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Original Article

The WHO Surgical Safety Checklist: knowledge and use by Brazilian orthopedists☆

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ABSTRACT

Objective: The research examined Brazilian orthopedists' degree of knowledge of the World Health Organization Surgical Safety Checklist.
Methods: A voluntary survey was conducted among the 3231 orthopedists taking part in the 44th Brazilian Congress of Orthopedics and Traumatology in November 2012, using a questionnaire on the use of WHO Surgical Safety Checklist. A statistical analysis was done upon receipt of 502 completed questionnaires.
Results: Among the 502 orthopedists, 40.8% reported the experience of wrong site or wrong patient surgery and 25.6% of them indicated "miscommunication" as the main cause for the error. 35.5% of the respondents do not mark the surgical site before sending the patient to the operating room and 65.3% reported lack of knowledge of the World Health Organization (WHO) Surgical Safety Checklist, fully or partially. 72.1% of the orthopedists have never been trained to use this protocol.
Discussion: Medical errors are more common in the surgical environment and represent a high risk to patient safety. Orthopedic surgery is a high volume specialty with major technical complexity and therefore with increased propensity for errors. Most errors are avoidable through the use of the WHO Surgical Safety Checklist. The study showed that 65.3% of Brazilian orthopedists are unaware of this protocol, despite the efforts of WHO for its disclosure.

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Protocolo de Cirurgia Segura da OMS: O grau de conhecimento dos ortopedistas brasileiros

Palavras-chave:
Segurança do paciente
Erros médicos
Procedimentos cirúrgicos
Operatórios
Lista de verificação

R E S U M O

Objetivo: A pesquisa analisou o grau de conhecimento do Protocolo de Cirurgia Segura da OMS pelos ortopedistas brasileiros.
Métodos: Foi feita uma pesquisa voluntária entre os 3.231 ortopedistas participantes do 44° Congresso Brasileiro de Ortopedia e Traumatologia (CBOT), em novembro de 2012, por meio de um questionário sobre o uso do Protocolo de Cirurgia Segura da OMS. Após o recebimento de 502 questionários respondidos, foi feita a análise estatística dos resultados.
Resultados: Dentre os 502 ortopedistas respondentes, 40,8% relataram ter vivenciado a experiência de cirurgia em paciente ou em local errado e 25,6% deles apontaram "falhas de comunicação" como responsáveis pelo erro. Do total de respondentes, 36,5% relataram não marcar o local da cirurgia antes de encaminhar o paciente ao centro cirúrgico e 65,3%, desconhecer total ou parcialmente o Protocolo de Cirurgia Segura da OMS. Desses ortopedistas, 72,1% nunca foram treinados para o uso do protocolo.
Discussão: Erros médicos ocorrem, principalmente em ambiente cirúrgico, e representam um alto risco para a segurança dos pacientes. Considerando que a cirurgia ortopédica é uma especialidade de grande volume e frequentemente de alta complexidade, envolve uma probabilidade grande de ocorrência de erros, a maioria evitável por meio do uso do Protocolo de Cirurgia Segura da OMS. Na amostra pesquisada, restou evidenciado que 65,3% dos ortopedistas brasileiros desconhecem tal protocolo, apesar dos esforços da OMS para a sua divulgação.

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Introduction

The principle of *primum non nocere* (first of all, do not cause harm), which is attributed to Hippocrates, demonstrates the concern regarding the risks in medical practice that has existed since ancient times.

Medical societies around the world have recognized the problem of medical errors and have led the movement to avoid them and establish the concepts of safe surgery. The American Academy of Orthopaedic Surgeons (AAOS) began its efforts with the initiative known as Wrong Site Surgery in the 1980s and published its preliminary results in 1984.[1–3] In 2000, a publication from the Institute of Medicine (IOM) with the title "To Err is Human: Building a Safer Health System" raised awareness among the public, the media, politicians and medical professionals and consolidated the interest in this topic.[4]

In a World Health Assembly that took place in 2002, the member countries of the World Health Organization (WHO) recognized the need to reduce the harm and distress among patients and their relatives arising from medical errors, and consequently agreed on a resolution for increasing patient safety, within its worldwide public policies. In October 2004, WHO created the World Alliance for Patient Safety, which, from 2005 onwards, started to define priority topics to be addressed every two years, known as Global Challenges.[5]

In 2007–2008, the second global challenge placed the focus on improvement of safety within the surgical setting (Safe Surgery), with the aim of increasing the quality and safety standards for surgical care, through four important actions: (i) prevention of infections at the surgical site; (ii) safe anesthesia; (iii) safe surgical teams; and (iv) surgical care indicators.[4] Based on these actions, a campaign known as Safe Surgery Saves Lives was launched in WHO member countries.

In 2008, the Brazilian Ministry of Health joined the Safe Surgery Saves Lives campaign. The main aim of this campaign was to get hospitals to start using standardized checklists prepared by specialists, so as to help surgical teams diminish the errors and harm to patients. This checklist would have to be applied to all surgical procedures, in three phases: before the start of anesthesia (*Sign In*), before the skin incision (*Time Out*) and before the patient leaves the surgical theater (*Sign Out*)[6] (Figs. 1–3).

At the *Sign In*, the patient's identity, the markup of the surgical site, the signing of the consent statement and the correctness of the materials requested are checked. Difficulties in intubation and the risk of hemorrhage are also anticipated. At the *Time Out*, a brief pause of less than 1 min before the incision is made, all members of the surgical team (surgeons, anesthetists, nurses and any other individuals involved) state who they are, anticipate the possible complications of the surgery and verbally confirm the patient's identification, the surgical site, the procedure to be performed and the patient's position. At this stage, the following are also confirmed: (i) applications of prophylactic antimicrobial and thromboembolic agents, when indicated; (ii) the conformity of the imaging examinations; and (iii) the functioning and correct sterilization of the materials. *Time Out* is a way of ensuring communication between the members of the team and avoiding errors such as "wrong patient" or "wrong site". It is mandatory in the United States, but in many countries like Brazil it is only suggested. At the *Sign Out*, the procedure is again checked, the

SAFE SURGERY CONSIDER THE RISK

Surgical Safety Checklist

ENTRY – SIGN IN

PHASE 1

WHEN: before induction of anesthesia

WHO: the checking should be done by the nurse and the anesthetist

WHAT TO CHECK:

- Confirm with the patient:
  - Identification
  - Surgical site
  - Procedure
  - Consent
- Has the surgical site been marked?
- Is the anesthesia cart complete and has it been released for use?
- Is the oximeter in position and in working order?
- Are there any known allergies?
- Is there any risk of aspiration?
- Is there any risk of hemorrhage?
- Is blood transfusion anticipated? Is it available?

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This checklist can be adapted. Additions and modifications for adaptation to local practice should be encouraged.

Fig. 1 – Checklist before starting anesthesia (*Sign In*).

SAFE SURGERY CONSIDER THE RISK

Surgical Safety Checklist

SURGICAL PAUSE – TIME OUT

PHASE 2

WHEN: before the surgical incision

WHO: should be verbal and be conducted by the surgeon

WHAT TO CHECK:

- Is the surgical team present? Brief presentation of each member of the team
- Is the patient's identification correct?
- Is the surgical procedure correct?
- Is the surgical site correct?
- Have the scalpels and plates been tested?
- Are the instruments, images, devices and implants available?
- Has prophylactic antibiotic been infused?

ANTICIPATION OF CRITICAL EVENTS:

- Surgeon:
  - Duration of operation
  - Blood loss
  - Other expected events
- Anesthetist:
  - Specific concerns regarding the patient and/or equipment
- Nursing:
  - Specific concerns regarding the patient and/or equipment

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Fig. 2 – Checklist before making the skin incision (*Time Out*).

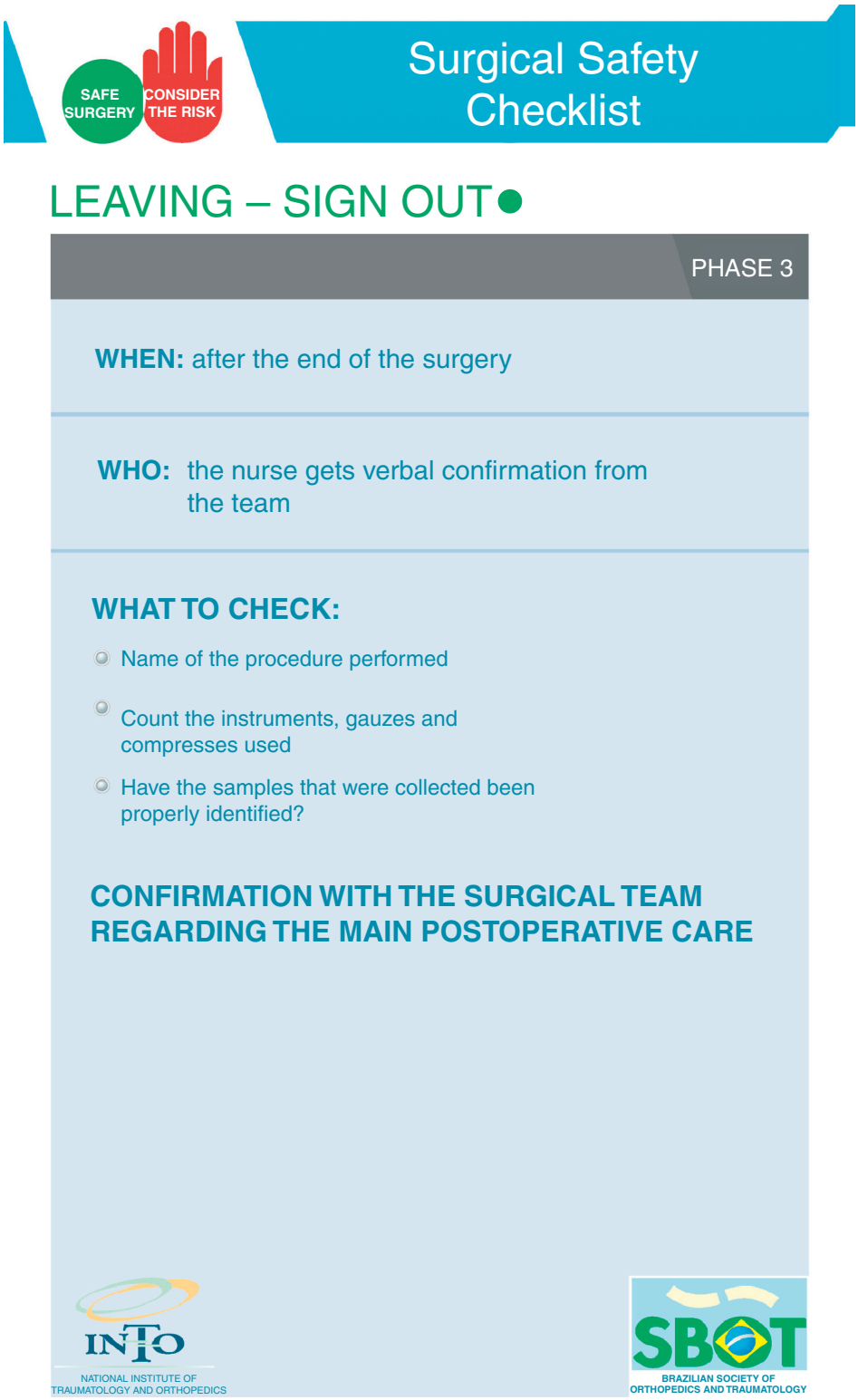

Fig. 3 – Checklist before the patient is taken out of the operating theater (*Sign Out*).

materials used are checked and counted, the samples are sent off and the postoperative plans are discussed. At each of the three stages, the coordinator of the checklist needs to confirm whether the surgical team has completed all of the tasks for that stage, before proceeding to the next stage.[6]

Approximately 234 million surgical procedures are performed worldwide every year. Around seven million patients present serious complications and one million die during or soon after the surgery.[7] Increases in the numbers of surgical procedures have become possible through extraordinary technological advances, which have brought considerable benefits for patients. Surgical results have improved significantly and highly complex surgical procedures have become routine. On the other hand, technological advances have made the surgical environment less safe.[8]

Over a six-month period at one surgical center in the United States, a mortality rate relating to medical errors of one in every 270 errors (0.4%) was shown, and 65% of these errors were considered to be avoidable.[9] Currently, the surgical environment is considered to be highly unsafe, with an adverse event rate that has been estimated as one in every 10,000 surgical procedures. In cases of orthopedic trauma, this rate rises to one complication in every 100 procedures.[10] Comparison between the surgical mortality rate and the civil aviation rate (which is less than one in 1,000,000 exposures) shows that healthcare is considered to be more dangerous.[10] In addition to these factors, there is also the social and financial cost of these errors.

According to data from the Litigation Authority (LA) of the British National Health Service (NHS), most complaints of clinical negligence come from surgical specialties. Orthopedics has the highest representation, accounting for 29.8% of the cases (87 out of 292),[11] and these data are underreported, given that many patients choose not to sue the surgeons and hospitals.[12]

Even the simpler procedures involve dozens of critical stages, with very many opportunities for failures and enormous potential for errors resulting in injuries to patients: (i) correct identification of the material used; (ii) efficient sterilization of the material used; (iii) safe administration of anesthesia; and (iv) the surgical procedure itself.

The most critical obstacle to good performance in a surgical team is the team itself: the surgeons, anesthetists, nurses and other members need to have a good relationship and effective communication. A team that works together to use its knowledge and skills for the patient's benefit may prevent a considerable proportion of the complications that threaten life.[6]

For this, technical precision needs to be combined with patient safety. In this context, correct use of tools like the WHO Surgical Safety Checklist may help in reaching this target.[13]

The present study had the aim of analyzing the degree of knowledge of the WHO Surgical Safety Checklist among Brazilian orthopedists.

Materials and methods

The present study was of exploratory and quantitative nature, and was based on application of a questionnaire on the topic of safe surgery among 3231 orthopedists who were participating at the 44th Brazilian Congress of Orthopedics and Traumatology (CBOT), which was organized by the Brazilian Society of Orthopedics and Traumatology (SBOT) in Salvador (BA), in November 2012.

The questionnaire was based on one that was drawn up by the American Academy of Orthopaedic Surgeons (AAOS), which in turn used one created by the American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNS), with modifications to adapt it to practices within orthopedics and traumatology.[14,15]

The forms were distributed and gathered in by a team from the SBOT. The group of professionals who gave responses in the survey, who were not asked to identify themselves, were not selected in accordance with any specific criterion except for their willingness to participate in the study. Thus, the size of the sample was a matter of chance. After the forms had been gathered in, descriptive statistical analysis was conducted on the responses.

Table 1 – Geographical distribution of the participants.

State	Number of professionals	%
São Paulo	138	27.50
Rio de Janeiro	53	10.50
Minas Gerais	51	10.10
Bahia	42	8.40
Paraná	30	6
Santa Catarina	27	5.40
Ceará	25	5
Others	136	27.10
Total	502	100

Table 2 – Professionals who had done medical residency in orthopedics and traumatology.

Residency in orthopedics	Number of professionals	%
Yes	433	86.20
No	62	12.40
Not stated	7	1.40
Total	502	100

Results

The number of professionals participating in the 44th CBOT was 3231, while the number of forms returned was 502, which represented 15.5% of the total.

Most of the respondents (317; 63.1%) worked within general orthopedics. Among those who worked in subspecialties, knee surgery presented the largest number (105; 20.9%), followed by orthopedic trauma (85; 16.9%) and shoulder and elbow surgery (58; 11.6%).

In relation to geographical area, the orthopedists who participated in the survey were working in all the states of Brazil, with the exception of Acre. The state of São Paulo accounted for the largest number within the sample, with 138 respondents (27.5%), followed by the state of Rio de Janeiro (53; 10.5%), Minas Gerais (51; 10.1%) and Bahia (42; 8.4%) (Table 1).

Table 3 – Incidence of errors in the participants' clinical practice.

	n	%
Yes	205	40.80
No	296	59
Not stated	1	0.20

Table 4 – Knowledge among the professionals relating to the Surgical Safety Checklist.

	n	%
Yes	148	29.50
No	328	65.30
Not stated	26	5.20

Among these 502 orthopedists, 433 (86.2%) said that they had concluded medical residency in orthopedics and traumatology (Table 2).

Analysis on the length of time for which the respondents had been professionally active showed that approximately 40% of the total had been active for more than 20 years and that only 16.7% had had less than five years of practice.

In evaluating occurrences of errors among the professionals, 199 (39.6%) reported having experienced an error within their practice within the last six months. These incidents experienced at surgical centers related mostly to problems with material that was incomplete or became damaged after the start of the procedure, problems with the equipment in the surgical theater and communication failures (Table 3).

Among the orthopedists surveyed, 63.5% preferred to mark out the operation site before sending the patient to the surgical center and 69.5% reported that they checked the implant material and the functioning of the equipment in the surgical theater before the anesthesia (Fig. 4).

Although 65.3% said that they were totally or partially unfamiliar with the WHO Surgical Safety Checklist, 37.1% said that they recognized this checklist as a safety barrier for patients, physicians and the institution. Among the orthopedists, 72.1% reported that they had never had any training for its use (Tables 4–6).

The last question on the form related to the professionals' involvement in complaints to the Regional Medical Council or to the courts. It was seen that involvement with the courts was more frequent, given that 171 respondents (34.1%) said that they had answered this type of complaint, whereas 131 (26.1%) said that they had answered complaints at the Medical Council.

Table 5 – Other questions regarding safe surgery.

Questions	Number of professionals	%
Do you mark out the site to be operated before the procedure?	319	63.50
Do you check the implant material and the functioning of the equipment in the operating theater before anesthesia is induced?	349	69.50
Has it ever happened that a patient's operation has been suspended after induction of anesthesia, because of lack of materials, test data and/or other requirements?	192	38.20

Table 6 – Training for using the Surgical Safety Checklist.

How were you trained to use the Surgical Safety Checklist?	Number of professionals	%
Not trained	362	72.10
Trained by the medical team	46	9.10
By the quality advisory personnel	28	5.60
By the nursing team	17	3.40
By administration professionals	17	3.40
By risk management personnel	12	2.40
Others	20	4.00

Discussion

Studies involving specific populations present limitations. In this study, we obtained data on a limited percentage, i.e. 15.5% of the target population, and this result was close to what was obtained in the actions undertaken by the AAO-HNS (18.6%) and the AAOS (16.6%).[15] We used the standards that these two societies had used, with the objectives of giving greater consistency to the information gathered and enabling comparisons between the findings. In addition, the results from this study may be useful as an initiative providing motivation for a more detailed study.

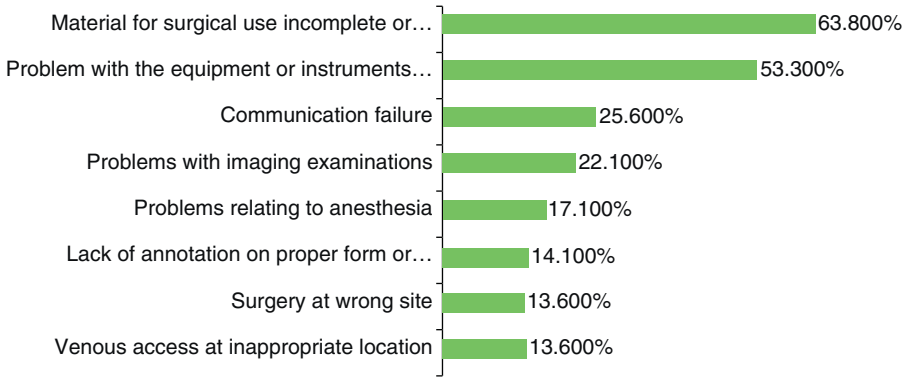

Fig. 4 – Classification of the types of incidents.

The participants in this study were concentrated in the states of São Paulo, Rio de Janeiro, Minas Gerais and Bahia (56.7%), which is in accordance with the geographical distribution of orthopedists in Brazil. Likewise, specialists who had done medical residency represented 86.2% of the total number of respondents, which corresponds to the number of SBOT members who generally attend the Brazilian Congress. The number of professionals who stated that, at some time during their careers, they had already experienced cases of surgical procedures at the wrong site or on the wrong patient represented 40.8% of the total.[16] In the AAOS survey, errors relating to surgery performed on the wrong side accounted for 59.1% of the incidents, and 56% in the study by the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO).

Recently, a study evaluating the database of the National Reporting and Learning Service (NRLS), in England, was conducted in relation to the year 2008. The authors concluded that the WHO Surgical Safety Checklist contributed toward aligning technical precision with patient safety.[6] Reports from American subspecialty societies also corroborate this understanding. The American Hand Surgery Society reported that 21% of the surgical procedures were performed in the wrong locations.[17] In relation to spinal surgery, this number has been shown to be even more alarming, according to a study by the American Academy of Neurologic Surgeons, who found that 50% of the informants stated that they had performed surgery at the wrong level at least once.[18,19] A study conducted by the American Academy of Foot and Ankle Surgeons also showed that the incidence of surgery at the wrong site was 13%.[20]

In our study, the most frequent error category related to the material for use during the surgery, which was incomplete or became damaged after the start of the procedure in 127 cases (63.8% of the total). The following were also reported: (i) problems with the equipment in the surgical theater, with 106 cases or 53.3% of the total; and (ii) communication failures, with 51 events or 25.6% of the total. In the findings of the AAOS, in developed countries, errors relating to equipment are the commonest failure, representing 29% of the total, followed by communication errors, with 24.7%.[15] On the other hand, the error category that was most frequent in our setting (incomplete or damaged surgical material) is not a situation with much representation in the United States.

Among the orthopedists in our sample, 63.5% stated that they marked out the location to be operated before sending the patient to the surgical center. Furthermore, 69.5% reported that they checked the implant material and the functioning of the equipment in the operating theater before anesthesia was induced.

Although 37.1% of the respondents recognized the risk involved in performing surgery and acknowledged that the WHO checklist was a safety barrier for patients, physicians and the institution, 65.3% reported that they were completely or partially unfamiliar with this checklist. Moreover, 72.1% mentioned that they had never been trained to use it.

Conclusions

Medical errors occur and represent a risk to patients' safety. This survey demonstrated that despite Brazil's adherence to the Safe Surgery Saves Lives campaign of the World Alliance for Patient Safety, in 2008, in which the Safe Surgery Saves Lives manual was produced and distributed at national level, presenting the WHO Surgical Safety Checklist as a means of preventing errors during surgical treatment, the checklist was unknown to 65.3% of Brazilian orthopedists. Even some of the orthopedists who were aware of it had never been trained to use it.

Considering that the specialty of orthopedics is responsible for a large proportion of adverse surgical events, among which most are avoidable through using the WHO Surgical Safety Checklist, it becomes necessary not only to recognize this as an important tool for improving safety within the surgical environment, but also to train teams and stimulate its use among Brazilian orthopedists.

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