Abstract

**Background:** Safety is one of the fundamental criteria for ensuring the quality of patient care. In a survey conducted by the WHO with data from 56 countries, resulting in two million deaths and seven million complications, half of which were considered preventable. The objective of the study is to analyze the knowledge of anesthesiologist about the implantation of the protocol of safe surgery in Brazilian public health case system Hospital.

**Methods:** A prospective, quantitative, cross-sectional exploratory descriptive study was conducted with 50 anesthesiologists from the hospital between July and August 2019, through a structured questionnaire on the knowledge of the safe surgery protocol. Data were analyzed descriptively by the quantitative method through the use of the R 4.1.0 software.

**Results:** The questionnaire was answered by 35 anesthesiologists and 15 anesthesiologist's residents. Of the total, 64% knew the safe surgery protocol. The results showed that 98% of the physicians had experienced an error, 76% marked the site to be operated on, 98% check the material to be used, 98% had surgery suspended after the anesthetized patient and 34% did not know the protocol. Of the anesthesiologists who answered the questionnaire, 98% know that the hospital is accredited, but only 52% know the name of the body that performed the accreditation, 76% never received training and 58% feel motivated to comply with the protocol. Only 24% report incidents.

**Conclusions:** We believe that there is a difference between the imaginary and the reality in completing the protocols for safe surgery, requiring everyone to have adequate training.

**Keywords:** Patient safety; Medical errors; Surgical procedures, Checklist; Operating rooms; Surgical team.

Introduction

The performance of surgical procedures is an essential practice in the health area and has shown an increase due to technological advances and also to the rapid demographic and epidemiological transition of the population [1]. In a survey conducted by the World Health Organization (WHO) with data from 56 countries, 234.2 million surgical procedures occur annually, resulting in two million deaths and seven million complications, half of which were considered preventable [1,2].

Safety is one of the fundamental criteria for ensuring the quality of patient care [3,4]. Patient safety is defined as the prevention of errors and adverse effects on patients associated with healthcare [5]. The adoption of strategies to reduce errors and adverse events in any health institution is a fundamental approach towards this reduction [3,4,6]. In the last century in the 70s, Health Risk Administration emerged in the United States, in response to an increase in the number of lawsuits against doctors in health institutions, aiming to prevent financial damages by lawsuits. The report "To Err is Human: Building a Safer Health System", was a milestone in health safety and reported the occurrence of 44,000 to 99,000 deaths/year caused by preventable medical errors. These errors are considered the 8th cause of death during hospitalization [4,7].
world, regardless of its degree of complexity? There is evidence that this Checklist reduces complications in surgery, thus saving lives. In 2009 the implementation of the safe surgery checklist was recommended for all hospitals; in 2010, 1,788 hospitals worldwide joined this practice [4,8]. When a tool that ensures surgical safety is not applied, the number of wrong procedures in patients increases, causing damage to the health system, professionals and the patient, increasing costs [8,9]. This study aims to analyze the degree of knowledge of the Safe Surgery Protocol by health professionals involved in the perioperative period, through a questionnaire.

**Methods**

This is an observational, prospective, descriptive study, based on the application of a questionnaire on the topic of safe surgery. The study was carried out in a hospital of the Brazilian Unified Health System (SUS) recently accredited by the Canadian company Qmentum. The choice of the hospital was due to the researcher performing the residency in Anesthesiology, simplifying the work of data collection. The study was registered in the Brazil Platform (CAAE: 53129716.3.0000.5179). Data collection was formalized by the approval by the Ethic Committee in Research numbered 12/2016.

The research population was formed by the hospital's anesthesiology professionals. The hospital's Anesthesiology Department consists of 50 anesthesiologists and 18 residents, six of them each year. The inclusion criteria for this study were: anesthesiologists or anesthesiology residents of both sexes, who accepted to participate in the study, and signed the Free and Informed Consent Form (ICF). Questionnaires with incomplete information and professionals who refuse to participate in the study were excluded.

The instrument for data collection was an online questionnaire using the Google Forms platform composed of 20 questions about the safe surgery protocol according to the WHO, applied during the months of July and August 2019 (Appendix A). There was no calculation of the sample size, and 78 questionnaires were delivered to all anesthesiologists and all residents. All participants received information about the purpose of the study and the data collection procedure.

**Statistical Analysis**

Data were analyzed descriptively by the quantitative method through the use of the R 4.1.0 software. The data will be shown graphically and table with simple percent and absolute.

**Results**

Of the 78 professionals in the Anesthesiology Department, 50 (64.1%) answered the questionnaire, 35 anesthesiologists and 15 residents. Professional recruitment and flow are summarized in Figure 1. All 35 anesthesiologists had completed their residency in the specialty.

![Figure 1: Consolidated Standards of Reporting Trials (CONSORT) flow diagram](image)

Table I presents percentages about direct questions with Yes or No answers when applied. The following data call our attention: 98% of interviewed doctors had experience with error in their practice in the OR, 24% do not check material that will be used in the surgery, 98% already had a suspension of surgery after induction of anesthesia, 34% do not know the Safe Surgery Protocol and 96% know they work in an accredited Hospital. Regarding the check of the side or local to be operated on, 76% answered yes and 24% answered no. As for checking the material or the condition of the equipment in the operating room before starting anesthesia, only 1 answered no. Regarding the suspension of surgery due to lack of adequate material for the procedure, only 1 participant declared that he had not had or assisted.
Of the 50 professionals who answered the questionnaire 76% responded that they had not received any training in how to perform the safe surgery protocol. Regarding the compliance with the rules of the safe surgery protocol, 56% responded that they adequately complied with the protocol. Regarding the notification of the incident, 54% answered that the incident was not notified and 46% answered that it was (Table I).

<table>
<thead>
<tr>
<th>No</th>
<th>QUESTIONS</th>
<th>YES</th>
<th>NO</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Error in surgical practice?</td>
<td>49</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Was the incident reported?</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>Request signing of the ICF?</td>
<td>43</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Does it mark the place to be operated?</td>
<td>38</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td>Check material?</td>
<td>49</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Had surgery suspended after anesthetized?</td>
<td>49</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Do you know WHO protocol?</td>
<td>33</td>
<td>17</td>
</tr>
<tr>
<td>12</td>
<td>Received protocol training</td>
<td>12</td>
<td>38</td>
</tr>
<tr>
<td>14</td>
<td>Requires filling in the protocol?</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>15</td>
<td>Is the protocol filled out at the SC entrance?</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>16</td>
<td>Is the protocol filled in the OR?</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>17</td>
<td>Did you have any complaints in CRM?</td>
<td>5</td>
<td>45</td>
</tr>
<tr>
<td>18</td>
<td>Had you been involved in a lawsuit?</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td>19</td>
<td>Does the hospital have accreditation?</td>
<td>48</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 1: Percentage on direct questions with YES / NO answers

As for the place where the checklist was carried out by nurses, 56% stated that the checklist is carried out by nurses before entering the Surgical Center; 54% stated that the checklist is performed by nurses within the operating room (Table I). All 50 participants witnessed or participated in an error in the operating room (OR). Asked about what stages the error 12 (24%) reported before the procedure, 21 (42%) during, 9 (18%) before and during and 8 (16%) before, during and after the procedure. The teams correlated to the incident or causing event were: 60% of the responses attributed to the medical team, 20% to the nursing team, 12% to residents and only 6% to the sterilization center and the administrative employee team received one mention (2%).

Regarding the classification of the incident, the most cited were: lack of communication (56%), incomplete material (42%), wrong administration of medication (50%) and inadequate venoclysis (42%). Among the ones that received fewer citations is surgery on the wrong patient (3%), and lack of notification form (2%) (Figure 2).

Figure 3 shows how anesthesiologists understand the safe surgery protocol. The majority do not know the protocol or only part of this protocol. Figure 4 shows how anesthesiologists feel about the application of the Safe Surgery Protocol, with the majority feeling motivated and important for everyone's safety.
Figure 2: Incident Classification
Figure 3: How Do You Understand the Safe Surgery Protocol?

- I think an important way to ensure patient safety
- I only know part of the protocol
- I do not know the protocol
- Great
- As an obstacle to ensuring safety for health professionals
- As an obstacle to ensure patient safety
- As a guarantee of safety of the patient and health professionals
- As a crucial step towards reducing the chance of harm to patients

Figure 4: How Do You Feel About the Safe Surgery Protocol?

- Motivated, important for everyone
- Indifferent, I consider routine
- Ashamed, for exposing myself
- Angry, the protocol delays surgery
- Others

Of the 50 responses, 5 anesthesiologists had some demand in the Federal Council of Medicine and 4 some judicial demand.

Regarding the knowledge about whether the Hospital was accredited, 96% of the participants stated that the hospital was accredited. Regarding the name of the body in which the hospital was accredited, 40% responded to the National Accreditation Organization (ONA), 26% answered Qmentum International Accreditation, 12% answered Accreditation Canada (Qualisa), and no participant only indicated International Joint Commission (IJC) and 22% did not answer the question.

**Discussion**

The quality of health care in highly complex procedures, such as surgeries and the use of various anesthetic techniques, has been a constant worldwide concern due to the high rates of adverse events and human errors related to these procedures. In the context of assistance to the surgical patient, it has already been shown that half of the postoperative complications can be avoided, highlighting the predictable potential for damage [10]. In this study it was found that despite the Hospital Accreditation, the training of anesthesia professionals after implantation was very low (24%).

In Brazil, the Ministry of Health instituted the Safe Surgery Protocol, which advocates the systematic use of the checklist, and constitutes the National Patient Safety Program. As a strategy to achieve the proposed objectives, WHO recommends that health institutions use the checklist to be filled out [10,11]. The Hospital where the study was carried out is at the maximum level of Accreditation of Qmentum International Accreditation.

The checklist provides greater security for the team that finds itself in a situation of standardization of services and routine, because the way to avoid an error is to standardize the surgical act, since it causes, at the same time, the team to increase the attention with the patient and his safety, aiming to reduce the problems caused by unexpected situations [12]. In the present study, all participants replied that they had witnessed and/or participated in an error at the Surgical Center. In 2009, an international multicenter study with 3,733 consecutively enrolled patients 16 years of age or older who were undergoing noncardiac surgery showed a 36% reduction in complications and 47% in mortality in surgical patients after the implantation of the surgical checklist [13]. A study carried out in two teaching hospitals, suggests that the low adherence to the checklist possibly reflects on the occurrence of adverse events in surgical care, resulting in the patient staying longer in the hospital, risk of readmission, need for care intensive care, mortality and others [14].

Regarding the incident, the study showed that the lack of communication occurred in 56%, the presence of incomplete material for the proposed surgery occurred in 42%, the wrong administration of medication in 50% and the lack of surgical instruments in 42%. In a study carried out in 2013, the most frequent causes attributed were related to incomplete or damaged surgical material after the beginning of the procedure in 63.8%, problems related to the operating room equipment in 53.3% and communication failures in 25.6% [15]. In developed countries, errors related to equipment are the most common failure, followed by communication errors [16].

Marking of the surgical site is essential in cases of laterality (distinction between right and left), multiple structures (fingers and toes, ribs) and multiple levels (spine). The laterality marking is performed by the team member physician, preoperatively, with the patient’s authorization, confirming the location of the intervention [17]. All anesthesiologists confirmed that the location to be operated on was properly marked with an appropriate black pen for this. In the present study, the number of professionals who reported checking the side to be operated on accounted for 76% of the total, despite verifying that the location was marked. However, in a study carried out in Sweden, only 25% of the surgeries observed were confirmed by the anesthesiologist’s team at the operative site. It should be noted that surgical specialties that involve double laterality, such as orthopedics, the possibility of error is even greater [11].

In the present study, it was found that most professionals (37 out of 50) demonstrated to know the protocol of safe surgery; however 13 participants did not have knowledge about the protocol. Even so, it was verified that the knowledge regarding the procedure was expressive. However, 46% of participants reported only knowing part of the protocol. The professionals’ knowledge of part of the checklist does not mean understanding the correct way to apply it; therefore, it is necessary to conduct training with all workers who work in the operating room. The incidence of training was very low in 24% of anesthesiologists and without any training in 76%.

With regard to training in the application of the protocol, 31 of the professionals (62%) responded that they had not received any type of training. A 2017 study also reported that the team of doctors, anesthesiologists (62.5%), surgeons (82.4%) and residents (83.9%), did not have training [18]. In this context, training is a simple but very important tool for acquiring more knowledge, enabling the health professional to promote the quality of care provided, allowing the service to be performed in a safe and effective manner [18].

In a WHO study, the incidence of surgical adverse events of 7.6% was found, of which 66.7% were considered preventable [19]. According to the research, the inadequacy of training and qualification of the teams contributed to this [20].

It was observed that 64% of the studied health professionals agree on the importance of the safe surgery protocol. Within this context, studies report that the use of the safe surgery checklist is aimed at preventing human errors and errors. Therefore, there is a need to train the entire surgical team and institute policies that collaborate with high adherence, with the creation of training, protocols and measures so that all
professionals of the institution are aware of the great importance of the checklist [21]. The Surgical Center is one of the environments with the highest number of adverse events and hospitalization due to the complexity of the procedures, the interaction of interdisciplinary teams and work under pressure [22]. In the study in question, most respondents answered that there is a verification of both the instruments and the equipment of the operating room. The WHO manual portrays the importance of identifying items in the operating room, with each service specifying when and which professional will be responsible for these checks [17].

A percentage of 56% of the participants answered that the checklist is performed by a nurse just before the patient enters the operating room, and 54% in the operating room in the presence of the full team. The main advantage for nursing professionals in relation to the checklist, concerns the promotion that this tool contributes to decision-making and attitudes that seek the safety of the patient and the team, avoiding failures, providing effective actions, in order to avoid errors related to surgery, thus improving the efficiency of team work [23].

According to the WHO, the checklist in the operating room contains the essential components of surgical care and serves as a barrier to prevent human error. In addition, it serves as a memory aid for better task performance, standardization of tasks to facilitate the coordination of the surgical team, a means to create and maintain a culture of safety in the operating room; and support for quality control actions by hospital managers, the government and inspectors [24].

Brazilian Association of Surgical Center Nurses, Anesthetic Recovery and Material and Sterilization Center (SOBECC) states that "the WHO Surgical Safety List has been useful and used successfully in various settings, but on the other hand, recognizes that its implementation and adherence by the professionals who work in the surgical center requires commitment and adaptation [24]."

Finally, in relation to hospital accreditation, most participants (96%) answered that the hospital is accredited. For a hospital to have its accreditation certificate and, consequently, international recognition, it must follow quality standards recommended by the Brazilian International Accreditation Program, or, as an external alternative, by the Joint Commission International (JCI) [9].

**Conclusion**

After eleven years of Brazilian adherence to the WHO Safe Surgery Protocol and its importance as a way of preventing errors during surgical care [15], this research shows that this protocol is only recognized by 58% of the physicians of this accredited hospital, the minority of these (24%) trained to perform the protocol. All of this in the face of a percentage of 98% of the participants declaring that they had already witnessed errors within the operating room and 46% reported their incidents. Considering that the medical profession is responsible for a large part of adverse surgical events, according to data from the medical participants themselves, who put the medical team as the most cited group of professionals with 58% and with the possibility of being preventable through the use of the protocol, it is training of anesthesiologists, continuing education to follow the application and even more for the safety of the patient-health professional binomial is essential.

**Appendix A**

1. In your life, have you ever witnessed / participated in an error in the operating room?
   - [ ] YES
   - [ ] NO

2. If the previous answer is affirmative (yes), at what stage did it occur?
   - [ ] Before the procedure
   - [ ] During the procedure
   - [ ] After the procedure
   - [ ] I never saw or participated in an error in the operating room

3. Who was involved in the incident?
   - [ ] Medical Team
   - [ ] Nursing
   - [ ] Administrative Employee
   - [ ] Sterilization Center
   - [ ] Residents
   - [ ] Others

4. How would you rate the incident? If more than one, check them all.
   - [ ] Identification
   - [ ] Anesthesia
   - [ ] Laboratory
   - [ ] Notification Form
   - [ ] Inadequate Venodiscis
   - [ ] Image Exams
   - [ ] Blood Transfusion
   - [ ] Wrong Medication
   - [ ] Poor Communication
   - [ ] Antibiotic Prophylaxis
   - [ ] Surgery on the Wrong Patient
   - [ ] Incomplete Material
   - [ ] Surgical Instruments
   - [ ] Surgery with Wrong Laterality

5. Was the incident notified?
   - [ ] YES
   - [ ] NO

6. Was the patient or guardian required to sign the Informed Consent Form (ICF)?
   - [ ] YES
   - [ ] NO

7. Do you check the side to be operated on before surgery?
   - [ ] YES
   - [ ] NO

8. Did you check the material to be used or the condition of the equipment in the operating room before anesthesia started?
   - [ ] YES
   - [ ] NO

9. Have you ever had or watched the suspension of surgery for lack of material, tests or other problem?
   - [ ] YES
   - [ ] NO
10. Do you know the WHO (World Health Organization) protocol for safe surgery?
   □ YES □ NO

11. How do you understand / know the safe surgery protocol?
   □ I don’t know the protocol.
   □ I only know part of the protocol.
   □ As an obstacle to ensure patient safety.
   □ As an obstacle to ensure safety for health professionals.
   □ Another bureaucracy.
   □ Others.

12. Have you received training for the safe surgery protocol?
   □ YES □ NO

13. How do you feel about the safe surgery protocol?
   □ Motivated, important for everyone.
   □ Boring, I think it’s unnecessary.
   □ Indifferent.
   □ Ashamed, for exposing myself.
   □ Riled up. The protocol delays surgery.
   □ Others.

14. As a doctor, do you demand the correct follow-up of the protocol?
   □ YES □ NO

15. Is the checklist performed by a nurse (o) soon BEFORE the patient enters the operating room?
   □ YES □ NO

16. Is the checklist carried out by a nurse INSIDE the operating room?
   □ YES □ NO

17. In your professional practice, have you ever been involved in any demands on your respective professional advice?
   □ YES □ NO

18. In your professional practice, have you ever been involved in any JUDICIAL demand?
   □ YES □ NO

19. Is your hospital accredited?
   □ YES □ NO

20. In the case of the previous answer YES, in which company are you accredited?
   □ International Joint Commission (IJC).
   □ Organização Nacional de Acreditação (ONA).
   □ Accreditation Canada (Qualisa).
   □ Qmentum International Accreditation Program.
   □ I do not know how to answer.

**Conflict of Interest**

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**References**


