



<https://doi.org/10.59298/ROJESR/2025/4.1.5054>

# Robotic Companions for Mental Health Support

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## ABSTRACT

Mental health disorders such as anxiety, depression, and stress have become prevalent global health concerns. As demand for mental health support increases, technology-driven solutions, including robotic companions, are emerging as promising alternatives to supplement traditional therapeutic interventions. This paper investigates the potential roles of robotic companions in mental health care, examining their ability to provide companionship, reduce loneliness, and enhance accessibility to mental health services. By integrating artificial intelligence and mood-aware systems, robotic companions can offer consistent, non-judgmental support while alleviating the burden on human therapists. The paper further discusses critical design considerations, ethical concerns, and privacy implications associated with using robotic companions for mental health support. Drawing on qualitative and quantitative research, as well as real-world case studies, the study highlights the opportunities and limitations of robotic companionship in mental health settings. While robotic companions present a promising frontier in mental health care, their integration must be approached with careful ethical and regulatory considerations to ensure responsible and effective implementation.

**Keywords:** Robotic companions, Mental health support, Artificial intelligence, Human-robot interaction, Social robotics, Ethical implications.

## INTRODUCTION

Mental health problems have gained increasing recognition as a major societal and public health challenge across the globe. In recent years, population levels of reported anxiety, depression, and stress have risen at accelerating rates, magnifying the problem further. As a result, there is a growing public urgency to enhance the accessibility and efficacy of mental health support. To supplement traditional sources of support, many people are turning to technologies such as mental health apps and telephonic therapy services, which have seen unprecedented growth over the last year. In this context, we argue that there is potential for robotic companions to offer valuable mental health support to people, as social robots are particularly appealing forms of technology for many different individuals. This paper seeks to explore the role that robotic companions could play in supporting people's mental health and well-being. The paper is supported by evidence from qualitative and quantitative research conducted with robot designers and developers, individuals with lived experience of mental health problems, mental health care professionals, and members of the general public. This work encompassed a brief review of the state of the art in therapeutic robots, alongside the ethics of human-robot interactions and care relationships, design implications of the concept of companionship, and human-centered facial expression tools. To maintain the transparency of this paper, we have opted to preserve these participants' own words throughout this piece to represent the key viewpoints of these professionals. The objectives of this paper are to answer the following questions: 'What characteristics of robotic companions may be valued, by whom, and in what

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supporting ways?' and 'How might these valued characteristics offer potential for human well-being?' The scope of this paper is thus intentionally 'broad brush,' providing a substantial starting point for more detailed future work [1, 2, 3].

### **The Role of Robotics in Mental Health Support**

Through an understanding of both the limitations and capabilities of robotic companions, a vision of the potential roles robots can play in mental health care is unfolding. Briefly, robotics can offer companionship, reducing loneliness and isolation. Robots can act as comforting pets offering the friendship that seekers desire, facilitating access to others, and enacting specific therapeutic interventions. Some robotic systems have been developed with mental health applications as the primary aim. Robots are seen as potentially ideal candidates for these applications as they have all of the necessary features and none of the drawbacks of current companions, particularly medical registries and therapeutic dogs. Several studies have reported the influence of dogs and robots on mental health and have indicated that robotic systems may be able to engage users in mental health activities [4, 1, 3]. A key property of all robotic systems is their ability to engage people consistently, in a manner limited by the design and functionality programmed into the robot. Unlike humans, robotic companions do not hold things against their users; they are consistent across interactions and have no conflicts of interest. These features can be beneficial for establishing a therapeutic alliance in the target population and enhancing the support they receive. Interactions can then be used to offload human therapists and thus increase efficiencies in the system. Applying robotics in this way can offload simple tasks and increase accessibility to mental health support by improving the reach of human mental health services. Furthermore, artificial intelligence algorithms can be applied to improve the interactivity of robotic companions by establishing mood-aware systems. In this scenario, systems deploy techniques onboard the robotic platform to assess user needs and to decide which behavior is most appropriate for the users [5, 6, 7].

### **Design Considerations for Robotic Companions**

The design of effective robotic companions for individuals experiencing mental health challenges requires the consideration of several factors. User-centered design prioritizes the needs and preferences of the users in the development of systems, processes, or technologies and could also apply to the design of robotic companions. Mental health care is increasingly moving towards the use of self-help and even unguided online interventions. Robotic companions to support mental health are therefore designed with the primary user in mind: the person seeking mental health support [8, 9, 10]. Important factors in the design consideration of robotic companions for mental health should be operable, aesthetic, emotional, ethical, and cultural. In this context, we focus on the aesthetic and emotional aspects. The need for robotic companions that are responsive to a patient's emotional states is considered important since emotion is a key factor in the social and psychological design aspects of human-robot interaction. It is also considered a major factor in the development of robotic animal companions. The adaptability of robotic companions is also important, as one design does not universally apply. This could include the age, gender, and formal cultural group of a user. Given that perception and acceptance directly pertain to the user, one must consider stakeholder preferences. Furthermore, the development of technologies does not necessarily imply that individuals will want to use them. For the introduction of robotic companions for mental health support to be successful, they need to be empathetic and be able to provide support to the user. Perceptions can change with time as well. Early opinions on the acceptability of robotic companions are necessary, particularly if the intention is for robotic animal companions to be used as a long-term effective treatment for individuals experiencing mental health issues [11, 12, 1].

### **Ethical and Privacy Implications**

From an ethical perspective, deploying robotic companions to provide mental health support raises several concerns. First, the data that robotic devices collect can be easily accessible when the device is connected to the central computer system and can be effectively used to identify the patient, track behavior, and provide actionable information, such as appointments or hygiene assistance. Thus, data security and integrity are a priority. Furthermore, patient consent to process their information is critical. This might be particularly important given the psychological significance of the relationship between the user and the machine. Suppose a patient feels the robot is a companion, able to communicate emotions and reciprocate interaction, and based on this develops an affective attachment to it. In that case, it can concern the law [13, 14, 15]. More generally, robots can replace human contact, which can be risky in terms of the psychological or cognitive implications for people. In terms of data, worries about the nature of the data being stored have been superseded by documented assumptions about the growth of various

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psychological and neuro-biosignal datasets. Therefore, protecting patient information is important, with rigorous data access policies required, as well as strong encryption techniques to ensure that data is appropriately stored. Furthermore, it is necessary to implement a patient policy or protocol that should be comprehensive and emphasize the complexity and importance of involving all stakeholders, including patients, caregivers, and inexperienced professionals, to manage, access, and decide whether, how, and under what circumstances proprietary algorithms and processed data can be analyzed. The care function has several ethical, legal, and social implications for individuals in society, including their acceptability, the relationship between humans and robots, and the meaning and opportunity of relationships. It is important that these risks and their potential impact are minimized and that robots are formalized and behave ethically, with the highest transparency, explainability, and predictability of uncertainty [16, 17, 18]. Given these issues, while it is important to develop regulations that enable the use of robotic devices for mental health care and support, it is also necessary to provide standard guidelines to better understand the ethical implications of introducing robots as mental health professionals and to support the development of best practices. Patients need to know that professional caregivers are also part of the robotics chain. Professionals need to respect and take into account the role of the family in care and mental support systems. This carefully tailored attitude needs not only to be linked to the profession's ability to ensure the scalability of technology but also to the ability to ensure that the use of machine technology in intimate care does not reveal a deficit in the current healthcare economy. Careful consideration of these ethical and privacy implications needs to be established before integrating systems involving robotic technology provision in cases of mental health support [19, 20, 21].

#### **Case Studies and Research Findings**

The last two decades have seen meaningful and purposeful attempts to integrate socially assistive robots in mental healthcare, with case studies and research evidence indicating robotic companion use aimed at addressing mental health improvements. Robotic companions for mental health support are contextually situated in clinical and community settings to better understand and target the specific needs of particular user populations with defined mental health concerns. This varied exploration has addressed geriatric health concerns, adult team-based supported living, reporting of psychosis symptoms, child and adolescent anxiety, and child hospital-based interactions and measures of satisfaction. Research has taken the form of qualitative case studies or quantitative observational research, to more formal scientific inquiries on effects and long-term approaches currently being employed. Measured impacts indicate that socially assistive robotic companions are acceptable and able to effect change; therefore, it can be expected that they may have had a positive effect on the outcomes of interest, can encourage and maintain long-term engagement, and are capable of offering potential just-in-time support for mental health concerns. However, many insights remain outstanding, as does a need for unique robotic companions that target new and less frequently investigated clinical presentations [22, 23, 24]. Examples of mental health-focused robotic companions include: elderly ecosystem-in-place interventions; a transitioning to mental health robotic care assistant; an adult-assistive telecare scoped peer-introduced therapeutic robotic research assistant; an inpatient psychosis detection and intervention gathering robotic companion; a child robot assisting young people to report experienced emotions through an empathetic robot designed to look appealing to children and directly ask about the presence of anxiety symptomology during the children's outpatient clinic visits; and a child-major hospital-in-situ robots and interactive research conducted at a hospital [25, 26, 27].

#### **CONCLUSION**

Robotic companions represent a promising avenue for mental health support by offering companionship, reducing social isolation, and enhancing accessibility to mental health services. Their ability to provide consistent and non-judgmental support, combined with AI-driven emotional intelligence, makes them valuable supplementary tools in mental health care. However, their successful integration requires careful consideration of ethical, legal, and privacy concerns to ensure user safety and trust. While research and case studies demonstrate positive outcomes, further investigation is needed to refine robotic designs, enhance adaptability, and address long-term implications. As the field evolves, collaboration between technologists, mental health professionals, and policymakers will be crucial in shaping responsible and effective robotic interventions in mental health care.

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**CITE AS: Chrispus Owunyesiga (2025). Robotic Companions for Mental Health Support. Research Output Journal of Engineering and Scientific Research 4(1): 50–54.**  
<https://doi.org/10.59298/ROJESR/2025/4.1.5054>