

Talkit: Localized, Anonymous Depression Caretaker

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ABSTRACT

In recent years, the increase in mental disorders among university students has raised concerns about the effects that these disorders have on an individual's life and the community as a whole. Depression, being the most prevalent mental illness, is being tackled via various methodologies. However, in a developing country like Pakistan, the stigmatization of mental health, low mental health literacy, distrust of professional therapists and lack of data privacy laws have resulted in barriers, disallowing individuals from catering for their mental well-being. In this work, we introduce an anonymous, focused and moderated online safe space along with self-therapy techniques to university students of Pakistan as a mobile application to encourage them to open up about mental health. With Patient Health Questionnaire used as the mental health indicator, the System Usability Scale and acceptability survey proved our application to be an acceptable option for the Pakistani context.

Keywords: *Mental Health, Depression, mHealth, Therapy.*

1. INTRODUCTION

The World Health Organization (WHO) [39] defines depression as a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration. At its worst, depression could lead to suicide [31]. In addition, depression can be long lasting or recurrent, thus impairing an individual's ability to function at work or school or to cope with daily life. University students must adapt to various psychosocial changes besides coping with the academic and social demands in preparing for their professional careers [36]. The high expectation of academic achievement has created an exasperating environment, which if left untreated can be hazardous to their physical and mental health. Depression is one of the most common health problems for university students [21]. The prevalence of depression seems to be affected by factors such as population studied, gender, age, and place of study [33]. Although concern has been increasing about depression in specific groups such as adolescents or the elderly [32], the problem of university students' depression has received relatively little attention, despite evidence of a steady rise in the number of depressed students [7].

The prevalence of this issue is also visible in a developing country like Pakistan. More than 20 million

Pakistanis, 10% of the country's population, suffer from some form of mental disorder [24]. In addition, the social norms and societal pressures tend to have a negative psychological effect, notably on women, resulting in almost half of the female population experiencing anxiety or depression [26]. Furthermore, educational institutions such as Baqai University and King Edward University are reporting deteriorating mental health among their students [12].

The cost of affective disorders can be particularly high in young people because they represent the future of any community [11]. Depression has been linked to poorer academic achievements [15], relationship instability [38], and suicidal attempts. Although arguably university students are more likely to be advantaged in socio-economic terms which are considered protective against depression [20], there are many factors that might increase students' vulnerability to depression. These factors include changes in lifestyle resulting in sleep and eating disturbances, family relationship alterations, academic woes, and post-graduation life stress [23].

Several treatments for depression exist, with the foremost being antidepressants. Besides the use of medicines, experts recommend that friends and family should participate in the treatment of patients as it has been observed that individuals tend to be more comfortable in sharing with people from their community rather than a therapist [30]. Non-drug treatments such as

exercises, psychotherapy, counseling [25], and mindfulness-based interventions [34] are also being used to treat depression. Furthermore, technology, such as mobile systems and gamification, which is the use of game dynamics and mechanics in computer applications to change user's behavior, has also been used to support mental health [4].

However, depression treatments in Pakistan are facing the hurdle of low mental health literacy rates. Mental health literacy is defined as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention" [16]. The dearth of awareness can be associated with the way mental disorders are stigmatized in society, often linking the illness with an evil eye, black magic or possession by demons, with prayers and visits to shrines being encouraged as the solution [24]. Furthermore, lack of faith in psychological treatment, religious fatalism, social defame, personal shame, the bad reputation of mental health practitioners, and fear of treatment [14] are barriers that hinder mental health awareness. The problem is further exacerbated by the fact that Pakistan has one of the lowest psychiatrist-to-person ratios in the world [24]. Moreover, people who are receiving active therapy tend to shy away from encouraging others towards seeking professional help, as in times of arguments, turmoil and abuse, the stigmas associated with mental illness are routinely used to discredit the individual [17].

The stigmas make mHealth for treatment a viable option. Students can become the primary beneficiaries of mHealth, owing to the private nature of mobile phones. Moreover, students are considered above par smartphone users when it comes to technological literacy, with educational institutions claiming over 90% of their students are smartphones owners [1]. Due to this widespread usage coupled with deteriorating mental health, mHealth for students is being increasingly pushed for the purposes of creating an online safe space [40]. In Pakistan however, mHealth is plagued with privacy concerns. Despite passing a mental health ordinance in 2001, only two out of the five provinces have a mental health act in place, the exercise of which is also dubious [35]. Furthermore, the implementation of data protection laws is yet to be observed [18]. Prior, data of people were at risk, as intuitions were not liable legally to treat the data solely for the purposes it was obtained for. With the stereotypes and stigmas attached to mental health, the lack of privacy further derails the technologically focused efforts towards mental health awareness.

1.1. RELATED WORK

Numerous studies have been carried out for depression and its treatment which provided invaluable

insights about the causes and existing solutions. As students were our target audience, therefore we initially investigated the research that has been done related to students' mental health issues followed by a literature review related to depression and therapy.

1.1.1. Identifying Depressed Students

Gauging depression in university students is a tedious task, as the distrust in the administration often prevents students from availing and responding to on-campus facilities that may help them in facing their mental issues. One attempt was made at Atlantic State University, where 215 students were surveyed [36]. It was found that 50.7% of the students were facing depressive symptoms despite the university's efforts to reduce depression. Students declared numerous reasons for their lack of availing professional help; mistrust of mental health services and confidentiality concerns were two of the main reasons. Some students also claimed that the social stigma surrounding mental health treatment is a major deterrent. However, students did prefer talking to their peers rather than a professional stranger.

1.1.2. Role of Privacy and Anonymity

The previous study employed anonymity in its surveys. Anonymity plays a vital role in screening of mental issues, and the tests that guarantee anonymity achieve better results. According to studies conducted by [37], United States soldiers who had been deployed overseas, reported more honestly about their depression, post-traumatic stress disorder (PTSD), and suicidal inclination if their identities were kept secret. A similar study was also carried out on the United Kingdom (UK) military personnel [9], which also showed the same trend of more depression reporting and outspoken reviews when their identities were undisclosed. Moreover, a study [19] based on focus group data also emphasizes that anonymity helps people reporting sensitive psychological states when they are dealing with mental health issues. Anonymity not only reduces the social stigma among individuals while sharing mental health problems but also gives them the feeling of not being judged.

1.1.3. Self-Therapy Techniques

Humor has been used successfully in the group treatment of clients with depression [28]. It has been referred to as an example of the perceptual process of bisociation. When humor is applied in counseling, the perception of a client's report of their life experience consists of one frame of reference. The counselor offers an alternate frame, which is designed to create a bisociation that is intended to be of therapeutic value, offering to the client an assuaging perspective of a painful experience.

Music therapy has been used in a range of ways to treat depression. The putative mechanism of action of receptive music therapy is that different types of a musical stimulus directly induce physical and emotional changes. It has been suggested that music therapy can help reduce stress, soothe pain, and energize the body [6]. Furthermore, music is linked with improvements in mood that go beyond those found with standard care alone.

Art therapy is another alternative treatment. It provides tools for self-exploration with increasing self-awareness, awareness of what affects the individual and of response patterns occurring in everyday life. Research shows that clients' capacity for creativity, and their ability to transfer learning from therapy to their daily lives, have healing effects and can help develop new coping strategies towards recovery [8].

1.1.4. Community-based Therapy

Family, friends, and community play an important role in helping people dealing with depression and other mental health problems. Some studies claim that people more often prefer support or help from informal sources such as family or friends rather than professional help [13]. The paper [19] showed that peer support interventions for depression result in greater improvement in depression symptoms than usual care and may have similar efficacy to group cognitive-behavioral therapy.

Another study [10] explored that people who used online support groups for depression therapy showed a significantly greater reduction in depressive symptoms. Most of these studies show that community does play an important role but there is little to no research on the closeness of the community. Reviews on already available community-based help platforms such as "TalkLife", suggest that focused communities tend to be more helpful compared to open ones. This is why many people prefer private social media groups such as Facebook to dedicated platforms like "TalkLife".

1.1.5 mHealth as a Therapeutic Tool

mHealth applications are available that people can use for therapy. However, their analysis reveals several problems within the platforms that need to be addressed. One of the popular applications is "7Cups", where people can find a listener to share their problems. However, the lack of localization makes finding a listener who relates to the seeker's context difficult [5]. "TalkLife" is another anonymous sharing platform, however, the lack of focused groups has resulted in an imbalance, disturbing the entire experience, as evident from a review "there's so much sadness on "TalkLife" that even the messages that

do lend support seem overshadowed by the general negative vibe on this application" [2]. Furthermore, people also seek support via games, movies, or social media to ease their sudden anxiety or depression. Applications like 'Mindfulness' and 'Sanvello' provide meditation techniques and relaxation tips, however, they charge a premium for their services.

1.2, Our Contribution

This study gauges the acceptability of a localized anonymous online safe space in the form of a mobile application "Talkit", based on literature review and user research, to provide a depression caretaker for students.

1.3. Paper Structure

Section 2 explains the methodology and the user research findings, followed by results and discussions in sections 3 and 4, respectively. Section 5 concludes the paper with section 6 containing the references.

2. METHODOLOGY

2.1. User Research and Findings

User research was carried out to identify the problems related to our area of interest. It spanned across two methods, anonymous surveys, and interviews. Surveys are an inexpensive means of gathering large sets of information. Interviews give in-depth information related to the research question, thus allowed us to build a relationship with users and gave users the ability to share their experiences. However, due to the sensitive nature of the topic, they were limited in number.

We chose students at Lahore University of Management Sciences (LUMS) as our target audience. A pool of questions was generated through the literature review and then two surveys were distributed followed by interviews. The first survey (n=91) was used to gauge the prevalence of depression in LUMS and the second (n=30) focused on students' views on existing solutions. Interviews (n=5) were semi-structured and dwelled deeper into the various aspects of depression. Everyone had their own interpretation and explanation of depression. For some it was "sadness without reason,

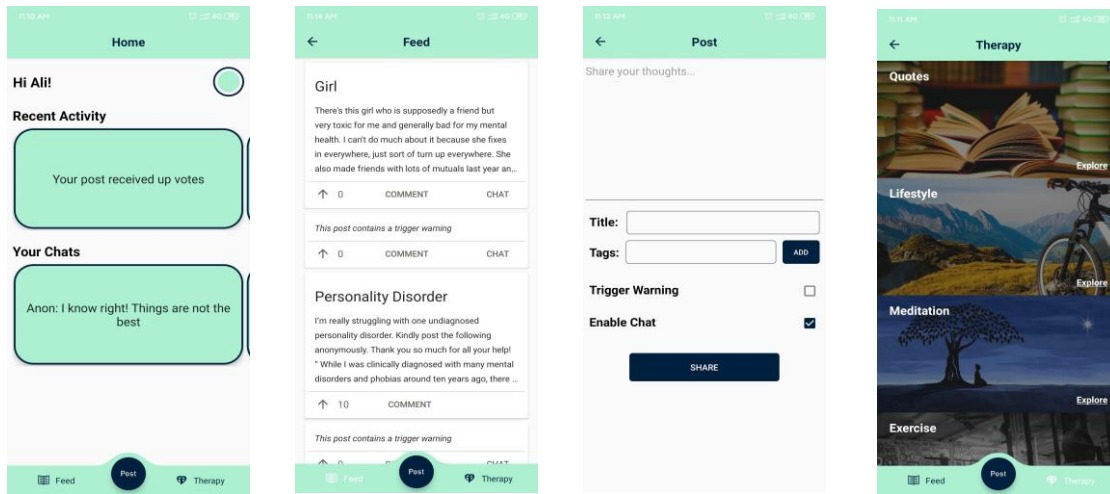


Figure 1. Screenshots of talkit showing main pages

even at happy moments," (Interview 1) whereas one described it as "a ghost that is always there, sometimes it comes forward, at others it is at the back of my mind" (Interview 2). Negativity and sadness were also ways depression was described, "when something bad happens in life, the feeling that comes with it is depression" (Interview 4) and "when I feel like dying" (Interview 3). The subjectivity of depression did not stop here. Some claimed that negativity and sadness lead to depression and for others, the latter lead to the former. Moreover, the duration and frequency varied from person to person, but a few trends were visible. For some, it was a constant state of mind while for others it was a monthly event. However, almost every user stated that depression was not a properly addressed topic among students.

Our results conformed with the literature review as the various reasons identified are prevalent in our community as well. The stress of studies, negative thoughts, failures, and family issues were some of the prevalent causes. Interviews further revealed that old memories and events, such as the death of a loved one or a mishap in childhood, scar the personality of an individual for life, and this repeatedly pulls the person back into depression. One interviewee claimed, "what happened when I was 8 years old, shaped my personality, and every day, it's my struggle living with that personality, overcoming the sadness that follows from it" (Interview 1). On the other hand, one claimed "loneliness leads me to depression, and that usually happens when I am homesick" (Interview 5). At times, not being able to live your life on your terms also leads to depression, as a person feels their existence has been trapped in a cage, "I usually get depressed because I am being forced to do something that I don't want to do and I am not allowed to do what I want to do in life" (Interview 2). Lack of family

support was a common event as only half of the interviewees claimed that their families are aware of their situation. The worsening of depression was also investigated which turned out to be directly linked with the inability to share and the unavailability of a person to share with. A few causes that were not in the majority but are of our attention are cultural shock, harassment, and the competition in classes, for instance for class participation points.

Our user research revealed that a stark majority of the students simply isolate themselves when they are depressed. They lock themselves up until the depression tones down, distracting themselves using social media, movies, music and so on. Several people opted to talk to family, but stigmatization is a concern. Considering an interview, "my mother is very supportive, and I started therapy sessions, but my extended family started talking ill of it, so I quit in the middle. I now think I should not have left the sessions, but I cannot live with people talking ill about me" (Interview 1). Individuals tend to be supportive of professional help, "talking to a professional is better than isolation" (Interview 5), but the stigmas that are prevalent in our society, force students to avoid taking this path. Some students preferred talking to friends however, toxic social circle and fair-weather friends are deterrents. Many students also pointed out that it is common that a student gets laughed upon because of sharing depression problems with parents or friends. According to a participant "The students feel that it is a better option to die with depression than sharing the problem with parents" (Survey 2). A few people utilized online groups. Such platforms tend to be anonymous by nature, and hence we received mixed responses. They were claimed to be good when one needs to vent, but for long-lasting friendships, anonymity proved to be a

hindrance. Moreover, 80% of the users identified that the diverse audience of these platforms leads to cultural differences and communication problems. 85% of the users suggested that an improvement in these platforms would be limiting the diversity to university or cultural level. They implied that a platform with the assurance that the users are from their own university, while maintaining anonymity, would enable them to share their problems and seek help more effectively, as a participant stated “I have this satisfaction that the reader or anyone commenting on my post is someone from my surroundings and can relate better to what I am saying” (Survey 2). The major concerns which the participants pointed out were the abuse of anonymity to spam or bully. To lighten the conversation and to make interviewees comfortable, a few unconventional questions were asked as well such as the favorite color of an individual. Half of the interviewees acknowledged that their color is reflective of their personality, and their favorite color “refreshes” (Interview 1) them. A few acknowledged that physical activities and music are a great distraction.

People tend to prefer sharing and seek companionship, and this personal connection proves to be beneficial at times of need. However, the primary need that every interviewee had was independence. Everything else, whether it be a friend or therapy or medicines, is believed to be a crutch by the ones facing depression. This feeling is further bolstered by the stigmas in our society. These individuals want something that they can control, something for which they do not have to ask or go to someone or somewhere. People are looking for ways to distract themselves, that does not end up being an addiction or a source of sadness for them. This fact was prevalent in all, irrespective of the causes of depression and the student class they belong to. The interview and surveys, both fall in tandem at this finding.

2.2. Design and Testing of “Talkit”

Several approaches to the application were discussed and the final design (figure 1) was chosen after low-fidelity and high-fidelity user testing. The design comprised of a traditional sign-in via Facebook or Google to authenticate the user and deter spam. Anonymous posting and chatting with other users were included with the ability to add tags, title, and trigger warning. Furthermore, the ability to toggle anonymity in-chat was added. Rating ability was included to rate the help received from a person and upvotes and comments were included as well. Moreover, a circular button was added at home screen which mimicked a fidget spinner, vibrating and changing color schemes on tap. A novel addition were the various self-therapy techniques, including but not limited to exercises, meditation tips, music, and lifestyle tips. Mental health experts’ contacts

were also included. All these features and techniques followed the mental models that users had built through the regular use of various social media applications to keep the learning curve low.

The application was tested for usability. The goal of usability testing is to analyze the extent of the application’s functionality, identify problems with the application including the interface design and to gauge the ease of use of our application [22]. Volunteers(n=23, the limited number associated with the sensitive nature of the topic) were gathered in the usability testing laboratory where they were handed a pre-test questionnaire, which focused on the user’s proficiency with mobile phones, and Patient Health Questionnaire (PHQ-9), which helped us gauge depression levels. They were also asked to sign a consent form as their actions and emotions were being recorded and observed. Next, users were handed an Android device and a task book, which contained the actions(n=7) that they had to perform. After the tasks had been completed, a post-test questionnaire was handed to the user which gathered feedback regarding the application.

3. RESULTS

3.1. Smartphone Proficiency

Almost every participant rated themselves above average when asked about their proficiency with smartphones, as 90% of them claimed that they have been using a smartphone for more than four years. Only 2 of them termed iPhone as their primary smartphone; the others claimed to be Android users.

3.2. Depression in students

The PHQ-9 scores are grouped as follows:

- a) 0-4: No depression
- b) 5-9: Mild depression
- c) 10-14: Moderate depression
- d) 15-19: Moderately severe depression
- e) 20-27: Severe depression

Out of these 22 users who performed the testing, 4 claimed no depression, 7 reported mild depression, 8 claimed moderately to moderately severe depression and 3 claimed severe depression (Figure 2).

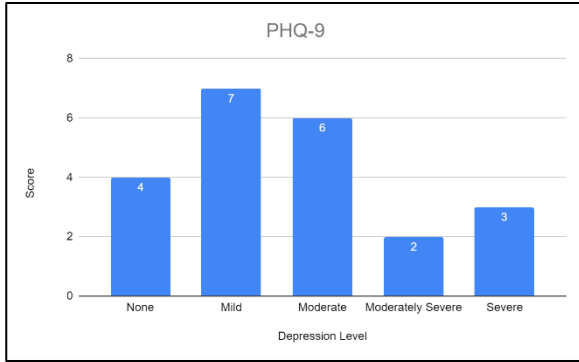


Figure 2 PHQ-9 Scores

3.3. System Usability Score (SUS)

We computed the SUS score for all the users using the post-test questionnaire. The average SUS score was 75.11, with 30 being the minimum and 90 being the maximum.

3.4. Emotional Response

The observation was utilized to gauge the emotional response of users. Any error that occurred while performing any of the tasks often resulted in a frown or a state of confusion among the users, whereas, users were often surprised or amused when they were asked to look for the circular button that mimics the fidget spinner. The application did not generate any extreme emotion.

4. DISCUSSION

The participants rated themselves highly proficient with mobile phones as most of them have been a smartphone user for more than four years, hence no issues were faced by any user in terms of the operation of the testing device. According to PHQ-9, one in every four students at LUMS is suffering from moderately severe depression or higher. Surprisingly, this 25% rate is not far off from major schools worldwide. Ivy league schools report that 35% of students suffer from depression [27], whereas in the UK colleges, the depression rate is 20% [29]. Hence our random selection of participants resulted in a group that is representative of the LUMS student body.

When it comes to learnability, our application had a low learning curve as the participants that tested our prototypes were able to complete the tasks without much effort. In the post-test questionnaire, participants highly rated the usability and ease of use of the application with several opting to use it again. This is further backed by SUS scores. According to [3], an SUS score of 75 represents an above-average score. In terms of usability, our application will lie in the category of “Good” as it

scored 75.11. Further, with the application utilizing cloud technologies for the backend, the real-time responses and updates provide a seamless experience. Thus, we have been successful in developing an acceptable application.

The effectiveness of our application to cater to depression was measured via the feedback received from participants after the test. Most of the participants claimed it to be a companion to their professional and medical help. For those who want to share, the posting and chatting aspect was an attraction, “I think I won’t have to wait for anyone to get free and listen to me, I can just type it out.” (User 3). At the same time, participants who tend to isolate themselves found distractions in the various self-therapy techniques that are available, “this certainly will help me not feel alone when I am depressed” (User 10). With access to application being exclusively for university students, participants claimed to be more confident in seeking community help as the contextual barriers are greatly lessened and anonymity created a safe space that protected them from stigmatization. Furthermore, the dynamic nature of anonymity in chats was appreciated by the participants as this gave them the control of their interaction, a stark deviation from the currently available applications. The fidget button, which is a unique addition in our application, resulted in smiles and delights, “this is so cute” (User 8), with participants spending time just to explore all the colors that change when the button is pressed. The participants were pleased by the idea of the application, “I will use it every other day for sure if not every day” (User 20) and several requested it to be released as soon as possible, highlighting the dearth of free of cost mHealth applications with students as the primary users. It is to be noted that the long-term effects in improving the mental health of students via “Talkit” are yet to be determined as the testing was conducted on test devices, and have not been rolled out to the students.

5. CONCLUSION

Research has shown that depression is rampant among university students and most are reluctant to seek professional help, primarily due to the stigmas around it, opting either to isolate themselves or ask peers for help. Available online and mHealth technologies are unable to meet the demands of Pakistani students owing to the contextual gaps and general unawareness. “Talkit” has tried filling the gap between professional help and self-help by providing students a depression caretaker that is localized, anonymous, and incorporates self-therapy techniques, and can be termed successful based on the user testing carried out. Further research can be done to identify long term effects of “Talkit”.

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