Impact of Implementation of WHO Surgical Safety Checklist In Patients Operated In Emergency Operation Theater

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ABSTRACT

Objective — *To document the feasibility and reliability of implementation of WHO surgical safety checklist (SSC) and its impact on the patients operated in emergency operation theater.*

Study design — *Cross-sectional study.*

Place & Duration of study — *Department of Anesthesiology and Pain Management, Jinnah Postgraduate Medical Centre (JPMC) Karachi, from January 2022 to June 2022*

Methods — *Patients who underwent emergency surgical procedures were included in the study. All procedures were carried out in emergency operation theatre. For documentation of outcome two groups were made. Group A included patients who had complications during or after surgery in the last six months before the implementation of surgical safety checklist and group B had patients who developed complications after the implementation of surgical safety checklist. Data were recorded on a predesigned form. Independent sample t test was applied to find the correlations between the groups. A p value of <0.05 was considered as significant.*

Results — *A total of 300 patients were included in the study. There were 142 (47.3%) females and 158 (52.7%) males. The age of the patients was from 12-70 years. The mean age was 35.73±1.41 years. Postoperative infection were noted in 59 (39.3%) patients in group A which reduced to 24% in group B after effective implementation of the surgical safety checklist. This was statistically significant (p=0.001). Unplanned return to the operating theatre was 6.7% in group A which reduced to 1.3% in group B (p=0.001).*

Conclusion — *WHO SSC is effective in reducing perioperative and postoperative complication rates with a significant reduction in mortality figures.*

Key words — *Emergency surgery, WHO surgical safety checklist, Perioperative complications, Surgical mortality.*

INTRODUCTION:

Effective and better health care is always a team effort. Organizational complexities and human limitations are responsible for number of errors in healthcare settings. Surgery has been one the main treatment options for a number of diseases and around 312.9 million surgeries are performed globally every year.[1] All surgical procedures can have risks as well as morbidity.[2] Surgical outcomes are directly affected by the system of care of hospitals.[3] Preventable adverse events reported in surgical patients are about 48%.[4] Most errors are due to the poor team work and lack of proper communication.[5] Surgical safety has been under consideration of surgeons since the last two decades and efforts are made to avoid such events.[6] These may reduce adverse surgical events and improve patient related

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outcome. Various measures to prevent such adverse events are advocated and are being employed in hospitals.

The concept of surgical safety covers all activities employed in hospitals that are related to patient's safety. WHO surgical safety checklist is one of such measures used globally to avoid surgical adverse events.[2] This checklist is in use since 2008 in almost all hospitals in the world.[7] It consists of three parts and instructions for its use were published on WHO website. Three different short briefings are held during the course of anesthesia and surgery and important information is rechecked and communicated to all the team members. The three briefings are just before the anesthesia called as 'sign in', before skin incision known as 'time out' and after skin closure which is 'sign out'. The 'sign in' phase is carried out by the anesthesiologist which consists of correct identity of the patient, site of operation and anesthesia related questions. The 'time out' phase is done by surgeon in which patients' identity is rechecked with the procedure being done and site of operation with roles of team members defined with expected blood loss. In 'sign out' phase final closing points are checked like sponge count and post-operative orders.[5]

This surgical safety checklist is being effectively used in low and middle socioeconomic countries with poor implementation that negates its benefits.[8] A research showed that with the implementation of WHO safety checklist the surgical adverse events were reduced markedly.[9] A study conducted in Pakistan also concluded that WHO surgical safety checklist is an effective tool in reducing in-hospital complications thus producing a favorable outcome.[10] In Pakistan the WHO surgical safety checklist, although is in use, but its implementation in true letter and spirit is still questionable. WHO safety checklist is in use in our hospital in elective surgery theatres. This study was conducted to find out the feasibility and reliability of the implementation of same protocol in emergency operation theatres and its related outcome on patients.

METHODS:

Study design, place & duration: This cross sectional study was conducted from January 2022 to June 2022 in the Department of Anesthesiology and Pain Management at Jinnah Postgraduate Medical Centre Karachi.

Ethical considerations: The study was approved by the Ethical Review Board letter No.F2-81/2023-GENL/40/JPMC dated 20-03-2023. An informed consent was obtained from patients and risk benefits ratio was explained along-with the purpose and procedure of the study.

Sample size estimation: The sample size was estimated by using WHO calculator, taking level of significance at 5%, power of study as 80% and intraoperative surgical complications 5.1% versus 2.4%.[11] Patients were included by using non probability consecutive sampling technique.

Inculsion / Exclusion criteria: Inclusion criteria were all patients, without any comorbid condition, aged between 12-70 years, who came in emergency for any surgical condition and the emergency surgery was carried out in emergency operation theatre (OT).

Study protocol: The study was carried out in two phases. Firstly, a retrospective analysis of the record of last six months of the emergency operation theater of the complications that happened was carried out. All staff of the emergency theater, surgeons and anesthetists were briefed about WHO surgical safety checklist. The data were then collected prospectively after implementation of the checklist and compared with the previous one. The patients were followed in postoperative period till discharge or for 30-days, which ever happened first, and all complications and adverse events were noted on a predesigned form. For documentation of outcome two groups were made. Group A included patients who had complications during or after surgery in the last six months before the implementation of surgical safety checklist and group B had patients who developed complications after the implementation of surgical safety checklist. The hospital staff was also informed about the study protocol.

Statistical analysis: The collected data were analyzed in SPSS version 23.0. Gender and postoperative complications were reported as frequency and percentages. Age and operative time were measured as mean ±SD. Independent sample t test was applied to find the correlations between the groups. A p value < 0.05 was considered as significant.

RESULTS:

Total of 300 patients were included in the study. Data of 150 patients was sorted out from the record and complications were noted before implementation of surgical safety checklist. There were 142 (47.3%) females and 158 (52.7%) males. The mean age of patients was 35.73±1.41 years. Seventy-four (24.7%) patients belonged to the general surgery group and

Table I: Demographics of the Patients

Variable		Number - n (%)
Gender	Males	158 (52.7%)
	Females	142 (47.3%)
Surgery group	General surgery	74 (24.7%)
	Orthopedic surgery	81 (27%)
	Gynecology and obstetrics	88 (29.3%)
	Neurosurgery	33 (11%)
	Others	24 (8%)

Table II: Comparison of Complications in Study Groups

Variable	Group A n= 150 (%)	Group B n= 150 (%)	CI	p value
Mean age of patients (mean ± SD)	36.34 ±14.50	35.12±13.83	34.12-37.14	0.45
Surgical site infection (SSI)	59 (39.3%)	36 (24%)	1.41-1.80	0.004
Postoperative mortality	51 (34%)	35 (23.3%)	1.66-1.76	0.04
Postoperative pneumonia	31 (20.7%)	21 (14%)	1.78-1.86	0.12
Equipment related errors	46 (30.7%)	31 (20.7%)	1.69-1.79	0.04
Other complications	37 (24.7%)	13 (8.7%)	1.79-1.87	0.001
Missed prophylactic antibiotics	21 (14%)	7 (4.7%)	1.87-1.93	0.005
Unplanned return to OT	10 (6.7%)	2 (1.3%)	1.93-1.98	0.01

81 (27%) had orthopedic procedures. Details are given in table I. Mean age of patients in group A and B was 36.34±14.50 and 35.12±13.83 years respectively which was not statistically significant (p=0.45). All postoperative and perioperative outcome were significantly low in group B as compared to group A. Details are given in table II.

DISCUSSION:

Most errors that occur in the operation theatres are due to poor communication and lack of team work.[12] Briefing is therefore necessary to avoid such errors which consist of improper relay of information and task sharing between the team members. Concerns of the team members are also catered for.[13] Preoperative briefings in operation theatre generally improve the harmony and discipline among various teams working in same place. It is expected to improve the patient related outcome. A study conducted by Haynes et al concluded that preoperative briefings in operation theatre reduced postoperative complications from 4% to 75%.[14] Effective communications beforehand in the operation theatre also improve the techniques opted by different teams.[15]

In our study grey areas were identified before the implementation of checklist to objectively analyze where improvements were required. Due to huge burden of emergency cases, number of perioperative and postoperative complications were noted in retrospective data collection. Before the implementation of surgical safety checklist postoperative infection rate was high. This was significantly reduced after the implementation of checklist. Similar results are also reported in other studies.[16,17] However, in our study the infection rate is still quite high in comparison with other studies. This is an area of concern and must be probed in collaboration with our surgical teams.

In our study postoperative pneumonia was not decreased significantly after the implementation of checklist. Same were the findings in other studies.[16,18] A significant change is also witnessed in unplanned return to operating theatre rate which was 6.7% in group A and 1.3% in group B. This is similar to the study of Kwok et al who also reported similar pattern.[19] In our study mortality rate of patients in group A was 34% and in group B 23.3%. This is still high but significantly decreased statistically. Van Klie et al also showed a drop of mortality rate from 3.1 % to 2.9%.[20]

Limitations of study: This study has the limitation of small sample size and inclusion of procedures performed in emergency operation theatres where generally the rate of surgical site infection and mortality are high. However, same can be considered as its strength because a significant change in positive direction is reported.

CONCLUSION:

The implementation of WHO surgical safety checklist effectively reduced perioperative and postoperative complications with a significant reduction in mortality rates.

REFERENCES:

1. Susmallian S, Barnea R, Azaria B, Szyper-Kravitz M. Addressing the important error of missing surgical items in an operated patient. Isr J Health Policy Res. 2022;11(1):19. doi: 10.1186/s13584-022-00530-z.

2. Ramsay G, Haynes AB, Lipsitz SR, Solsky I, Leitch J, Gawande AA, et al. Reducing surgical mortality in Scotland by use of the WHO Surgical Safety Checklist. Br J Surg. 2019;106:1005-11. https://doi.org/10.1002/bjs.11151

3. Torrente M, Sousa PA, Sánchez-Ramos A, Pimentao J, Royuela A, Franco F, et al. To burn-out or not to burn-out: a cross-sectional study in healthcare professionals in Spain during COVID-19 pandemic. BMJ Open. 2021;11(2):e044945. https://doi.org/10.1136/bmjopen-2020-044945.

4. Kable AK, Gibberd RW, Spigelman AD. Adverse events in surgical patients in Australia. Int J Qual Health Care 2002;14:269-76. https://doi.org/10.1093/intqhc/14.4.269

5. Hosseini M, Heydari A, Reihani H, Kareshki H. Elements of teamwork in resuscitation: An integrative review. Bull Emerg Trauma. 2022;10(3):95. https://doi.org/10.30476/beat.2021.91963.1291.

6. Weiser TG, Haynes AB. Ten years of the surgical safety checklist. Br J Surg. 2018; 105:927-9. https://doi.org/10.1002/bjs.10907

7. Bansah EC, Adanu KK, Adedia D, Addo-Lartey AA. Surgical provider-reported reasons for utilization of the World Health Organization's Surgical Safety Checklist at a tertiary hospital in Ghana. PLOS Glob Public Health. 2023;3(1):e0001143. https://doi.org/10.1371/journal.pgph.0001143

8. Holden M, Ogada E, Hebron C, Price P, Potokar T. Quality improvement training for burn care in low-and middle-income countries: A pilot course for nurses. Burns. 2022;48:201-14. https://doi.org/10.1016/j.burns.2021.04.002

9. White MC, Baxter LS, Close KL, Ravelojaona VA, Rakotoarison HN, Bruno E, et al. Evaluation of a countrywide implementation of the world health organisation surgical safety checklist in Madagascar. PloS One. 2018;13(2):e0191849. https://doi.org/10.1371/journal.pone.0191849

10. Anwer M, Manzoor S, Muneer N, Qureshi S. Compliance and effectiveness of WHO Surgical Safety Check list: A JPMC audit. Pak J Med Sci. 2016;32:831-5. doi: 10.12669/pjms.324.9884.

11. Haridarshan SJ, Girish CS, Rajagopalan S. Effects of implementation of WHO Surgical Safety Check List: our institutional analysis. Indian J Surg. 2018;80:465-9. https://doi.org/10.1007/s12262-017-1635-x

12. Mostafapour Z, Torabizadeh C, Moayedi SA, Nick N. Operating room nurses' perception of professional relationships. Perioper Care Oper. 2022;26:100231.

13. Shukla B, Sufi T, Joshi M, Sujatha R. Leadership challenges for Indian hospitality industry during COVID-19 pandemic. J Hosp Tour Insights. 2022;7. http://dx.doi.org/10.1108/JHTI-08-2021-0217

14. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AH, Dellinger EP, et al. Safe Surgery Saves Lives Study Group. Changes in safety attitude and relationship to decreased postoperative morbidity and mortality following implementation of a checklist-based surgical safety intervention. BMJ Qual Saf. 2011;20:102-7. doi: 10.1136/bmjqs.2009.040022.

15. Watermeyer J, Etheredge H, Fabian J, Tager S. Emphasising organisational routine: A qualitative study of patient and health professional experiences of inpatient oncology care. Healthcare (Basel). 2022;10(11):2145. doi: 10.3390/healthcare10112145.

16. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AH, Dellinger EP, et al. Safe Surgery Saves Lives Study Group. A surgical safety checklist to reduce morbidity and mortality in a global population. N Engl J Med. 2009;360:491-9. doi: 10.1056/NEJMsa0810119.

17. Weiser TG, Haynes AB, Dziekan G, Berry WR, Lipsitz SR, Gawande AA. Safe Surgery Saves Lives Investigators and Study Group. Effect of a 19-item surgical safety checklist during urgent operations in a global patient population. Ann Surg. 2010;251:976-80. doi: 10.1097/SLA.0b013e3181d970e3.

18. Askarian M, Kouchak F, Palenik CJ. Effect of surgical safety checklists on postoperative morbidity and mortality rates, Shiraz, Faghihy Hospital, a 1-year study. Qual Manag Health Care. 2011;20:293-7. doi: 10.1097/QMH.0b013e318231357c.

19. Kwok AC, Funk LM, Baltaga R, Lipsitz SR, Merry AF, Dziekan G, et al. Implementation of the World Health Organization surgical safety checklist, including introduction of pulse oximetry, in a resource-limited setting. Ann Surg. 2013;257:633-9. doi: 10.1097/SLA.0b013e3182777fa4.

20. van Klei WA, Hoff RG, van Aarnhem EE, Simmermacher RK, Regli LP, Kappen TH, et al. Effects of the introduction of the WHO "Surgical Safety Checklist" on in-hospital mortality: a cohort study. Ann Surg. 2012;255:44-9. doi: 10.1097/SLA.0b013e31823779ae.

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Authors claim revising the manuscript, final approval of the draft, and agreement to be accountable for the content of the article.

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