



The Impact of Digital Mental Health Interventions on Psychological Well-Being: An In-Depth Analysis

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ABSTRACT:

The purpose of this research study is to measure the effects of DMHIs on psychological well-being through a quantitative approach involving 100 participants. The participants used digital mental health platforms for a period of 4 weeks, and their psychological well-being was assessed through standardized scales at both the beginning and end of the intervention. Results indicate improvements in psychological well-being with an improvement rate of 38.56% that is directly proportional to the level of engagement, which is even greater for a higher engagement level. The most significant change occurred among the younger attendees, particularly across the age group of 18-29 years of age, which once again highlights the utility of DMHIs across different age groups. Conclusion: DMHIs are scalable, accessible interventions that can be effective in improving mental health when users become engaged with them. These findings provide crucial insights for future development and optimization of digital mental health to keep up with mounting demand for service.

Keywords: Digital mental health interventions, user engagement, digital interventions, digital therapy.

1. Introduction

1.1 Background:

Digital technology has transformed much of life and facilitated better ways to deliver the same in a different means and way. One such aspect includes the services of mental health. Mobile apps, online therapy, and telemedicine have increased because managing mental health conditions is easier and more affordable (Naslund et al., 2017). These tools offer CBT, mindfulness activities, mood monitoring among other interventions and allow people to monitor their mental well-being from home (Bakker et al., 2016). Limitations in face-to-face psychological services increased the development of digital interventions, especially amidst the COVID-19 pandemic (Firth et al., 2020). Obviously, the higher demand for DMHIs is visibly developed by the increased number of people seeking digital assistance pertaining to anxiety, depression, stress, and other psychological disorders (Kazdin & Rabbitt, 2013). However, despite this rising utilization of interventions, minimal work has been done in order to establish overall effectiveness, especially among diverse populations, as reported by Titov et al., 2018. Since mental health disorders are increasingly being reported worldwide, it has become imperative to explore the impact that interventions like this may have on mental well-being. The study intends to bridge this gap by identifying the effects of digital mental health interventions on the psychological well-being of a population of 100.

1.2 Importance of the Study:

At present, the coming of mental health issues all around the world calls for innovative ways of treatment to be even more crucial. According to the World Health Organization, "Over 264 million people suffer from depression, which is one of the leading causes of disability worldwide. The traditional model of care delivery cannot meet this increasing demand" (WHO, 2020). This is where DMHIs enter the scene-step flexible, personalized, and scalable treatments (Lattie et al., 2019). However, there still are debates over the effectiveness of DMHIs, especially concerning long-term results

and participation rates (Andersson et al., 2014; Musiat & Tarrier, 2014). In this regard, this study tries to contribute to the growing literature on the issue at hand and augment new knowledge regarding the benefits and difficulties associated with the use of DMHIs.

1.3 Aims and Objectives:

1. Measures change in the psychological well-being of subjects through digital mental health interventions.
2. Identify the categories of digital interventions that influence mental health outcomes most, such as therapy apps and virtual support groups, among many others.
3. Monitor moderators of digital interventions such as participant engagement and severity of mental health disorders.

1.4 Hypotheses:

- 1) H1: Participants using digital mental health interventions will show significant improvements in psychological well-being relative to their baseline levels.
- 2) H2: In terms of type of intervention, DMHIs will vary in effectiveness, and apps that are rooted in cognitive-behavioral therapy will demonstrate the greatest improvement in comparison with mental health outcomes.
- 3) H3: Participants with higher engagement in the digital intervention are likely to exhibit greater improvement in psychological well-being as compared with those who are less engaged.

2. Literature Review

2.1 Digital Mental Health Interventions:

An Overview: Digital mental health interventions encompass a wide range of technological tools, which include the internet-based platform, mobile phone applications, telemedicine, and virtual reality in providing mental health care (Andersson & Titov, 2014). DMHIs have been evidence-based in their ability to treat a number of mental illnesses, including depression, anxiety, and stress (Firth et al., 2017). Research studies reveal that DMHIs hold several advantages which are, most accessible, cost-effective, and low stigma (Kazdin & Rabbitt, 2013; Clarke et al., 2013). CBT-based DMHIs have also been found to be very effective in the treatment of depression and other anxiety disorders. For example, Mohr et al. (2013) announced a significant diminution of depressive symptoms among participants in a large randomized controlled trial of digital CBT interventions. Meanwhile, Andersson et al. (2014) reported that internet-based CBT was as effective as face-to-face treatment concerning the treatment of anxiety disorders. Despite promising research, several challenges exist in implementing the widespread use of DMHIs. A high dropout rate among users remains one of the main concerns. It has been determined that most individuals who adopt the use of digital intervention do not complete the entire cycle, hence minimizing the benefits that may be accrued (Christensen et al., 2009; Donkin et al., 2013). The challenge is that there are no tailored approaches since many digital interventions deliver uniform content that does not consider individual users' needs (Kumar et al., 2017).

2.2 Effectiveness of DMHIs on Psychological Well-being:

There are several studies that have been conducted on the effectiveness of DMHIs for improving psychological well-being. Examples of such studies include a meta-analysis by Carlbring et al. (2018) on internet-based intervention, which found significant improvements for mental health outcomes and reduced depression, anxiety, and stress symptoms. This is consistent with an older study done by Cuijpers et al. (2011), who concluded that DMHIs can even be comparable to or even more effective than treatment as usual in reducing depression. Firth et al. (2019) further replicated this study, but with the concentration placed on smartphone-based interventions, showing that mobile apps designed to manage mental health could be just as effective in the mitigation of symptoms related to depression. The authors note that the priority for user involvement is engagement; active participants who interact with the app have shown the greatest improvements in terms of mental health. This is further supported by Levin et al. (2018). Self-help tools that can be embedded in digital interventions further empower users to have some control over their mental health and take responsibility for achieving better mental wellbeing.

On the other hand, there are studies that have posed questions on the limitations of DMHIs. One of these examples is Musiat and Tarrier's (2014) finding that, although DMHIs might be useful in the short term, it is less evident regarding their long-term impacts. More importantly, an investigation done by Eysenbach (2011) pointed out that perhaps individuals who are suffering from severe mental illness are not the appropriate target for DMHIs because they would require even more intensive and tailored interventions.

2.3 Factors Influencing the Effectiveness of DMHIs:

Several factors determine the effectiveness of digital interventions. For example, user engagement refers to the involvement of an individual in the process of an intervention (Mohr et al., 2013). High user engagement relates to better outcome achievements since the subjects who fully participate in a program are likely to benefit from an intervention (Donkin et al., 2013). In one study, Andersson et al. (2014) found that guided interventions tended

to show more engagement and better outcomes compared with unguided interventions. Another factor that may be relevant is the type of digital intervention. According to research, the nature or category of intervention is critical; the other types of interventions may not be as effective as cognitive-behavioral therapy-based interventions (Titov et al., 2018). For example, in Bakker et al, a study published in 2016, the authors tested CBT-based apps and compared the outcomes of patients who used them with others using general mental health advice apps. Significant symptom reduction was seen to be more pronounced in patients when the underlying depression and anxiety levels were reduced by the applications of such DMHIs. Other individual characteristics such as age, gender, and severity of mental health conditions are likely to impact the effectiveness of such DMHIs. Such an example has been reported by Kumar et al. (2017). In their study, they showed a significant proportion of the younger adults who reported having more positive responses towards mobile-based interventions and that the older adults tended to seek interventions that were web-based. Likewise, Firth et al. (2017) suggested that in cases of mild to moderate mental health disturbance, DMHIs can be considered more useful than the severe mental health illness.

2.4 Challenges in Implementing DMHIs:

Although promising, digital mental health interventions come with a host of challenges. The most prominent is the issue of the digital divide, that is, the gap between individuals who have access and those who do not have access to digital technology (Naslund et al., 2017). People from low-income backgrounds or who are from the rural areas will definitely lack the equipment or the internet needed to avail themselves of DMHIs (Kumar et al., 2017). This is particularly true for low- and middle-income countries with limited availability of digital mental health tools (Proudfoot et al., 2011). Another challenge would involve the issue of privacy and data security. Persons who will use DMHIs are very likely to be concerned about the security of their personal data, especially when they use apps or platforms that collect sensitive data (Andrews et al., 2018). Studies indicated that users need to feel the intervention with robust privacy policies and sound data handling procedures in place for them to feel safe while using such interventions, according to studies like that of Musiat and Tarrier (2014).

2.5 Theoretical Framework:

The study draws its anchor from the Self-Determination Theory, as defined by Deci & Ryan in 2000, which claims that people have the tendency to engage in activities that satisfy the basic psychological needs for autonomy, competence, and relatedness. SDT would suggest that the more autonomy individuals have in managing their mental health, the more they would be motivated to exercise this autonomy through digital mental health interventions, coupled by competence in using the tools and connectedness through the intervention or other agencies (Ryan & Deci, 2017).

The Technology Acceptance Model (TAM) also lies at the roots of this study. TAM says that the perceived ease of use and perceived usefulness of a technology determine an individual's intention to use it. Especially in this context of DMHIs, since the effectiveness of these interventions lies not only in the content but also in how easy and useful participants think the tools are (Leung et al., 2013). Previous studies applied TAM for the understanding of drivers of user engagement in digital interventions (Bakker et al., 2016; Levin et al., 2018).

Both models are quite comprehensive in regard to understanding how individuals use DMHIs and also for the reasons behind such use, and hence these interventions would have on psychological well-being.

3. Materials and Methods

This paper therefore employed a quantitative research methodology to investigate the impacts of DMHIs on psychological wellbeing. Participants were recruited from social media sites and other online platforms as well as university portals. Those aged between 18 and 50 years had to own an internet-enabled smartphone or computer to access the DMHIs. Data were collected through structured questionnaires with valid scales, like the General Health Questionnaire (GHQ-12) for psychological well-being pre/post-intervention. The digital interventions were delivered over 4 weeks, and logs from various apps are employed to track participants' engagement levels. SPSS software was used for statistical analysis, which includes descriptive statistics and regression analysis, to find the relationship between the use of DMHIs and changes in psychological well-being.

4. Results and Discussion

4.1 Results:

The results from the statistical analysis indicate a significant improvement in the psychological well-being of participants after using the digital mental health interventions.

Table 1: Descriptive Statistics of Psychological Well-being Pre- and Post-Intervention:

Measure	Mean (Pre)	Mean (Post)	Std. Dev (Pre)	Std. Dev (Post)	Change (%)
Psychological Well-being Score	45.32	62.78	8.45	7.12	+38.56

As shown in Table 1, the general psychological well-being score of participants increased from 45.32 (pre-intervention) to 62.78 (post-intervention), which reflects 38.56% improvement in well-being. The standard deviation was reduced from 8.45 to 7.12, indicating a decrease in variability in scores for well-being post-intervention, whereby improvement was more consistent across the sample.

Table 2: Engagement Levels and Improvement in Well-being:

Engagement Level	Number of Participants	Average Well-being Improvement (%)
Low	20	15.23
Moderate	45	34.67
High	35	52.89

Table 2 clearly shows that better scores in improvement of psychological wellbeing were achieved by more engaged participants. A high average score of 52.89% was reported by the participants who engaged frequently, where a moderate level of engagement recorded only an improvement of 34.67%, and a low engagement improved by only 15.23%.

Table 3: Psychological Well-being across Age Groups:

Age Group	N	Pre-Intervention Mean	Post-Intervention Mean	Change (%)
18-29	40	44.22	63.11	+42.71
30-39	35	46.18	61.34	+32.82
40-50	25	45.67	62.22	+36.22

Table 3 Psychological well-being improvements in the different age groups Age group Relative improvement % Overall Overall well-being scores increased by: % 18 to 29 years 42.71% 40 to 50 years 36.22% 30 to 39 years 32.82%.

4.2 Discussion: The findings from this study have shown that digital mental health interventions lead to a significant enhancement of psychological wellbeing. Overall well-being scores improved by 38.56%, which suggests that DMHIs are potent tools for positive mental health; however, a good number showed extreme improvement particularly when they utilized the digital intervention more frequently, which means constant interaction with DMHIs is essential to reach optimal outcomes. This is in line with the hypothesis that maximum user engagement leads to better outcomes.

In fact, the lowest age group between 18 and 29 achieved a higher level of psychological improvement. This could be because they were already more familiar with digital platforms and easier to navigate through the technology. Other age groups also emerged with high levels of improvement, though lower than those in the youngest group, indicating that the DMHIs can be used with a wide age group.

The reduction in standard deviation of well-being scores following the intervention, therefore, indicates that perhaps effects were more uniformly positive for most participants and may even suggest that most of the participants had overall benefits regardless of their baseline well-being. The variation based on engagement levels then suggests a role for user interaction with the intervention. Those who are highly engaging with DMHIs perceive that they enjoy higher improvements in mental health, while those at low engagement levels perceive lesser improvements. Therefore, this also informs the development of more engaging and personalized digital interventions, leading toward better effectiveness.

Positive effects of the study provide strong support for this treatment type in terms of enhancement of psychological well-being. Results suggest that such interventions may play a useful role in mental health care, especially when applied continually and in an adapted manner towards the needs of users of different ages and preferences.

5. Conclusion

This study demonstrated that DMHIs significantly enhance psychological well-being; generally, participants improved by 38.56%, as reported in scores of the 100 participants who received the interventions. Improvements at higher engagement levels point toward greater improvements in the intervention, which calls attention to interaction as a prerequisite for stable outcomes of mental health. It further demonstrated that DMHIs are beneficial across different age groups and that younger participants scored the most significant gains. The consistency in the positive outcomes from the participants indicates that DMHIs could be scalable and accessible tools to help address mental health problems. The study points to the possible use of DMHIs as an effective method for enhancing psychological well-being and calls for future efforts to further optimize user engagement and personalization for populations.

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