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Exploring perceptions of psychology students in Delhi-NCR Region towards using mental health apps to promote resilience: a qualitative study

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Abstract

Background Mental health apps (MHapps) have the potential to become an essential constituent for addressing mental health disparities and influencing the psychological outcomes of students in India. Though lauded as a practical approach to preventing various mental health issues, there are concerns that developing and utilizing MHapps standardized on Western populations produce ineffective results for the natives of Asian countries such as India due to a wide range of cultural differences. This research was conducted on psychology students living in the Delhi-NCR region of the Indian subcontinent. The study explored psychology students' perceptions, needs, and preferences regarding mental health apps that promote resilience, identified barriers and facilitators for developing effective mental health apps, and explored the cultural relevance of the development of MHapps in India.

Methods This was an exploratory study utilizing focus group discussions among psychology students. Psychology students were sampled using snowball sampling from Delhi-NCR region colleges to participate in FGDs. We conducted six focus groups, which included a representation of 30 psychology students from full-time UG/PG courses. The study used a reflexive thematic analysis framework using the six-step Braun and Clarke process to develop themes.

Results Psychology students valued MHapps for their easy accessibility, 24*7 functionality, affordable costs, highly engaging features, and the option of being anonymous. However, students preferred the apps based on established psychological frameworks with strong empirical evidence and the availability of remote mental health professionals with relevant qualifications and training. The main barriers to using MHapps identified by students included difficulties in differentiating between real and fake MHapps, lack of progress tracking of the users due to minimal human interactions, and ethical and data privacy concerns. Students also emphasized the cultural relevance of MHapps. The interpretation of our findings indicates that students demanded transparency regarding the authenticity of MHapps.

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Conclusion The findings of this exploratory investigation offer a better understanding of how college students perceive the usage of MHapps to improve resilience. This study highlights that further research should explore the specific needs and preferences of university students for developing and implementing effective MHapps for different contexts.

Keywords Mental health apps, MHapps, University students, Reflexive thematic analysis, FGDs, Resilience, Progress tracking, Engaging features

Background

The estimated youth population in India, i.e., those aged between 15 and 29 years, is approximately 808 million, or 66% of the total Indian population [1]. The number of university students in India is approximately 40 million, according to the data reported by the All India Survey on Higher Education (AISHE) 20–21 [2]. In India, one in seven individuals aged 15 to 24 reported feeling depressed or lacking motivation to do things [3]. Over the last five years, 33 students took their own lives at IITs. Observing the spate of student suicides over the past few months, the Indian Institute of Technology (IIT) Council called for a “proactive” approach, which will include several steps, such as increasing psychological counseling services and reducing pressure. [4]. However, the epidemiological data emphasizes the students studying in a wide range of courses; hence, it lags in highlighting how the impact of mental health issues might vary across students enrolled in particular degree courses. Psychology students deal with many challenges that are not given appropriate attention. According to [5], adjusting to environmental changes, living away from home for the first time, and managing academic stress are significant difficulties psychology students in universities face.

Students of psychology, in particular are prone to experience higher levels of anxiety, depression, and suicidal ideation [6]. Additionally, for many students the content taught in psychology courses exacerbates pre-existing symptoms and induces concerns about treatments, as some of them report previous mental health issues or mental health problems in family members as motivators for studying psychology [7]. Various emotional and psychological problems encountered by students include but are not limited to relationship difficulties, fear of failure, managing transitions, bereavements and parental separations, loneliness, homesickness, anxieties about aspects of the study, including exams and presentations, uncertainties about the future and unclear thought processes. [8].

In the Indian context, students have to navigate through challenges such as higher aspirations, parental expectations, peer pressure, transforming social relations, struggle for a healthy self-identity formation, experimenting with novel ideas, and interacting with new people [9]. Thus, students are exposed to long-term adversities, such as academic stressors and environmental pressures [10].

A critical factor in adapting to the university environment is resilience. [11]. According to research, resilience improves academic performance, lowers the risk of psychological distress, helps handle academic demands, and offers effective coping mechanisms when faced with academic pressures. [12, 13]. Stressors that students encounter have the potential to be detrimental to their mental health, worsen psychological distress, and lead to further adjustment issues if they lack resilience. [14, 15]

In the past, *resilience* was defined as the protective factor that enables a person to handle pressure. It was thought to distinguish between those who adjust to their environment and others who submit to pressure. [16]. However, the term resilience gradually started to mean much more than merely a protective factor. Nowadays, resilience is considered a process through which individuals overcome the adversities they experience [17]. More recently, *resilience* has been defined as the role of mental processes and behaviour in promoting personal assets and protecting an individual from the potential negative effects of stressors. [16]. Resiliency is a core transferrable skill. Overall, research indicates that resilience in the academic setting is favourably correlated with improved mental health and a smooth transition to college life. [11, 18, 19]

Therefore, intervention to enhance resilience among students can help them to have better mental health outcomes. However, according to an analysis, India has just 0.75 psychiatrists for every 100,00 patients despite being the world’s most populous country [20]. This implies that there is a significant gap in India generally between the prevalence of mental health issues and availability of mental health professionals (MHPs). However, it is not practically feasible to increase the workforce of MHPs in proportion to the requirements of the Indian population instantly.

In this unprecedented era characterized by rapid technological evolution, accessing health information through the internet has become incredibly convenient and accessible with handheld and portable electronic devices. [21] With digital technologies, accessibility to evidence-based interventions can be improved [22]. Furthermore, community-based programs are part of the WHO’s Mental Health Action Plan for 2013–2020, which pushes for comprehensive and inclusive mental health and social care. The role that mental health apps

(MHapps) can play in improving university students' mental health is recognized globally. However, there are not enough studies conducted in Indian settings to support their potential to prevent mental health concerns, and gathering and synthesizing the relevant data is necessary to develop preventative mental health interventions. Most research studies exist outside of the Indian context and are based on geriatric, clinical, and young adult population [23]. Moreover, many MHapps have not been explicitly developed for university psychology students. Most of psychology students are likely to and do become mental health professionals. However, no research to date has explored psychology students' unique needs and preferences of for developing mental health apps to enhance resilience in the Indian context. This reflects a general paucity of knowledge in the extant literature. Therefore, after taking into account their needs and preferences in Indian context resilience based MHapps can be designed to assist psychology students navigate through challenging times. Experts recommended including students as early in the app development process as possible in order to make MHapp for them [24]. This study addressed the research question—'What are the perceptions of psychology students of the Delhi-NCR region regarding the use of MHapps to promote resilience?'. Due to the scarcity of research on preventative mental health solutions available for Indian university students, the present research explored the perceptions of the university students enrolled in UG/PG psychology courses in the Delhi-NCR region in the Indian subcontinent regarding MHapps usage to enhance resilience, their design, and how these could be further harnessed. Furthermore, the study found shortcomings and barriers that hindered the growth of MHapps use and activity. The paper draws out features and facilitators for making MHapps more engaging for students and how culturally sensitive MHapps impact the Indian students. The study's findings will add to the body of knowledge by offering insightful information about the requirements and preferences of psychology students in Indian universities. The study aims to fulfill four objectives: (i) To identify psychology students' perceptions, needs and preferences to develop MHapps to promote resilience. (ii) To identify the barriers and facilitators related to MHapps development. (iii) To explore the relevance of culture in designing MHapps in the Indian context. (iv) To identify the features which can enhance the effectiveness of MHapps.

Methods

Research design

In order to explore and provide insights into the perceptions and needs of psychology students for the design of MHapps to enhance resilience, we employed Reflexive Thematic Analysis (RTA). According to [25], RTA is

considered an experiential analysis that is inductively oriented and predominantly based on data rather than existing theories and concepts. Moreover, RTA permits researcher triangulation. Qualitative data was collected by conducting focus group discussions with psychology students in central or private universities in the Delhi-NCR region. FGDs effectively gather comprehensive qualitative data and permit the exploration of collective perceptions, attitudes behaviors and experiences [26]. Furthermore, FGDs can highlight inconsistencies within and between groups [27]. We followed the CASP Qualitative Checklist's items [28] and the Standards for Reporting Qualitative Research (SRQR) [29] for reporting the study.

Researcher characteristics

The research team comprised one Ph.D. student (SC, M.A. in Psychology). It was supervised by SS, an Assistant Professor, and an associate researcher, who also provided input and feedback as a senior researcher. In order to get feedback and validate the findings, we presented the study analysis and results at a conference that specialists and university students attended. We have considered and recognized the influence of researchers in the data-gathering and analysis phases of the study process.

Study recruitment and population

The snowball sampling technique was used to identify individuals for the focus groups. The participants included in the FGDs were: (1) students enrolled in full-time undergraduate or postgraduate psychology courses (aged 18–25); (2) English-speaking individuals; (3) Individuals without serious mental health difficulties; and (4) students enrolled in universities in the Delhi-NCR region of the Indian subcontinent. (5) Students who have prior experience of using MHapps. Everyone who satisfied the inclusion criteria, expressed interest in participating in the study, and provided their consent was included.

As a result of this process, a sample of 30 individuals was obtained. The participants, 15(50%) males, and 15(50%) females were aged between 18 and 25 years ($M=20.7$, $SD=2.2$). The majority, 23 (76.7%), were UG students, and the remaining 7(23.3%) were enrolled in PG courses. Regarding their university affiliations, 18(60%) students were from Central/ State universities, and 12(40%) were from private universities. Table 1 summarises the participant attributes. Each eligible participant was required to complete a survey, providing their sociodemographic data and a self-declaration confirming they were not undergoing mental health treatment or medication, ensuring the accuracy and reliability of the data collected.

Table 1 Attributes of participants split by focus group

Participants characteristics	Group 1 (n=5) N (%)	Group 2 (n=5) N (%)	Group 3 (n=5) N (%)	Group 4 (n=5) N (%)	Group 5 (n=5) N (%)	Group 6 (n=5) N (%)	Total (n=30) N (%)
Age Mean (SD)	20.8 (1.9)	21.6 (2.6)	21.4 (2.6)	21 (3.3)	20.4 (1.3)	19.4 (1.6)	20.7 (2.2)
Gender:							
Male	3(60%)	4(80%)	2(40%)	1(20%)	5(100%)	0	15(50%)
Female	2 (40%)	1(20%)	3(60%)	4(80%)	0	5(100%)	15(50%)
Education level							
UG	2(40%)	5(100%)	4(80%)	3(60%)	4(80%)	5(100%)	23(76.6%)
PG	3(60%)	0	1(20%)	2(40%)	1(20%)	0	7 (23.3%)
Type of University							
Private	2(40%)	2(40%)	3(60%)	3(60%)	1(20%)	1(20%)	12(40%)
Central/ State	3(60%)	3(60%)	2(40%)	2(40%)	4(80%)	4(80%)	18(60%)
Duration (mins.)	72	85	68	75	77	87	60–90 (range)

Table 2 Focus group topic guide

Introductory Question:
"What is your idea of resilience? What do you think about using MHapps as a tool for building resilience?"
Key questions regarding perception for MHapps for enhancing resilience?"
a) "Should MHapps be tailored in some ways? Would you prefer to use a MHapp that is tailored to the needs of Indian university students over a non-tailored MHapp?"
b) "What could affect your use of MHapps? What are the common facilitating factors and barriers in your opinion?"
c) "According to you what is the role of cultural context while developing MHapp?"
d) "According to you what features should be included in the MHapps to make them engaging?"

Ethical considerations

The Ethics Committee of the CHRIST (Deemed to be University), India, approved the study procedures (No. RCEC/00515/09/23). We prioritised participant safety and ethical considerations throughout the study. We provided the study participants with information regarding data privacy, study methods, and study objectives. All participants provided their voluntary, informed consent in writing, and they were made aware of their rights to take breaks, avoid unpleasant questions, and withdraw their participation at any moment. The data records were gathered on a secure Google Drive link at CHRIST (Deemed to be University), India. Only project staff with permission in the bounds of confidentiality agreements may access the data records. No participant requested psychological support or contact referral.

Data Collection

The data was collected from 6 focus group discussions (FGDs) with university students enrolled in UG/PG Psychology courses in private or central/state universities. The FGDs were conducted at Zoom platform. FGDs were recorded digitally to ensure a detailed and accurate capture of all verbal interactions and nuances. No field notes were taken. The infographics with information about the study were distributed via professional forums and groups, social media groups of students, and bulletin boards. For the FGDs, snowball sampling was used. We collected data between September and December 2023. We informed the participants of the aim and procedure

of the study. Using an online form, participants completed demographic questions and provided written informed consent.

We undertook 6 FGDs with 5 participants each. Every focus group was verbatim transcribed from an audio recording. The participants and respective facilitators attended these meetings solely. Before the study, the facilitators had no notes before and after the data was collected. Each FGD lasted for approximately 60–90 min. A semi-structured topic guide was used, as shown in Table 2.

Data Analysis

We analyzed data using the qualitative approach. We were guided by an interpretive approach focusing on understanding the participants' perception regarding MHapps to enhance resilience, interpreted in the cultural context of Indian universities about the existing literature. The transcriptions of the FGDs verbatim were obtained from their recordings on Zoom. Reflexive thematic analysis was done using Clarke's six-step process [30]. *Data familiarisation*: The first step focussed on getting acquainted with the data by identifying the important parts of the transcripts and repeatedly reading the texts. SS and SC independently analyzed all the transcripts. In order to familiarize themselves with the data, both the researchers read and reread the transcripts. In the second stage, *code generation*, codes were created for significant aspects before further assessment, allowing themes and data that were not previously known to

be identified, i.e., inductive coding was utilized for coding and categorizing the data. For instance, statements like “nobody will be aware that I use MHapp,” “no stigma will be there as my identity will be kept confidential,” or “I don’t have to travel anywhere to use MHapp, and since no one will be able to see me so no one will know who I am” were grouped under the code “anonymity.” After independent analysis, researchers discussed multiple times and used an iterative interpretive approach to move on to the third step, i.e., *theme development*, which included the development of main thematic categories in line with the topic guides. When there were disagreements about interpretations, the researchers carried out the discussions until they reached a consensus. In the fourth step, i.e., *review* of the candidate themes, all the themes and sub-themes elicited from the transcripts were reviewed along with the reanalysis of the relevant passages of the transcripts. The fifth step is *theme refinement*, which includes organizing, modifying, and refining the themes and sub-themes. This stage included renaming codes or rearranging some subthemes to prepare the final list of themes. It was done to weave a convincing story from the data to ensure coherence and consistency. Lastly, in the sixth step, the *final report* was written.

Iterative discussions were carried out among the researchers to develop themes in the final stage. Furthermore, refinement was done to examine the validity of the identified themes. The coherence of codes within themes was also ensured. The themes were developed in agreement with both researchers. After the sixth focus group, the researchers concluded that saturation was reached, i.e., no new themes emerged. Member-checking, external audit, and researcher triangulation were used to ensure the validity of the findings.

Results

The analysis revealed a range of thematic areas relating to the focus of the research. This section presents the themes to highlight concepts of resilience, perceptions regarding MHapps, perceived facilitators in using MHapps, perceived barriers in using MHapps, the potential role of culture in developing MHapps, and suggestions of psychology students regarding the inclusion of prominent features in MHapps to make them engaging.

Concept of Resilience

University students’ understanding of Resilience

From the majority of university students’ perspectives, resilience meant an ability to cope up with challenges and bounce back. One participant considered resilience as a mental reservoir of strength that helps people handle stress. [P6, FG2] Thus, being ‘*resilient*’ implied being able to cope with adversities successfully:

“I think resilience is a treatment but not an immediate one. It is something you have while experiencing all the problems. But, it does not mean that stress and emotional disturbance is not experienced by them. It is about understanding that life is full of challenges and setbacks. It’s like you are bouncing back from difficult life events.” [P17, FG4].

University students in focus groups also highlighted the role of a flexible outlook toward different life situations in a way that’s positive and constructive, and sometimes, inevitably leads to the path to developing the ability to work through stress, emotional pain, and suffering. [P3, FG1]. One of the stated: *“Having resilience does not mean that you doesn’t experience stress but it means to remain open, flexible and willing to adapt to change and experience a good outcome regardless of the trials you have faced. Resilience can protect against depression and maybe anxiety also I think.” [P27, FG6].* For some university students, “resilience” also meant the capacity to handle difficulties and one’s ability to respond flexibly.

Focus group participants described resilience as either a “skill,” a “process,” or a “result.” Mainly, students considered it as a skill that is not present in everyone. On the other hand, some students emphasized that resilience is a process as an individual gradually understands how to keep going even in adverse times and overcome the adversity. Regarding resilience as a result, one participant emphasized that *“when stressful times come in a person’s life, one has no choice but to face them. Hence, individuals have to become resilient due to stressful times.” [P14, FG3]* Until now, none of the participants had used MHapps to improve their resilience.

Use of MHapps to enhance resilience

When asked for the use of MHapps to enhance resilience in our focus groups, the majority of university students reported that resilience can be enhanced effectively using MHapps. One participant emphasized the drastic increase in MHapps after the onset of COVID-19 [P2, FG1]. Another participant stated that:

“When meditation, breathing techniques, CBT can be taught by using apps then the training for resilience can provide help to people to navigate through complex problems, such as relationship issues, body image issues and what not and they may provide an opportunity to the individual to identify potential solutions rather than simply giving up.” [P21, FG5].

University students in the focus groups reported that MHapps might be beneficial in helping to reduce social stigma associated with mental health issues, especially in India. Most students underlined the future relevance of

MHapps to enhance resilience, self-help and prevention as university students have easy access to mobile apps. Furthermore, it is evident that future developments in technology are inevitable; therefore, it is imperative for well-qualified mental health professionals like therapists, counselors and educators to engage in app development:

“MHapp made for any purpose whether to enhance resilience or to provide some other psychological support it is important that it is developed using a holistic approach and are not just stuck on one aspect. For instance, the apps can track progress and based on it provide suggestions to improve whichever aspect is lacking which can provide users with an added advantage.” [P29,FG6].

Personalized MHapps

Participants emphasized that they were willing to use MHapps which offered personalized resilience training with respect to specific issues like exam stress, career concerns, or for relationship issues. Specifically, the students reported that the development of MHapps should be tailored to the needs of university students. One participant stated:

“I think a tailored MHapp would be more effective. They will target a diverse audience with individual differences in terms of culture, education, jobs, health issues etc. I believe that tailored MHapp can offer strategies which can be easily used by students like us.” [P10, FG2].

Another factor emphasized by university students was the stigma attached to issues related to mental health in the Indian context:

“Our society still refrains from talking openly about mental health challenges faced by individuals. So, according to me if MHapps can be designed in such a manner so as to educate people regarding various mental health issues and thus make the conversations around such topics more comfortable rather than filled with guilt, shame and embarrassment.” [P6, FG2].

Acceptance of MHapps

Facilitating factors

Psychology students varied in their acceptance of MHapps regarding intentions to use them in the future. Several factors that facilitate their acceptance were described.

Easy accessibility as well as being cheap and economical were reported to be important to boost usability of MHapps. Furthermore, students stated that MHapps can be used in a flexible manner, i.e., they can be used at any time and at any place, unlike the time-consuming therapy sessions or appointments with counsellors, or psychiatrists, or psychologists, which require a more regular commitment and inflexible scheduling.

The accessibility to the MHapps for 24*7 provided by them was highlighted as the major facilitator for the use of MHapps by the students, especially because individuals dealing with mental health challenges are stigmatised and live in a constant fear of being labelled.

“I think for me personally the major facilitator for using MHapp is the easy accessibility: treatment can take place anywhere on the road, on a bus, at home and it is also ideal for people who have trouble in person appointment.” [P29,FG6].

Respondents also suggested that the MHapps have a wider reach to provide support to their users. One student stated:

“Using technology in the form of MHapp maybe a good first step for those who have avoided taking care of their mental health at first. So, in a way MHapp can be an introduction to care for individuals struggling with mental health issues. They can be accessed by everyone having a mobile and an internet connection” [P18, FG4].

The students further expressed what they liked most about MHapps is the anonymity. One of the participants expressed:

“According to me an important aspect of MHapp is their anonymity. Anonymity in the sense that it is not involving other people i.e., no one knows if I am using an MHapp or taking any help from it. Moreover, MHapps provide the freedom to not to enter true personal details which helps in maintaining our anonymity.” [P17, FG4].

Participants highlighted various factors of MHapps that can encourage their usage and reported that low or no costs would further motivate the users to use MHapps.

Barriers

Difficulties in differentiating between real and fake MHapps, lack of progress tracking of the users due to minimal human interaction, ethical and data privacy concerns were perceived as barriers to the use of MHapps. The following quote suggests:

“The biggest concern with the MHapp interventions is obtaining scientific evidence that they work and they work as effectively as traditional methods.” [P11, FG3].

“Online therapists may not be able to see the patient or hear them, and so they’re not able to see their body language or hear their vocals. MHapps are thus, not at all suitable for people who suffer from severe psychiatric disorders.” [P19, FG4].

“People with mild issues can be wrongly labelled as psychiatric patients. I feel scared of this thought that I might get a label of being a bipolar patient or am being delusional.” [P5, FG1].

The random and un-investigated approach to designing MHapps was found to be problematic. In this sense, participants valued MHapps being based on scientific principles providing factual information related to mental health, as one student explained:

“The lack of organisation in the app’s content can be one of the biggest barriers for the MHapp usage. I came across an app that promised to increase individual’s well-being I do not want to name it. When I downloaded it only consisted of what does well-being meant, what is happiness, gratitude and optimism. It only consisted of text nothing else. I wonder how can such an app improve the well-being of any person? I believe apps should be more than just text that we can find anywhere over internet. But app should be designed using specific psychological principles and impart skills.” [P23, FG5].

Students also thought that the factors that hinder the use of the MHapps also included concerns related to data privacy and ethical issues. For example, psychology mentioned:

“MHapps deals with very sensitive user data hence, proper ethics need to be followed which are followed during the conventional therapeutic settings like informed consent of the client should be taken, the client should be debriefed about the uses and relevance of app, the client should be informed that the data collected will be kept confidential as otherwise since there is no face-to-face interaction between client and therapist how will the client know that therapist is not a fraud but actually well-qualified. So, MHapps should provide all the relevant information to the client to maintain transparency with the users regarding their data privacy policy and ethical considerations. It will help in gaining user’s trust.” [P14, FG3].

Some of the concerns raised, were data privacy and security concerns. Students believed that MHapps asking to sign in using their email accounts, asking for sensitive personal details, and requesting to access private photos and contacts would thwart the privilege of anonymity and hence hinder the usage of MHapps.

Cultural sensitivity in MHapp development

Respondents identified several opportunities for designing MHapp taking into account the culture of the users for which it is being developed.

Recognition of local requirements

The significance of incorporating the views of Indian psychology students when building MHapps created and built in Western countries may require targeting the Indian population more carefully to yield the best results. Participants mentioned the importance of taking into account the diverse nature of the Indian population while designing an MHapp:

“MHapps should avoid one size-fits-all approach and be inclusive and respectable to all regional or ethnice differences. They should refrain from using any remarks or content which can hurt the feelings of any particular cultural community.” [P5, FG1].

Another participant suggested that narratives of various famous or ordinary people belonging to a cultural community can be included in the MHapps as they might help the students and other citizens feel more connected to the MHapp:

“In our (Indian) culture mental health issues are still looked down upon and society stigmatise those individuals who are going through mental health challenges. MHapps in cultural context can help in reducing this stigma by presenting various stories and narratives of people of particular culture going through these issues and it is normal for people to take help for their mental health. Like, you might have heard of Deepika Padukone famous Bollywood actress and Virat Kohli famous Indian cricketer. The talk about their struggle with mental health issues so openly. If MHapps can convey such stories or interviews with such famous personalities they will be most beneficial in our country. As people of our country will relate with her or Virat Kohli more rather than celebrities of some other country.” [P16, FG4].

In addition, there was a willingness among students to engage with MHapps if they could help them work

through the culture shift taking place at a higher rate due to easy access and exposure to media and technology.

"MHapps can create awareness regarding the different cultures followed globally as it will help students who are targeting abroad education to be able to easily cope with cultural change."[P22, FG5].

Respondents acknowledged the cultural distinctions between Western and Asian cultures. However, they also emphasized the need for MHapps to understand and seize the opportunity to help minimize the gap between cultures by offering culturally inclusive resources and networks to contribute to mental well-being:

"Just like social media MHapps can be a good platform for students like us and across borders and to interact over MHapps and share our struggles and provide social support to each other." [P27, FG6].

In today's era, the challenges of using culturally inclusive MHapps are not insurmountable, as emphasized by the participants. Furthermore, they also highlighted that any attempt to design MHapps that bring a sense of togetherness would be well received.

MHapps features

Though various facilitators related to the use of MHapps, like culture inclusivity, facilitators, and barriers, were described by respondents, it was not clear what features can be incorporated into the MHapps to enhance resilience among Indian university students. This theme revolves around the participants' perspectives regarding including of features in MHapps to increase their effectiveness. Participants listed their preferences based on the mental health app they used or heard. Some of the apps cited by the participants were the Driven Resilience app, eQuoo, and Headspace. The perceptions were manifested in various recommendations, and opinions of the respondents:

"In my opinion MHapps can be very useful for managing data related to progress so the changes can be easily tracked." [P1, FG1].

"I believe that MHapps can give reminders to us as we are always busy in some thing or the other but if reminder notifications for the MHapp will come we can use it and it will be like mental health workout can be done using these apps." [P3,FG1].

The potential to improve MHapps by providing researched interventions was also felt to lie at the center of the features that should be added to the MHapps. For instance, the majority of participants insisted that:

"It is so economical to have a range of features and tools all at one place to help me deal with mental health challenges. These MHapps can offer features which can help in managing stress, anxiety and can also offer mindfulness exercise along with guided meditations."[P22, FG5].

"I have used some the MHapps and most of them have mood tracker which I feel is a good feature to have." [P11, FG3].

Since mental health issues are extremely sensitive and people are usually hesitant to open up about their struggles with them, respondents also identified how MHapps can be made more personalized as it will give users a sense of connection with others and hence, the users can feel more comfortable using it. For instance, one participant mentioned that:

"I wish to have avatar in the MHapp as it will be my representation in the app and I will feel connected to it."[P24, FG5].

"For me it would be great if some rewards or points are provided in MHapp whenever any targets are met or some progress is made I feel that its good for keeping us motivated" [P7, FG2].

Additionally, participants recommended adding features that would allow users to interact with other users and mental health specialists or connect them with local psychological services. A participant stated that:

"I think it would be great if there is a feature on the app with which we can connect with therapists or counsellors over the MHapp. Only the licenced or well-qualified professionals should be there on the MHapp as it will make the app trustworthy for the users and there should be transparency for users regarding the qualifications of the mental health professionals."[P20, FG4].

"I believe that there should be an option on the MHapp so that users can connect with each other as it help creating a community and will give a sense of beltableonginess to the users." [P27, FG 6].

Overall, participants were very enthusiastic and expressed that MHapps can be a very effective and viable option for providing mental health interventions and support to users.

Discussion

In order to better inform decisions regarding the development and design of MHapps to improve resilience, this paper aimed to highlight the diverse needs and preferences of college students. It specifically focussed on the

barriers and facilitators that currently exist in the use of MHapps and identified potential features that could increase the effectiveness of the MHapps that have been created. Reflexive thematic analysis is highly useful for obtaining depth of information and identifying contextualized and personal perceptions, underpinned the study's exploratory research design. We contend that this innovative methodological approach provides a fresh perspective on how MHapps can be used in the Indian context. To facilitate extensive data collection, this reflexive thematic analysis was combined with in-depth focus group discussions. Using this approach has the advantage of forming rapport with university students.

Influenced by the lack of availability and accessibility of quality mental health interventions for university students, MHapps are a long-standing alternative to offline interventions of great importance both in research and practice. With the growing emphasis on using technology features to address the individual's behavioral, cognitive, and affective aspects to support their physical, behavioural, and mental health, the use of MHapps has increased due to the introduction of Behavioural Intervention Technologies (BITs) into mental health intervention studies. [31] Because MHapps are online, their effectiveness depends on economic viability, evidence-based interventions, and cultural sensitivity. However, the Indian subcontinent has seen little research on this topic. To effectively bring about change, MHapps need to rely on the empirical evidence that supports and promotes their use for enhancing mental health and well-being. [32] Indeed, this rhetoric was well understood in this study, and the participants recognized the practical barriers. Participants' perceptions of the concept of resilience and their understanding of MHapps to enhance resilience provided valuable information on the needs and preferences of the university students regarding their expectations from the MHapps. We identified various sub-themes related to the concepts of resilience, like university students' understanding of resilience, the use of MHapps to enhance resilience, and personalized MHapps. As indicated, features like gamification, personalization, and reminders have been suggested as essential engagement elements to boost adherence to interventions [33, 34]. The second theme, acceptance of MHapps, sheds light on the facilitators, like ease of accessibility and anonymity. This is in line with previous research stating that MHapps have the potential to make mental health support more accessible and reduce barriers to help-seeking [35]. Furthermore, the advantages of MHapps highlighted in the literature, such as increased accessibility, affordability, convenience, anonymity, and immediacy [36], make them an inevitable resource to meet populations' mental health needs. Participants considered it crucial that MHapps are easy to use and evidence-based.

Thus, these should be considered when designing an MHapp for university students. Some of the concerns expressed by participants were identified as barriers to the use of MHapps. Lack of proper information regarding the target users for the MHapps was a significant factor that contributed to their unwillingness to use a specific MHapp as it might lead to false labelling. This argument is valid due to the former research by [37], which indicated that many MHapps label their users with a mental illness diagnosis, which can be harmful and stigmatizing by making the user feel unable to change their condition.

Another concern raised by participants included the presence of irrelevant content in the app. MHapps are significantly difficult to evaluate in Indian culture due to the presence of unrecognized and more entrenched determinants of mental health issues among the Indian population. This issue is unsurprising and has also been noted by [38] as one of the reasons for disengagement from the MHapps. The others are usability issues, lack of personalization and customization options, customer support issues, and data privacy issues [39, 40].

This study demonstrated how users' desire to use MHapps effectively was severely hampered by concerns about data security and privacy. Although this is understandable, it can also be a significant drawback of evidence-based online interventions. There is a strong ethical imperative to adapt the evidence-based interventions in MHapps to ensure that mental health promotion does no harm to their users. It will also reduce the wastage of limited funds on ineffective interventions or by raising unrealistic expectations about what might be achieved.

Mental health professionals stressed the value of evidence for this reason. In a study by Li et al., [41] a participant stated: 'I do firmly believe that we need some evidence before we launch into things. I think the prospect of doing harm is too great to not have some inkling of where it is going to go.'

The development of MHapp, which is culturally sensitive, can lead to exciting research-based outcomes along with evidence for future utilization. Culturally sensitive MHapps are inclined to act on the social determinants affect an individual's mental health. Participants indicated that to reduce the stigma associated with mental health concerns in Indian society, they preferred that culturally unique experiences and narratives be included. This is an essential consideration for MHapps to improve relatability and engagement. The findings also highlight the importance of creating awareness regarding different cultural and social norms in designing MHapps. Furthermore, participants also emphasized the need to include an option in MHapps to interact with other users. It will provide social support and help build a community with shared experiences and struggles as

Table 3 Developing effective MHapps by including features based on barriers and facilitating factors mentioned by participants

Barriers	Facilitators	Features
Irrelevant content	Easily accessible	Progress tracker
Ethical concerns	Anonymity	Stress and anxiety management tools
Data privacy concerns	Awareness regarding mental health care	Guided meditation tools
Lack of empirical evidence behind MHapps	Economical	Mood tracker, rewards & avatar

expressed by participants. This is consistent with other research that suggests websites and application developers for child and youth mental health and well-being should focus more on appropriately limiting the intended target audience, simultaneously offering a more comprehensive range of opportunities for social connection over MHapps. [42]

The last theme focussed on the features that can be added to make MHapps more effective and engaging for Indian university students.

Asynchronous support from a remote therapist, progress tracking, reminder notifications, stress and anxiety management tools, mindfulness tools, guided meditation, mood tracking, avatars, rewards, and group interactions within the MHapp were the main features that were outlined to improve the MHapps based on participant's responses. The features to be included in MHapps derived from the FGD and the perceived barriers and facilitators are described in Table 3.

Strengths and limitations

The present study highlights the facilitators and barriers associated with utilising MHapps to enhance resilience. In terms of having access to extensive data for analysis and interpretation, our experience was overwhelmingly satisfactory. Reflexive thematic analysis based on the interpretive approach was receptive to the opportunities presented during the FGDs. Moreover, the interpretive approach also facilitated expedient access to significant issues that have not been discussed in the Indian context. To the best of our knowledge, this exploratory study is the first one to give Indian university students a chance to participate in the initial phase of creating an MHapp to enhance resilience.

There were, however, some limitations to the study, as only psychology students from universities in the Delhi-NCR region were included in our study. The results of our study cannot be transferred to students from other fields like engineering, law, business, or management, as their lived experience and usage of the MHapps may differ from those included in our study. Additionally, due to the qualitative nature of the study, generalizability is limited. Another limitation of this study is selection bias; only those students who had prior experience of using MHapps participated in the FGDs. Students with no interest or prior experience in MHapps could have identified additional disadvantages or barriers not raised

by participants in this study. With 30 participants, the sample size is small and not representative of the entire student population. Nevertheless, thematic saturation was reached despite a small number of participants. The validity of the benefits and drawbacks of the various features discussed throughout the FGD could have been higher if the FGD participants were specialists in MHapp design.

More focus groups should be conducted to consider the viewpoints of diverse participants. Further research could test an MHapp considering the needs and preferences of our study participants that were identified in the study. For instance, good quality relevant content should be added to make the app effective. Quantitative testing with a broader sample of students could generate more representative results. Longitudinal studies could be conducted to see the long-term impact of MHapps in the Indian population.

Conclusions

The study used an interpretive approach to explore and highlight the perceptions of university students enrolled in UG/PG psychology courses regarding MHapps. Our results suggested that psychology students will try MHapps that promote resilience if certain aspects (e.g., irrelevant and unorganised content, ethical issues, data privacy issues, lack of evidence) are addressed. However, in severe cases of mental illness, participants expressed a preference for more sensitivity before labelling or providing any diagnosis. Considering psychology students' perspectives is crucial in designing MHapps that they will accept by them as potential users and future healthcare providers.

Abbreviations

MHapps	Mental Health Applications
MHPs	Mental Health Professionals
SD	Standard Deviation

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions

SC and SS designed the study. SS reviewed the FGD question guide used for the study. SC collected the data for the study and performed the reflexive thematic analysis under the supervision of SS. SC wrote the manuscript and SS provided inputs on drafts of the manuscript and helped in making revisions. All authors read and approved the final manuscript.

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Data availability

The datasets generated and/or analysed during the current study are not publicly available to protect the anonymity of the participants but are available from the corresponding author on reasonable request.

Declarations**Ethics approval and consent to participate**

All methods were carried out in accordance with relevant guidelines and regulations. The present study is reviewed and approved by the Research Conduct and Ethics Committee (Institutional Review Board), CHRIST University. The committee cleared proposal for data collection after assessing ethical aspects. Followed by providing information sheet to the participants, highlighting the procedure, voluntary participation, confidentiality and the use of data followed by obtaining the informed consent from all the participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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