JOURNAL OF PALLIATIVE MEDICINE
Volume 27, Number 3, 2024
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DOI: 10.1089/jpm.2023.0534

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Conversational Agents in Palliative Care: Potential Benefits, Risks, and Next Steps

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Abstract

Conversational agents (sometimes called chatbots) are technology-based systems that use artificial intelligence to simulate human-to-human conversations. Research on conversational agents in health care is nascent but growing, with recent reviews highlighting the need for more robust evaluations in diverse settings and populations. In this article, we consider how conversational agents might function in palliative care—not by replacing clinicians, but by interacting with patients around select uncomplicated needs while facilitating more targeted and appropriate referrals to specialty palliative care services. We describe potential roles for conversational agents aligned with the core domains of quality palliative care and identify risks that must be considered and addressed in the development and use of these systems for people with serious illness. With careful consideration of risks and benefits, conversational agents represent promising tools that should be explored as one component of a multipronged approach for improving patient and family outcomes in serious illness.

Keywords: conversational agents; palliative care; symptoms

Introduction

''I'VE NEVER BEEN GOOD at giving bad news,'' says a physician in a white coat to a woman perched on the edge of an examination table. ''Perhaps you'd like to spend a few minutes with our hospital's new empathy robot.'' This caption, on a cartoon by Nathan Gray, MD, titled ''Some Things Shouldn't Be Animated,''[1] captures widespread concerns about outsourcing of compassion in high-tech modern medicine. Many people view palliative care, a field founded on the power of human connection and interpersonal communication, as incompatible with technology-based conversational agents—systems using artificial intelligence to simulate human-to-human conversations, such as Apple Siri or Amazon Alexa.

Experience with conversational agents in palliative care settings remains limited to date—a recent review of digital health intervention in palliative care noted that ''studies involving robots or chatbots were not identified despite their potential application in palliative care.''[2] However, increasing capabilities and use in other health care contexts[3] warrant careful consideration of how conversational agents might function in palliative care. Could they play a role in improving palliative care access—not by replacing clinicians, but by interacting with patients around select uncomplicated physical symptoms while facilitating more targeted and appropriate referrals to specialty palliative care services?

Could these tools help to establish therapeutic alliance, facilitate coping, or provide social support? Given well-documented palliative care workforce shortages,[4,5] inequitable access to palliative care specialists,[6] and the challenge of training nonpalliative care clinicians to provide primary palliative care,[7] new and innovative approaches are needed to achieve the goal of meeting the physical, functional,

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Accepted December 19, 2023.

psychological, practical, and spiritual needs of every patient with serious illness.

This article defines conversational agents and their use in health care, discusses their potential roles in palliative care, and outlines risks that must be considered and addressed in the development and use of these systems for people with serious illness. We argue that with careful consideration of risks and benefits—incorporating the diverse expertise of health technology, behavior change, communication and data scientists; clinicians; patients; and families—conversational agents represent promising tools that should be explored as one component of a multipronged approach for improving patient and family outcomes in serious illness.

A Brief History and Definitions of Conversational Agents in Health Care

Conversational agents (sometimes called chatbots) are computer programs that mimic human conversations. The first example of a conversational agent in health care was ELIZA, a program developed in the 1960s to provide psychotherapy through prerecorded responses.[8] Since then, advances in artificial intelligence, including machine learning (a means of training models to make predictions using data) and natural language processing (the ability to understand text and spoken words), have expanded the capabilities and use of conversational agents in health care.

Today, conversational agents are deployed through multiple different modalities (e.g., websites, mobile phones apps, or smart speakers) and increasingly used for a range of applications in health care, ranging from patient education to behavior change. Research on conversational agents in health care is nascent but growing, with recent reviews highlighting the need for more robust evaluations in diverse settings and populations.[3,9,10]

Today's conversational agents may be simpler to use than other available mobile health interventions. Potential advantages include the option for people with disabilities or a low degree of comfort with technology to interact without using a keyboard or touch screen and the flexibility for people with visual or hearing impairments to access information in different ways. Voice assistants are increasingly being used by owners of mobile devices.[11]

Encouragingly, one recent study found high feasibility and acceptability of a virtual voice-based problem-solving therapy intervention among adults with mild-to-moderate depression or anxiety, with the greatest effects on psychological distress for non-White and less educated patients, suggesting that conversational agents could have unique benefits for select groups with lower technological resources.[12]

Potential Roles for Conversational Agents in Palliative Care

Ongoing investigation of conversational agents in health care has included several areas that align closely with core domains of palliative care, as defined by the National Consensus Project's Clinical Practice Guidelines for Quality Palliative Care[13] (see Table 1). Below we describe select potential uses of conversational agents and cite examples with relevance to palliative care.

Table 1. Potential Roles for Conversational Agents in Palliative Care

Agent focus	*Example*
Physical symptoms	Assessing, monitoring, and providing nonpharmaceutical recommendations for common symptoms (e.g., exercise for fatigue).
Psychological symptoms	Delivering cognitive behavioral therapy, positive psychology, dialectical behavior therapy, acceptance and commitment therapy, or gestalt therapy.
Culturally sensitive care	Providing treatment recommendations in a patient's primary language or with other characteristics that match a user's cultural background.
Social support	Providing companionship and entertainment (e.g., playing music, playing games, and telling jokes).
Spiritual needs	Providing spiritual counseling or prayers.
Coordination of care	Symptoms exceeding predetermined thresholds (e.g., pain ≥7/10) trigger referral or clinician notification.
Education and support for clinical teams	Clinicians receive in-the-moment feedback on palliative communication skills (e.g., how to elicit patient values and provide emotional support)

Conversational agents could play a unique role in meeting the emotional and psychological needs of patients with serious illness. There has been increasing interest in conversational agents to promote mental health, using a range of therapeutic approaches including cognitive behavioral therapy, positive psychology, and acceptance and commitment therapy.[10] Advances in artificial intelligence have allowed these tools to understand open-ended user input and select corresponding conversational and therapeutic responses. Conversational agents may be particularly well suited to conversations about sensitive topics, with the potential to overcome stigma associated with self-disclosure in some human-to-human interactions.

Experimental research has found equivalent emotional, relational, and psychological benefits from emotional disclosure whether people thought they were interacting with a computer or a human partner.[14] In one study with healthy adults, conversational agents incorporating emotional and relational communication behaviors led to beneficial effects on therapeutic alliance akin to the beneficial effects seen when clinicians incorporate these communication skills.[15] Another randomized controlled trial found a significant improvement in mental health among young adults with cognitive behavioral therapy delivered through a fully automated conversational agent.[16]

Another emerging role for conversational agents is in monitoring and addressing physical symptoms. For example, intervention development and pilot testing led by authors of this article found high levels of feasibility, acceptability, and satisfaction with a virtual assistant for addressing poor sleep,

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pain, fatigue, and distress among women with metastatic breast cancer, using the Amazon Echo Show device with Alexa.[17,18] These promising findings warrant future larger scale studies to evaluate efficacy. Conversational agents can provide evidence-based nonpharmacological interventions (e.g., physical activity for fatigue) in a patient's home, with the potential to connect to a clinician when symptoms are not adequately relieved or a patient's questions remain unanswered.

Conversational agents have also been explored for use as potential spiritual advisors[19] and virtual companions,[20,21] with the flexibility to provide spiritual and/or social support in multiple different culturally congruent ways. This includes the ability to speak multiple languages and dialects (as of 2023, Alexa speaks nine languages with 10 different dialects—e.g., U.S. Spanish, Spain Spanish, and Mexican Spanish) and to embody multiple different ''personalities''—expressed as different physical embodiments, voice registries (e.g., formal vs. informal), genders, and traits (e.g., supportive, firm, and encouraging).[22] These capabilities could play a role in palliative care contexts, given the diversity of experiences with serious illness, though evidence is needed to support their use.

Although never replacing palliative care clinicians, conversational agents could play a key role in care coordination, meeting select straightforward patient needs while facilitating more targeted and appropriate referrals to specialty palliative care services. For example, a conversational agent could help a patient with more routine tasks such as scheduling appointments or facilitating medication refills. A patient using a conversational agent for palliative support at home who reports certain physical or psychological symptoms exceeding predetermined severity thresholds could trigger a recommendation and/or referral to a palliative care specialist.

In our pilot study, patients with metastatic breast cancer who reported pain or distress ≥7/10 to a conversational agent were referred to their clinical care team.[17] Aligning early palliative care delivery with patient and caregiver needs is a major area of interest and investigation in the field.[23]

Alternatively, conversational agents have been suggested as coaches for oncologists or other clinicians attempting to choose the right words or incorporate more empathy in difficult conversations with patients, such as giving serious news.[24] The ability of conversational agents to suggest phrases or provide immediate in-the-moment feedback on primary palliative care communication skills could provide complementary benefits to more costly and time-intensive communication training programs.[25] Allowing clinicians the opportunity to ''practice'' communication skills with conversational agents may help to avoid sounding fake or scripted when talking with actual patients.

Potential Risks and Necessary Next Steps

Conversational agents entail potential risks that must be carefully considered in their application to palliative care (Table 2). These agents should adopt existing guidelines to support trustworthy and responsible interactions.[26,27] Transparency is critical: ethical dilemmas may arise if patients with serious illness believe they are interacting with a person, not a computer.

Most Americans have concerns about privacy and data security with artificial intelligence technology.[28] These risks must be addressed through transparent reporting of where, how, and when data are stored, processed, and accessed, following established regulatory guidelines for handling health information securely. Data breaches should be reported quickly and users should have the opportunity to request that previously collected data be destroyed.[29]

Ensuring the ability to appropriately handle patient distress (e.g., suicidality) is critical to avoid patient harms with conversational agents. This risk can be alleviated by including instructions for accessing clinical services when

Table 2. Potential Risks and Strategies to Ensure Conversational Agents Are Developed Responsibly in Palliative Care

Risk	*Strategies to mitigate risk*
Transparency	• Ensure users understand that they are interacting with a conversational agent, not another person. • Convey the capabilities and limitations of the system.
Data security and privacy risks	• Follow established legal requirements (e.g., HIPAA regulations in the United States) for data protection. • Choose appropriate data storage and security methods and notify users of privacy limits and protections in place to secure data. • Request permissions to store and use data. • Report data breaches within prespecified time limits. • Include mechanisms so that users may request all private data be deleted.
Patient harm	• Develop with expert clinical input. • Disclose limitations and screening users for suitability. • Include ability to monitor patient use with appropriate procedures when risks are identified. • Ensure adequate resources (e.g., palliative care or mental health specialists) are available when risk of harm is identified.
Design bias	• Include data from diverse target populations. • Develop with broadly representative user input. • Prioritize research and evaluation of potential disparities in use and outcomes.
Inequitable access	• Design agents to be accessible to the populations that could benefit from them, considering access to technological infrastructure (e.g., broadband service), familiarity with technology, and health literacy.

HIPAA, Health Insurance Portability and Accountability Act.

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symptoms exceed prespecified thresholds or including emergency protocols that automatically trigger clinician involvement.

Conversational agents must also avoid design biases that could worsen existing disparities in serious illness care. These tools should prioritize equitable access for palliative care patients, including those with functional limitations or low technological literacy. To date, most studies of digital health technologies have been conducted with healthy volunteers, not high-burden populations.[30] Patients should also be informed when they are speaking with a conversational agent and have the opportunity to choose whether they would prefer to speak with a clinician whenever possible.

Successful strategies to mitigate these risks in the development and investigation of conversational agents in palliative care will necessitate team science, involving experts in health technology, data science, human–computer interaction, health care communication, and health behavior change. Tools must also be developed with input from clinicians to ensure that they are clinically relevant and up to date, include appropriate procedures for addressing potential patient harms, and can be integrated with existing clinical resources to improve palliative care access and equity.

Finally, it is critically important that end users, including seriously ill patients and their families with diverse backgrounds, be involved at all stages of research and development to ensure that tools are useable, acceptable, perceived as trustworthy, and helpful for meeting palliative care needs.

This is a time of rapid advances in artificial intelligence technologies and increasing interest in their uses across multiple aspects of health care. Nascent research suggests that conversational agents could play a role in several key domains of palliative care. Increasing access to high-quality serious illness care is a multifaceted problem that will not be solved by any single approach. However, rather than viewing conversational agents as incompatible with palliative care, we should be exploring their use as one potential tool for improving patient outcomes and optimizing use of palliative care specialists.

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Funding Information

This study was funded by ACS Clinical Research Professorship (K.H.S.) and McElhattan Foundation (Y.S. and R.A.).

Author Disclosure Statement

No competing financial interests exist.

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