	52	100.0	0	0.0
12	Access to emergency drugs	Location of drugs not known to the surgeon, Unavailability of drugs,	52	100.0	0	0.0
13	Prophylactic Antibiotics	Procedure started without taking antibiotics 1 hour before the surgery.	52	100.0	0	0.0
14	Recording procedures	Procedure not written on the case paper, staff member's sign absent.	1	1.9	0	0.0
15	Post- operative instructions	Patient discharged without post op instructions by the surgeon.	1	1.9	0	0.0
		MEAN	**22.93**			**0.20**
		SD	**24.15**			**0.41**

DISCUSSION

The principal purpose for conducting the research was to bring surgical patient safety issues about the Oral and Maxillofacial S-specialty in focus and to evaluate the implementation the modified SSC.

Introduction of the modified WHO Surgical Safety Checklist into operating room at Department of oral and maxillofacial surgery was associated with marked improvements in surgical outcomes. Postoperative errors decreased from 44.09% to 0.3%. And the possibly preventable errors decreased from 9.6% to 6.16%

The department saw a reduction in the rate of errors, in the post – intervention period. The decline in the rates of errors was statistically significant. This suggests that the checklist program can improve the safety of surgical patients in ambulatory oral surgical procedures.

A questionnaire was also distributed among surgeons and assistants regarding their opinion on the SCC. The results showed positive attitude towards patient safety by preoperative personnel in the department. Assistants and surgeons both felt responsible for the safety of their patients and prioritized the safety of their patient as important. There was widespread adherence to rules and clinical guidelines by the operative professionals.5 out of 12 personnel found a need of such a procedural checklist in reducing post-operative complication.9 out of 12 personnel found it was easier to use the checklist next time, than the previous use.7 out of 12 personnel agreed that the checklist be made as a protocol in operating room. Similar to the research by Nilsson et all the perioperative personnel had positive attitude towards the checklist.[9] Majority of the perioperative personnel believed the checklist improves communication and collaboration among personnel. It was perceived to be easy to use in surgery and was valued as very important in every patient's case. These findings are consistent to other similar researches.

The evidence of improvement in surgical outcomes is significant, the ex-act mechanism of improvement is most likely multifactorial. Use of the checklist involved both changes in systems and changes in the behavior of individual surgical teams. To implement the checklist, operative teams had to introduce a formal pause before starting the

surgery and another pause for postoperative debriefing. These team practices had previously shown to be associated with improved safety processes and attitudes. Various measures such as ensuring the correct identity and site of the patient, its subsequent oral confirmation; while the patient is on the dental chair, along with other measures proved to be new in the department. Implementation of the checklist required various changes in the existent system such as the patients were told to taken Cap. Amoxicillin 1gm at home before coming for extraction. This ensured that the antibiotics were taken 1 hour before the surgery and no time was wasted in the process. Checklist implementation encouraged the administration of antibiotics before the surgery rather than in the post-operative phase. The checklist provided additional oral confirmation of appropriate antibiotic use, increasing the adherence rate from 0 to 100%.It can be fairly assumed that the sum of these individual, systemic and behavioral changes could have accounted for the improvements observed.

Another mechanism, however, could have been the Hawthorne effect. "An improvement in performance due to subjects' knowledge of being observed". The original research at the Hawthorne Works in Cicero Illinois on lighting changes and work structure changes such as working hours and break times were originally interpreted to mean that paying attention to overall worker needs would improve productivity.[10] Later interpretations suggested that the novelty of being research subjects and the increased attention from such could lead to temporary increases in workers' productivity. The contribution of the Hawthorne effect is difficult to separate in this study. The checklist is orally performed by peers and is intentionally designed to create a collective awareness among surgical teams about whether safety processes are being completed. The presence of data collector near the dental chair could have been responsible for the invariable implementation of checklist and thus reducing rate of errors in the surgical procedure.

CONCLUSION

Our study concludes that use of this checklist program on a routine basis has the potential to prevent large numbers of errors and complications. Although further study and randomization is needed to determine its efficacy in the field of ambulatory oral surgery. This study proves that the preintervention phase without the use of checklist followed by the intervention program followed by the implementation of checklist significantly reduces surgical errors.

In conclusion, the utilization of the checklist, followed by intervention is in its early stages in the field of OMFS since its introduction to hospitals and other surgical branches. This study is the first step in the process of making use of this tool in reducing surgical errors and subsequently complications of patients undergoing ambulatory oral surgery.

REFERENCES

1. Caraka Samhita, complete text with Cakrapani's commentary; edited by Harinatha Visarada, Calcutta, 1892. Gawande, A(2010).
2. The Checklist manifesto: how to get things right. New York: Metropolitan Books.
3. Thomas, Eric J.; Studdert, David M.; Newhouse, Joseph P., et al. Costs of Medical Injuries in Utah and Colorado. Inquiry.36:255–264, 1999.
4. Brennan, Troyen A.; Leape, Lucian L.; Laird, Nan M., et al. Incidence of adverse events and negligence in hospitalized patients: Results of the Harvard Medical Practice Study I. N Engl J Med. 324:370–376, 1991.
5. Centers for Disease Control and Prevention (National Center for Health Statistics). Births and Deaths: Preliminary Data for 1998. National Vital Statistics Reports. 47(25):6, 1999.
6. Institute of Medicine (IOM). 2000. To Err is Human: Building a safer health system. L.T. Kohn, J.M. Corrigan, M.S. Donaldson, eds. Washington, DC: National Academy Press. :
7. 9 .World alliance for patient safety. WHO guidelines for safe surgery. Geneva: World Health Organization 2008:
8. www.thelancet.com Vol 372 July 5, 2008
9. Nilsson L., Lind Berget O., Gupta A. &Vegfors M. 2010. Implementing a Preoperative Checklist to Increase Patient Safety: A 1-Year Follow-Up of Personnel Attitudes. Acta AnaesthesiologicaScandinavica, 54: 176–82.
10. Henry A. Lands Berger, Hawthorne Revisited, Ithaca, 1958

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