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# A Comparative Analysis of Chatbot-Enabled Mobile Apps for Self-Assessment and Support in Mental Health Management

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**ABSTRACT:** The study looks at many ways that digital tools and interventions might be used in mental health. The topics covered include chatbot-based mental health applications, user experience, and resilience tactics, as well as digital interventions that are culturally appropriate for Indigenous communities. The purpose of this study is to examine the usefulness, user attitudes, and real-world difficulties of digital mental health tools in various settings, including their contribution to resilience and mental health. A range of approaches were used in the studies, including as randomized controlled trials (RCTs) of digital therapies, systematic meta-analyses of resilience and self-compassion, and exploratory reviews of consumer data. App reviews, validated scales, and feedback interviews were important sources of data. Every study adhered strictly to ethical guidelines. Chatbot apps have great potential in terms of user engagement and psychological support but also highlighted poor crisis response and over-reliance on technology by users. One was self-compassion, that was a major predictor of resilience, moderated by age and culture. Culturally adapted apps, such as the Stay Strong App, demonstrated feasibility in jail settings, but retention and meaningful impact remained difficulties. Digital technologies have the potential to improve mental health assistance, but difficulties such as crisis management, cultural responsiveness, and user engagement require specific solutions.

**KEYWORDS:** User experience; mHealth intervention; chatbots; customer reviews; health care applications; mental health apps; app development; mobile health;

## I. INTRODUCTION

The rapid advancement of digital technology has revolutionized the mental health landscape and given innovative solutions to the mental health issues in the world. Most of these are available as mobile applications, chatbots, and other digital tools that offer mass mental health care at very affordable prices. Such tools come in handy where access is limited, for example, rural areas, marginalized communities, or even prisons. For instance, mental health apps based on a chatbot use AI in providing relief to stressed, depressed, or anxious users through personalized support that is entertaining. While this is increasingly gaining popularity, there are still reservations regarding whether they can handle emergencies properly, safeguard individual data privacy, and cut down the risks inherent in using too much technology. The treatment of the exclusive mental health problems that afflict Indigenous populations can be given through culturally appropriate digital interventions. The Stay Strong App, in fact, is designed and targeted towards Aboriginal and Torres Strait Islander people on empowerment and cultural safety premises. Even though these treatments appear to hold great potential, their effect will only be maximized with the resolution of the concerns over low user retention and constraints in resources. The second important mental health factor is resilience; it is a capacity of the ability to adapt in recovery from adversity. This new evidence points out the role of self-compassion as a potential protective factor for the development of resilience, but it is very poorly understood at this stage in the context of differing demographic and cultural backgrounds.

## II. BACKGROUND AND RELATED WORK

### Chatbots in Mental Health Apps:

Chatbots have emerged as innovative tools in mobile mental health applications, exploiting artificial intelligence to deliver personalized psychosocial support. These applications are designed to boost user engagement and adherence using features such as personalized conversations and CBT-based exercises (mhealth-2023-1-e44838 (...)). Among the



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challenges facing these innovations are inadequate mechanisms for response to critical mental health emergencies and concerns about data privacy and security. This notwithstanding, there are value propositions for chatbots such as 24/7 availability, judgment-free environment and provocation of self-disclosure especially for users who avoid accessing the traditional mental health services because of stigma (mhealth-2023-1-e44838 (...)).

### Fill Gaps in Research

Despite such tremendous progress made, there are still several gaps in these areas. To enhance user confidence, crisis management capabilities of chatbot-based mental health apps must be enhanced with ethical safeguards. Similarly, though shown to play a protective role in resilience, the pragmatic applicability and generalizability of self-compassion across different peoples and conditions remain unexplored. Lastly, culturally adapted interventions like the Stay Strong App illustrate an ongoing process of work through Indigenous perspectives in digital mental health care to ensure equal but also inclusive mental health treatment.

### Research Deficits

#### Lack of evidence of how the chatbots work :

This can deliver scalable and accessible mental health support for populations. However, general user demographics limit this study. It didn't study the special needs and effectiveness of specific demographic groups, like rural users, younger people, and those who suffer from major mental health disorders. There is less evidence of long-term user adherence or crisis management abilities, which could be an obstacle to more widespread applications in large-scale settings (mhealth-2023-1-e44838).

#### The Overlooked Relationship Between Resilience and Self-Compassion:

Self-compassion is a characteristic that has been shown to improve resilience and reduce mental health problems such as stress, anxiety, and depression. Despite the fact that there has been evidence linking these two dimensions, there is yet a lack of comprehensive knowledge on how self-compassion interacts with resilience across varied demographics such as age, gender, health condition, and also cultural contexts. There is the lack of practical application in self-compassion-based therapies to improve resilience (resprot-2024-1-e60154).

#### Supporting Indigenous Mental Health Through Digital Tools:

The Stay Strong App represents a significant stride in trying to address the mental health needs of the marginalized community, especially the Indigenous Australians. This paper documents its feasibility and cultural appropriateness while proposing recommendations to overcome operational barriers. Lessons learned from this work can inform culturally tailored tool development for other underserved populations (mental-2024-1- e53280).

## III. METHODS

In this section, we outline the techniques for selecting and filtering the mobile apps for this study, the data analysis method we used, the ethical standards we followed, our positionality statement, and methodological limitations.

### App Selection and Reviews

#### Chatbot-Based Mental Health Apps (mHealth Apps)

App selection was conducted with a focus on finding commercially available tools that had a considerable number of users adopting them and where functionality catered to mental health concerns. Methodology is provided below:

#### Data Sources

Publicly accessible peer-reviewed journal articles on mental health chatbots. Two prominent review platforms of mental health apps, Mindtools and PsyberGuide. The Google Play Store and Apple App Store through the keywords mental health and chatbot.





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### Inclusion criteria

Have in-built chatbot features.

Focused on providing assistance or cure for mental health-related concerns like anxiety, depression, and stress. Available for iOS as well as Android Presented a conversational design so that it can start the interactive session with users and also sustains it.

### Stay Strong App (Indigenous Mental Health Interventions)

The Stay Strong App is a culturally adapted digital mental health intervention for the Aboriginal and Torres Strait Islander peoples. The processes followed to select and assess this app are as follows:

#### App Feature Selection Criteria:

The app was focused on social-emotional well-being (SEWB), which involves goal setting, personal strengths identification, and cultural support. Tools were designed to operate offline and be compatible with custodial settings, ensuring user privacy and accessibility.

#### Feedback and Outcome Measures:

Qualitative interviews and thematic analysis for the capturing of user feedback, where practitioners and participants convey the experiences concerning app usability, cultural safety, and empowerment potential. Quantitative measures that were used include the Warwick-Edinburgh Mental Wellbeing Scale, Growth and Empowerment Measure and the Kessler Psychological Distress Scale (mental-2024-1-e53280).

#### Data Analysis

##### 1. Chatbot-Based Mental Health Apps (mHealth Apps) Analytical Goals:

Features and limitations of chatbot-based mental health apps and user experience of functionality and effectiveness.

Qualitative Analysis of Comments Data Extraction: The reviews were extracted from Google Play Store and Apple App Store using Python's Selenium library. A total of 3621 reviews were taken from Google Play, while 2624 reviews were taken from the Apple App Store.

Thematic Analysis: Open Coding: In the initial pass, open codes were generated by deducing recurring patterns across the reviews, including satisfaction that arises from personalization features within the app and frustrations at the inability to conduct real crisis responses.

Quantitative Summaries: Summary statistics, such as means and standard deviations, were used to combine user reviews and frequency of review opinions as positive, negative, or neutral. Data regarding specific features, such as 24/7 access and judgment-free interaction, are being quantified to determine the strengths and weaknesses of apps (mhealth2023-1-e44838).

##### 2. Self-Compassion and Resilience (Resilience Studies)

Analytical Aims:

Relationship between self-compassion and resilience and to estimate effect sizes as well as explore moderators.

Meta-Analysis of Quantitative Data:

Pooled Effect Size:

Random-effects models were used in order to correct for heterogeneity among studies. Pooled the effect sizes across the studies in terms of their association with self-compassion and resilience, which are measured as Pearson's  $r$  or Cohen's  $d$ .

Data Extraction Process:

Data from relevant studies were extracted independently by two reviewers on a standardized form to ensure reliability. The authors were contacted in order to obtain missing data; otherwise, the relevant study was excluded from specific analyses, if data were still unobtainable.

##### 3. Objectives of the Stay Strong App for Indigenous Mental Health Interventions:

Assess the feasibility, cultural safety, and psychological outcomes of the Stay Strong App for Indigenous Australians who are incarcerated.

Outcome Measures



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### Qualitative Analysis:

Thematic Analysis of Feedback Interviews Feedback both from participants and practitioners about cultural appropriateness and usability and perceived impact was analyzed. Both positive and critical perspectives were applied in a constant comparison methodology in order to refine the themes.

### Data Integrity

Data integrity was a primary concern in all the three studies to ensure that the research findings were valid, reliable, and ethical. For each of the research themes, the measures taken towards data integrity are explained below in detail.

#### 1. Review of Mental Health Apps or Chatbot-Based mHealth Apps

Issues to be mitigated: Possibility of low-quality reviews, especially on shorter reviews, that skews results.

Data Quality Control/ Integrity: Reviews with a minimum character length of 200 were included to exclude short, vague, or promotional reviews. This approach ensured that the focus was on detailed and substantive user feedback.

Authentication and Validity: The pilot studies reveal that fake reviews in the "Health & Fitness" category of app stores occur less than 6% in frequency and are typically short and vague. The study set a word limit to minimize the possibility of incorporating low-quality, inauthentic reviews (mhealth-2023-1-e44838).

#### 2. Resilience Studies (Self-Compassion and Resilience)

Problems addressed:

The reliability of included studies with respect to the measurement's validity and reporting of the selected studies. Potential biases through incomplete data from the studies selected or reporting that varied between studies.

Maintaining Data Integrity Strategies.

Study Quality Assessment:

Publication in peer-reviewed journals was made to ensure a minimum amount of methodological quality Scales used must be validated for measuring self-compassion and resilience. For this purpose, Self-compassion Scale has to be used and Connor-Davidson Resilience Scale.

Transparency in Selection:

PRISMA flowchart was adopted to record and explain study exclusions. Thus, the process of screening is reported transparently (resprot-2024-1- e60154).

#### 3. Stay Strong App (Indigenous Mental Health Interventions)

Issues Addressed: Participants left custody before follow-up, and this leads to attrition rates, and results are biased.

Data Integrity Approaches: Approvals were also received from various ethics committees, such as the Darling Downs Hospital and Health Service Human Ethics and Research Committee and the Queensland Corrective Services Research Committee.

## IV. RESULTS

Overall, the overall findings from the three studies are evidence of the digital mental health tools performance, challenges, and acceptance with diverse users. The two apps which utilize a chatbot illustrated very valuable gains in the sense of usability as high and judgment-free as well as personal support. Specifically, the availability of chatbots anytime for instant emotional help was much appreciated, and simulating human-like interaction was seen to be most attractive by the users.

### Overview Of The Aspects Commonly Used In Chatbot MH Apps

They will integrate advanced technologies with principles of therapy to offer chatbot-based mental health support available and personalized. The primary element is Conversational AI combined with NLP, providing chatbots with the possibility to understand user inputs to generate empathetic and contextual responses. This kind of interactive platform brings about a feeling of having been heard and cared for, even in an automation context. A very important aspect is the use of evidencebased therapeutic techniques like Cognitive Behavioral Therapy that allows users to alter or reframe negative thought patterns and mindfulness techniques that reduce stress and enhance emotional regulation. Many apps also include psychoeducation, which imparts great knowledge about mental health issues and coping mechanisms in an easy-to-understand manner.



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**Table 1:** Overview of Mental Health Apps with Integrated Chatbot Support.

App Name	Apple App Store Ratings	Google Play Ratings	Google Play Downloads	Age Rating (years)	Price
Headspace	684,900+ ratings (4.9/5)	1M+ ratings (4.3/5)	10M+	4+	\$12.99/month, \$69.99/year
Calm	1.1M+ ratings (4.8/5)	1M+ ratings (4.4/5)	10M+	4+	\$69.99/year, \$399.99 lifetime
BetterHelp	85,000+ ratings (4.8/5)	35,000+ ratings (4.6/5)	5M+	12+	\$60–\$90/week subscription
Talkspace	10,000+ ratings (4.0/5)	15,000+ ratings (3.7/5)	1M+	12+	\$69–\$129/week subscription
Woebot	4,500+ ratings (4.7/5)	12,000+ ratings (4.5/5)	1M+	12+	Free
Sanvello	20,000+ ratings (4.8/5)	60,000+ ratings (4.4/5)	1M+	12+	Free with in-app purchases
Moodpath	10,000+ ratings (4.8/5)	50,000+ ratings (4.4/5)	1M+	12+	Free with in-app purchases
Youper	2,500+ ratings (4.7/5)	10,000+ ratings (4.5/5)	1M+	12+	Free with in-app purchases
7 Cups	5,000+ ratings (4.4/5)	25,000+ ratings (4.2/5)	1M+	12+	Free with subscription options
Replika	120,000+ ratings (4.6/5)	650,000+ ratings (4.2/5)	10M+	17+	Free with in-app purchases

Another feature is personalization, where chatbots will adjust their recommendations and conversations based on user input, preferences, or mood tracking data. These apps usually integrate mood tracking tools to help users monitor their emotional well-being over time, thus allowing for self-awareness and data sharing with therapists if needed. Some apps also include crisis support features, offering immediate guidance or referrals to emergency mental health services for users in distress. Many of these apps also emphasize accessibility and inclusivity, for instance, with multiple language options and interfaces that are friendly to different populations. Last but not least, solid privacy and security measures protect sensitive user data, as required by laws such as GDPR or HIPAA. All these factors make the chatbot-based mental health apps a useful tool in the mental health landscape. They offer round-the-clock scalable support to people worldwide.



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**Table 2:** Criteria for Chatbot-Based Mental Health Apps.

Criteria	Description	Relevance to Mental Health	Evaluation Method
<b>Chatbot Intelligence</b>	How advanced the chatbot's AI is in understanding and responding to user inputs.	Determines how well the app can simulate therapeutic conversations.	Test conversation scenarios.
<b>Therapeutic Techniques</b>	Use of evidence-based techniques (e.g., CBT, mindfulness, psychoeducation).	Ensures the app provides scientifically supported interventions.	Content analysis of chatbot outputs.
<b>Personalization</b>	Ability to tailor conversations and recommendations based on user data.	Enhances user engagement and relevance of mental health support.	Analyze adaptive responses.
<b>Accessibility</b>	Language options, ease of use, and compatibility with assistive technologies.	Ensures inclusivity and accessibility for diverse users.	User testing and UX audits.
<b>Mood Tracking Integration</b>	Capability to monitor and log user mood patterns or emotional states over time.	Helps users and therapists identify trends and triggers.	Review data-tracking functionalities.
<b>Community Interaction</b>	Chatbot's ability to connect users with peer support communities or forums.	Adds social support to individual therapy.	Test integrations with social features.
<b>Engagement Features</b>	Gamification, reminders, or prompts to encourage consistent app usage.	Encourages regular interaction and long-term use of the app.	Track engagement metrics over time.
<b>Privacy and Security</b>	Data encryption, user anonymity, and compliance with regulations (e.g., HIPAA, GDPR).	Protects sensitive mental health information.	Security and compliance audits.
<b>User Feedback Mechanism</b>	Options for users to provide feedback about their experience with the chatbot.	Facilitates improvement and user satisfaction.	Review feedback channels and systems.



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### Suggestions for Future Design and Research on Mental Health Chatbots

#### 1. Advanced feature enhancements for ease of use

In the future, mental health chatbots will be more similar to user engagement by constructing integration with advanced conversational AI. NLP and machine learning will be possible in simulating empathetic contextual conversations that can support feelings that users are understood. Other personalized features may include the scientifically validated tools used for stress, anxiety, and depression management, such as evidence-based therapeutic techniques like CBT and mindfulness exercises. Other personalization features may also be adaptation of responses from the chatbot according to the mood, preferences, or behavior data of a user, which might improve user relevance and satisfaction. The other features of engagement include gamification and occasional reminding that would encourage long-term usage of these resources.

#### 2. Management of Crises and Ethical Dilemmas

The main enhancements for future designs are escalation protocols to directly connect the user to a human counselor or emergency services when there is an indication of high distress or suicidal thoughts. Other trust-building features would be ethical considerations of privacy and security in handling user data and compliance mechanisms toward regulatory compliance through mechanisms of HIPAA and GDPR by means of data encryption and anonymization. By presenting application efficacy and safety parameters in the report, it may create more confidence on the part of the users and stakeholders for this application.

#### 3. Increase Accessibility and Inclusion

More representative and inclusive mental health chatbots will be those able to support multiple languages in communication and are compatible with assistive technologies. A group, including rural users or the user group of people with impairments, is underserved; in reaching these groups of users, culturally tailored mental health frameworks must be available and operational for the chatbot just as the Stay Strong App that is designed for indigenous Australians. Such tools can be also more accessible in resource-poor settings if simplification of app workflows and offering off-line functionalities is included. Finally, feedback mechanisms allow users to contribute to their experiences, leading developers toward better inclusivity and accessibility.

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