Conversations in Health-Literacy using AI-Technology in OsteoArthritis (CHAT-OA): A Randomized Clinical Trial

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INTRODUCTION:
Patient comprehension is critical to making informed healthcare decisions, particularly in total joint arthroplasty where postoperative adherence and care navigation influence outcomes. Low health literacy is associated with increased decisional conflict, impacting patient satisfaction, anxiety, and engagement as patients often do not fully comprehend the benefits or consequences of their choice. This study evaluated whether a generative artificial intelligence (AI) tool could reduce decisional conflict among patients with hip or knee osteoarthritis compared to usual care. We also assessed the safety of the AI educational outputs.
METHODS: In this OREF-funded, prospective randomized controlled trial, patients with hip or knee osteoarthritis were enrolled prior to orthopedic surgery consultation. Participants in the intervention arm received diagnosis-specific education from a generative AI chatbot tailored to their goals of care, followed by their standard clinical visit. Control participants received standard care without AI interaction. Measures collected pre-visit and one month post-consultation included demographics, health literacy, decisional conflict scale (DCS), Beck Anxiety Inventory, and patient-reported outcomes.
RESULTS: Preliminary analysis included 51 patients, 81% of whom underwent total joint arthroplasty. Baseline demographics were similar between groups. Post-intervention, patients who engaged with the AI chatbot reported significantly lower DCS scores related to benefits (p=0.029), choice (p=0.042), decision making (p=0.044), and values clarity subscore (22.6 vs. 8.3, p=0.0409). Other DCS domains also trended toward improvement but were not statistically significant, likely due to limited sample size. All AI outputs were reviewed and rated 0/5 on a harm Likert scale, indicating no perceived risk or unsafe content.
DISCUSSION AND CONCLUSION: Preliminary findings suggest that a brief AI-driven educational tool may reduce decisional conflict and improve patient preparedness prior to total joint arthroplasty consultation, with no evidence of harmful outputs. This represents a novel, scalable approach to enhancing informed decision-making in orthopedic care.