

Patient Willingness to Undergo Robotic Surgery: Identification and Validation of a Predictive Model

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Introduction

Robotic surgery is in its infancy as a treatment mechanism and is largely not understood by consumers. However, more doctors and hospitals are adopting use of these robots. Therefore, it is important to understand the factors which may influence an individual's perception of robotic surgery.

Though some research has been performed in the realm of technology acceptance, and patient decision making, the two fields rarely intersect (e.g., Alaid & Zhou, 2014). Only one study to date has investigated patient perceptions of robotic surgical technologies, with a limited sample and limited conclusions (Zineddine & Arafa, 2013).

The current research attempts to understand the factors which may influence perceptions of robotic surgery. The potential predictors being studied include: age, gender, income, education level, perceived complexity, perceived value, familiarity, wariness of new technologies, personality factors, and affect (in the form of the six universal emotions).

Methods

Participants. 1324 individuals (699 female) responded to a survey about their willingness to undergo robotic surgery. Participants also responded to questions about their demographics, personality, emotions, and perceptions of robotic surgery, as well as technology in general. Surveys were administered via Amazon's [®] Mechanical Turk [®].

Design. The study used a correlational design, with backwards stepwise regression analyses.

Imagine you have just gone to your physician for tests, and were told that you had to have your gallbladder removed, and the fastest and cheapest option is to have robotic surgery where the surgeon performs the surgery largely aided by a robot. The human surgeon programs and controls the robot at all times, but has no direct access to your body during surgery. The only entity actually touching your body throughout the surgery is the robot.

Regression equation:

$$Y = .316 + .122X_1 + .349X_2 - .098X_3 - .016X_4 - .041X_5 - .032X_6 - .066X_7 + .111X_8$$



Results

Regression analyses were performed to better understand the factors which predict willingness to undergo robotic surgery. Eight of the twenty-one predictors were significant.

- Backward stepwise regression
 - 1324 participants
 - $F(8, 1323) = 275.876, p < 0.001$
 - Eight significant predictors (see graphic)
- Accounts for 62.7% (62.4% adjusted) of the variance

Discussion

- No demographic factors were significant predictors of willingness to undergo robotic surgery.
- Emotions played a significant role in predicting willingness.
- The strongest predictor was perceived value.

Potential Reasons:

- Healthcare and surgery are pervasive, across genders, ages, etc.
- Emotions play a significant role in the decision-making process.
- As individuals perceive more value, they may be more willing to accept the "risk" of the unknown.

Key Takeaways:

There are significant predictors of willingness to undergo robotic surgery.

The strongest predictors are familiarity and perceived value

References

- Alaiad, A., & Zhou, L. (2014). The determinants of home healthcare robots adoption: An empirical investigation. *International journal of Medical Informatics*, 83(11), 825-840.
- Zineddine, M., & Arafa, N. (2013). Attitude towards Robot Assisted Surgery: UAE context. In *Innovations in Information Technology (IIT)*, 2013 9th International Conference on (pp. 175-179). IEEE.