Utilization of an AI Chatbot for Pre- and Post-Operative Patient Inquiries in Hip and Knee Arthroplasty Care

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INTRODUCTION:
The integration of artificial intelligence (AI) chatbots in healthcare has the potential to enhance patient engagement and alleviate the workload for medical staff. However, ensuring a well-defined scope with appropriate guardrails for any large language model is crucial for patient safety. Generative AI chatbots can provide personalized, comprehensive responses for patients to answer peri-operative questions. This study aims to evaluate a novel AI-driven assistant designed for arthroplasty surgeons and to identify common themes among patient inquiries.

METHODS:
The custom-tailored AI Chatbots (Aidify Knee Replacement Care Aid, Dover, DE) uses unique deep-learning architecture and prompt engineering framework to ensure high-quality natural language interactions. The custom-tailored chatbot was trained with system prompts based on surgeon-specific education, ensuring consistent and accurate information. The custom chatbot provides a unique surgeon- and procedure-specific QR code. Prospective de-identified data was collected on the types of inquiries asked and the frequency of interactions over six months period.

RESULTS:
The AI chatbot addressed 398 unique inquiries. The most frequent category of inquiries was post-operative expectations (57%), including recovery timelines, normal symptoms, and expectations after surgery. Post-surgical instructions, including follow-up care, diet, activity restrictions, and medications, comprised 15.5% of the inquiries. Pre-surgical concerns, such as dental clearance, pre-op instructions, and preparation steps, represented 14.5% of the inquiries while concerns related to pain management, complications, and wound care accounted for 9.9%. Issues related to communication, surgery logistics, insurance, and billing were reported by 3.2% of the patients.

DISCUSSION AND CONCLUSION:
The deployment of this novel AI chatbot was utilized by patients, primarily regarding post-operative expectations and pre-surgical concerns. Future research should quantify the impact on medical staff workload and explore additional strategies for integrating AI chatbots into patient care workflows.

Figure 1: Proportion of Patient Inquiries by Area

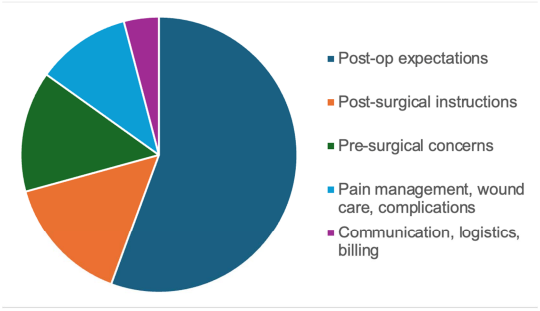

Table 1: Themes in Chatbot Inquiries. N = 398.

Category	*Description*	*Percentage*
Post-op expectations	Recovery timelines, normal symptoms, and what to expect after surgery	57.0%
Pre-surgical concerns	Dental clearance, pre-op instructions, and preparation steps	14.5%
Post-surgical concerns	Follow-up care, next steps, and recovery-related concerns	10.6%
Pain management	Discomfort, severe pain, and whether symptoms are normal	4.3%
Diet & activity	Eating, drinking, walking, exercising, and activity restrictions	4.5%
Wound care	Stitches, bandages, scars, and proper wound cleaning	4.%
Complications	Infections, swelling, or other post-op issues	1.6%
Communication issues	Struggling to contact their doctor or get responses	1.5%
Surgery logistics	Locations, scheduling, and procedural details	1.2%
Insurance & billing	Costs, insurance coverage, or billing	0.5%
Medications	Prescriptions, painkillers, or antibiotics	0.4%