

Safer Surgery Checklist: Barriers in the Adoption of Tablets in Operating Room

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Abstract. It is crucial that registering the checklist needs to be done synchronously and according to the care tasks within the operating room. Therefore, we aim to find out what are the difficulties that the surgical technicians have when checking the list and exploring potential barriers to implementing the use of tablets. Qualitative research was conducted based on focus groups, in-depth interviews and on-site observations until a full coverage of the topics was achieved. We detected that this problem includes technical aspects (connectivity, hardware and software issues), those related to workflow and logistics, those related with registration process, and those related to organization culture and power structure. Based on results, we developed a plan to solve problems detected.

Keywords. Checklist; Operative Surgical Procedure; Patient Safety; Qualitative Research

1. Introduction

In order to standardize care processes in the operating room, the World Health Organization designed a checklist with the advice of surgeons, anesthetists, nurses, and patient-safety experts from around the world [1]. It aims to reinforce established safety practices and promote communication and teamwork across multiple clinical disciplines.

Checklist's implementation during the surgical procedure is intended to work as a tool to improve patient safety, human factors, reduce the incidence of adverse events, morbidity and mortality [2] [3] [4].

However, evidence shows that there are some factors that prevent this procedure from being done on time and correctly [5], despite being a requirement of the Joint Commission International [6]. The barriers to the correct implementation of the surgical checklist are multifactorial and cover both cultural and structural aspects, including communication gaps, the benefit perceived by the user, lack of understanding of the procedures, the perceived ambiguity of the process and negative perceptions regarding operational efficiency, and others [7] [8].

In 2014 the Italian Hospital of Buenos Aires (HIBA), computerized the checklist to be used during the surgical process, and in 2015 the use of tablets was implemented so that the surgical technicians team can complete it from a mobile device, and thus be able to do it next to the patient. However, the use of the tablets was not maintained

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over time, and gradually ceased to be used for the checklist registration.

It is crucial that registering the checklist needs to be done synchronously and according to the care tasks within the operating room. Therefore, we aim to find out what are the difficulties that the surgical technicians have when checking the list and exploring potential barriers to implementing the use of tablets, in order to formulate solutions that guarantee the correct realization of it.

2. Methods

The HIBA is a center of high complexity located in the City of Buenos Aires. Every year performs 52,000 surgical procedures in its 41 operating rooms.

Qualitative research was conducted based on focus groups, in-depth interviews and on-site observations until a full coverage of the topics was achieved. Both the interviews and the focus groups were audio recorded for further analysis, protecting the identity of the participants who voluntarily participated through an informed oral consent. The research project was approved by the institutional ethics committee (CEPI # 5001). The study was performed in full agreement with current national and international ethical regulations.

Between November and December of 2018, 2 focus groups were held, one with the morning shift group and the other one with the afternoon shift group. A total of 41 surgical technicians participated. A tool from the Lean Change Management was used as a triggering material for the investigation. This tool consists in expressing which is the summoning problematic [9]. Then each member, individually, writes in a piece of paper the reasons why they think this is happening. Next step, the reasons are collected, grouped by categories and the different issues that arise begin to be discussed among all the participants. This way, participant's feedback is shared, eliminating biases and generating perceptions of greater value, where possible solutions arise from the group itself.

A group interview was carried out with 2 key participants: the surgical technicians coordinator and the management and update coordinator of the surgery department. Three surgical processes were observed on different days, schedules and operating rooms. Also electronic devices, access to networks and the software involved during the surgical processes were reviewed. The observations were carried out in the central operating room, covering all the tasks performed by surgical technicians, especially focusing on the checklist registration process. The information was systematized in field newspapers, elaborating a dense description [10] through interviews and focus groups.

The analysis process was carried out simultaneously with the information collection process, through the coding and categorization of information, based on a constant comparison process. The categories were built taking into account the central research questions such as the findings that emerged from the same focus groups, interviews and observations, building a descriptive framework that helps contextualize the collected data [11].

3. Results

Emerging categories according to the checklist completion arise from the combination of three employed techniques, that allowed greater wealth in the understanding of the phenomenon. We found three main dimensions. These dimensions account for technical aspects expressed in problems ranging from device's hardware, software, and problems with Wifi signal. We also found workflow related problems, manifested as logistic and organization issues, as well as problems related to the process at registering the checklist, to the organizational culture and about power structure.

3.1 Technical aspects

We evidenced difficulties or barriers in the inquiry that were related to technical aspects associated with checklist registration, which includes connectivity, software and hardware problems.

Connectivity: We detected connectivity problems as unstable range of Wifi inside each operating room, that causes logged out, browsing slow, or lose information loaded. This could make the registration process problematic and longer times.

"often the wifi is wrong and that's it, if you don't have Wi-Fi ... it doesn't work"

Software problems: In order to access checklist interface, surgical technicians must enter to the Electronic Health Record (EHR) from the tablet. In this sense the screen does not adapt to the resolution of used device, making zooming and scrolling necessary. This creates which creates possibilities of error when accidentally touching buttons and when they need to click many times to enter the surgical episode of each patient.

"It is cumbersome to have to enlarge and shrink the image to check option"

"I had to be enlarging the screen, you went to the next step and you had to enlarge it...if there was an application in a standard size, that's it, the size would not be a problem"

Hardware problems: Tablets were slow and usually freeze, and users have difficulty writing on them:

"The tablet's size creates difficulties for writing" "The icons looked very small"

3.2 Workflow

Within this dimension we find three barriers, one is related to dynamics inside the operating room, another refers to operational logistics of tablets and the last one refers to registration itself. Dynamics inside the operating room: in the record of the observations, we noted that operating rooms have 2 desktop computers, one is exclusively used by anesthesia team, expressed explicitly, and the other one, although it was not expressly announced, was constantly used by surgeons. This makes difficult to synchronize the checklist because surgical technicians must wait until computer was available.

*"getting to the computer is very difficult and the computer is far from patient",
"in order be able to register something that is done at a certain moment you need to get away
from the patient, turn their backs at them. It is
very careless and when they register the data, the computer is busy"*

Tablets operational logistics: responsibility generated by using a device that is not their

own but belongs to the institution is explained. In order to use them, a process to ensure safety and cleanliness of tablets had to be respected. Circuit becomes disruptive in routine surgical technicians tasks, since they have to go to storage and complete a form when borrowing the devices, taking responsibility for them, which consumed too much time and made them uncomfortable to continue with another tasks. In addition, tablets were not always available because they were stored without enough battery, and chargers were missing.

“you were going to ask for tablet, you opened it, it had no battery, you had to go back to ask for a charger, and there were no chargers”, “They (surgeons) asked for charger to another use (phone charge), I don’t know if they would take it home, or leave it there. Doctors have their radio, they never have battery and they have the same charger plug as tablets”, “A lot of liability for possible losses between surgeries while we have to prepare material”

Check List Registration: problematic of synchronous register of checklist is given by a set of topics related to assistencialist aspect of surgical technicians work. On one hand, presence of a mobile device such as tablets could hinder dynamics their work, since they need to have both hands free to specify their care tasks with patient, since interrogation until ensuring availability of necessary supplies on operating table.

“At patient’s admission we have many things to do, we cannot have it (tablets) in our hands”, “One difficulty is having to have it during surgeries”

On the other hand, check list is generic and unique for different services and types of surgeries, which implies that all fields present in it do not always apply, or some are missing, or order items may not correspond to a specific workflow.

3.3 Organizational culture and power structures in operating room

Transversally to addressed problems, an underlying category refers to organization culture and power structures in operating room. We observed that power structures within operating room set out priorities on devices use of such as computers and tablet chargers. Sometimes surgical technicians relegate tasks to comply with requests from surgeons in the ward, for example bringing their cell phone, taking a picture of surgical marking on patient. Likewise, although correct application of check list is a responsibility of the entire operating room team, surgical technicians adopt this task as their own.

4. Discussion and Conclusion

We explored difficulties of surgical technicians that arise checklist procedure. We detected that this problem includes technical aspects (connectivity, hardware and software issues), those related to workflow and logistics, those related with registration process, and those related to organization culture and power structure.

Based on preliminary results, we solved connectivity issues, we installed more Wi-Fi access points in operating rooms, and we developed a plan to replace obsolete devices. Regarding the software, we plan to develop a new mobile application that responds to specific registration needs of surgical technicians team. However, solving technical aspects would not solve all difficulties detected. Despite our plan with informatics issues, additionally, it will be convenient to attend organizational and

cultural factors, concordant with literature [8].

Workflow problems could be solved by installing a bedside post next to patient to hold tablets and allowed hands free. This would ensure that surgical technicians have a device exclusively for them, and able to prevent wasting time in withdrawal and return.

Finally, we consider that could be convenient to redesign checklist according to specific context in which it will be used, as Raman recommends [12]. According to organization culture and power structure, it would be desirable to work with the entire Department of Surgery to raise awareness among all members of operating room about the importance of correct completion of checklist on patient safety, following the importance of the team's commitment is highlighted [13], as a collective responsibility.

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