

# Revolutionizing Peer Support for Children with Chronic Illness Leveraging Technology

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## Abstract

Children with chronic health conditions face an increased risk for mental health issues compared to their healthy peers. These mental health conditions can negatively impact disease management and medical outcomes. Digital mental health interventions (DMHIs), such as computerized Cognitive Behavioral Therapy and conversational AI, may help address this need. This paper describes an in-progress DMHI using generative AI called Starfly. Starfly connects children with chronic illness with peers to facilitate positive interactions without stigma. The app offers a secure platform for social support and community building among young people managing chronic illness. By leveraging AI and thoughtful design, Starfly aims to promote mental well-being and improve disease outcomes in this vulnerable population.

## Keywords

Mental Health, Chronic Illness, Digital Mental Health Intervention, Artificial Intelligence, Peer Support, Children, Starfly

## 1. Background

Children with chronic health conditions are at a greater risk of developing emotional and behavioral problems compared to their physically healthy peers, with rates of psychiatric disorder up to four times greater (Bennet et al., 2021). Psychiatric symptoms, most often experienced as depression and anxiety, have considerable consequences for the child's and their family's quality of life, as well as their behavioral, emotional, educational, and social functioning. In addition, poor mental health in these children has been shown to impact the management and medical consequences of the physical illness (Hood et al., 2006). In fact, chronic psychological stress in childhood and adolescence elevates the risk of adverse outcomes across the lifespan (Chiang et al., 2022).

Despite evidence demonstrating adverse outcomes for children with mental health difficulties in the context of chronic conditions, many are still not accessing evidence-based treatments for their mental health needs (Bennett et al., 2018). Mental health problems should be detected and addressed early, as early detection, accurate diagnosis, and effective treatment can alleviate suffering. The traditional methods of mental health detection that psychiatrists and pediatricians normally use are face-to-face interviews, self-reporting, or questionnaire distribution. There is some research on drop-in centers for children who have mental health needs in the context of chronic illness (Bennet et al., 2021) and some research on Intensive Outpatient (IOP) treatment (Kapur, Thakkar, & Anderson, 2022). However, traditional methods such as face-to-face interviews, clinics, drop-in centers, and IOP are typically labor-intensive and time-consuming, and there is a nationwide shortage of providers to treat school-aged children with mental health problems (Mental Health Weekly 2022). Computer-assisted therapies are beginning to supplement these more traditional efforts to address these challenges.

## 2. Digital Mental Health Interventions

There exist digital tools for adults with chronic and serious mental health disorders. Digital mental health interventions (DMHIs) are promising and effective avenues for improving equitable access to mental health support while providing increased flexibility. App-based mental health support can address barriers that prevent individuals from seeking care, such as access, cost, and stigma, and provide greater flexibility for long-term treatment (Mojtabai et al., 2011). The use of DMHIs for mental health also has the potential to alleviate pressures facing providers, including mental health provider shortages, further increasing the availability of care. The increased attention devoted to a variety of digital mental health solutions highlights the potential that DMHIs have for meeting an increasing demand for mental health care.

The future of technology-enabled treatment in mental health is probably best captured in the artificial intelligence (AI) “revolution” unfolding within the larger space of DMHIs. In their viewpoint article, Miner et al. (2019) discuss how conversational AI may impact psychological and psychiatric care at the level of diagnosis and information gathering and treatment. Conversational AI is changing the way mental health care is delivered (Miner et al., 2019), and software programs using the technology can communicate like people (i.e. chatbots and digital assistants) so are now beginning to provide mental health care.

Of technology-mediated therapies, computerized cognitive behavioral therapy (cCBT) and internet-based cognitive behavioral therapy (iCBT) possess the most efficacy evidence, with virtual reality exposure therapy (VRET) and mobile therapy (mTherapy) representing promising but less researched options. cCBT and iCBT are catch-all terms that can refer to apps that are self-guided with no support from a licensed clinician to programs that are fully supported and

guided by a professional. DMHI solutions present the opportunity to create novel and easily accessible mental health therapies, such as telepsychiatry and online counseling, and mental health chatbots. The utilization of technology can also involve the collection and analysis of vast amounts of data, which can offer insights into the occurrence and potential causes of mental health disorders, as well as the effectiveness of various treatments (Pandey & Sharma, 2023).

Examples of conversational AI abound. An evaluation of the conversational AI mental health chatbot app Wysa found that heavy users of the app experienced a significant improvement in their depression symptoms, however, the sample size was small ( $n = 129$ ) (Inkster, Sarda, & Subramanian, 2018). Another evaluation of Wysa was more robust, with a sample of 7929, and found that users were overwhelmingly satisfied with the app, but the study did not evaluate how effective it was in decreasing mental health symptoms (Malik & Sinha, 2022). Users of Wysa have reported to feel as though they have established a therapeutic alliance with the app (Beatty et al., 2022). An Irish evaluation of another conversational AI app, the cCBT MindWise program, found that users experienced a significant drop in anxiety symptoms, but not a decrease in depression symptoms (Collins et al., 2018).

The next generation of AI technology is the Generative Pretrained Transformer (GPT) model that uses Natural Language Processing (NLP) and Large Language Models (LLM) to understand and predict patterns. In one study, ChatGPT-3 was presented with a list of medical symptoms and it generated a well-differentiated diagnosis list for common chief complaints (Hirosawa et al., 2023). Another study (Lai et al., 2023) proposed the Psy-LLM framework, an AI-based system leveraging LLM for question-answering in online psychological consultation. The framework combined pre-trained LLMs with real-world professional Q&A from psychologists and extensively crawled psychological articles. There is a growing body of research on using NLP techniques to analyze mental health-related text. Researchers have applied machine learning (ML) algorithms to detect mental health conditions (Rahman et al., 2020) and identify linguistic markers associated with psychological well-being (Akstinaite, Garrard, & Sadler-Smith, 2022). De Choudhury et al. (2021) extracted linguistic features from text conversations, and by using ML classifiers, they achieved promising results by identifying individuals at risk of depression. One important process in NLP is morphological analysis and part of speech (POS) tagging. POS helps to parse the meaning of chat text based on a set of rules (Handoyo et al., 2018).

There exist some challenges and current limitations when using ML technology in the treatment of mental distress. First, ML models are inherently limited by the quality and quantity of data used to develop, or “train” the model. Importantly, ML should not be used to replace other clinical approaches to mental health treatment, instead it should be considered as an adjunct or value-added to other treatment modalities (Shatte, Hutchinson, & Teague, 2019). There has been very little real-world research on the use of ML in the treatment of mental

health concerns, and even less research on children using these technologies. Clinical research on the use of these applications, including in children, is direly needed.

### 3. The Importance of Social Connections

Children and young people with pre-existing mental health difficulties may be prone to loneliness (Hards et al., 2022). Researchers have long known the crucial role that social relationships play in people's mental health and well-being (Saeri et al., 2018) and people with limited social connectedness have poorer mental and physical health, including increased depression (Cruwys et al., 2014). There is widespread consensus in the public health and epidemiology literature that social connectedness, including from support groups with other children with chronic illness, causally protects and promotes mental health (Perkins, Subramanian, & Christakis, 2015). Maintaining social contact both by direct and by indirect means, especially through the Internet, could be important in mitigating loneliness (Hards et al., 2022). Interventions, including digital ones, that support social relationships are widely used to promote mental health (Andersen et al., 2021). Digital interventions may improve people's opportunities to develop new relationships or strengthen existing ones, and recent evidence suggests a trend towards digital technologies to promote social connections and mental health (Andersen et al., 2021). Digital health interventions in the form of smartphone apps aim to improve mental health and enable people to access support where and when needed without having to face stigma or embarrassment.

### 4. Approach

Starfly is an art and creativity focused social media platform designed to help chronically ill children and children with disabilities connect with other youth who have similar experiences. The design of Starfly leverages both the importance of social interactions for these children and soon, advanced LLM models to detect patterns and changes in their communication. The app gives these children a safe, structured space where they can engage with one another in a positive, bullying-free environment to reduce isolation and loneliness—helping produce better health and well-being outcomes. Through various group app functions and engagement pieces, such as collaborative art, text, and video chat, children can engage with each other without social and “normality” pressures.

The app is available for download now on the Google Play store and the Apple App Store, with a web app version planned. Currently, it is in beta and is being tested with target-market groups in Texas and the broader United States with plans to expand the app globally. A future version of Starfly will incorporate a set of assessment tools, featuring an LLM that will give children and their healthcare providers reports on wellbeing outcomes from the users' app usage.

Starfly aims to support two priority areas that align with our responsible user growth objectives. Firstly, we intend to conduct an anonymized and ethically

sound study to examine children's mental health outcomes after using Starfly. By doing so, we will gather valuable insights that will allow us to promote Starfly as a therapeutic tool supported by evidence-based outcomes. These results will also inform our second priority, which involves developing a comprehensive assessment toolkit leveraging LLM. This toolkit will assess the mental health of users over time by reviewing the chat language, voice discussions, and user engagement on various features such as art. With permission, these assessments will be securely shared with children's medical providers. Through AI-powered outcomes reports, we aim to forge strong relationships with institutional care providers by providing instant insights into the mental health and well-being of their patients. Our objective is for Starfly to become a trusted therapeutic tool for children with chronic illnesses or disabilities within medical settings.

Starfly's overarching goal and mission is to become a go-to resource and a standard therapeutic approach for the healthcare industry when it comes to isolation and loneliness in children experiencing chronic illness or living with a disability.

## 5. Conclusion

Creating a safe, welcoming, and all-around bullying-free space for kids experiencing chronic illness or disability is what differentiates Starfly and something we take very seriously, so we have been deliberate as we engage with appropriate parent groups and institutions that care for such children. As such, our initial user growth strategy is intentionally gradual, involving the vetting of groups and organizations individually while also verifying user accounts methodically so that we can develop systems and processes that will help us grow Starfly safely, efficiently, and over time faster.

## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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