Original Article

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

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A R T I C L E  I N F O

Article history:
Received 7 August 2013
Accepted 16 August 2013

Keywords:
Patient safety
Medical errors
Surgical procedures
Operative Checklist

A B S T R A C T

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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2255-4971/$ – see front matter © 2013 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. All rights reserved.
http://dx.doi.org/10.1016/j.rboe.2013.12.010
**Protocolo de Cirurgia Segura da OMS: O grau de conhecimento dos ortopedistas brasileiros**

**RESUMO**

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 44º 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. 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.

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.

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. 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) (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
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?

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

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

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

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

WHEN: after the end of the surgery

WHO: the nurse gets verbal confirmation from the team

WHAT TO CHECK:
- Name of the procedure performed
- Count the instruments, gauzes and compresses used
- Have the samples that were collected been properly identified?

CONFIRMATION WITH THE SURGICAL TEAM REGARDING THE MAIN POSTOPERATIVE CARE

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

Fig. 3 – Checklist before the patient is taken out of the operating theater (Sign Out).
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.\(^\text{14,15}\)

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.

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).

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### Table 1 – Geographical distribution of the participants.

<table>
<thead>
<tr>
<th>State</th>
<th>Number of professionals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>São Paulo</td>
<td>138</td>
<td>27.50</td>
</tr>
<tr>
<td>Rio de Janeiro</td>
<td>53</td>
<td>10.50</td>
</tr>
<tr>
<td>Minas Gerais</td>
<td>51</td>
<td>10.10</td>
</tr>
<tr>
<td>Bahia</td>
<td>42</td>
<td>8.40</td>
</tr>
<tr>
<td>Paraná</td>
<td>30</td>
<td>6.00</td>
</tr>
<tr>
<td>Santa Catarina</td>
<td>27</td>
<td>5.40</td>
</tr>
<tr>
<td>Ceará</td>
<td>25</td>
<td>5.00</td>
</tr>
<tr>
<td>Others</td>
<td>136</td>
<td>27.10</td>
</tr>
<tr>
<td>Total</td>
<td>502</td>
<td>100</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Residency in orthopedics</th>
<th>Number of professionals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>433</td>
<td>86.20</td>
</tr>
<tr>
<td>No</td>
<td>62</td>
<td>12.40</td>
</tr>
<tr>
<td>Not stated</td>
<td>7</td>
<td>1.40</td>
</tr>
<tr>
<td>Total</td>
<td>502</td>
<td>100</td>
</tr>
</tbody>
</table>
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.

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 AAOS-HNS (18.6%) and the AAOS (16.6%). 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.](image-url)
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 90% 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 is 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.

**REFERENCES**


