Original Research Article

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Digital mental health apps for self-management of depression: a scoping exploration on awareness, attitude, and user experience among professional course students

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ABSTRACT

Background: Globally, depressive disorders are ranked as the single largest contributor to non-fatal health loss (7.5% of all years lost due to disability-YLD). In India, provision of quality mental health care services remains a challenge due to severe deficiency of qualified care givers. Harnessing the potential of digital technologies and smart phone apps need to be explored to address the existing gaps in mental health care services. This study aims to describe the awareness, attitudes and user experiences of mental health apps among professional course students.

Methods: A mixed-methods study methodology was adapted involving medical professional students of a tertiary teaching hospital in South India. A web-based survey assessed the awareness, attitudes and usage of mental health apps. Further, in-depth interviews (30) were conducted among selective app users (20) and non-users (10) to gain insights about the user experiences.

Results: Among 898 respondents for the web-based survey, majority were female (513,57.1%), aged between 18-25 years (801,89.2%) undergraduates (673,74.9%), undertaking professional courses in medicine and allied health sciences (633,70.6%). 273 (30.4%) respondents were aware of apps and 86 (9.6%) were ever users. Novel interactive platforms, privacy and agency for self-care are the major factors for using the apps however data confidentiality and authenticity of the app-based information were identified as major concerns limiting app usage.

Conclusions: The study found the utilization of mental health apps as self-management tool for depression gaining slow traction among professional course students.

Keywords: Depression, Mental health apps, Mixed-methods, Web-based survey, In-depth interviews

INTRODUCTION

Depression is recognized as the most common global mental health disorder by World Health Organization (WHO). The theme for World Health Day 2017: "Depression-let's talk" addresses this issue as societal stigma associated with mental health remains critical

barrier for care seeking behaviours to remain either minimal or attempted only for serious ailments. Globally, more than 264 million people of all ages suffer from depression. The proportion of the global population with depression in 2015 is estimated to be 4.4% and in India at 4.5%. Depression is more common among females (5.1%) than males (3.6%) and depressive disorders led to a global

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total of over 50 million years lived with disability (YLD) in 2015. Globally, depressive disorders are ranked as the single largest contributor to non-fatal health loss (7.5% of all YLD).

Health systems have not yet adequately responded to the burden of mental disorders worldwide and as a consequence the gap between the need for treatment and its provision persists large all over the world. Between 76% and 85% of people with severe mental disorders receive no treatment in low-income and middle-income countries (LMIC) and the corresponding range for high income countries is also high between 35% and 50%. Almost half the world's population lives in countries where on average, there is one psychiatrist to serve 200000 or more people. The number of psychiatric beds in the India is low at about 0.2 per 100000 population and there are only two psychiatrists per 10 lakh population.

The informative and communication technology (ICT) advances in health care made in the past two decades created web-based platforms which invoke a great potential in addressing the gaps in mental health care services. Mental health applications (apps) represent a unique opportunity to expand the availability of quality of mental health care support services to young adults who are technology engaged generation and potential beneficiaries with body of literature on healthy lifestyles such as fitness apps.

The number of mobile health (mHealth) apps focused on mental health is rapidly increasing and a survey of 15000 mHealth apps by WHO revealed that 29% of mHealth apps focus on mental health diagnosis, treatment, or support.⁵ A meta-analysis of 18 randomized controlled trials (RCTs) covering 22 mobile apps revealed that using apps to alleviate symptoms and self-manage depression significantly reduced patients' depressive symptoms compared to control conditions (g=0.38, p<0.001).⁶ It reported that smartphone-based therapies yield the greatest benefits for individuals with mild to moderate rather than major depression. Research in exploring the awareness, acceptance of mental health apps and perceptions from users about their utility in supporting mental wellness are rare to be found from Indian sub-continent.

Currently to our knowledge this will be the first study in India to generate body of knowledge about the impact of mental health apps in self-management of depression and also document the various mental health apps used by our study participants. With this background this study was initiated with the objective to describe the awareness, attitudes and user experiences of mental health apps among professional course students.

METHODS

A cross-sectional survey using Google forms survey tool was designed after extensive review of literature. The webbased survey questionnaire included 29 survey items

including: socio-demographic characteristics, history of earlier clinical diagnosis of depression and status of treatment, Cohen's patient health questionnaire-9 (PHQ-9) item scale for screening of depression, and awareness on mental health apps, apps used by the respondents, attitudes towards the role of mental health apps as self-care tools for management of depression. Cohen's PHQ-9 item scale is widely used screening tool for depression in community settings and it allows for participants who may be suffering with depression to self-identify by responding to the 9 questions assessing their depressive symptoms during the past two weeks duration. The grades of depression as per Cohen's 9 item scale based on response score were: minimal depression (0-4), mild depression (5-9), moderate depression (10-14), moderately severe (15-19), and severe depression (20-27).

The Institutional research committee approval was provided for the study (TMCH/IRC/2019/049). Purposive sampling technique was used to disseminate the web-link widely https://forms.gle/52YmJdqHDdWsvcPM9 among undergraduate medical students of Tagore Medical College Hospital, Chennai, Tamil Nadu through affinity groups using snowballing techniques through social media platforms including whatsapp, facebook during November 2019 to February 2020. Both male and female students were included in this survey and respondents submitting the survey online were considered as consenting (implied consent) to participate in the survey and were clearly explained at the beginning of the survey their participation is voluntary. Quantitative date from google forms survey was auto-generated in real time and descriptive statistics were performed.

Qualitative study design

The qualitative study design included conducting in-depth personal interviews wither one-one, face to face interviews or telephone interviews. After the quantitative survey was concluded, open calls for voluntary participation in the interviews were notified to the medical undergraduates through class representatives. A semi-structured interview guide was designed to meet the objective of the study and the principal investigator (PI) scheduled and conducted the interviews with consenting study participants at a time which was feasible for the study subjects. In-depth interviews were conducted personally at a pre-scheduled time where PI explained the purpose of the interviews and privacy and confidentiality were maintained by allowing only the PI and respondent's presence during the interview. Twenty interviews were conducted among ever users (history of past use, current use) and ten interviews among non-users of mental health apps (Figure 1).

Participants were not comfortable for audio recording of the interviews and thus only notes was taken by the PI using the interview guide to the discussions. The interviews documented the responses of related to their aptitude, user experiences of using the MH apps for maintaining mental wellness. Extensive notes were taken during the interview and all interviews were conducted in English for a period of approximately 20-25 minutes.

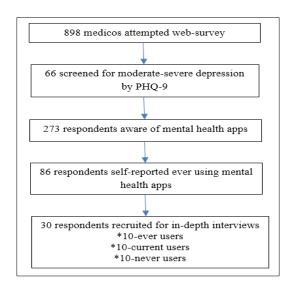


Figure 1: Flow chart of the study participants' recruitment for mixed methods study components.

Data capture and analysis

The web-survey data from Google forms were analyzed using Stata (version 12.0) statistical package. Inductive pre-determined thematic coding from the write-up from interviews was independently performed manually by two researchers with qualitative research experience as per the themes of the interview guide and the consensus was arrived. The process ensured the grouping of content into two broad themes: app based and personal characteristics of the users/non-users.

RESULTS

Among 898 respondents for the web-based survey, majority were female (513,57.1%), aged between 18-25

years (801,89.2%) undergraduates (673,74.9%), undertaking professional courses in medicine and allied health sciences (633,70.6%). 273 (30.4%) respondents were aware of mental health apps and 86 (9.57%) reported ever users including past use or current use of these apps. Among these groups of respondents the mental health apps usage was as shown below. (Table 1 and Figure 1).

Respondents self-reported that they had been clinically diagnosed with depression (59,6.57%) and of whom 11 (18.64%) respondents admitted being on treatment for clinical depression. Cohen's PHQ-9 item scale was used to screen for depression among the survey respondents and different grades of depression screened was as shown below in Table 2. Among respondents with minimal depression when screened with PHQ-9, 6.07% were ever users of apps. Similarly for mild depression, moderate depression, moderate severe depression and severe depression the ever users of apps were 10.10%, 16.47%, 9.09% and 3.33% respectively (Table 2, Figure 1).

The mental health (MH) apps used by the respondents include Headspace, Calm, Replica, Mindspace, Aura, Healthifyme and Mfine. The features reported by the users included guided meditation sessions (20), chats bots (3), virtual consultations (2), networking in online peer support groups (2), tracking of moods/symptoms (28) and screening for symptoms of depression (1). Approximately, 20.4% (12/59) of respondents who were clinically diagnosed with depression were using mental health apps. Likert scale was used to assess the respondents' belief towards mental health apps as a self-care tool for management of depression and 24.4% respondents believe the apps can support their self-management of depression whereas 56.3% remained neutral. The in-depth interviews were conducted among ever-users (20) and non-users (10) of mental health apps which captured the following predetermined thematic-based inputs as shown in Table 3.

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S. no.	Characteristics	Frequency (N)	Percentage (%)
1	Aware of mental health apps	273	30.4
2	Ever users of mental health apps	86	9.5
3	Current app users (daily)	9	10.46
4	Current app users (irregular)	29	33.72
5	Past users	24	27.90

Table 2: Screening for depression (PHQ-9) and usage of mental health apps (n=898).

S. no.	Grade of depression	Frequency (%)	Mental health apps ever use-frequency (%)
1	Minimal depression	329 (36.63)	20 (6.07)
2	Mild depression	297 (33.07)	30 (10.10)
3	Moderate depression	176 (19.59)	29 (16.47)
4	Moderate severe depression	66 (7.34)	6 (9.09)
5	Severe depression	30 (3.34)	1 (3.33)

Table 3: Pre-determined thematic coding and user testimonials-matrix of mental health apps (n=30).

S. no.	Theme variable	App users (20)	App non-users (10)
1	App based- favorable inputs	 Novel features are added in a timely manner Interactive mode Virtual consultations and time saving Tracking of moods at ease from home Self-management tool at finger tips 	 Peer review of app users was positive Helped peers and friends in some way to cope with their depression and is impressive to come to know
2	App based- unfavorable Inputs	 Not strongly recommended by mental care providers Data confidentiality issues and misuse of data Scientific content authenticity and lack of guidelines of reference Lack of evaluation studies on mental health apps impact on population level 	Lack of wide awareness about mental health apps similar to fitness apps Necessity did not arise personally to use these apps Do not believe apps can help in mental health issues as they do not provide personal interaction and empathy
3	Personal characteristics	 Exploring self-care avenues and is a novel area of potential Maintian privacy and do not fear losing confidentiality and leaking of personal information Immediate access without wasting too much time Non-stigmatising platform 	Possessing strong individual mental wellness and do not need gadgets to support

DISCUSSION

In this study 898 participants were self-screened with PHQ-9 for depression, moderate depression was found to be nearly 20% and moderately severe and severe depression amounting to 10%. Also in our study, 59 subjects admitted that they were clinically diagnosed with depression and 11 were currently undertaking treatment. Participants (30%) in this study were aware of mental health apps and ever users of apps remained low (9.6%). Among moderately depressed participants 29 (16.47%) used apps to self-manage their depression and also to maintain mental wellness. Our study findings concur with work of Schueller et al where app features such as guided meditation sessions, mood tracking and customized individual virtual sessions were important reasons among users favoring the use of mental health apps.8 Survey of mobile health apps by WHO revealed that one-third of apps cater to mental health support services.⁶ This highlights the recognition of the global burden of mental health disorders by the app designers and interest to address the demand for alternative care pathways.

In our study, ever app users reported that mental health care providers have not recommended the use of apps. This is similar to the low levels of care provider recommendation as reported by Schueller et al and was argued to be due to lack of awareness and less confidence about the efficacy of the apps among care providers. Informal sources such as peer users and personal curiosity in exploring alternative mental wellness support pathways were the two important reasons for using mental health apps among our survey respondents. In a qualitative study from North India, care givers of a tertiary care setting preferred mobile apps for providing information on service

availability and for automating routine caregiving activities. Sinha et al cited severe mental health treatment gap of more than 80% and low utilization of digital technologies in health care and mental care. The features of apps which remain appealing to younger generation such as ready accessibility, ensuring privacy with innovative and interactive features were also identified in our study by our app using respondents. These strengths of smart phone-based apps were identified in multiple studies. 10-12

In their review study of mental health apps, Firth et al found that mild to moderately depressed subjects benefitted maximally from smart phone app-based therapies including cognitive based therapies (CBT).⁶ This is similar to our findings where mild and moderately depressed participants were found to be the majority among mental health app users compared to others. The features of mental health apps especially tracking of moods and emotions on a regular basis are reflecting emotional self-awareness which is defined as the ability to identify and understand one's own emotions. This awareness was found to reduce symptoms of mental illness and improve coping skills of mental health affected participants.¹³⁻¹⁶

Our findings show that among 86 ever users of mental health apps, 10.46% were using on a daily basis, 27.9% discontinued the apps usage, and another 3.72% were using apps irregularly. Baumel et al, highlighted the need for prior testing before app release and developing user engagement analysis models to improve app-user retention.^{17,18} The authenticity of the information of the mental health interventions provided by the apps was also identified as a major concern. To address these concerns adapting a participatory approach in design of the apps

involving the beneficiaries or end users of these apps was suggested.⁹ Multiple studies also found evidence that although the content of the apps was not grounded in theory, if appropriately designed these apps still effectively address issues related to depression among other mental health disorders. 19 Mental health app users in this study expressed their concerns regarding the data sharing of the personal and clinical data collected by the app platforms with other third parties. Torous et al identified this apprehension among users could lead to lack of trust with uptake and engagement with apps and may affect their utility in providing alternate pathways of affordable mental health support.20 Stawarz et al argued that multiple stakeholders including app designers, regulatory bodies and app distributors such as app store owners should have shared responsibility to address trust related issues.²¹ In spite of these concerns, the author quote that the users tend to combine different technologies to support their mental well-being and this reveals an open window of opportunity to harness better and safer technology assisted mental health support systems in the upcoming future.

Limitations

This study has limitations which the authors would like to submit. Using web-based survey they were able to reach to maximum respondents during the specified time period but these findings may be from a homogenous group and thus studies involving wider representations of populations may be undertaken. Qualitative study design helped them to gain deeper insights but data saturation was achieved quickly due to relative novelty of the topic among study participants and limited utility of apps and hence they had to terminate with only 30 interviews.

CONCLUSION

The utility of mental health apps as self-care tool seems to be gaining slow traction and further studies to assess their potential in delivering mental wellness support are needed. Technical guidelines and frameworks might be needed from regulatory authorities in India in consultation with multiple stakeholders to create a dashboard of safe technology enabled solutions to enhance assistance for mental well-being at the tips of end users if they wish to access.

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