

Design, develop, and pilot test a digital platform to enhance student well-being: Protocol for a mixed-methods study

Ashish Joshi, Kamalpreet Kaur, Krishna Mohan Surapaneni Surapaneni, Ashoo Grover, Apurva Kumar Pandya

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Ashish Joshi^{1*} MBBS, MPH, PhD; Kamalpreet Kaur^{2*} MSc, MPH; Krishna Mohan Surapaneni Surapaneni^{3*} MHPE, PhD; Ashoo Grover⁴ MD; Apurva Kumar Pandya^{5*} PhD

¹CUNY Graduate School of Public Health and Health Policy New York US

²Foundation of Healthcare Technologies Society New Delhi IN

³Panimalar Medical College Hospital & Research Institute Chennai IN

⁴Indian Council of Medical Research New Delhi IN

⁵Parul Institute of Public Health Vadodara, Gujarat IN

*these authors contributed equally

Corresponding Author:

Ashish Joshi MBBS, MPH, PhD

CUNY Graduate School of Public Health and Health Policy

55 W 125th St

New York

US

Abstract

Background: Well-being is a multidimensional concept and has been extended to many areas. Student well-being has garnered attention over the last decade due to increased well-being issues. Digital health interventions have the potential to enhance and improve student well-being.

Objective: The study aims to identify the multiple determinants impacting dimensions of well-being among undergraduate and graduate students. It further aims to design and develop an interactive digital intervention for various dimensions of well-being. The study will also evaluate the feasibility and acceptance of digital health intervention and their role to enhance the well-being of undergraduate and graduate students.

Methods: 5000 thousand participants will be recruited across Gujarat and Tamil Nadu, India. These participants will be enrolled from, Parul University, Vadodara, Gujarat, Panimalar Medical College Hospital, and Research Institute, (PMCHRI), and Panimalar college of nursing Chennai, Tamil Nadu. Current undergraduate and graduate students agreeing to participate will be recruited using convenience sampling from these two institutes. The study will collect baseline data to construct the student well-being index. A random subset of the population will be provided access to the digital platform that will deliver tailored interactive messages addressing the various dimensions of well-being among undergraduate and graduate students. The eligible study participants will be of 18 years and older, enrolled in these institutes, and willing to give their consent to participate in the study. Subjects will be excluded if they are less than 18 years of age, and not willing to give consent.

Results: The study will help to identify the factors affecting well-being among college students. The findings of this study will help to design, develop, implement and evaluate tailored internet-based, interactive, digital health interventions to enhance student well-being. The study will also evaluate the feasibility and acceptance of digital health intervention and help in understanding their role to enhance student well-being. All statistical analysis will be performed using SAS v9.3 and results will be reported as 95% CI and P-values.

Conclusions: The proposed study will help to determine the factors affecting well-being among college students and also help in designing digital health interventions to improve the well-being of the undergraduate and graduate students

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Original Manuscript

Design, develop, and pilot test a digital platform to enhance student well-being: Protocol for a mixed-methods study

Dr. Ashish Joshi¹, Kamalpreet Kaur², Dr. Krishna Mohan Surapaneni³, Dr. Ashoo Grover⁴, Dr. Apurva Kumar Pandya⁵

¹City University of New York Graduate School of Public Health and Health Policy, New York, NY, US

²Foundation of Healthcare Technologies Society, Delhi, IN

³Animalar Medical College Hospital & Research Institute, Chennai, IN

⁴Indian Council of Medical Research, New Delhi, IN

⁵Parul Institute of Public Health, Parul University, Vadodara, Gujarat, IN

Abstract

Background: Well-being is a multidimensional concept and has been extended to many areas. Student well-being has garnered attention over the last decade due to raised concerns. Digital health interventions have the potential to enhance and improve student well-being.

Objective: The objective of the study is to design, develop and pilot test a digital health platform to enhance student well-being.

Methods: A sample size of five thousand participants will be recruited across Gujarat and Tamil Nadu, India. Students will be enrolled from, Parul University, Vadodara, Gujarat, and Animalar Medical College Hospital and Research Institute, (PMCHRI), Animalar Engineering College, Animalar Institute of Technology and Animalar College of Nursing, Chennai, Tamil Nadu. Current undergraduate and graduate students consenting to participate will be recruited using convenience sampling from these institutes. The study will collect baseline data to construct the student well-being index. Based on the risk profile, a random subset of the population will be provided access to the digital health intervention that will deliver tailored interactive messages addressing the various dimensions of well-being among undergraduate and graduate students. The eligible study participants will be of 18 years and older, enrolled in these institutes, and willing to give their consent to participate in the study.

Results: The proposed research is an unfunded study. The enrolment of the individuals in study will begin from October 2022. Data gathered will be analysed using SAS v9.3 and results will be reported as 95% CI and p-values.

Conclusions: The proposed study will help to determine the factors affecting well-being among college students and help in designing digital health intervention to improve the well-being of the undergraduate and graduate students.

Keywords: well-being; students; digital interventions; social support; family demands; mental well-being

Introduction

Background and Rationale

Well-being is a multifaceted concept that encompasses, three dimensions: mental, social, and physical well-being [1]. According to the World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [2]. Therefore, well-being can be summarised as a positive outcome that constitutes physical, mental, and social stability. It is comprised of the presence of positive emotions such as happiness and resilience

and the absence of negative emotions such as anxiety and depression [3].

Over the last decade, there has been an increased interest in the student well-being [4]. The transitional period from school to university, puts forward a lot of new challenges and changes for students such as academic demands, facing new people, making independent choices, and being away from homes, and social networks. These shifts or changes act as potent stressors in the lives of students [5].

In a survey conducted by the World Health Organisation in 21 countries to assess the associations of mental disorders with college entry and attrition it was found that anxiety disorders were the most prevalent class of disorders followed by mood disorders, substance disorders, and behavioural disorders [6]. Another cross-sectional study conducted across 30 low – middle income countries drew similar conclusion [7]. A study of undergraduate students at a South African University reported minimal to mild symptoms of depression in 87.7% of students and moderate to severe in 11.2 % of students. Similarly, low anxiety was prevalent in 84.2% of students, and moderate to severe anxiety was depicted in 5.8% of students [8]. Additional studies across Nigeria and Kenya also reported prevalence of moderate to severe depression among university students [9] [10].

For medical education students, the components of a stressful environment include on-call responsibilities, high workload, competitive training, peer pressure, a large volume of content to study, and financial burdens [11]. A meta-analysis reported depression in approximately one-third of medical students globally [12], which may contribute to anxiety, burnout, suicidal thoughts, and substance abuse [11].

In a local context, a survey to assess the perceived stress and psychological well-being of 281 college students from six states of India showed a negative effect of perceived stress on their psychological well-being. A higher level of internet addiction negatively affected psychological well-being, whereas, perceived social support from friends, family, and significant others were positively associated with well-being among college students[13]. Female students reported a higher level of well-being even though their stress levels were similar to male students [14].

In a study conducted by Swaminathan et al, among college students of Maharashtra, India stress was observed in 24.4% of students. Moderate to severe stress was experienced in 14.4% of students. Academic factors and lifestyle were significantly associated predictors of stress among college students[15] . Another large survey study in India, highlighted over 80% of medical students experienced burnout and were at higher risk of mental disorders and lower well-being [16]. This was also corroborated by additional studies that reported high psychological distress, burnout [17], perceived stress[18], poor well-being, stress, and depression in Indian medical students[19], [20] .

In India, mental health problems are prevalent in the young adult population and since India is the home to the largest pool of young population, therefore it becomes a matter of critical concern for this age group [21]. The World Health Organization reported that 8% of the Indian population suffers from common mental disorders, of which 4.5% and 3.5% experience depression and anxiety respectively [16].

However, the conventional evidence-based psychological treatments have certain limitations associated with them, such as, lack of access, stigma, and difficulty in affording the services [22]. Additionally, the limited availability of mental health professionals further exacerbates the situation [23]. In this scenario, digital health interventions have the potential to address these challenges as they can reach a larger audience, are more cost-effective, and avoid the risk of stigma [24]. Targeted use of technology can be more effective in the health and well-being domain [25]. Various digital interventions such as computer-based [26], [27] web-based [28], [29], mobile-based (short messages service-based, and apps-based), and, virtual reality [30], [31], [32] have been used for depression, anxiety, stress, sleep quality, psychological well-being, and mindfulness.

There is limited research available on digital health intervention in enhancing overall well-being among college students in India [33] Further studies have shown that use of the Health Belief Model (HBM) for student wellbeing is effective Model [34]. Hence, this study aims to explore the factors affecting the well-being of the students and develop and design a tailored, internet and mobile-enabled digital health intervention based on Health Belief Model to enhance well-being among college students in Indian settings.

Study Objective

The objective of the study is to design, develop and pilot test a digital health platform to enhance student well-being.

The study aims are:

1. To identify the multiple determinants and factors impacting well-being among undergraduate and graduate students.
2. To design and develop a digital health intervention based on Health Belief Model incorporating the findings of aim1 to address the well-being issues among undergraduate and graduate students.
3. To evaluate the feasibility, acceptance of the proposed digital health intervention.
4. To evaluate role of the digital health intervention, its adherence and engagement in enhancing the well-being of undergraduate and graduate students

Methods

Study design and Population

For aim1, a cross-sectional study will be conducted to identify multiple determinants affecting the well-being of the students. Five thousand participants will be recruited across Gujarat and Tamil

Nadu, India. The current undergraduates and graduates will be recruited from Parul University, Vadodara, Gujarat, Panimalar Medical College Hospital and Research Institute, Panimalar Engineering College, Panimalar Institute of Technology and Panimalar college of nursing Chennai, Tamil Nadu using convenience sampling approach. The participants will be recruited from their respective institutes with prior permission from the respective departments. The survey will be filled by the students using their mobile devices or from the computer labs of the institutes. The survey will consist of validated tools which have attached in the appendix.

For aim2, we will employ mixed methods approach using quasi experimental research design to gather the data. Baseline data will be collected from aim1 using pre-defined questionnaire and validated tools. Additionally, two focus group discussions will be conducted across each study site to identify the barriers that students face to manage their well-being. Two focus group across each site is considered to be ideal [35]. Consenting participants from the baseline survey will be invited via an email to participate in the FGD, they will be given access to the mobile/web-based platform to generate their initial user profiles. The data gathered from user profiles and FGDs will be used to formulate a student wellbeing index and also employed to design and develop a tailored and context specific digital health interventions (based on the principle of a human-centred approach) to address the well-being issues of the students. The quantitative data collected from the baseline survey and the qualitative factors will help in identifying causal factors in the environment of the student affecting their wellbeing [36]. The digital intervention will be based on a human centred approach which will be designed after understanding the analysis of the responses generated from the baseline survey and FGDs. The digital health intervention will be designed as per the needs identified from the FGDs and baseline survey with a Population Health Informatics.

For aim3 and aim4, we will perform a randomised control trial. Based on the well-being index generated, high risk individuals will be divided randomly into intervention group and control group. The digital health intervention will be a mobile/web-based platform for students designed to provide tailored well-being related education and awareness. Human centred approach will be employed to design and develop the intervention by incorporating the students' needs and preferences to ensure the optimal use of technology-enabled intervention [37]. The study will also use the health belief model (HBM) in designing the digital health intervention where HBM will be used as a framework to aid in the factors that influence implementation and persistence to maintain well-being among the students. The HBM is one of the most widely used theoretical frameworks for understanding behavioural change. The model holds that an individual's likelihood of adopting and maintaining a new behaviour is heavily influenced by their perceptions around the health threat and the behaviour

being proposed to address that threat [38]. The intervention will include modules for physical, social, and mental well-being of the students. The study participants will be able to access the personalized, human-centred digital health intervention through their computers, or cell phones, depending on the technology platform available to them. The intervention will be tailored and will be delivered via interactive messages addressing the various dimensions of well-being among undergraduates and graduate students. Study participants in the control group will be provided with an educational booklet addressing health information related to student well-being. Pre- and post-evaluation of the individuals in the intervention and control group will be conducted to assess the impact of digital health intervention. The feasibility, adherence, engagement, and acceptability of the system will be assessed.

Study eligibility

The eligible study participants will be 18 years older, enrolled in the Parul University, Vadodara Gujarat, Panimalar Medical College Hospital, and Research Institute, Panimalar Engineering College, Panimalar Institute of Technology and Panimalar College of nursing Chennai, Tamil Nadu, having access to Wi-Fi/internet enabled device and willing to give the consent to participate in the study. Participants less than 18 years older, not enrolled in these two institutes, and involuntary consent will be excluded from the study.

Informed Consent

The institutional review board-approved informed consent form will be attained from the eligible study participants by the research team. The consent form will include information for the study, the duration of the study, and the benefits of the study results to the participants. Participants who are willing to participate will be enrolled in the study via email. Study participants can withdraw from the study at any time. All data including withdrawals will be reported in the final analysis. No monetary compensation will be given for participation in the study.

Data Collection, Data Entry, and Quality Assurance

To ensure efficiency and high-quality data collection and processing, we will (1) use a well-trained team of fieldworkers, (2) use a clearly defined study manual, (3) conducted weekly meetings with the research team, and (4) maintained logs of all patient contacts. Confidentiality of the information obtained from the participants will be ensured. The information will be accessible to members of the research team only. .

Variable Assessment

Sociodemographic profile

Data will be gathered from the participants such as age, gender, income level, education level, region of residence, marital status, children, and religion. The socio-economic status of the family will be evaluated through an updated version of the original Kuppuswamy Scale [39].

Health status profile

Height and weight of the participants will be measured to calculate body mass index as a study conducted by Sarwer D, B *et al* suggests impact of BMI on wellbeing [40]. Any self-reported disability will be assessed. Predefined questionnaires will be used to gather the data.

Familiarity with technology

This will include access to the desktop, laptop, tablet and mobile phone, type of phone, knowledge of texting, access, and familiarity with the use of the internet. Predefined questionnaires will be used to gather the data.

Health behaviour

This will include data on the consumption of tobacco, alcohol, smoking, and sleep duration. Predefined questionnaires will be used to gather the data.

College profile

Data will be collected on the residential status and prior education of the students within the city or outside the city. Predefined questionnaires will be used to gather the data.

Data Security and Privacy

Data security will be maintained by the frequent backup in password-protected computers locked in a principal investigator's office. The information will be accessed by the research team only. Locked data will be stored for 5 years from the point of study completion to the time they will be destroyed [41].

Outcomes

The study will help to identify multiple determinants affecting the students' well-being. Additionally, it would explore the role of digital health interventions to enhance the good health and well-being of the students. The study will also help in designing and developing individualized, tailored, and interactive internet-enabled digital health interventions to manage well-being of undergraduate and graduate students.

Outcome variables

The outcomes will be assessed by using the following tools:

General well-being: General well-being scale will be used to gather data. The scale covers six dimensions such as anxiety, depression, general health, positive well-being, self-control, and vitality to measure mental and physical well-being [42].

Perceived Social Support: Multi-dimensional Scale of perceived social support will be used to collect the data. It includes sub-scales of support from family, friends, and significant others to assess the perceived social support [43].

Mental well-being: Two components: stress and depression will be measured to assess mental wellness. Depression will be measured via the eight-item Patient Health Questionnaire [44] on a four-point Likert scale that ranged from 0 (not at all) to 3 (nearly every day). Stress will be measured through 10-item Perceived Stress Scale [45] that ranged from Never to Very Often on a five-point Likert scale.

Family demands: Family demands are measured through a work family conflict scale. It has 5 items with a Likert scale from strongly disagree (1) to strongly agree (7) [46].

System acceptability: System acceptability will be evaluated through the Client Satisfaction Questionnaire -8 to assess the acceptability of the digital health intervention [47].

General Self-efficacy : It will be evaluated through the General self-efficacy scale [48]. It is a 10-item scale to assess the ability to cope with the daily challenging demands or situations in life.

Stigma: The Stigma scale will be used to assess the stigma. It has 42 statements on a five-point Likert scale ranging from strongly agree to strongly disagree [49].

Perceived ease of use (PEOU): The questionnaire will be used to assess the feasibility of the digital health intervention [50].

Diet and behaviour scale: A 29-item questionnaire called the Diet and Behavior Scale (DABS) is used to gauge people's intake of typical dietary components. The DABS's first component focuses on the respondent's typical frequency of consumption of common foods and beverages. The answers to the questions are given on a scale of 1 to 5, with 1 being "never," 2 "once a month," 3 "once or twice a week," 4 "most days," and 5 "every day." The second segment is open ended and looks into the normal serving sizes for 11 popular foods and beverages [51].

Tools other than PEOU and CSQ-8 will be used pre intervention and post intervention to assess the usefulness of the digital health intervention.

Individuals will be followed-up for a period of 3 months at regular intervals to assess adherence to

the well-being modules provided in the digital health intervention.

Engagement with the digital health intervention will be assessed by monitoring the number of times of weekly logins, completion of tasks in a timely manner and submitting their regular data.

Data Analysis

The baseline data for generating well-being profile include socio-demographic profile, college profile, health status profile, familiarity with technology, and health behaviour. Outcome variables will be assessed using General well-being schedule, Multidimensional scale of perceived social support, Personal health questionnaire depression scale, Perceived stress scale, Work-family conflict scale, CSQ-8, Perceived ease of use questionnaire, General self-efficacy scale, Nutrition behaviour scale, and Stigma scale. From the baseline data gathered from descriptive analysis will be carried out, also cross tabulation of socio-demographic factors with variables gathered from the instruments will be done. Two focus group discussions per site to assess the perception of students of how their well-being can be addressed. Thematic analysis will be done in accordance with AMEE Guide No. 131 for the qualitative data collected through FGDs [52]. For continuous variables, means and standard deviations will be reported and for categorical variables frequencies will be calculated. All statistical analysis will be performed using SAS v9.3 and results will be reported as P-values CI 95%.

Project Timeline and Milestones

A detailed study timeline is presented in Table 1

Table 1. Scheduled timeline of the tasks in the student well-being study

Task	Months									
	01-02	3	4	5	06-07	08-10	11-13	14-15	16-19	20-24
Development of study protocol and ethical approval	✓									
Baseline data collection		✓	✓	✓						
FGD and development of intervention					✓	✓				
Deployment of the Well-being intervention and recruitment of the target sample into intervention and control groups							✓			
Follow up data collection							✓	✓		
Post assessment of intervention								✓		
Reviewing collected data by the research team								✓	✓	
Data analysis									✓	
Scientific Publication										✓
Dissemination (report writing and										✓

presentations)										
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Ethics and Dissemination

The study bearing protocol number PMCHRI-IHEC-071 gained approval from the Panimalar Medical College Hospital and Research Institute Institutional Human Ethics Committee (Central Drugs Standard Control Organization Registration No. ECR/1399/Inst/TN/2020) in January 2021 with approval No. PMCH&RI/IHEC/2021/078 dated December 13, 2021. Results of the study will be disseminated through national and international conference presentations, and peer-reviewed publications. Findings of the study will also be disseminated to the local and state officials and policymakers for data-driven, evidence-based informed decision-making.

Results

The proposed research is an unfunded study. The enrolment of the individuals in study will begin from October 2022. Data gathered will be analysed using SAS v9.3 and results will be reported as 95% CI and p-values. Thematic analysis will be done of the qualitative data from FGDs. The proposed research study will help in determining the determinants affecting well-being among college students. It would also help in designing tailored internet-based, interactive, digital health interventions to enhance student well-being.

Discussion

The research project would help in assessing the factors affecting the well-being of undergraduate students. It would also aid in developing and implementing data-driven, human-centred, interactive interventions to improve the overall well-being among undergraduate and graduate students. It would explore the role of digital health interventions to enhance the good health and well-being of the students. Additionally considering the barriers related to delivery of digital interventions for mental health and unique needs of Indian college students, it is imperative to fill up the research gap and implement research studies to design, develop and assess the usability, acceptability and feasibility of digital interventions tailored as per the students' needs [51] [53]. The study will provide an outline of the well-being and also the potential academic stress of college going students in India [54].

Acknowledgments

The authors are the only contributors to this manuscript and are acknowledged.

Data availability

The data sets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Authors' Contributions

All authors have contributed to the design of the study, development of the questionnaire, preparation of the manuscript, and have approved the manuscript for publication.

Conflicts of Interest

None declared

Multimedia Appendix1

Full text of the survey questionnaire

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Abbreviations

SAS: Statistical Analysis System

CI: Confidence Interval

Supplementary Files

Untitled.

URL: <http://asset.jmir.pub/assets/70619827c83f76aa9c0cb63270dd2b42.docx>

Multimedia Appendixes

List of instruments.

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