max 200 characters

Title: Human Factors Approach to Improving Communication between Console Surgeon and Bedside Assistant

Submission Summary

Please summarize your topic, application, background, and overview of presentation, etc. You should focus on the importance of message and take away points.

250-1050 words

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Background, Importance, and Objective:

Miscommunication in the Operating Room (OR) is a leading cause of surgical error and patient injury. Successful communication is essential in robotic surgery due to the complex nature of these surgeries and substantial risk for patient morbidity. The surgeon sits at the robotic console and at least one bedside assistant is positioned next to the patient. Communication is especially strained between these two people in the Robotic OR due to the following factors: 1) physical distance: the console surgeon and the bedside assistant are 10-20 feet apart, 2) indirect communication: the console surgeon has their head in the console with their back to the bedside assistant and speaks through a microphone, broadcasted on a speaker on the patient cart, and 3) loud noise environment: presence of multiple loud sound sources between them. In our initial work, OR staff, including robotic surgeons and bedside assistants, confirmed that the loud OR sound environment interfered with job performance and team communication.

Objective:

In this work, our objective was to observe communications between the console surgeon and the bedside assistant using our Speech Communication Interference instrument, which has undergone validation testing, and propose interventions based on human factors principles.
If we can better understand the context of Speech Communication Interference, then we can make recommendations and changes to improve the Robotic OR system better supports communication.

Presentation:

We will present results from a prospective study in which we observed 20 robotic surgeries and analyzed Speech Communication Interference between the console surgeon and the bedside assistant. We observed cases from General Surgery, Gynecology, and Urology. The most common surgery observed was Robotic Inguinal Hernia Repair. Speech Communication Interference was defined as "group discourse disrupted according to the participants, the goals, or the physical and situational context of the exchange." We observed all phases of surgery, including the critical moment of the surgery, defined as when patient safety is most in jeopardy. For example, the critical moment of a laparoscopic inguinal hernia repair is the dissection into the hernia plane, when the femoral vessels and bladder are at risk for injury and team communication is essential. We performed supplemental observations, including post-surgery interviews with Speech Communication Interference event participants to identify contextual factors. We thematically analyzed notes and interviews.

Results:

Analysis of Speech Communication Interference events demonstrated disrupted communication between the console surgeon and the bedside assistants with three themes:

1. The "lean": After speaking into the console microphone and not receiving a reply from the bedside assistant, the console surgeon often removed their head from the console, and "leaned" back in their chair, twisting their trunk and rotating their head as far back as possible in order to repeat the message without using the microphone. This out-of-console conversation lasted 3-25 seconds in which the surgeon was not directly monitoring the surgical field. This delayed the case and placed the patient at risk for injury.

2. The "telephone game": After "leaning" out of the console, if the surgeon still could not get a reply from the bedside assistant, they conveyed the instruction to an intermediary (a "messenger"), who then conveyed the instruction to the receiver. For example, the console surgeon would speak the instruction directly to the resident surgeon, who would then walk to the scrub tech table to relay the message to them.

3. "Cannot hear the speakers": Interviews with bedside assistants conveyed that instructions from the console surgeon were often difficult to comprehend when they were relayed into the console microphone and out of the patient cart speaker. The instruction often sounded like it was being directed towards the ceiling or another direction in the room. The inability to hear the instruction was compounded by noise coming from the patient cart. Additionally, not every message from the bedside assistant was audible to the console surgeon when their head was in the console.

We will present detailed visual timelines of these 3 themes and how they contributed to miscommunication that threatened patient safety.

Proposed Interventions

Preliminary brainstorming with OR team members generated the following Interventions to address the three miscommunication themes. We hypothesize that these interventions will decrease Speech Communication Interference by improving the ability of the console surgeon and bedside assistants to intelligibly understand each other:

1. Attach multiple speakers with varying angles on the patient cart. Multi-directional speakers can be heard by a bedside assistant at any location surrounding the patient cart, including team members of various height, both seating and standing.

2. Extra microphones on patient cart. Similar to the patient cart speakers, microphones that will pick up voices of a variety of bedside assistants at any location surrounding the patient cart.

3. Team View: Install cameras over both the bedside assistants and the surgeon consoles and incorporate into the surgeon console screen a view of the bedside assistants enabling recognition of nonverbal cues.

4. Turn the surgeons: Reorient the surgeon consoles so surgeons don't have their backs to the bedside assistants.

We hypothesize that this additional intervention will improve communication in the OR:

Close the telephone game: If an instruction from the console surgeon must be relayed via a messenger, then the receiver of the instruction should walk to the surgeon console and repeat it to the surgeon, verifying it is correct.

Knowledge Advancement, Target Audience & Impact
Please include the submission's main learning objectives with additional detail about the target audience, uniqueness and impact of your message and importance of your conclusions and take away points.
100-500 words
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Learning Objectives:

1. Discuss the impact of miscommunication on surgical errors and patient injury in Robotic surgery
2. Understand the context responsible for miscommunication in the Robotic OR
3. Discuss interventions to address miscommunication in the Robotic OR and their implementation

Target audience:
Human Factors scientists; clinical providers, including surgeons, anesthesia providers, and nursing staff; and patient safety leaders

Uniqueness and impact:
We have developed a methodology, supported by a validated instrument, to measure and characterize miscommunication in the OR. In this study, we apply it to Robotic surgical cases, specifically miscommunication between the console surgeon and the bedside assistant. The themes from this study and the proposed interventions can be used to improve communication in the Robotic OR and improve patient safety through improved design of the Surgeon Console and the patient cart. Furthermore, our methodology can be exported to other health care locations that are dependent on coordinated teamwork and team communication, such as the Labor & Delivery and the ER.

Our next steps are to enact these interventions and measure the change in frequency of Speech Communication Interference events.

Importance of conclusions:
Understanding how Speech Communication Interference in the Robotic OR alters monitoring the safety of the patient can lead to recommendations to improve communication in the OR, improving patient safety. After testing these interventions in our Robotic OR, we plan to test them in other hospitals: that will allow us to understand the extent of the problem and evaluate interventions that might be of benefit. We anticipate this work will lead to a grant and a multi-institutional study of OR miscommunication.

Take away points:

1. Miscommunication is common in the Robotic OR and predisposes the team to committing surgical errors, causing patient injuries
2. Speech Communication Interference provides a repeatable and empirically sound way to measure and characterize miscommunication in the Robotic OR
3. Communication between the console surgeon and the bedside assistant is threatened by three primary factors: poor microphone-speaker communication (the "lean"), relaying of instructions through a messenger (the "telephone game"), and inadequate positioning of speakers on the patient cart ("Cannot hear the speakers")
4. We proposed novel interventions to address these 3 factors and improve communication in the Robotic OR

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