

Does timing and type of surgery influence the WHO surgical checklist compliance?

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Key points

- Time of the day of surgery does not appear to influence checklist compliance.
- Day of the week of surgery does not appear to influence checklist compliance
- Type of operation, elective or emergency, does not appear to influence checklist compliance.

Abstract

The timing and type of surgery may influence the World Health Organization (WHO) safety surgical checklist compliance. The aim was therefore to determine the prevalence of compliance and completion of the WHO surgical checklist with regard to time of the day, day of the week and type of operation. The WHO surgical safety checklist for all patients who underwent surgery were evaluated using a cross-sectional observation study. The time of surgery was categorised as occurring during the working-hours or after-hours. The day of surgery was categorised as occurring during the weekday or weekend. The type of surgery was categorised as an emergency or elective procedure. From 421 operations, 207 (49.2%) checklists were incomplete, 201 (47.7%) were completed and 13 (3.1%) with no attempt at the checklist. Compliance of the checklist during working-hours was similar to after-hours, with 97.6% and 95.3% respectively. Compliance of the checklist during weekdays was similar to the weekend, with 97.1% and 95.6% respectively. Elective operations had a compliance of 97.1%, compared to emergency operations at 96.7%. There was no significant difference between checklist compliance compared to time of day ($P=0.446$), day of week ($P=0.766$) and type of operation ($P=0.710$). Time of day, day of week and type of operation does not influence the WHO surgical checklist compliance. Although the majority attempt the checklist, completion rate still requires improvement..

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Introduction

Approximately 234 million surgical procedures are performed annually worldwide with the estimated complications up to 22% [1-3]. In 2009 the WHO published guidelines on safe surgery with global implementation of a surgical safety checklist [4]. The checklist entails three phases which covers the period from pre-surgical intervention (sign in or phase I), before skin incision (phase II), to patient release from theatre (sign out or phase III). A correlation between checklist

adherence and reduced major postoperative complications in high- and low-income countries has been shown [5-8].

There are various challenges identified to the implementation of safety surgical checklist, but the most prominent was found to be lack of prior training, lack of interest by seniors, staff resistance and the checklist was not seen as a priority [9-12]. To our knowledge, no report has specifically evaluated the timing of surgery and/or the type of surgery. The time of day or the day of the week may influence compliance due to the various factors already mentioned. Also, there are less staff on duty after-hours, including weekdays and weekends. Surgery is only performed for emergency/urgent conditions after-hours, whereas elective operations and emergency/urgent operations are performed during working-hours. Emergency surgery is more likely to have decreased compliance as the situation would call for rapid management and therefore time to complete the checklist may be compromised. The aim of the study was to determine the prevalence of compliance and completion of the WHO surgical checklist with regards to time of the day, day of the week and type of operation.

Patients and Methods

All patients who underwent surgery, elective or emergency, at Kalafong Provincial Tertiary Hospital, Pretoria, South Africa, were selected prospectively. Ethics approval was obtained from the University of Pretoria, Faculty of Health Sciences, Research Ethics Committee (ref. no. 122/2018). The WHO surgical safety checklist, which are placed in the file of each patient going to theatre, were assessed and if attempted then evaluated for completeness. Files of all patients who underwent surgery during one week, i.e. 19 to 26 April 2018 with no public holidays, were included. Files of patients were excluded if surgery was cancelled perioperatively and patients who died on the operating table.

Compliance was defined as a WHO surgical safety checklist that was attempted. Adherence indicators included whether the checklist was complete (all checkpoints had a response), incomplete or not attempted. Measurement data collected included emergency or elective procedure, time of surgery (working- vs. after-hours, weekday vs. weekend) were recorded. Working-hours were defined as 8am to 4pm and after-hours as after 4pm. Weekend was defined as including Saturday and Sunday.

Frequency counts and percentages were given for categorical variables. Association between checklist status and categorical variables of interest were undertaken using the Chi-squared test. Data was captured into Excel and all statistics was evaluated at 5% level using STATA 15.

Results

A total of 421 surgical safety checklists were evaluated with 207 (49.27%) incomplete, 201 (47.7%) completed and 13 (3.1%) with no attempt at the checklist. The most commonly omitted steps from the WHO checklist were time-out and sign-out factors.

There were 420 patients that had data on whether the operation occurred during working- or after-hours. There was a greater frequency of operations during working-hours, 293 (69.6%), compared to after-hours, 127 (30.2%). The frequency of checklist compliance during working hours was 285/293 (97.6%). There were almost equal numbers of checklists attempted during working-hours that were complete, 141 (48.1%), or incomplete, 145 (49.5%), with 7 (2.4%) checklist forms not attempted. The frequency of checklist compliance during after-hours was 121/127 (95.3%). There were almost equal numbers of checklists attempted during after-hours that were complete, 60 (47.2%), or incomplete, 61 (48.0%), with 6 (4.7%) checklist forms not attempted. There was no statistical significance between checklist compliance and time of day of surgery ($P= 0.446$).

There were 416 patients that had data on whether the operation occurred during the weekday or weekend. There were more operations during the weekday, 348 (83.7%) compared to the weekend, 68 (16.3%). The frequency of checklist compliance during weekdays was 338/348 (97.1%). There were almost equal numbers of checklists attempted during the weekday that were complete, 168 (48.3%), or incomplete, 170 (48.9%), with 10 (2.8%) checklist forms not attempted. The frequency of checklist compliance during the weekend was 65/68 (95.6%). There were almost equal numbers of checklists attempted during the weekend that were complete, 31 (45.6%), or incomplete, 34 (50.0%), with 3 (4.4%) checklist forms not attempted. There was no statistical significance between checklist compliance and day of the week of surgery ($P=0.766$).

There were 418 patients that had data on whether their operation was an elective, 237 (56.7%), or an emergency, 181 (43.3%), procedure. The frequency of checklist compliance for elective operations was 230/237 (97.0%). There were almost equal numbers of checklists attempted during elective surgery that were complete, 117 (49.4%), or incomplete, 113 (47.7%), with 7 (2.9%) checklist forms not attempted. The frequency of checklist compliance for emergency operations was 175/181 (96.7%). There were almost equal numbers of checklists attempted during emergency surgery that were complete, 82 (45.3%), or incomplete, 93 (51.4%), with 6 (3.3%) checklist forms not attempted. There was no statistical significance between checklist compliance and type of surgery ($P=0.710$).

Discussion

The WHO surgical checklist was created to improve surgical safety. Despite the benefits of the checklist, multiple hospitals in different countries show poor compliance in completing the checklist [10; 11; 13]. Auditing of compliance should become part of performance indicators and national core standards and should be regularly conducted at every hospital if adverse events are to be avoided. Our study showed a high attempted rate of 408 (96.9%) from 421 operations to

complete the surgical checklist, with only 13 (3.1%) not attempted at all. The compliance rate is higher compared to other reports where the compliance ranges from 39.7% to 48.5% [10; 13]. However, the completeness of the checklist was only recorded in 201 (47.7%) operations, which is lower than previous reports which range around 60% [10; 11; 13]. It appears the intention to comply with the checklist is prevalent but there are obstacles preventing the completion.

There was no significant difference between compliance of the checklist with time of day ($P=0.446$) or day of the week ($P=0.766$). Staff are therefore aware and majority comply with checklist compliance. However, only about half of the checklists were completed. Although the expectation was that compliance, and completion, would be less prevalent during after-hours [14]. Surprisingly, the time of the day did not influence checklist completion as both, during working-hours and after-hours, only had around 50% checklist completed. Similarly, the expectation on weekends was also decreased compliance [15], as in other hospital protocols [16], but the day of the week did not influence checklist completion as both, weekday and weekend checklists, only had around 50% completion. Decreased number of staff after-hours, or on weekends, therefore does not appear to influence compliance or completion of the checklist. Incompletion may be a reflection on the lack of time, workload, or lack of experience/training to complete the checklist.

Implementation and training of the checklist are essential to ensure compliance and completion. Formal checklist introduction, or implementation workshops, to educate the surgical staff on completion of the checklist have been shown to improve compliance and completion of the checklist, especially in low- middle- income countries, as seen in different centers in Africa [8; 9; 13].

Understandably, the more senior staff have more checklist training exposure, which does not always correlate with compliance to complete the checklist [9]. There does not appear to be a difference

between different surgical speciality operations and checklist compliance [17]. Completion of a checklist has been shown to be more successful if there is good team communication [7] and if led by the surgeon [11].

The type of operation did not appear to influence compliance of the checklist even though surgery is only performed for emergency/urgent conditions after-hours. There was no significant difference between compliance of the checklist and type of operation ($P=0.710$). This is in keeping with Russ et al. who also reported no difference in compliance [11]. As for timing and day of operation, type of surgery checklist completion was just below 50%. Elective operations had 50.9% completion, with slightly lower completion rate for emergency operations at 46.9%. Due to the more urgent nature of emergency operations, completion of the checklist may not take preference at the time. Also, each member in the operating theatre may be more busier compared to a more controlled elective operation.

Limitations of the study include data collected from a single center only. Also, study recruitment was over one week. Although checklists were completed, the individual checkpoints may not always be executed.[18]

Conclusion

Time of day, day of week and type of operation does not influence the WHO surgical checklist compliance. Although the majority attempt the checklist, completion rate still requires improvement.

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None

Conflicts of interests

None

Author Statement

D.M and B.S.J. collected data, wrote the paper, reviewed and edited the manuscript.

Data sharing statement

Access to the data can be obtained through the authors.

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