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Are Mobile Mental Health Applications Effective at Reducing the Primary Symptoms Associated with Anxiety Disorders?

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Abstract: *Generalized anxiety disorder (GAD) and panic disorder (PD) are among the most diagnosed anxiety disorders in adults (4). Since the onset of the pandemic, there has been a growing number of mobile applications that attempt to treat anxiety disorders in adults. However, there is a lack of information on whether mobile health applications to treat anxiety disorders effectively reduces the primary symptoms among patients. This systematic literature review aimed to investigate whether mobile mental health applications are effective at reducing symptoms that are associated with GAD and PD. A search of the literature transpired using Internet Archive Scholar and PubMed Central following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Data from the 8 relevant articles were thematically analyzed using a screening process of constant comparing of notes from two reviewers, using a final consensus, and categorizing statements that related directly to our research question on whether mobile mental health applications are effective at reducing the primary symptoms associated with anxiety disorders. The authors identified four themes that emerged from the literature during the data analysis process. The themes included accessibility, efficacy of mobile mental health applications, barriers to mental health care, and anxiety disorder treatment. The findings indicate that mobile mental health applications in general are effective at accessibility and reducing the primary symptoms that are found in individuals with anxiety disorders. The implications of these findings provide clinicians an opportunity to provide greater accessibility to individuals that typically don't have access to care.*

Keywords: Telehealth, mobile applications, mental health services, anxiety disorders, ehealth

Introduction

Since the onset of the COVID-19 pandemic, there has been an increased need for mental health services. Millions of individuals worldwide have experienced social isolation and loneliness because of the pandemic. Additionally, individuals with anxiety disorders have experienced these symptoms much more intensely. The advent of telehealth applications has reduced barriers to care and improved feasibility. Thus, there has been a rise in the use of mobile mental health applications in individuals with Generalized Anxiety Disorder (GAD) and panic disorder (PD). According to Chandrashekar (2), the use of mobile health applications has increased. The author noted that in 2015, at least 29% of these applications could diagnose mental health and provide treatment support and resources. However, there is a lack of reliable research on whether these applications hold value in treating anxiety disorders.

One of the most "prevalent anxiety disorders in adults is generalized anxiety disorder (GAD) followed by panic disorder (PD)" (4). Factors associated with GAD include experiencing long-term anxiety, distress associated with daily tasks, significant physical effects, and cognitive symptoms (10). Also, "symptoms required for diagnosis include feeling restless, easily fatigued, difficulty concentrating or mind going blank, irritability, and sleep disturbance" (9). The authors also mentioned that a rapid burst of acute fear or discomfort is a panic attack. Primary symptoms of panic disorder include "palpitations, pounding heart, sweating, trembling, or shaking, sensations of shortness of breath or smothering, choking, chest pain or discomfort, derealization, and fear of dying" (1). Lastly, treatment for GAD and PD typically includes psychotherapy and medication. One of the studies aims to fill in the information gap on whether mobile health applications targeting treating anxiety disorders reduce primary symptoms among adults with GAD and PD.

The use of mHealth applications has become increasingly popular in the past decade. Using these applications has been shown to be more effective than receiving care in person (3). The most common mental health applications include Talkspace, Intellicare, and Calm. These tools may help people recognize their symptoms, manage their mental health, encourage assistance-seeking, and offer therapeutic and preventative measures (7).

Additionally, mental health applications can be an effective way of providing services to many people worldwide, thus addressing mental health needs in individuals who typically do not have access to care. Some advantages of m-Health applications include anonymity, capacity, 24/7 availability, equity, immediate support, lower cost, and links to other systems (7). However, it is essential to note that not everyone has access to a smartphone or has Internet access. Additionally, mHealth applications that are self-guided and uninteresting or difficult for patients to use have a higher dropout rate (3). The study will consist of peer-reviewed journal article findings that include information that displays whether the use of mobile health applications to treat anxiety disorders effectively reduces primary symptoms among patients.

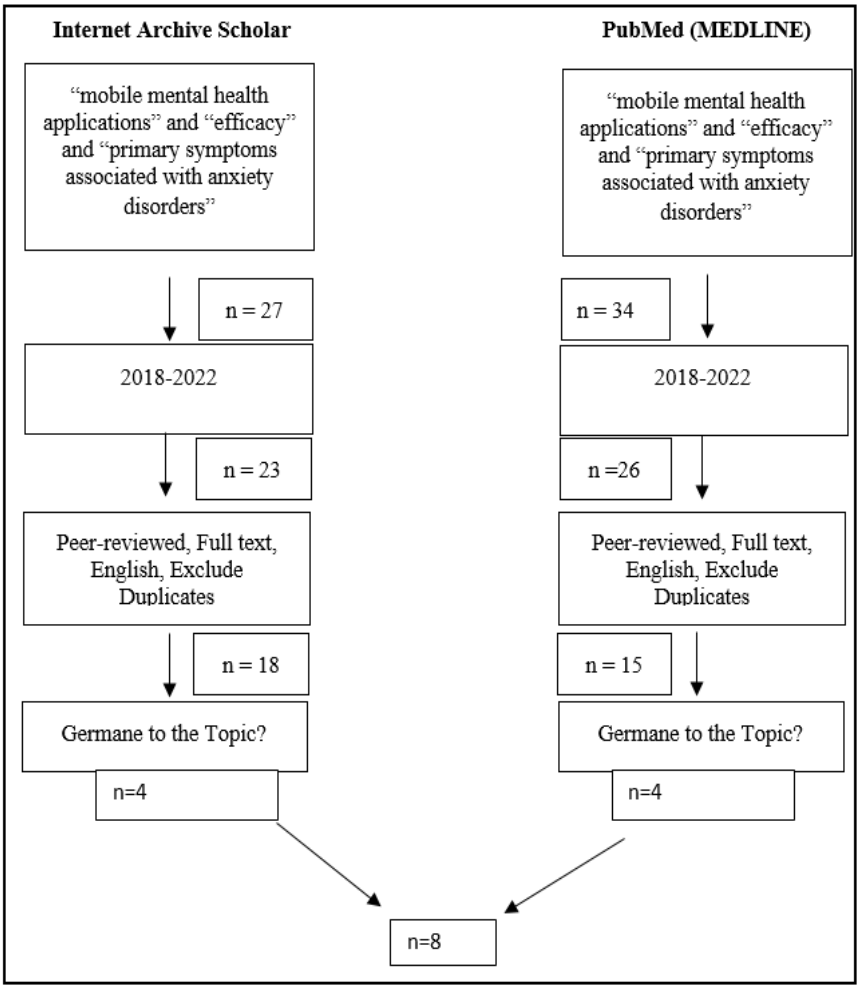
Significant advances in technology have allowed for increased access to mental health services. For example, mobile mental health applications such as Intellicare, Talkspace, and Calm have provided significant opportunities to give care to the uninsured and provide access to help whenever needed (3). However, there is little information on whether these mental health applications effectively treat mental health disorders such as Generalized Anxiety Disorder and Panic Disorder in adults. This systematic literature review aims to determine whether mobile health applications to treat anxiety disorders effectively reduce primary symptoms among patients.

Methods

After utilizing Google Scholar to narrow down the research topic choice, articles were chosen that were in line with the research question, does the use of mobile health applications to treat anxiety disorders effectively reduce primary symptoms among patients? A literature search transpired using Internet Archive Scholar and PubMed Central databases per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines (8). These Method phases included (a) searching relevant studies, (b) screening for inclusion and exclusion criteria, (c) data extraction based on the screening criteria, (d) synthesis of the data to identify key themes, and (e) reporting and disseminating of the findings (8). Searching the academic databases utilizing keywords, *mobile mental health applications, efficacy, and primary symptoms associated with anxiety disorders* provided consistent parameters in choosing the best articles to review the topic and answer the research question.

For the inclusion of articles to review, publications had to meet all the following criteria (a) searches for works that were published between 2018 and 2022, (b) written in English, (c) published peer-reviewed journal articles, (d) full-text articles, and (e) with a focus on whether mobile mental health applications are effective at reducing the primary symptoms that are associated with anxiety disorders place. The first academic database, Internet Archive Scholar, yielded 27 articles when the applied filters were in place four articles remained germane to the topic (See Figure 1). On the other hand, the second academic database resulted in 34 articles and when the applied filters were in place four remained pertinent to the topic. (see Figure 1). Excluded from this review are any articles that do not meet the inclusion criteria.

Figure 1: *Flow Diagram*



Results

The primary research question was, does the use of mobile health applications to treat anxiety disorders effectively reduce primary symptoms among patients? An in-depth literature search and review transpired using two academic electronic databases, Internet Archive Scholar, PubMed Central, and a web search engine, Google Scholar. An established literature search, selection, and data analysis occurred (6).

Eight articles were relevant to the research question based on the data from seventy-five articles chosen. A final decision transpired by comparing and finalizing the summary findings from each article (see Figure 1). Table 1 lists the articles' titles and key summation findings from these eight articles.

Table 1

Summarized findings of the literature

Title	Findings
A systematic review of the effectiveness of mobile apps for monitoring and management of mental health symptoms or disorders [1]	Mental health apps can potentially improve the monitoring and management of mental health symptoms or conditions. However, most currently available apps lack clinically validated evidence of their efficacy. Thus, more research is needed to develop and test evidence-based programs.
Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps [2]	Mobile apps have significant potential to deliver high-efficacy mental health interventions. However, there is little to no information on whether these mobile applications effectively address mental health disorders. Thus, there needs to be more regulations and monitoring of these applications.
Efficacy of the Digital Therapeutic Mobile App BioBase to Reduce Stress and Improve Mental Well-Being Among University Students: Randomized Controlled Trial [3]	This study aimed to test the efficacy and effects of using a mobile app (BioBase) and paired wearable device (BioBeam) on anxiety and stress in university students.
Table continues	
Efficacy of the Mindfulness Meditation Mobile App "Calm" to Reduce Stress Among College Students: Randomized Controlled Trial [4]	This study aimed to test the efficacy and effects of the mobile meditation app- Calm on university students with stress. Overall, Calm was found to be a beneficial mobile app for reducing stress and improving mindfulness in college students.
Recent developments in the use of smartphone interventions for mental health [5]	The purpose of this article was to provide an overview of research studies that were done on mobile mental health applications between 2017 and 2018. Overall, it was concluded that more evidence is needed to test mobile-based applications' acceptability, feasibility, and efficacy for mental health treatment.

Coached Mobile App Platform for the Treatment of Depression and Anxiety Among Primary Care Patients: A Randomized Clinical Trial [6]	This article aimed to evaluate the efficacy of a mobile application, IntelliCare, for treating depression and anxiety among primary care patients. This study also concluded that designing mental health applications containing simple; brief plans would be more user-friendly among patients.
Efficacy and Moderation of Mobile App-Based Programs for Mindfulness-Based Training, Self-Compassion Training, and Cognitive Behavioral Psychoeducation on Mental Health: Randomized Controlled Noninferiority Trial [7]	This study investigated the efficacy of mindfulness, self-compassion, and cognitive behavioral psychoeducation training in mobile applications that focus on mental health interventions. The authors of the study found that these applications were advantageous in reducing psychological distress among adult programs and a three-month follow-up.
Clinical or gimmickal: The use and effectiveness of mobile mental health apps for treating anxiety and depression [8]	Further research is needed to be done on the effectiveness of mobile mental health applications, and clinicians need to be aware of this when recommending these applications to patients. In the future, healthcare providers must be included in developing these mobile mental health applications.

The data from the eight articles connected to categorizing the frequency of occurrence regarding the effectiveness of mobile mental health applications and reducing primary symptoms associated with anxiety disorders concerning delivering mental health services led to the development of four main themes. Each theme is directly related to the research question. The following themes included accessibility, the efficacy of mobile mental health applications, barriers to mental health care, and anxiety disorder treatment.

Table 2

Frequency of occurrence in the literature.

Theme	Occurrences	Instances of Attributes (n)	Percentage (%)
Theme 1: Accessibility	1,2,3,4, 6	5	67.5%
Theme 2: The efficacy of mobile mental health applications	1,2,3,4,7,8	6	75%
Theme 3: Barriers to mental health care	5,6	2	25%
Theme 4: anxiety disorder treatment	2,4,5, 8	4	50 %

From the research findings, sixty-two and a half percent of the eight articles mentioned theme one, accessibility, which included articles one, two, three, four, and six. From the results, six articles out of eight, seventy-five percent, mentioned theme two, the efficacy of mobile mental health applications, which included articles one, two, three, four seven, and eight. Also, the findings show

that twenty-five percent of eight articles mentioned theme three, barriers to mental health care, including articles five and six. Lastly, articles two, four, five, and eight mentioned theme four, anxiety disorder treatment, which was displayed in fifty percent of eight articles.

Discussion

The study aimed to investigate whether the use of mobile mental health applications designed to treat anxiety disorders effectively reduces primary symptoms among adult patients. Seventy-five peer-reviewed articles published between 2018 and 2022 were considered in the study, allowing for a current analysis of mHealth, user design, anxiety disorder treatments, and user reviews. The data results in Table 2 display the main themes that emerged from the literature analysis. The four main themes found from the research included accessibility [along with the relevant article numbers (1,2,3,4,6)], the efficacy of mobile mental health applications [along with the relevant article numbers (1,2,3,4,7,8)], barriers to mental health care [along with the relevant article numbers (5,6)], and anxiety disorder treatment [along with the relevant article numbers (2,4,5,8)]. Theme one generated data on accessibility and whether user accessibility affects the efficacy of mobile mental health applications in individuals with anxiety disorders. The theme of accessibility provided evidence that user accessibility increased in individuals that use mobile mental health applications to treat their anxiety disorders, as demonstrated by 62.5% of the articles (1,2,3,4,6) in the literature review. Overall, accessibility is essential for individuals with disabilities and user-friendly designed mobile mental health applications. In contrast, several authors' results noted that accessibility needs to be increased for all users. However, the overall results indicate many of the authors, 62.5%, demonstrate that mobile mental health applications are effective in their accessibility, especially for those with either cognitive or physical disabilities.

Theme two generated data on mobile mental health applications' efficacy and whether they reduce anxiety disorders' primary symptoms. The theme of efficacy provided evidence that mobile mental health applications effectively treat anxiety disorders, which was shown in 75% of the articles in the literature review (1,2,3,4,7,8). Overall, mobile mental health applications effectively reduce the psychological distress associated with Generalized Anxiety Disorder and Panic Disorder. In contrast, several authors' (5) results noted that further research and analysis needs to be done under the supervision of a clinician to determine the efficacy of mHealth applications. However, the overall results indicate that many of the authors, 75%, demonstrated that mHealth applications effectively reduce stress levels and improve mindfulness in individuals with GAD and PD.

Theme three generated data on barriers to mental health services and the effects of the accessibility of mHealth applications. The theme of barriers to mental health services provided evidence that mHealth applications effectively increased accessibility for the underserved and vulnerable populations, as demonstrated by 25 % of the articles (5, 6) in the literature review. In contrast, several authors noted that not everyone has Internet or smartphone access. Thus, this is important to consider when evaluating whether mHealth applications effectively reduce barriers to mental health care.

Theme four generated data on anxiety disorder treatment and whether mHealth applications effectively reduce the primary symptoms associated with GAD and PD. The theme of anxiety disorder treatment provided evidence that mHealth applications effectively reduced psychological distress and provided beneficial coping mechanisms, as demonstrated by 50% of the articles (2,4,5,8) in the literature review. In contrast, several authors' (Marshall et al., 2019) noted that clinicians need to take caution when recommending these applications, as further evidence is required to determine their true efficacy.

Despite the findings described above, our review had some limitations that included a need for increased evidence as to whether mHealth applications are effective at reducing the primary symptoms associated with anxiety disorders and a need for increased accessibility. We conducted this research over twelve weeks. We excluded non-English language articles removing certain publications from the review. The literature review involved conducting a preliminary search strategy using Google Scholar first. A secondary search strategy incorporated Internet Archive Scholar and PubMed Central for reviewing peer-reviewed journal articles. Keywords guided the database searches, and a few articles were possibly missed. The last limitation is the subjective nature of the readers reviewing the articles, who may have interpreted the information from the articles differently.

Minimizing the limitations above transpired by following the PRISMA method based on systematic review guidelines and protocol. We triangulated and filtered down the information collected, starting at 75 articles, from 27 articles from Internet Archive Scholar and 48 articles from PubMed Central until a data saturation level occurred and no additional information for developing themes. Ensuring the readers reviewed each article and the articles aligned with the research question helped minimize this limitation's effect. Despite the limitations of this study, mobile mental health applications, in general, are effective at accessibility and reducing the primary symptoms associated with the primary symptoms found in individuals with anxiety disorders.

Researchers can use these results of the literature review as a steppingstone for future scholars and researchers conducting a different type of study, i.e., mixed method research design study incorporating data collection processes utilizing qualitative interviews of participants and a quantitative survey, to help further shed light on the research question. Also, healthcare leaders and clinicians can use these findings to expand care, from in-office to virtual visits. Mobile mental health applications have successfully expanded care and anxiety disorder treatment. However, more research needs to be done to determine mobile mental health applications' full efficacy in anxiety disorder treatment.

Conclusion

The purpose of this systematic literature review was to investigate whether the use of mobile mental health applications to treat anxiety disorders effectively reduces primary symptoms among adults with GAD and PD. The study provided four themes for understanding how mobile mental health applications are beneficial in reducing barriers to mental health care and symptoms associated with GAD and PD. The main themes included accessibility, the efficacy of mobile mental health applications, barriers to mental health care, and anxiety disorder treatment. Our review identified some limitations to these mobile applications, and further research is warranted as to the level of effectiveness mobile mental health applications have at reducing the primary symptoms associated with GAD and PD. Further research can include investigating more mobile mental health applications such as Intellicare, Talkspace, and Calm and whether they have high retention rates and are clinically effective at reducing symptoms associated with GAD and PD. The implications of these findings provide clinicians and nurses an opportunity to provide greater accessibility to individuals that typically don't have access to care.

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References

1. Cackovic C, Nazir S, Marwaha R. Panic Disorder. In: StatPearls [Internet]. StatPearls Publishing; 2022.

2. Chandrashekar P. Do mental health mobile apps work: evidence and recommendations for designing high-efficacy mental health mobile apps. MHealth [Internet]. 2018 [cited 2022 Aug 18];4(3):6–6. Available from: https://mhealth.amegroups.com/article/view/18848/18909

3. Fuller-Tyszkiewicz M, Richardson B, Klein B, Skouteris H, Christensen H, Austin D, et al. A mobile app–based intervention for depression: End-user and expert usability testing study. JMIR Ment Health [Internet]. 2018 [cited 2022 Aug 18];5(3):e54. Available from: https://mental.jmir.org/2018/3/e54/

4. Locke AB, Kirst N, Shultz CG. Diagnosis and management of generalized anxiety disorder and panic disorder in adults. Am Fam Physician. 2015;91(9):617–24.

5. Marshall JM, Dunstan DA, Bartik W. Clinical or gimmickal: The use and effectiveness of mobile mental health apps for treating anxiety and depression. Aust N Z J Psychiatry [Internet]. 2020;54(1):20–8. Available from: http://dx.doi.org/10.1177/0004867419876700

6. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med [Internet]. 2009;151(4):264–9, W64. Available from: http://dx.doi.org/10.7326/0003-4819-151-4-200908180-00135

7. Olff M. Mobile mental health: a challenging research agenda. Eur J Psychotraumatol [Internet]. 2015;6(1):27882. Available from: http://dx.doi.org/10.3402/ejpt.v6.27882

8. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ [Internet]. 2021;372:n71. Available from: http://dx.doi.org/10.1136/bmj.n71

9. Patriquin MA, Mathew SJ. The neurobiological mechanisms of Generalized Anxiety Disorder and chronic stress. Chronic Stress (Thousand Oaks) [Internet]. 2017;1:247054701770399. Available from: http://dx.doi.org/10.1177/2470547017703993

10. Roth CB, Papassotiropoulos A, Brühl AB, Lang UE, Huber CG. Psychiatry in the digital age: A blessing or a curse? Int J Environ Res Public Health [Internet]. 2021;18(16):8302. Available from: http://dx.doi.org/10.3390/ijerph18168302