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Abstract

Now more than ever mental health is in the spotlight on a global scale. Professionals from a variety of different disciplines are being encouraged to evaluate several different coping techniques in order combat the magnitude of societal crisis being discovered post-pandemic. At the top the list is Mindfulness-based interventions. The concept of mindfulness practices is nothing new. Evidence suggests it has existed for thousands of years; however, it is getting more notoriety in the past decade due to increasing expansion of mobile-based applications. These types of technology driven applications offer an easily accessible, convenient, and trackable way for individuals to actively participate in mindfulness techniques that offer a wide variety of benefits, especially pertaining to improved health outcomes. The purpose of this evidence-based project (EBP) was to start a pilot study that examines the effects of mindfulness programs delivered via smartphone applications, and use of the Mindful Attention Awareness Scale (MAAS) tool to evaluate improved mindfulness which is linked to stress reduction and improve health outcomes. Participants used the mindfulness meditation mobile application "Smiling Mind" to meditate for a short period of time every day for two weeks (14 days). The MAAS questionnaires were completed pre- and post-intervention. At the end of the fourteen days, participants showed increased mindfulness scores. Participants reported their perception of having increased mindfulness attributed to less stress and other positive outcomes. Several participants showed desire to continue using the mobile application after the completion of the study.

Keywords: Meditation, mental health, mindfulness, mobile applications, stress reduction.

Background and Significance

Now more than ever mental health is in the spotlight on a global scale. Professionals from a variety of different disciplines are being encouraged to evaluate several different coping techniques in order combat the magnitude of societal crisis being discovered post-pandemic. At the top the list is Mindfulness-based interventions. The concept of mindfulness practices is nothing new. Evidence suggests it has existed for thousands of years; however, it is getting more notoriety in the past decade due to increasing expansion of mobile-based applications. These types of technology driven applications offer an easily accessible, convenient, and trackable way for individuals to actively participate in mindfulness techniques that offer a wide variety of benefits, especially pertaining to improved health outcomes.

In recent years even before the pandemic, much of the work force, especially those who work in healthcare, have been struggling with demands of their work environments. These harsh realities have been characterized by high productivity targets, overtime, high work pressure, customer aggression, temporary employment contracts, continuous organizational changes, job uncertainty, employee shortages, and little autonomy (Janssen et al., 2018). In addition, Employees within healthcare setting are regularly confronted with stress in the form of physical and mental suffering as well as strong emotions (their own or those of their patients) (Janssen et al., 2018). Appropriate stress management is needed to improve the health of these professionals, which ultimately improves the quality of care they provide to their patients.

One powerful resource and tool in combating stress is the use of mindfulness. It is documented that the concept of mindfulness has existed in traditions and Buddhist philosophies for roughly 2,500 years (Janssen et al., 2018). Meditation and other mindfulness exercises are methods for reducing personal suffering and developing insight, compassion, and

wisdom (Janssen et al., 2018). Having mindfulness practices introduced into occupational environments or for those who lead high-stress lives can have a wide array of benefits.

Chronic stress presents as a growing burden in healthcare not only the workforce but also for patients, utilizing mindfulness practices can make a considerable impact. One fast and convenient way of initializing these interventions is though smartphone-based applications. Mobile smartphone applications (apps) have the potential to deliver evidence-based stress management strategies. Studies have identified that using mindfulness stress management apps have proven functionality, transparency, and evidence-based content. Based on these domains, these apps have the potential to effectively supplement medical care (Coulon et al., 2016). Incorporating these mindfulness applications as health interventions into daily life has never been so attainable. They have the potential to create remarkable and positive results for health outcomes.

Purpose/Aim

There is a need for stress reduction techniques in a multitude of diverse settings. Mindfulness is a proven method that offers a variety of health benefits. In today's world technology has an infiltrated presence with smart phone applications being highly used across multiple generations.

Public interest in mindfulness practice has remained high: around 10% of the individuals included in the National Health Survey between 2002 and 2012 reported practicing mindfulness to improve their health and well-being (Clarke et al., 2015). Currently, many more individuals have resorted to mobile apps to gain access to mindfulness content. According to company reports in 2018, Headspace has over 1 million paid subscribers, while Calm reached over 80 million downloads (Pesce, 2018).

Many studies have shown that app-delivered mindfulness interventions prove comparable to other methods to enhance results of self-compassion and stress reduction. Evidence highlights the effectiveness of mindfulness meditation apps in improving users' well-being and mental health related outcomes (e.g., symptoms of anxiety and depression, perceives stress, psychological well-being, life satisfaction, quality of life, positive and negative emotions). They are easily accessible, scalable, cost-effective, and constitute a feasible alternative to promote mental health and enhance well-being at a large scale (Mak et al., 2018).

The components of this pilot study are to further show with supporting evidence the important role that mindfulness-based applications have in creating positive changes within a brief period of time. For example, research has shown that a single session of yoga (a mindfulness and meditation practice) had favorable, moderate effects on anxiety (Yin et al, 2021).

The purpose of this project was to examine the effects of mindfulness meditation programs delivered via a smartphone application in conjunction with the use of the MAAS tool to evaluate improved mindfulness which is linked to stress reduction and improved health outcomes. The project aims to offer guidance and further initiate participation in the use of these applications to promote a healthier lifestyle and ultimately improve quality of life.

Evidence-Based Practice Model

A combination of two different EBP models helped influence and guide this project. The Iowa model and the Stevens Star Model of Knowledge Transformation seemed to be the most complementary models. They exemplify all important components for institutional change in a simplistic but organized and effective way. These models focus on gathering the most relevant

and high-quality evidence to be evaluated, implemented, pushing for positive changes in clinical practice and improvement of patient outcomes.

The Neuman systems model is the theory that provides the most comprehensive, flexible and holistic approach based on the perspective of nursing. It highlights four main concepts of person, environment, health and nursing. The focus is the response of the client system to actual or potential environmental stressors. It uses all three areas of primary, secondary and tertiary nursing prevention for optimal client system wellness.

The strength of these models helps improve outdated standards into current and relevant ones. They help breakdown healthcare stigmas that exist in instances where providers and patients are habitual in using traditional practices. They clearly and efficiently support evidence-based practice and its vital role in making improved alterations.

Sustaining these model formats helps create interventions and education programs that will lead to better outcomes for patients, providers, and organizations. Over time these models and the evidence-based practice they provide will continue to improve standards and transform healthcare.

Literature Review

This project included a literature search which revealed an overwhelming large number of articles. Terms of reference that were used to identify the best literature selected were health outcomes, meditation, mental health, mindfulness, mobile/smart phone applications, occupational stress, stress management, stress reduction and well-being.

PubMed was the leading data base used, followed by CINAHL, UpToDate, and Google Scholar. The year of publication was an important part of inclusion criteria, ranging from 2015-2021. Other inclusion criteria included adult population, both genders (males and females), and

mixed demographics. Exclusion criteria were limited to pediatric populations (children and adolescents). Literature included Randomized controlled trials (RCTs), systematic reviews, and meta-analysis.

Methods

Initial steps included approval of this project by the internal review board (IRB) at the University of San Diego (USD). Participants in this evidence-based practice pilot study incorporated adults over the age of twenty-one, with mixed demographics and diverse backgrounds. All of these individuals previously worked or are currently working in healthcare and are also active graduate students. The opportunity to improve mindfulness scores, potentially reduce stress and receive other health benefits associated with mindfulness practice was publicized in person and via emailed fliers among Doctoral Nurse Practitioner (DNP) students.

Interested participants were instructed to complete an online Mindful Attention Awareness Scale (MAAS) tool prior to downloading and using the selected mobile mindfulness application 'Smiling Mind', giving the participants a baseline assessment ('Pre-App Score'). Fourteen participants were recruited and then asked to use this mobile application at least once every day for two weeks. The trial took place in December 2022 during the completion of the semester and final exams.

Follow-up assessments were completed after the intervention period of two weeks via email. Participants were then asked to complete the MAAS for a second time and report their new score ('Post-App Score'). The pre-app and post-app MAAS scores data was then analyzed, and the results were put in tables and charts.

Ethical Considerations

This study was approved by the Institutional Review Board of the University of San

Diego, Hanh's School of Nursing (IRB-2023-342).

Results

The intervention was completed using fourteen participants from start to finish. The range of MAAS pre-scores were 1.5 to 4.6 with the average pre-score equaling 3.2. The range of the MAAS post-scores were 2.4 to 5.2 with the average post-score increasing to 4.0 after the intervention took place. The post-scores exceeded the benchmark of 3.8 by 14%. A comparison of the participant's pre and post scores is presented in Tables 1 & 2.

There was an identifiable and significant difference among pre and post intervention scores. No participants reported lower post-scores. Thirteen out of the fourteen participants showed increased scores post intervention alluding to an increase in stress reduction. The average pre-score equaled 3.2, and the average post-score equaled 4.0. There was a fourteen percent increase from the benchmark score of 3.8.

Higher scores reflect higher levels of dispositional mindfulness. With these higher scores also come lower reported negative emotional states. Statistically, those who actively participated in mindfulness activities reportedly had fewer and less intense instances of negative emotional experience. Only one participant reported the same pre and post scores.

After the termination of the study, several participant's feedback expressed positive outcomes while using the application and reported desire to continue using it on a regular basis. All participants reported that they perceived the intervention and application to be supportive and beneficial.

Study Limitations

Limitations for this project were linked to participation. There was difficulty in collecting a larger number of participants which restricted data collection. Secondly, there was the

perceived burden of commitment within a timeframe. Many people experiencing high volumes of stress did not want to devote extra time to the study because they felt they were already too busy and did not want to create an additional daily chore. This project included a free application, there are others that charge fees, so potentially cost could be a barrier in future studies. In addition, the use of the MAAS tool could be considered another limitation because it is a self-report survey and could be misinterpreted. It is possible that there is bias among the participants based on their own perceptions attributed to mindfulness.

Discussion

Participants of this project reported positive outcomes which included stress reduction, and improved sense of well-being. Even with brief mindfulness exercises (just a few minutes in length) a day, created relaxation breaks with lasting effects. Some participants felt empowered and wished to share this with their friends and family. The objective of this project was met. Mindfulness is a conduit to alleviating stress and negative experiences, which ultimately leads to an outpouring of various improved health outcomes. Strengths of this project included viability, low cost, and efficacy of health benefits.

Implications for Future Research

Extensive research exists on mindfulness and the abundant benefits it offers, however there are disparities among numerous populations. Improvements can be made, and implementation can be better utilized, especially with the aid of innovative technology. Researchers have highlighted that our healthcare system needs to be completely redesigned, and that offering smart mobile-based mindfulness applications can aid in the rehabilitation process. Future studies and research should consider a deeper tracking of the biophysical measurements through these applications to further explore the impact of improved health outcomes over time.

Prospective goals of evidence-based practice would allow for mindfulness and mobile application platforms that teach mindfulness philosophies, to become part of standardized interventions for various organizations and treatment modalities for medical providers to incorporate into their everyday operations.

Conclusion

The use of mindfulness-based mobile applications has proven to be valuable in creating positive change in an array of health outcomes in multiple diverse settings. There are many invaluable benefits in promoting the use of these techniques and technology. These interventions target functioning by decreasing stress, refining decision-making, increasing productivity and resilience. They also provide a sense of personal accomplishment, self-compassion, increased interpersonal communication. Some of the most positive outcomes included reduced levels emotional exhaustion (a dimension of burnout), psychological distress, depression, anxiety and occupational stress (Janssen et al., 2018). Improved quality of sleep, and deep relaxation was also commonly reported (Janssen et al., 2018). Currently there are hundreds of these types of applications available and many of them are offered for free or low cost. This evidence-based project demonstrates that institutions, organizations and healthcare providers should take advantage of these useful, convenient and cost-effective tools in assisting with improving and sustaining health and well-being.

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Table 1 Participant Pre and Post scores (with averages) of the Mindful Attention Awareness Scale (MAAS)

	Pre-Score	Post-Score	Difference
Participant 1	2.6	3.4	0.8
Participant 2	3.8	4.4	0.6
Participant 3	3.8	4	0.2
Participant 4	2.4	2.4	0
Participant 5	4.6	5.2	0.6
Participant 6	2.9	3.3	0.4
Participant 7	3	3.8	0.8
Participant 8	3.5	3.93	0.43
Participant 9	2.7	3.4	0.7
Participant 10	4	5	1
Participant 11	3.9	4.2	0.3
Participant 12	1.5	5	3.5
Participant 13	3.4	3.8	0.4
Participant 14	3.13	4.2	1.07
Average:	3.23071429	4.002142857	0.771428571

Figure 1 Participant Pre and Post scores of the Mindful Attention Awareness Scale (MAAS)