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Original research

Translation, cultural adaptation and content re-validation of the observational teamwork assessment for surgery tool

Ana Carolina Amaya Arias [a, *], Rocío Barajas [a], Javier H. Eslava-Schmalbach [a], Ana Wheelock [b], Hernando Gaitán Duarte [a], Louise Hull [b], Nick Sevdalis [b]

[a] Clinical Research Institute, Faculty of Medicine, Universidad Nacional de Colombia, Bogotá, Colombia
[b] Centre for Patient Safety and Service Quality, Department of Surgery and Cancer, Imperial College London, London, UK

HIGHLIGHTS

- The study provides a Spanish content validated teamwork assessment tool for ORs.
- It is an example of appropriate translation, adaptation and content validation.
- The assessment metrics were conducted robustly.
- OTAS-S can be used in future research to enhance teamwork in OR's.

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ABSTRACT

Background. Poor teamwork and nontechnical skill performance are increasingly recognized as important contributing factors to errors and adverse events in the operating room. Assessment of these safety critical skills is important to facilitate improvement, however there are no tools available to assess these safety skills in Latin America. This study aimed to translate, culturally adapt and content validate the Observational Teamwork Assessment for Surgery (OTAS) tool for use in Latin America. **Methods**. A multi-phase, multi-method study was conducted: Phase 1: translation and back-translation; Phase 2: content validity assessed via expert consensus; Phase 3: inter-rater reliability assessed via real-time observation in 98 general surgical procedures using OTAS-S. **Results**. The first change in OTAS-S, was to distinguish between the surgical nurses and scrub technicians (both OR team members are captured in the nursing sub-team in the original OTAS). OTAS-S consists of 168 exemplar behaviors: 60/114 identical to the exemplars listed in the original OTAS tool, 48/114 original exemplars underwent minor modifications, 13 were duplicated (to account for the additional sub-team distinguished in OTAS-S), 6 original exemplars were removed, and 47 new exemplar behaviors were added. Inter-observer agreement was substantial ($K_W = 0.602$; IC: 0.581–0.620). The calculated K_W by phase, behaviors and teams were between 0.534 and 0.678. **Conclusions**. The study provides a content validated teamwork assessment tool for use within Colombian operating rooms and potentially Latin–American. OTAS-S can be used to assess the quality of teamwork in ORs, facilitate structured debriefing and thus improve patient safety and reduce team-related errors.

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1. Introduction

Over the last decade, a growing number of investigations have highlighted teamwork and non-technical skills as important factors contributing to patient safety in the operating room (OR). Non-technical skills are defined as the social skills (e.g. communication, leadership), cognitive skills (e.g. decision-making, problem-solving), and personal resource skills (stress and fatigue management) that complement technical skills, and contribute to safe and efficient surgical operations [1–4]. Effective team functioning and good non-technical skills have been found to contribute to improved technical performance and patient outcomes [5–7].

Accurately assessing these safety critical skills is vital to increasing our understanding of how teamwork and team dynamics impact the safety of surgical patients. Such evaluations can also facilitate structured feedback (e.g. to trainees or entire OR

* Corresponding author.
E-mail address: acamayaa@unal.edu.co (A.C. Amaya Arias).

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teams), identify deficiencies in performance that need improvement, and guide the development of interventions to optimize team performance [8,9]. Teamwork and non-technical skills are typically assessed via observation using rating systems known as '*behavioral markers*'. [10] Observational assessment of teamwork focuses on the interactions between OR team members – in real or simulated OR environments [1]. Assessment tools have been developed to provide objective and structured taxonomies that define behaviors that are recognized as 'good practice' and that contribute to the psychometric validity and reliability of these evaluations. Numerous assessment tools have been developed to capture the non-technical and teamwork skills of OR team members, including the *Anesthetists Non-Technical Skills* (ANTS) [14], the revised *Non-Technical Skills* scale (NOTECHS) [15], the *Non-Technical Skills for Surgeons* (NOTSS) [16] and the *Observational Teamwork Assessment for Surgery* (OTAS) [17]. Some of these rating systems focus on the assessment of individuals' non-technical skills (ANTS, revised NOTECHS, NOTSS), and others assess the dynamics of teamwork across an entire OR team (OTAS).

Here we focus on the OTAS scale. OTAS has been developed to systematically capture the quality of OR team interactions and to link these to clinical processes in the OR and patient outcomes (see Methods for details on the tool). Since OTAS was originally developed in 2006, the tool has been subjected to a continuous program of psychometric testing. To date, OTAS has been found to be a feasible and acceptable form of teamwork assessment to OR teams [22], reliable (as measured by inter-rater reliability) and construct [23] and content valid [17]. In addition, training programs to teach both clinical and non-clinical faculty to use OTAS to make accurate teamwork assessments have been developed [19]. Furthermore, OTAS has been translated into Italian and German [24,25].

Despite the importance of teamwork performance and studies in Latin America citing communication and teamwork as contributing factors in the occurrence of surgical adverse events [26,27], a version of OTAS in Spanish for use in Latin America is not currently available. The primary aim of this study was to translate, culturally adapt and content validate OTAS for use in Colombian ORs, and in doing so provide a robust, scientific methodological approach for translating and culturally adapting assessment metrics in different languages/cultures where differences in practices, protocols and procedures exist.

2. Method

2.1. The OTAS scale

OTAS captures five behavioral constructs of teamwork: communication, coordination, cooperation/back up behavior, leadership and team monitoring/situation awareness. Each behavior is scored on a 7-point rating scale ranging from 0 to 6, where 0 indicates problematic behavior that severely hinders team function, and 6 indicates exemplary teamwork that is highly effective in enhancing team function.

2.2. Procedure

The translation and cultural adaptation of OTAS followed methodological recommendations set out by the American Psychological Association (APA) to adapt measurement instruments. These include: 1) ensuring that there is an equivalence of the constructs in languages and cultural stakeholders, 2) deciding whether to adapt existing text/terms or to develop new ones, 3) selecting qualified professional translators, 4) combining technics of translation (direct and reverse), 5) final review of the adapted version of the test and making necessary corrections, 6) providing prospective empirical evidence of the adapted test and 7) conducting further validation studies [28,29]. A multi-phase, multi-method study was developed based upon these recommendations – as follows:

2.2.1. Phase 1. Translation–back-translation

OTAS was translated from English into Spanish (OTAS-S) using an official Colombian translator. This translation was subsequently reviewed and revised amongst the research team (ACA and AW, both bilingual Spanish/English speakers, with Spanish as mother tongue). Once approved, an official native English translator performed the back-translation of the OTAS-S. The back-translation was reviewed further by a member of the OTAS development team (LH) to ensure equivalence in content between the back-translated and the original OTAS tool.

2.2.2. Phase 2. Content validity

Content validity is typically assessed through a panel of experts' judgment, defined as "an informed opinion of people with experience in the subject, who are recognized by others as qualified experts in this area, and can provide information, evidence, judgments and assessments" ([30], p.29). In the present study, OR experts (≥10 years experience) some of whom are representatives of their specialties at national level in Colombia were recruited and formed the Expert Content Validation Panel (ECVP). In total, eight experts (two surgeons, 2 anesthesiologists, 2 scrub technicians and 2 nurses) formed the ECVP (see Appendix 1).

Each exemplar behavior was reviewed and assessed independently by each member of the ECVP in relation to three dimensions: sufficiency, clarity, and relevance to team effectiveness and safety in the OR (see Appendix 2). Each exemplar behavior was assessed using a 4-pointLikert scale, according to the criteria shown in Table 1. These scores were converted to dichotomous values, such that scores of 4 became 1, and scores of 1–3 became 0. This is a strict validation test, such that behaviors scored 4 by the ECVP would remain unchanged in OTAS-S, whereas those scored 1–3 by

Table 1
Definition of each category and scores to be applied in the valuation of exemplary behaviors.

Coherence (COH)
As drafted, the exemplary behavior that is being reviewed is logically related to the dimension what is being measured.
1 The behavior does not have logical relationship with the dimension
2 The behavior has little relationship with the dimension
3 The behavior has moderate relationship with the dimension
4 The behavior is entirely related with the dimension
Relevance (REL)
The exemplary behavior that is being reviewed is an important dimension to capture examples of desirable behavior and good execution in operating rooms, and therefore such exemplary behavior should be included in the instrument.
1 The behavior can be eliminated without affecting the measurement of the dimension
2 The behavior has any relevance, but another could include what this measures.
3 The behavior is important, but is not decisive
4 The behavior is very important for the dimension measured, it should be included.
Sufficiency (SUF)
Exemplary behaviors that belong to the same dimension and are sufficient to obtain a complete measurement of this.
1 The behaviors are not sufficient to measure the dimension
2 The behaviors measure part, but not entirely the dimension. It should add or modify some behaviors
3 It should add or change a few behaviors to evaluate the dimension
4 The behaviors are sufficient to obtain a complete measurement of the dimension

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