

Leveraging AI to Improve Communication Skills in Anesthesia Providers: An Evaluation of Feedback Effectiveness

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INTRODUCTION / OBJECTIVES

Rationale

- Effective communication between anesthesia providers and patients is essential, given brief preoperative interaction
- Clear and empathic communication fosters trust and strengthens patient advocacy
- Ultimately, our goal was to implement an innovative PI project wherein human anesthesia providers participate in communication simulations. AI will provide evaluation and detailed feedback with recommendations.
 - AI is scalable
 - AI is available at all times (no scheduling issues)
 - **However, is AI evaluation just as accurate and reliable as human evaluation?**

Objective

- To assess the validity and reliability of AI-generated feedback compared to human anesthesia professionals

Hypothesis

- AI-generated evaluation and feedback on anesthesia professionals' response to simulations offer enhanced reliability and precision in assessing communication effectiveness

MATERIALS & METHODS

Study Design

- Three challenging communication scenarios encountered by anesthesia providers were created
 - Difficult anesthesia consent
 - Discussing anesthesia related complications
 - Communication with surgical colleagues
- For each scenario, three sample responses were created to represent different levels of communication
- These sample responses were evaluated using five metrics using predefined scoring criteria ranging from 1 (least effective) to 5 (most effective)
- Nine human anesthesia providers and three AI platforms participated in the evaluation process. Each AI platform was run in five separate sessions to generate sample

Analysis

- Kruskal-Wallis H Test** was used to determine if there was statistical difference in the distribution among four groups to determine whether AI platforms, as a group, could provide valid feedback compared to human anesthesia professionals

RESULTS: AI Generated Feedback is Valid and More Precise

Validity of AI-generated Feedback

- Kruskal-Wallis H test demonstrated no significant difference between human raters and AI platforms (H-statistic 6.38, p-value 0.095)
- AI platforms demonstrated AI platforms had lower standard deviation (ChatGPT 0.12, Gemini 0.11, Claude 0.10) than human raters (0.47)

Sample Scenario

Example: Anesthesia Consent Scenario

A 58-year-old woman is scheduled for a laparoscopic cholecystectomy due to recurrent gallbladder cholecystitis and gallstones. Her surgeon has recommended this elective surgery as essential to improve her quality of life and reduce the frequency of debilitating abdominal pain.

The patient has a history of anxiety and a previous negative experience with anesthesia during an unrelated procedure. She experienced severe postoperative nausea and vomiting, which led to a prolonged recovery and significant distress. This experience has left her with a deep-seated fear of undergoing anesthesia again.

The patient's adult daughter is present during the consent discussion and expresses strong reservations about the surgery, citing concerns about her mother's age, health conditions (including hypertension and mild asthma), and her past anesthesia experience. The anesthesiologist must navigate the patient's fears, the family's concerns, and the medical necessity of the procedure to obtain informed consent.

Sample AI-Generated Evaluation

Example: Anesthesiologist Response to Consent Scenario

"Good morning! I see you're here for your laparoscopic cholecystectomy. We'll be using anesthesia for this procedure, and while it's generally safe, there are some risks involved, like nausea or allergic reactions. I know you mentioned having nausea after your last surgery; we'll take steps to manage that this time.

Do you have any specific concerns? I want to make sure we address anything on your mind.

Your daughter is here too; I think it's good that she's with you. She can listen in, but I'll need you to make the final decision.

Let's go over a few details before you sign. It's important you feel comfortable. If you have questions later, you can always ask the nursing staff, or I can come back to chat more after we finish here. Just sign here when you're ready, and we'll get started."

Example: Anesthesiologist Response to Consent Scenario

1. Informed Choice (Score = 3)

Rationale: The anesthesiologist provides some general information on risks, such as nausea and allergic reactions, and acknowledges the patient's previous nausea experience. However, they don't fully explain the risks, benefits, or potential alternatives to the procedure, which may leave the patient feeling only partially informed.

2. Patient Engagement (Score = 3)

Rationale: While the anesthesiologist asks the patient about specific concerns, which encourages some level of engagement, there's limited follow-up to ensure her preferences are fully integrated. The statement, "Just sign here when you're ready," may convey an expectation to proceed without fully encouraging active decision-making by the patient.

3. Emotional Support (Score = 3)

Rationale: Some attempt is made to acknowledge the patient's prior negative experience and address her anxiety by mentioning efforts to manage postoperative nausea. However, the support

lacks depth; there's no exploration of her current emotional state or offering of specific coping strategies, leaving her feeling only somewhat acknowledged.

4. Family Involvement (Score = 3)

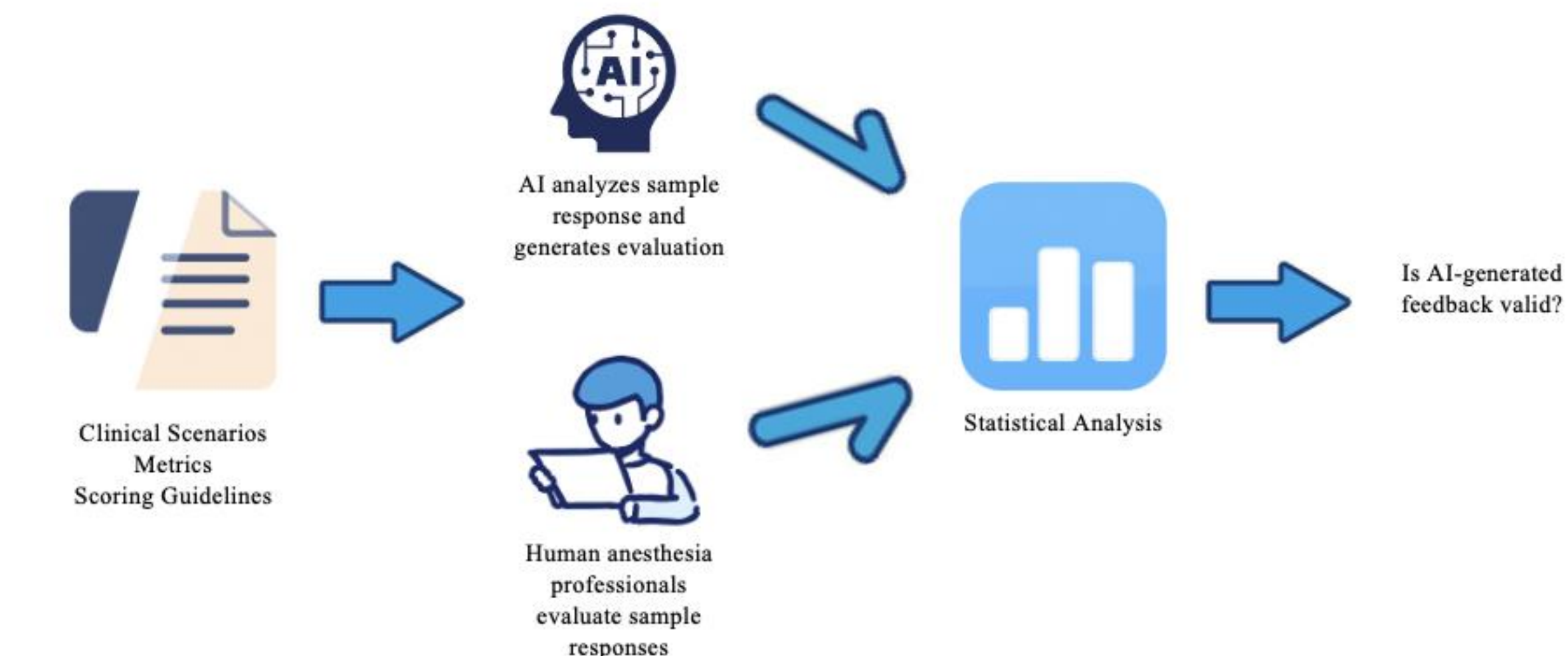
Rationale: The anesthesiologist acknowledges the daughter's presence and implies that her support is positive but doesn't actively engage her concerns. There's minimal integration of the daughter's input, which may leave her feeling marginally included but not fully engaged in the discussion.

5. Ethical Considerations (Score = 3)

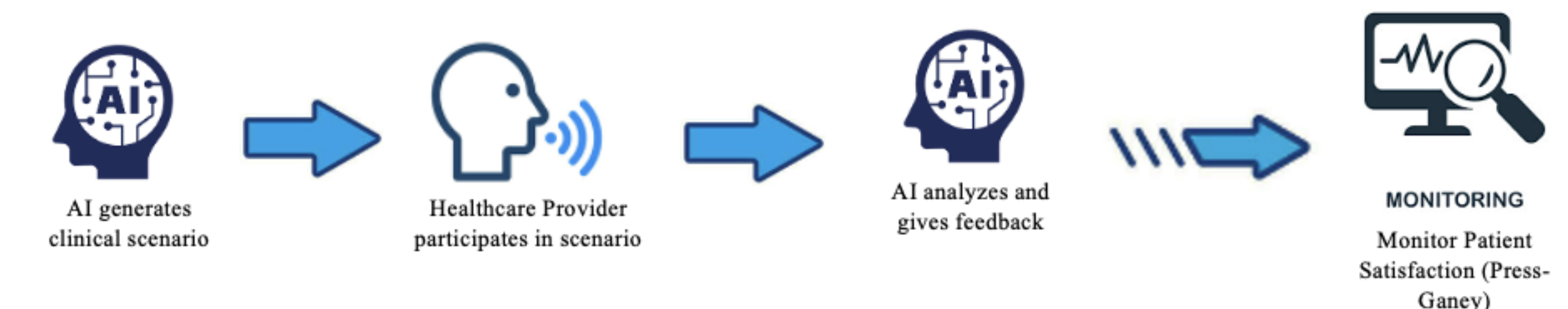
Rationale: Ethical considerations are partially present. The anesthesiologist ensures that the patient is making the final decision, maintaining her autonomy. However, there's an underlying tone of moving forward rather quickly, which may subtly pressure the patient to consent without fully addressing her and her daughter's concerns.

Proposed PI Project: Anesthesia Communication Enhancement

Step 1: Validate AI feedback - Is AI-generated evaluation valid?



Step 2: Human Anesthesia Providers participate in AI-generated and evaluated simulations



SUMMARY / CONCLUSION

- Lack of statistically significant difference supports the validity of using AI platforms for providing feedback in clinical communication scenarios
- Furthermore, lower standard deviation suggests that AI generated feedback have more precision than human evaluators
- Advantages of using AI platforms:
- Improved precision** that arise from different human evaluators
- Scalable** and can handle large volumes of ongoing assessments rapidly especially in large hospitals and departments
- Ease of scheduling as AI platforms are accessible 24/7 and offer immediate feedback
- Limitations of AI platforms:
- AI is adept at language processing but nuanced understanding of clinical context may be limited
- AI cannot fully replicate the empathic feedback that a human evaluator can provide

- This study demonstrates that AI platform can provide valid feedback on communication skills in healthcare setting
- This allows for future implementation of our PI project:
- Anesthesia providers regularly participate in simulation scenarios where they engage in challenging scenarios generated by AI
- Their responses are evaluated using predefined metrics, and scores are accompanied by written evaluation