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Original Research Article.

Understanding Mental Health App Use among Attendees of Primary Health Care in Taif, Saudi Arabia

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ABSTRACT

Background: Mental health apps are increasingly available and accessible to the public. Global research indicated variable rates of use among people with main barriers identified are cost, privacy concerns, and difficulty of use. Little is known about prevalence and barriers of use of mental health apps in Saudi Arabia.

Method: Descriptive questionnaire-based cross-sectional survey of a sample of Saudi adult population. We adopted a multiple logistic regression modelling of data to evaluate the impact of potential barriers and facilitators on use of mental health apps.

Results: The survey included (n= 636) participants. The prevalence of use of mental health Apps was (n = 80, 12.6%), with only (n = 32, 40%) found them useful. Younger age, females, separated marital status, students, history of mental illness, taking psychiatric medications, attending psychiatric services, seeing a psychologist (offline and online), and chatting to psychiatric patients online were all associated with unadjusted increase in use of mental health Apps. However, the adjusted impact on use of mental health Apps was significant only for those using psychiatric medications (odds ratio "OR" = 0.1289, p = 0.0243), individuals who requested online psychology intervention (OR = 7.9866, p < 0.00001), individuals who believed in costliness of mental health Apps (OR = 2.9358, p = 0.00034) or difficulty using them (OR = 4.1875, p = 0.0002). Stigma and privacy concerns were not statistically impactful on use of mental health Apps.

Conclusion: Use of mental health Apps is very low among Saudi patients. Those who use mental health apps remain skeptical of their therapeutic values and report concerns in terms of difficulty to use them and their cost-effectiveness. Design of effective, readable, safe, and cheap mental health apps should be attempted by health educators and mental health professionals.

Keywords: Mental Health, Stigma, Mental Health Apps, Barriers, Privacy, Saudi Arabia.

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INTRODUCTION

Mobile apps with focus on mental health are increasingly available and easily accessible. Many studies showed that such apps were of positive impact on psychological wellbeing among a range of users across the globe.[1] Other health areas, such as obesity management, have made consistent strides in terms of promotion of mobile health apps.[2] Use of mobile mental health apps was particularly common among younger patients. Many apps were developed but only a portion was available for download, and their effect of mental health outcomes was not demonstrable through focused and well-designed trials.[3] Many researchers called for a purpose-designed mental health app that addresses unmet needs of mental health service users and, hence, more effective engagement would be expected.[4]

Research from developed countries indicated high levels of interest in use of mental health apps among psychiatric patients and general public alike.[5] Therefore, the need for promotion of

and design for effective mental health apps remains largely not matched. It is considered main theme for research that delivery of effective psycho-social treatment can be accomplished using mobile health apps. Hence, motivated by the current COVID-19 pandemic, a treatment gap for patients and caregivers can be met remotely.[6] However, concerns were raised as to the low-income countries' ability to utilize such apps given limited technology penetration, lack of affordability, and questionable acceptance of such apps among the general public. For example, use of smartphones is considerably lower in Asian countries compared to the United States. Only a third of Indian patients owned a mobile phone compared to 93% of their American counterparts.[7]

Current research volume into the use and effectiveness of mobile mental health apps is limited.[8] A recent survey of five-hundred college students showed that one fifth use mental health mobile apps.[1] It was found that such use of mental health apps was potentiated by higher levels of perceived stress that necessitates help-seeking behaviour. Moreover, history of attending mental health services was another motivation for use of mental health apps. Interestingly, there was no gender difference in use of such apps, and use was consistent across age groups, however, privacy was a substantial barrier against their use.[1] One previous USA-based survey,[5] included over 320 psychiatric patients who acknowledged that they use smartphones for sending emails and text messages. Younger group of patients were more inclined to use social media and texting apps. Mood and anxiety symptoms did not predict the frequency of mobile health app usage among the patients surveyed. There was clear acknowledgement of the negative connotation attached to mental illness by social media apps. However, health care, calendar, and texting apps were much more positive in terms of mental health support. Four fifths of patients were willing to use a smartphone app to keep an eye on their psychological wellbeing. However, the prevalence of mental health app use was 44% among the participating patients. The commonest apps used were those related to mindfulness and meditation. Concerns regarding the affordability of mental health apps in middle-income countries settings lead a team of Indian researchers to survey (n = 176) patients and carers.[6] Only a third of the sample owned a smartphone with extremely low utilization of any health app. Main barriers included lack of familiarity, high cost, and language barriers. Carers were worried of mobile health use by patients. Carers were willing for apps to carry routine tasks for patients.

Very little, if any, is known about use of such useful mobile mental health apps among the public in Saudi Arabia. The main aim of the current study was to identify rates of use of mobile mental health apps by the public health care users in Saudi Arabia and how their use is affected by stigma towards mental illness and other demographic factors and potential barriers (such as concerns regarding data protection).

SUBJECTS AND METHODS

Study design and setting

This was a questionnaire-based study that incorporated a random sample of attendees at family medicine clinics in Prince Mansour Military Hospital and Prince Sultan Military in Taif, Saudi Arabia.

Data collection

The questionnaire was divided into three sections. Section one consisted of details of demographic characteristics (gender, age, education level, marital status, medical and psychiatric history). Section two consisted of questions regarding the use of mental health app, its perceived cost and competence in use and concerns about data privacy. Section three consisted of stigma related questions on a Likert scale.

Participants

Inclusion criteria: Attendance at family medicine clinic, literacy, and age between 18 and 65.

Exclusion criteria: Not giving written consent and limited literacy.

Data analysis: Demographic and psychological assessment data were collected through a pre-designed questionnaire that was completed by participants after they gave written agreement to take part in the study. The entire dataset was fed into Microsoft Excel system. The statistical tests used were measures of diversity, measures of central tendency and statistical significance tests. We used box-plots for presentation of study findings. Data was kept confidential according to medical records guidelines in AFPCC Hospital. To examine the effect of background variables on rate of mental health apps use we modelled the data using multiple logistic regression modelling. Data was analysed using R statistical software.

Local Research and Ethics committee permission to conduct the research was obtained.

Table 1: The demographic characteristics of the study participants and their effect on usage of mental health Apps

Factor		Count (n)/ Mean (μ)	Percentage /SD	App Use	test	P value
Age		μ = 34.2	SD = 14.2	Yes (μ = 27.3) No (μ = 35.2)	t = 6.535	< 0.0001
Sex	**Females**	393	61.8%	66 (16.8%)	$\chi^2_{(1)}$ = 15.632	< 0.0001
	Males	243	38.2%	14 (5.8%)		
Marital Status	**Married**	340	53.5%	24 (7.1%)	$\chi^2_{(3)}$ = 26.842	< 0.0001
	Separated	25	3.9%	8 (32%)		
	Single	293	41.4%	48 (16.4%)		
	Widowed	8	1.3%	0 (0%)		
Employment	**Employee**	191	30.0%	23 (12%)	$\chi^2_{(5)}$ = 17.321	0.0039
	Freelancer	16	2.5%	1 (6.3%)		
	Military	67	10.5%	0 (0%)		
	Other	60	9.4%	5 (8.3%)		
	Student	185	29.1%	34 (18.4%)		
	Unemployed	117	18.4%	17 (14.5%)		

Nationality	**Saudi**	615	96.7%	78 (12.7%)	$\chi^2_{(1)} = 0.009$	0.9246
	Non-Saudi	21	3.3%	2 (9.5%)		
Education	**Uneducated**	11	1.7%	0 (0%)	$\chi^2_{(4)} = 6.639$	0.1562
	Primary	13	20.4%	0 (0%)		
	Intermediate	14	2.2%	0 (0%)		
	Secondary	103	16.2%	10.7%		
	University	495	77.8%	13.9%		
History of mental illness	**Yes**	51	8.0%	20 (39.2%)	$\chi^2_{(2)} = 53.742$	< 0.0001
	No	522	82.1%	43 (8.2%)		
	I don't know	63	9.9%	17 (27%)		
On psychiatric medications	**Yes**	31	4.9%	9 (29%)	$\chi^2_{(2)} = 9.302$	0.0096
	No	602	94.7%	70 (11.6%)		
	I don't know	3	0.5%	1 (33.3%)		
Attended psychiatric services	**Yes**	41	6.4%	16 (39%)	$\chi^2_{(2)} = 28.19$	< 0.0001
	No	592	93.1%	64 (10.8%)		
	I don't know	3	0.5%	0 (0%)		
Visited a psychologist	**Yes**	47	7.4%	20 (42.6%)	$\chi^2_{(2)} = 41.846$	< 0.0001
	No	585	92.0%	60 (10.3%)		
	I don't know	4	0.6%	0 (0%)		
Chatted online to patients	**Yes**	88	13.8%	32 (36.4%)	$\chi^2_{(2)} = 55.486$	< 0.0001
	No	536	84.3%	45 (8.4%)		
	I don't know	12	1.9%	3 (25%)		
Requested online psychology	**Yes**	80	12.6%	48 (60%)	$\chi^2_{(2)} = 187.23$	< 0.0001
	No	553	86.9%	32 (5.8%)		
	I don't know	3	0.5%	0 (0%)		

Table 2: Participants' use of mental health Apps

		Count (n)	Percentage (%)
Mental Health Apps are expensive	**Yes**	138	21.7%
	No	372	58.5%
	I don't know	126	19.8%
Mental Health Apps are difficult to use	**Yes**	99	15.6%
	No	444	69.8%
	I don't know	93	14.6%
Actual use of mental health Apps	**Yes**	80	12.6%
	No	538	84.6%
	I don't know	18	2.8%
Found Apps useful	**Yes**	32	40%
	No	35	43.8%
	I don't know	10	12.5%
Who to turn to for treatment of stress?	**Doctor**	17	2.7%
	Family member	229	36.0%
	Friend	211	33.2%
	Imam	138	21.7%
	Nobody	4	0.6%
	Other	15	2.4%
	Social media	22	3.5%

Table 3: Participants' barriers against use of mental health Apps

Concern item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Concern 1: Easy access to own data from others	64 (10.1%)	164 (25.8%)	186 (29.2%)	164 (25.8%)	58 (9.1%)
Concern 2: Privacy breach of personal data	42 (6.6%)	123 (19.3%)	163 (25.6%)	235 (36.4%)	73 (11.5%)
Concern 3: Sharing of private information with other groups	66 (10.4%)	119 (18.7%)	165 (25.9%)	206 (32.4%)	80 (12.6%)

Table 4: Details of stigmatizing attitudes towards mental illness and psychiatric patients held by study respondents

Concern item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Mental illness proves personality weakness	40 (6.3%)	57 (9.0%)	100 (15.7%)	227 (35.7%)	212 (33.3%)
Mental illness is not real illness	58 (9.1%)	97 (15.3%)	117 (18.4%)	207 (32.5%)	157 (24.7%)
Psychiatric patients are dangerous	47 (7.4%)	111 (17.5%)	187 (29.4%)	180 (28.3%)	111 (17.5%)
Avoid psychiatric patients to avoid contracting mental illness	33 (5.2%)	69 (10.8%)	112 (17.6%)	230 (36.2%)	192 (30.2%)
Most people are secretive about mental illness	160 (25.2%)	226 (35.5%)	140 (22.0%)	83 (13.1%)	27 (4.2%)
Most people will not employ a psychiatric patient	125 (19.7%)	190 (29.9%)	195 (30.7%)	85 (13.4%)	41 (6.4%)

Table 5: Impact of background factors on use of mental health Apps among the participating individuals

Factor	Odds Ratio	95% Confidence Interval of Odds Ratio	P value
Age	0.9729	0.9362 to 1.0111	0.1617258
Sex: Male	0.6242	0.2774 to 1.4048	0.2548359
Married: Unmarried	2.1407	0.9362 to 4.8949	0.0712817
Nationality: Saudi	1.0502	0.1842 to 5.9870	0.9559752
Educated: University+	1.0839	0.4342 to 2.7058	0.8629766
Psychiatric Illness	2.9363	0.8545 to 10.0904	0.0872071
Psychiatric Drugs	0.1289	0.0217 to 0.7662	0.0242699*
Psychiatrist Consultation	1.8687	0.6226 to 5.6091	0.2648735
Psychologist Consultation	3.2437	0.9491 to 11.0854	0.0605519
Online Chat Experience	1.6745	0.8067 to 3.4759	0.1665323
Psychology web Request	7.9866	3.9239 to 16.2559	< 0.00001***
Apps are costly	2.9358	1.4275 to 6.0379	0.0034180**
Apps are difficult to use	4.1875	1.9943 to 8.7925	0.0001544***
Stigma	0.9550	0.8858 to 1.0296	0.2300518
Privacy	0.9652	0.8631 to 1.0795	0.5352846

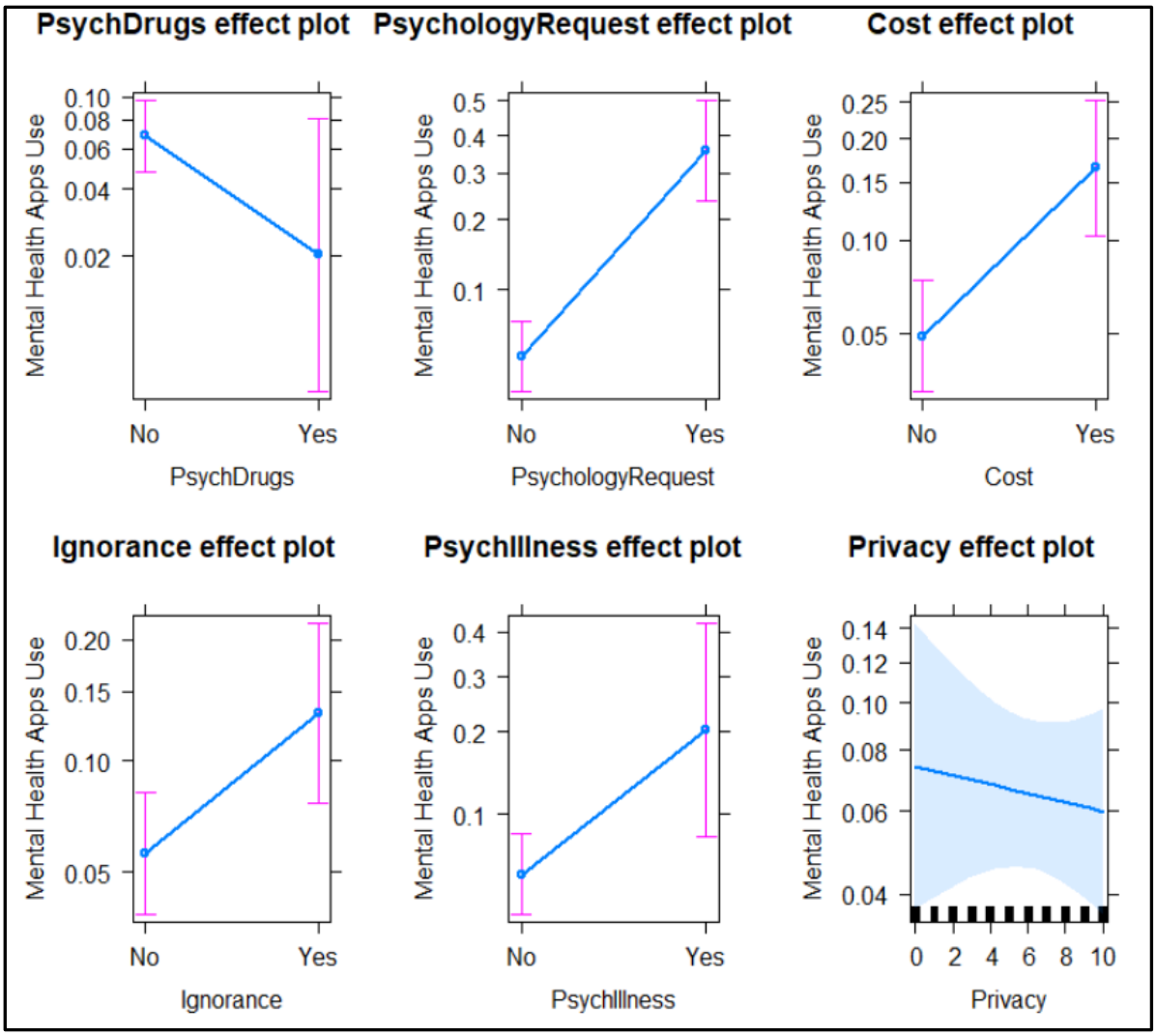

Figure 1: Adjusted effects of background factors on use of mental health apps among participating individuals

RESULTS

The survey included (n=636) respondents. Table (1) shows their demographic characteristics. The prevalence of use of mental health Apps among the surveyed individuals was (n = 80, 12.6%) only. The mean age among our participants was 34.2 years old (SD = 14.2 years), ranging between 17 and 90-year-old (the median age was 30 years old). Those who used mental health Apps were significantly younger than those who didn't (mean age was 27.3 years old in contrast to 35.2 years old). This difference was statistically significant at the unadjusted level (t = 6.535, p < 0.0001). Females were majority in our study (n = 393, 61.8%), with higher frequency of use for mental health apps (16.8%, compared to 5.8% among male participants). This female superiority was also statistically significant ($\chi2(1) = 15.632$, p < 0.0001). In terms of marital status, the most frequent class was married individuals (n = 340, 53.5%), however, separated individuals were using mental health Apps much more than others (32%), $\chi2(3) = 26.842$, p < 0.0001. Students were using mental

health Apps much more than other occupational categories (18.4%), followed by the unemployed (14.5%), and none of those affiliated to military used them ($\chi 2(5) = 17.321$, $p = 0.0039$). Although the shear majority of participants were Saudis (n = 615, 96.7%), nationality did not impact the rate of use of mental health Apps ($\chi 2(1) = 0.009$, $p = 0.9246$). University graduates were (n = 495, 77.8%) among the surveyed people, with 13.9% rate of use of mental health Apps which was not statistically significant compared with other educational categories ($\chi^2(4) = 6.639$, $p = 0.1562$). there were (n = 51, 8%) individuals with history of mental illness. Their use of mental health Apps was significantly higher than participants without history of mental illness (39.2% and 8.2% respectively), $\chi^2(2) = 53.742$, $p < 0.0001$. Also (n = 31, 4.9%) were on psychiatric medications compared to (n = 602, 94.7%) who were not. Use of mental health Apps by individuals taking psychiatric medications was 29%, and by those not on such medications was 11.6% ($\chi^2(2) = 9.302$, $p < 0.0001$). Attendees of psychiatric services were (n = 41, 6.4%) and 39% of them used mental health Apps (compared to 10.8% who were not attending psychiatric services), $\chi^2(2) = 28.19$, $p < 0.0001$. (n = 47, 7.4%) have seen a psychologist during last 12 months, and 42.6% of them used mental health Apps (only 10.3% of those not seeing a psychologist used mental health Apps), a statistically significant difference ($\chi^2(2) = 41.846$, $p < 0.0001$). Chatting online to fellow patients was reported by (n = 88, 13.8%), of whom 36.4% used mental health Apps (in contrast to 8.4% among those not engaging in online chat), another statistically significant difference ($\chi^2(2) = 55.486$, $p < 0.0001$). (n = 80, 12.6%) reported requesting online psychology consultation, of whom a staggering 60% used mental health Apps (compared to 5.8%) of those who did not request online consultation, $\chi^2(2) = 187.23$, $p < 0.0001$.

Table (2) shows the details of participants' use of mental health Apps and the concerns and basic attitudes towards their use. There were (n = 138, 21.7%) believed that mental health Apps were expensive, and (n = 99, 15.6%) believe them to be difficult to use. Although (n = 80, 12.6%) reported actual use of mental health Apps but only (n = 32, 40%) found them useful. When under stress, (n = 229, 36%) would turn to family member and (n = 211, 33.2%) to a friend, followed by (n = 138, 21.7%) who would consult an Imam.

Table (3) shows the prevalence of main privacy-related barriers against use of mental health Apps among the participants. (n = 228, 35.9%) agreed that others can easily access their personal data through mental health Apps, and (n = 185, 29.1%) were concerned about how their data may be shared with other social media groups if they used mental health Apps. Further (n = 165, 25.9%) were concerned of privacy breaches to their personal data. Table (4) gives a detailed account of stigmatizing attitudes held by participants towards mental illness and psychiatric patients. The most prevalent stigmatizing attitude was the secretive nature of mental illness (by n = 386, 60.7%) of participants, followed by how unemployable would be people with mental illness (by n = 315, 49.6%), whereas (n = 158, 24.9%) believed in dangerousness of psychiatric patients and (n = 155, 24.4%) were confident that mental illness was not real illness. (n = 102, 16%) believed that mental illness is contagious and (n = 97, 15.3%) noted that only weak personality gets mentally unwell.

As shown in Table 5 and Figure 1 the adjusted impact on use of mental health Apps was significant only for those using psychiatric medications (OR = 0.1289, p = 0.0243), individuals who requested online psychology intervention (OR = 7.9866, $p < 0.00001$), individuals who believed in costliness of mental health Apps (OR = 2.9358, p = 0.00034) or difficulty using them (OR = 4.1875, p = 0.0002). Stigma and privacy concerns were not statistically impactful on use of mental health Apps. Figure 1 shows that use of mental health apps was increased in those not taking psychiatric drugs, those who requested online psychology, and in those who believed in costliness of mental health apps. Clearly difficulty using mental health apps and getting diagnosed with mental illness also increased the odds of use of mental health apps. Privacy concerns did not significantly affect use of mental health apps.

DISCUSSION

The current investigation included a large sample of public, nearly six-hundred-and-forty respondents, who resided in Saudi Arabia. Our results showed that only 12.6% (i.e. one in eight) reported use of mental health apps. This falls badly below the one-in-five rate reported among American college students.[1] Clearly, this one eighth rate for use of mental health apps found by our team was not unexpected. Although Saudi Arabia is ranked among the top ten countries worldwide in terms of digital literacy and use of smartphones, there was considerable concern among researchers that smartphones were not used primarily for health-promoting purposes.[9] Worse, some studies estimated that a third of Saudi college students were overusing smartphones in a way that negatively affected their psychological well-being.[10, 11] Therefore, we may conclude that smartphones, although overused in Saudi Arabia, are used for purposes far from health-related reasons.

Only one in nineteen men in our sample used mental health apps. This was quite low indeed. One explanation could be how busy males in Saudi Arabia are with little or no spare time for checking on mental health apps. Worldwide, women were found to constitute majority among subscribers to anxiety-reducing mental health apps.[12] However, some surveys found young adolescent girls less enthusiastic about use of mental health apps despite avid use of web-related resources.[8]

We found that use of psychiatric medications was associated with lower odds of use of mental health apps. Patients with severe mental illness, that necessitates prescription of psychiatric medications, may not use mental health apps that often as they were shown to require face-to-face interventions.[13] Health apps use was extremely low among patients with severe mental illness and their carers.[6] Clearly, use of mental health apps during phases of substantial behavioural disturbance may not be feasible, acceptable, or even efficacious.[14]

Nearly forty per cent of psychiatric patients in our sample reported use of mental health apps. 46% of psychiatric patients surveyed by Atallah et al (2018) reported using 'some' health application in their mobile phones. Two thirds of psychiatric patients were 'interested' in downloading applications that would monitor their mood and anxiety symptoms.[15] Notably, out of the one-in-eight who used mobile phone apps, only forty per cent found them helpful. This opens the door for healthcare professionals to design creative and useful mental health apps. We did not examine the mental health apps used by participants in detail ourselves, but further research should identify useful and reliable mental health apps. For a mental health app to be deemed 'ethically useful'

researchers expected it to be consistent, helpful for patients with wide spectrum of mental health difficulties, readily accessible and affordable and empowers patient autonomy.[16]

We found students to be using mental health apps more frequently than other sections of our sample. This finding seems consistent across past similar surveys. Teo factors were identified among students that would improve their intention to use mental health apps, namely: higher performance expectancy and the effect of social influence on students.[17] Indeed, students prefer an app with creative content, that provides good user experience, cantered on the app user, and provides reasonable peer support.[18] These factors could well apply to students in Saudi Arabia and further development of mental health apps should take them onboard. Awareness of mental health apps is a substantial barrier against their use by students,[19] particularly in the Middle East.[20] Efforts should be made by mental healthcare professionals to encourage university administration to promote use of mental health apps.

Expectedly mental health apps were used more by existing psychiatric patients, particularly those using online platforms to access psychology services or chat to other fellow patients. It is established that mental health apps are of considerable benefit to patients at the short-term, but their long-term effect is yet to be examined.[21] However, although they offer a sense of 'connectedness', technical issues and limited personalization of mental health apps are main barriers against their use by individuals with mental illness.[1] However, use of mental health apps by psychiatric patients and their effects remains an understudied area in mental health research, particularly in the Middle East.[22]

Costliness of mental health apps and inability to use them affected some one fifth of our participants. However, what was a unique finding is the positive association between perception of cost and increased rate of use of mental health apps.This seems to be counterintuitive. How can people who find apps costly engage more in their use? This can be explained by the fact that as individuals use mental health apps, they find them difficult to use or they feel their cost more so than individuals who did not use them. Many researchers advised ways to reduce mental health apps costs through, for instance, re-imbursement schemes [23] that are quite applicable in a country like Saud Arabia.

Although privacy concerns and stigmatizing attitudes did not significantly affect mental health apps use, they were identified as considerable barrier in a series of large-scale surveys.[24] One study found that 39% of mental health apps recommended in colleges for college students had no privacy policy and nearly half of mental health apps with privacy policy share users' data with third parties.[25] Majority of privacy policies for mental health apps were found to be complicated, confusing, and unreadable.[26] Apps in Arabic language received little attention in terms of readability or presence of privacy policy. Future research should address this enormous gap.

In agreement with our results, recent surveys found that stigma was not impactful, negatively or positively, on use of mental health apps.[1] Despite though stigmatizing attitudes were rife among users of mental health apps.[27] Three out of every fife among our respondents believed that mental illness should be kept secret! Many families who has patients with severe mental illness felt ashamed and were quite secretive about it.[28]

STRENGTHS AND LIMITATIONS OF THE STUDY

The large sample size and maintain a focus on primary healthcare attendees are two main strengths of the current investigation. However, the cross-sectional design remains a significant limitation as it could not eliminate reverse causality as in the case of association between increased use of mental health apps and believe in costliness of them. Future research design needs to be longitudinal and qualitativein nature. Enumeration of specific mental health apps that are provided in Arabic should be attempted. Privacy policies should also be scrutinized. It is also preferable that trials should be conducted to evaluate the efficacy of mental health apps in maintaining recovery from serious mental illness.

CONCLUSION

Use of mental health Apps is very low among Saudi patients. Those who use mental health apps remain sceptical of their therapeutic values and report concerns in terms of difficulty to use them and their cost-effectiveness. Design of effective, readable, safe, and cheap mental health apps should be attempted by health educators and mental health professionals.

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