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To evaluate the EASE intervention for reducing anxiety and depression among adolescents in Pakistan: a protocol for a mixed methods study, including a cluster-randomised controlled trial

Lubna Ghazal , Naixue Cui, Fenglin Cao

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School of Nursing and Rehabilitation, Shandong University, Jinan, China

Correspondence to
Lubna Ghazal;
lubna.ghazal1@gmail.com

ABSTRACT

Introduction The rising prevalence of adolescent anxiety and depression in low- and middle-income countries (LMICs) highlights the urgency for effective interventions. Challenges with standard treatments necessitate exploring accessible strategies. In addition, adapting interventions from high-income countries to LMICs raises concerns about efficiency. The LMIC-tailored Early Adolescent Skills for Emotions (EASE) intervention, integrating cognitive-behavioural principles, group sessions, non-specialist delivery and parental involvement, provides a promising solution. This protocol aims to evaluate the effectiveness, acceptability and feasibility of the intervention in public schools in Multan, Pakistan, for addressing anxiety and depression among adolescents.

Method and analysis This proposed study aims to achieve its objectives through a two-phase approach by using a mixed methods experimental design. Primarily, a cluster randomised control trial with a two-arm (intervention and waitlist control) single-blinded design will assess the effectiveness of the EASE intervention in reducing anxiety and depression (primary outcome) and parenting, quality of life and psychological distress (secondary outcome) among adolescents aged 13–19, employing a 1:1 allocation ratio. Subsequently, leveraging effectiveness data, the study will explore moderating (eg, socioeconomic characteristics) and mediating pathways (parenting skills and parents' psychological distress) to enhance our comprehension of the intervention's effectiveness. Lastly, an exploratory descriptive qualitative study will investigate the perceptions of various stakeholders regarding the acceptability and feasibility of the School-Based Mental Health Programme intervention in the Pakistani context. For the trial data, linear mixed models will be used to account for clustering at the school level and adjust for baseline differences. For the qualitative data, content analysis will be conducted to identify stakeholder perceptions about the intervention.

Ethics and dissemination The study received ethical approval from the Ethics Committee of the School of Nursing and Rehabilitation at Shandong University, Jinan, China (Reference No. 2023-R-024) and Institutional Review Board (Ref: IRB-2019/MASH/Approval-06/March/2023) Mukhtar A Sheikh Hospital, Multan. The findings will be shared through publications in peer-reviewed journals and presentations at national and international conferences.

Trial registration number This trial is registered at ClinicalTrials.gov (ID NCT06155838).

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Comprehensive engagement with stakeholders including community leaders, healthcare professionals, parents and teachers enhances the relevance and feasibility of the research outcomes.
⇒ Rigorous adherence to ethical guidelines and obtaining consent from participants and their parents ensures the ethical conduct of the study.
⇒ Utilisation of a mixed methods approach allows for a holistic understanding of the intervention's effectiveness and feasibility.
⇒ The inclusion of a waitlist control group strengthens the internal validity of the study design.
⇒ However, potential limitations include the reliance on self-reported measures, which may introduce response bias, and the feasibility of implementing the intervention in real-world school settings may vary.

BACKGROUND

Adolescent mental disorders constitute 13% of the global disease burden,[1] with a noteworthy surge in psychological distress, especially anxiety and depression, reaching global rates of approximately 25%.[2 3] There is a concerning escalation in anxiety and depression trends among adolescents worldwide, particularly among school-going adolescents, necessitating immediate attention. A Canadian epidemiological study documented a twofold increase in anxiety from 6.0% in 2011 to 12.9% in 2018, and depression rose from 8% to 16%.[4 5] A meta-analysis involving 80 879 participants across 29 studies found a clinically significant depression prevalence of 25.2% and anxiety at 20.5%.[5] Another meta-analysis reported anxiety prevalence at

24% and depression at 22%.[6] The COVID-19 pandemic has aggravated existing mental health challenges among adolescents globally.[7] A US survey before the pandemic revealed that 38.12% experienced anxiety symptoms, and 34.31% of students aged 18–25 suffered from depression.[8] During the pandemic, 53% of surveyed US students reported increased depression, and 49% exhibited heightened anxiety.[6 9]

A joint report by WHO and UNICEF (2021) documented that the global adolescent population, aged 10–19, is 1.3 billion, constituting approximately 16% of the world's total population, with around 90% residing in low- and middle-income countries (LMICs). There has been a discernible increase in anxiety and depression trends from 2017 to the present, particularly in LMICs. A recent analysis of 35 studies from South Asian countries, involving 41 402 adolescent participants, found a combined prevalence of anxiety at 41.3% and depression at 34.1%.[10] Among school-going adolescents in LMICs, the prevalence of anxiety and depression varies across nations. Recent literature reveals varying rates in Asian countries, including Nepal with depression at 56% and anxiety at 33%,[11] India with depression at 53% and anxiety at 33%,[12] Afghanistan with depression at 49% and anxiety at 45%,[13] Iran with depression at 37% and anxiety at 15%,[14 15] Bangladesh with depression at 18% and anxiety at 20%.[16 17] Recent research in the Pakistani context highlights concerning prevalence rates of anxiety and depression among adolescents aged 13–19. An epidemiological investigation, predating the COVID-19 pandemic and involving 5856 adolescents in rural Pakistan, identified a substantial 25% prevalence of psychosocial distress.[2 18] Additionally, a study revealed that 53.2% of participants experienced anxiety and depression, with approximately 79% affecting girls' participants.[19] These findings emphasise the urgent need to address and alleviate the high prevalence of anxiety and depression among adolescents in Pakistan.

The conventional gold standard treatments for adolescent anxiety and depression include various psychopharmacology and psychotherapies.[20] However, the use of antidepressants and antianxiety medications remains controversial due to side effects, dependency concerns and challenges in acceptance by adolescents and their families.[21 22] Moreover, many studies have failed to establish clinically significant results regarding the right doses[23] and duration of treatment.[24] While cognitive behavioural therapy has proven effective, it faces limitations such as limited independent access, the need for specialists[23 25 26] and the stigma surrounding mental health services,[26] making it less cost-effective and challenging for adolescents and their families to sustain the intervention.[27] These limitations prompt researchers to explore preventive strategies with high accessibility for adolescents to address anxiety and depression.[27 28]

The existing literature outlines various preventive and promotive mental health interventions aimed at reducing anxiety, depression and suicidal tendencies among the adolescent population.[28] These interventions, developed in high-income countries (HICs) and tested in community and school settings, as well as through digital platforms, have shown promise for adolescents. However, their effectiveness, with effect sizes ranging from 0.21 to 1.4, has produced mixed results[29–31] highlighting the need for a clearer understanding to guide future intervention development and testing.[29–31] Challenges include the lack of standardisation in interventions and outcomes, non-random study designs influencing perceived effectiveness and the initial development and testing of interventions in HICs before adaptation to LMICs.[32] The Early Adolescent Skills for Emotions (EASE) intervention was selected based on its evidence-based framework and success in addressing adolescent mental health challenges in LMICs. The intervention was adapted to align with cultural and contextual needs. EASE's focus on cognitive, behavioural and emotional regulation skills makes it particularly relevant for addressing anxiety and depression among adolescents, which are pressing issues in Pakistan.[18 32] However, this adaptation process can be complex and challenging as interventions in LMICs are often not cost-efficient due to limited financial resources, inadequate infrastructure and high relative costs, which hinder scalability and affordability.[33 34] Cultural stigma and diverse population needs further increase costs through required adaptations.[33 35] Developing cost-effective, scalable options is essential for sustainability and utilisation.[36 37] Lastly, the existing research falls short in understanding the acceptability and feasibility of these interventions, crucial factors for refining and tailoring interventions for improved future uptake.

This study will use the EASE intervention, devised[38] for LMICs grappling with adverse conditions such as poverty, disaster-affected communities and limited access to mental health services. The intervention was selected based on its evidence-based framework and success in addressing adolescent mental health challenges in LMICs. The intervention was adapted to align with cultural and contextual needs. Its' focus on cognitive, behavioural and emotional regulation skills makes it particularly relevant for addressing anxiety and depression among adolescents, which are pressing issues in Pakistan. EASE, designed as a cost-effective intervention suitable for resource-constrained environments like Pakistan, aims to mitigate comorbidities like anxiety and depression.[38] Grounded in cognitive-behavioural and interpersonal theories, it employs group-based, in-person sessions in schools, involves non-specialists in delivery and actively engages parents, tailoring it to the specific challenges of low-resource settings. Despite its potential, it is crucial to note that the effectiveness of the intervention in the context of Pakistan has not been tested.

Regarding the intervention's effectiveness, the research will investigate mediating factors such as individual perceived emotional support, problem-solving skills,[39] parent stress, parenting skills and teacher–student relationships.[40] This aligns with a focus on comprehending

and addressing essential elements for effective interventions.[40 41] Additionally, the inclusion of moderators like baseline symptoms and socio-demographic factors is justified to identify optimal conditions for intervention efficacy, exemplified by the tailored approach of the EASE intervention.[41 42] Implementing this robust methodology and analytical approach will enhance the research by providing deeper insights into the nuanced dynamics of adolescent mental health, aiding in intervention refinement. Furthermore, assessing stakeholders' perspectives on the EASE intervention's effectiveness, acceptability and feasibility in the Pakistani context will offer a pragmatic evaluation of its impact.

Study purpose and significance

The proposed study aims to comprehensively evaluate the efficacy, psychological mechanisms, moderating factors and feasibility of the EASE preventive School-Based Mental Health Programme (SBMHP) with the following objectives:

1. Evaluate the effectiveness of the EASE intervention in reducing anxiety and depression among adolescents (aged 13–19 years) compared with the control arm postintervention and at 12 weeks postintervention in Pakistan.
2. Investigate the psychological mechanism of the intervention in reducing anxiety and depression among adolescents by identifying the mediating effect of a supportive school environment characterised by positive teacher–student relationships, students' engagement with school and support from peers, parenting and parents' psychological well-being on the primary outcomes.
3. Explore moderating factors affecting the intervention's effectiveness, including gender, age groups, socioeconomic status, parental education and parents' psychological well-being in the impact of the intervention on the primary outcomes.
4. Explore the perceptions of various stakeholders regarding the acceptability and feasibility of intervention in the context of Pakistan using a qualitative approach.

RESEARCH METHODS

Study design

A Mixed Methods Experimental Design (QUAN+qual) will be used to attain the objectives of this research project.[42] First, a 1:1 two-arm (intervention and waitlist control), single-blinded cluster randomised control trial (cRCT) will be employed to evaluate the effectiveness of the EASE intervention. Second, based on effectiveness data, the study will explore moderating and mediating pathways to strengthen our understanding regarding the effectiveness of the intervention. Finally, an exploratory descriptive qualitative study will also be conducted to explore the perceptions of multistakeholders on the acceptability and feasibility of SBMP intervention in the context of Pakistan.[41–43]

Study population

This study focuses on the adolescent population aged 13–19 who are enrolled in schools and reside with their parents. Exclusions encompass individuals with psychiatric concerns and those with physical or sensory disorders, as detailed in the online supplemental file 1, table 1.

Study setting

The study is set in Multan, a key economic centre in Southern Punjab, Pakistan, characterised by its agricultural prominence and predominantly Saraiki-speaking population. Public high schools in a rural subdistrict have been selected for this study, given the lack of mental health services in rural areas despite constitutional provisions for free education up to the 10th standard. The population in this area primarily works as labourers, lacks adequate resources and has a literacy rate of approximately 43%, further emphasising the need to address health disparities. The study will include eight schools, four for boys and four for girls, to respect the religious and cultural norms of separate schooling.

Study sample size

Sample size calculation was performed using OpenEpi software V.3.01. The calculation was stratified by gender, with the school defined as the cluster unit of randomisation. A feasibility study[2] informed the assumptions for the calculation. An effect size of 0.4 was assumed at a 3-month postintervention follow-up. The calculation aimed for 90% power with a significance level of 0.05. The study accounted for an intracluster correlation coefficient of 0.05 and two-sided hypothesis testing. An anticipated attrition rate of 20% was also included. The clusters of schools will be randomised in a 1:1 allocation ratio. This results in a total of 449 participants (rounded to approximately 450). Each arm will include around 56.25 participants (rounded to 56–57) aged 13–19 from eight schools. Stratification by gender-based schools aims to balance the groups. This approach minimises between-cluster variability and enhances the study's statistical power.

Sampling and randomisation

In Pakistan, public schools provide education to girls and boys separately. Therefore, the current study will employ stratified random sampling by gender to ensure homogeneity within each group. This approach involves independently and randomly selecting samples from each stratum, ensuring equal representation of both genders. Schools will be randomly selected from a list of eligible institutions, followed by the random assignment of classes within these schools. Finally, participants within the selected classes will be randomly chosen based on predefined inclusion criteria. This multistage randomisation process aims to minimise potential biases and ensure balanced representation across groups (online supplemental file 2-flow diagram 1)

Schools' selection

The eligibility criteria to select a school will be (1) a public school in the rural area having a student population ranging from 300 to 1000 students, (2) students both boys and girls, ages between 13 and 19 years, (3) 80% enrolment and (4) 80% attendance in the school. First, the list of eligibility criteria to select a school will be submitted to the Chief Executive Officer (CEO), district education department of Multan. Second, a computer software programme will be used at the trial unit at Aga Khan University, by a staff member. Third, the list of schools will be first separated based on gender. Through software randomised allocation of eight schools will be done (four boys and four girls). Finally, of this selection, four schools from each gender category will be numbered in the order 1–4. The schools with odd numbers (1 and 3) will be selected for the intervention arm and schools with even numbers (2 and 4) will be shortlisted as wait control. Later, the list of eight schools will be shared with the CEO district education department to get permission letters for the schools' principals to conduct the study in their schools.

Class and participants' selection

The research team member will discuss the eligibility criteria of students' selection with principals to initiate the selection of class based on the required number of students from each school (56–57) students between ages 13 and 19 years. The public schools in the subdistricts have large class sizes (50–100 students per class) and various sections of one class. For example, grade nine may have 4–8 sections on average. To suffice the sample size, classes will be randomly selected in the same manner the schools will be selected. After section selection, 7–8 students will be selected through random selection using their attendance register, every seventh student will be selected from every class.

Recruitment plan

First of all, informed consent will be sought from the CEO, education department, school principals, parents' consents (for their children and own participation) and assent from adolescents. A copy of the participant consent form is provided as online supplemental file 6. The study participants will be recruited between October 2023, and the data collection period began on 11 November 2023 and concluded on 31 March 2024. All those meeting the adolescent participants' eligibility criteria will be invited along with the parents to participate in the study. Written study information translated in the Urdu language and assent and consent forms will be given to invite students and their parents. After the informed assent and consent signing from participants, the students will be finally enrolled for the intervention and control group on a 1:1 basis by a research team member in collaboration with principles. For students whose parents do not provide consent, or adolescents not interested in participating, alternative supervised activities will be arranged during intervention sessions (library session), ensuring these students remain engaged and supported without exposure to the intervention.

Intervention, training and supervision

The EASE intervention includes four core empirically-supported themes: identifying feelings, cognitive restructuring, behavioural activation and problem-solving. These themes are organised into seven group sessions with adolescents and three group sessions with their parents. The adolescent sessions will be delivered during school hours, face-to-face, over 7 weeks, with one session per week lasting approximately 90 min (for details, see online supplemental file 3—table 2A,B). The parent sessions, held separately, will focus on promoting adaptive parenting practices to enhance the parent–adolescent relationship and increase parents' confidence in managing adolescents' mental health distress.[38]

The interventions will be delivered by two non-specialists (teachers) per school, who will have an educational background of 16–18 years. The principal of each school will be requested to nominate 2–3 teachers to participate in the training programme. These nominated teachers will undergo a comprehensive 10-day training programme designed to equip them with the knowledge and skills required to effectively deliver the EASE intervention.[43]

The training will be conducted by a graduate-level specialist with expertise in mental health intervention delivery. The training will follow a manualised approach to ensure consistency and fidelity across all sessions. Along with the non-specialist teachers, two session evaluators with a mental health background will also participate in the training. These evaluators will be responsible for assessing the quality of intervention delivery when the sessions are conducted. Their inclusion ensures an additional layer of oversight to maintain high standards in implementation.

As part of the training, specialists will supervise non-specialist facilitators' mock sessions, using the 18-item ENhancing Assessment of Common Therapeutic factors (ENACT) scale to evaluate key skills and adherence.[44] Additionally, specialists will train and supervise session evaluators in using the scale for assessment. During the intervention delivery, session evaluators will apply the ENACT scale to assess quality and ensure protocol adherence. 50–60% of the EASE sessions will also be observed by a specialist trainer to assess if the elements of the programme have been carried out by the facilitator, and to what quality.

Adolescent and parental engagement in the intervention is also important; therefore, for adolescents, sessions will be scheduled during school hours to ensure accessibility and minimise routine disruptions. Interactive elements will be incorporated to maintain interest and encourage participation. For parents, flexible scheduling, including evening or weekend sessions, will address diverse availability. Communication strategies will include culturally tailored messaging and reminders

to boost attendance. Gender-sensitive arrangements, such as separate sessions for mothers and fathers, will ensure cultural appropriateness and participant comfort.

Waitlist control group

During the study, the waitlist control group participants will receive treatment as usual, defined as the standard care or support typically available to them through existing school-based services. This does not include any additional structured interventions provided as part of the study. Following the trial, if the intervention results are found to be significant, all participants in the control group will receive the EASE intervention over 7 weeks, including three sessions for their parents and guardians. This design ensures that the control group is not disadvantaged and aligns with ethical principles and the study's commitment to equitable treatment.

Data collection

Referring to research aims, the outcome measurement is planned at baseline (T1), postintervention (T2—8th week) and after 12 weeks postintervention (T3). All the tools were found in Urdu translation and tested in the Pakistani context. The level of understanding of vocabulary at 13–19 years of age was evaluated, and minor changes were made. The adolescents and their parents will be part of this assessment. The data collector will obtain consent or assent prior to data collection. The baseline characteristics (demographic factors) to be collected include age, gender, socioeconomic status, educational background and family composition. The data will be collected by data collectors, who will first get training on administering these tools. The data collector will be blind to the random allocation of the participants. In addition, the data assessor will also be blind. This blinding will be useful to collect and analyse unbiased data from the participants.[45]

Outcome measures

Data will be collected at baseline (T1), postintervention (T2, eighth week) and follow-up (T3). At T1, sociodemographic and clinical information, including age, gender, socioeconomic status, school grade, family composition and prior exposure to interventions, will be gathered. At T3, qualitative data will be collected via semistructured interviews to explore stakeholders' perceptions of the intervention's acceptability and feasibility within the Pakistani context. Primary outcomes (anxiety and depression) will be assessed using the Aga Khan University Anxiety and Depression Scale (AKUADS), while secondary outcomes (psychological distress, psychological adjustment, quality of life and parenting skills) will be evaluated through standardised self-report measures at all time points. All the tools mentioned below have been validated and found reliable both globally and within the context of Pakistan.[19 41 43]

Primary outcome

Anxiety and depression

A pretested validated AKUADS will be used to assess psychological distress (anxiety and depression) affecting the target population over the last 2 weeks.[45] This tool is specifically designed for the local population (Pakistani) in Urdu language and includes 25 items with two subscales exploring psychological (13 items) and somatic (12 items) problems. Items score ranges from 0 to 3 (0=never, 1=sometime, 2=mostly, 3=always) for each question item; hence the total score of the tool is 0–75. The higher the score, the more severe anxiety and depression will be, with a cut-off score of 19. 'At a cut-off of score 19 verified sensitivity of 74% and specificity of 81%, positive predictive value 61%, the negative predictive value of 88%, and an overall misclassification rate of 21%'.[46] A score equal to or greater than 19 shows anxiety and depression. The scale is reliable to use among 15–19 years of school and high school Pakistani adolescents reporting Cronbach's Alpha of 0.8.[19]

Secondary outcome

Psychological distress

K10 will be used to assess psychological distress among adolescents and parents.[47] The K10 consists of questions about mental health in the previous week, which are scored on a scale from 5 to 1 (5=all of the time; 4=Most of the time; 3=Some of the time; 2=A little of the time; 1=none of the time). The scores range from 6 to 30; by summing the individual items, total scores are calculated. The higher scores indicate high psychological distress. The K10 showed strong internal consistency (Cronbach's alpha=0.83) and a two-factor structure explaining 66% of the variance.[48]

Quality of life

This tool will be used to assess adolecents' quality of life (health-related) during the past 4 weeks.[49] Having four functioning subscales namely, physical, emotional, social and school functioning. This tool measures a child's quality of health on a points Likert scale ranging from 'no problem=1' to 'almost always a problem=4'. Items are then reverse-scored and linearly transformed to a 0–100 so that higher scores indicate better quality of life. This tool has a total score (of all 23 items) and domain scores including physical health summary score (8 items), psychosocial health summary score (10 items) and school functioning score (5 items). A valid and reliable tool used widely across the globe.[50]

Problem-solving

The problem-solving and psychological adjustment will be assessed using a self-reporting scale Social Problem-Solving Inventory-Revised Short Form,[51] including five subsets of scales with five items each. Of five subscales, two of these include 'positive problem orientation' and 'negative problem orientation', which measure the functional and dysfunctional cognitive and emotional orientations

towards solving problems. The other three remaining subscales measure the styles of 'rational problem-solving', 'impulsivity-carelessness' and 'avoidance style', assessing problem-solving skills and behavioural style. The total score of this scale varies between 0 and 20 points. The highest scores correspond to better social problem-solving abilities.

Perceived emotional/personal support

It is developed to measure the perceived emotional support by a self-report[52] on perceived support by each relationship category such as family members, non-family adults and friends. On a four-point scale (hardly at all to very much), the subjects answer the following questions about each person listed: 'How much do you talk to them about personal concerns?' 'How close do you feel to them?' and 'How satisfied are you with the help and support they give you?' How much do they talk to you about their concerns? Three support variables are created by averaging all ratings for all persons listed within each relationship category: perceived support from family, non-family adults and peers. Scores range from 1 to 4.

Parenting practices

The assessment of parenting behaviours will use the Alabama Parenting Questionnaire-42,[53] this tool includes five constructs: involvement (10 items), supervision and monitoring (10 items), positive parenting (6 items), consistent discipline (6 items) and corporal punishment (3 items), with the additional 7 items addressing alternative disciplinary practices. Each item, rated on a 5-point scale from 1 (never) to 5 (always), contributes to the construct's score, calculated by summing the relevant items.

Strengths and difficulty

The Strengths and Difficulties Questionnaire, a widely used screening tool for assessing psychological adjustment in children and adolescents,[54] categorises positive attributes (strengths) and problematic behaviours (difficulties) across five domains, each comprising five items: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour (strengths). Respondents use a Likert scale ('not true=0', 'somewhat true=1', or 'certainly true=2') to indicate their response, representing a three-point categorical scale. Scores within each domain are summed, with higher scores in emotional symptoms, conduct problems, hyperactivity/inattention and peer relationship problems indicating greater difficulties, while higher scores in the prosocial behaviour domain signify strengths.

Perceived belonging

The assessment of perceived belonging and psychological engagement in school will use the Psychological Sense of School Membership scale.[55] This comprehensive scale delves into the sense of belonging in school environments, focusing on caring relationships, acceptance and rejection. Comprising 18 items rated on a Likert scale from 1 (not at all true) to 5 (completely true), scores are calculated by summing responses and then averaging, resulting in a score range of 1–5. Higher scores signify a stronger sense of perceived belonging and engagement within the school community.

Moderating factors

We will also explore potential moderating factors that may influence the intervention's effectiveness on the primary outcomes. These factors include gender, age groups, socioeconomic status, parental education and parents' psychological well-being. Statistical analyses will assess whether these variables moderate the relationship between the intervention and changes in anxiety and depression.

Data management and Statistical Analysis Plan: for the cRCT

All data will be securely entered into a password-protected database by trained personnel. To ensure data quality, a double data entry process will be implemented, whereby two independent entries will be compared with identify discrepancies. Range checks and logical validation rules will be applied to ensure consistency and accuracy of data values. Data will be coded using predefined schemes to maintain confidentiality, and all identifiers will be removed before analysis. Secure, encrypted storage solutions will be used for both electronic and physical records. The primary investigator and the supervisor will only have access to the data.

In the forthcoming cRCT study, the Statistical Analysis Plan outlines the following procedures. Initially, data entry and analysis, using SPSS software V.27.0, will involve comprehensive data cleaning, including handling missing data through deletion or imputation as needed. Descriptive statistics will then summarise demographic data, reported as frequencies and percentages. The primary analyses will adopt an intention-to-treat approach, using linear mixed models (LMMs) for differential treatment effects, accommodating varying observations and handling missing data through maximum likelihood estimation. These models will include fixed effects (intervention, assessment time) and random effects (clusters), tested via t-tests with a significance level of $p<0.05$ and calculated 95% CIs. Following model fitting, a sensitivity analysis will ensure the study outcomes' reliability under diverse assumptions.

Next, employing LMM analyses, the impact of the intervention on five targeted indicators will be examined, with time, group and interaction serving as independent variables. If an intervention effect is discernible, the PROCESS 3.3 plugin in SPSS will be used for a simple mediation model. The significance of the mediating effect will be tested using the bias-corrected non-parametric percentile Bootstrap method (n=5000), with a significant effect determined by a 95% CI excluding zero.

Finally, moderation analysis will explore how variables such as gender, age groups, socioeconomic status, parents' education, psychological well-being, geographical

contexts and strengths and difficulties behaviours influence the relationship between the EASE intervention and anxiety/depression outcomes. The Random Forest algorithm will be employed for moderation effects analysis, identifying potential moderators based on recursive partitioning from the R 'mobForest' package.

Qualitative study

Employing an explorative qualitative descriptive design, this study will qualitatively investigate four public high schools actively participating in the SBMHP within the intervention arm. Participants in this qualitative inquiry will include various stakeholders involved in the recent clinical trial of SBMHP. The stakeholders within the SBMHP will be categorised into three distinct groups (online supplemental file 4—table 3) based on their roles: the first group comprises authorities responsible for programme execution, such as the CEO, the district education authority in Multan, and school principals. The second group involves those supporting researchers in programme management, including vice principals, teachers, session evaluators and data collectors. The third group encompasses individuals directly engaged in the programme's implementation, comprising teachers, students and parents. The study will use purposive sampling to select 27–42 participants from three stakeholder groups in intervention arm schools implementing SBMHP, considering unique characteristics and experiences related to the programme. The final sample size will be determined based on data saturation.

Eligibility criteria for different participants

Eligibility criteria for participants in the study include students who have attended at least 4–5 out of 7 sessions, teachers delivering the intervention sessions, parents attending at least two out of three sessions, school principals supporting the intervention, managing staff/session evaluators/data collectors, leaders providing permission and guidance from the education and training department and volunteers with informed consent.

Data collection

The participants will be recruited after the completion of the intervention. The data will be collected via open-ended individual interviews, using semistructured interview guides (online supplemental file 5) tailored for each stakeholder. Interviews, lasting 60–90 min, will occur at agreed-upon times and locations. Before data collection, the data collector will obtain written consent and assent from the participants. Demographic information will be gathered. Interviews will be conducted in Urdu, with field notes and emotional cues noted. Audio recordings will be securely stored and backed up. Transcripts will be translated and meticulously checked for accuracy by the primary investigator before analysis.

Qualitative analysis and study rigour

Our protocol for qualitative data analysis, informed by the methodology outlined by Miles, Huberman and Saldana,[56] will follow a systematic approach for thematic analysis. Initially, we will meticulously organise and prepare collected data to ensure its readiness for analysis. Subsequently, we will identify key phrases and patterns through attentive reading and sensing of the data. These elements will be categorised using coding tables to facilitate systematic analysis and organisation. Additionally, we will employ an editing approach to accurately describe participants' narratives. Furthermore, we will align identified patterns and themes with research questions to ensure coherence and relevance throughout the analysis process. Finally, we will interpret the data to construct and justify theoretical frameworks, thus providing a comprehensive analysis grounded in systematic procedures.

In ensuring study rigour or trustworthiness, qualitative research adopts Lincoln and Guba's (1985) criteria, covering credibility, transferability, dependability and confirmability.[57] Triangulation is employed, integrating both qualitative and quantitative data to enhance credibility and trustworthiness. The qualitative component provides nuanced insights, revealing contextual factors, capturing perspectives and identifying implementation challenges. Observations using the ENACT checklist during teachers' sessions further enhance study credibility.[44] The preparation as a valid 'tool' involves reflexivity, using a reflexive journal to acknowledge biases and employing peer debriefing for diverse perspectives. Handling prior experiences' influence on data interpretation includes an audit trail strategy, bracketing personal preconceptions and consulting the research team for varied perspectives, ensuring a more objective interpretation.

ETHICS AND DISSEMINATION

The research plan places a significant emphasis on ethical considerations. Approval from the Ethics Committee of the School of Nursing and Rehabilitation, Shandong University, was obtained (reference No. 2023-R-024) and an approval from the Mukhtar A Sheikh Hospital, Multan, Institutional Review Board (Ref: IRB-2019/MASH/Approval-06/March/2023) before initiating the study. The trial is registered at ClinicalTrials.gov (ID NCT06155838). Participants and their parents will receive detailed information about the study's purpose, objectives, procedures, potential risks and benefits to ensure their comprehensive understanding. Informed consent will be obtained from parents, along with assent from adolescent participants (online supplemental file 6), emphasising the voluntary nature of participation. Privacy and confidentiality will be strictly upheld, with all data and materials collected during the study securely stored and accessible only to authorised research personnel throughout the investigation. Any adolescent found with a profound level of anxiety or depression will be referred to a psychologist/psychiatrist at the identified public hospital in collaboration with parents. The manuscript has adhered to the SPIRIT (Standard Protocol

Items: Recommendations for Interventional Trials) checklist along a Gantt chart (online supplemental files 7 and 8). Results will be disseminated via peer-reviewed publications, conferences and stakeholder meetings to inform future practice and research.

Patient and public involvement

Patients or the public are not involved in the design. Adolescents, parents and teachers were involved in the intervention implementation.

DISCUSSION

This study, employing a mixed-method design involving a cRCT and qualitative study, aims to test the efficacy of the EASE intervention and unravel the multilevel factors influencing the implementation of the intervention, addressing anxiety and depression among school-going adolescents in Pakistan. The findings not only provide valuable insights for refining existing interventions in school settings but also introduce a novel model for assessing complex interventions in real-world school environments, particularly in resource-constrained settings like Pakistan. The anticipated outcomes hold substantial potential for actionable knowledge, guiding local adaptations for scaling up initiatives in rural school settings. This involves preparing teachers and empowering adolescents and their parents to identify and address critical mental health needs among school-going adolescents. The translational implications of this research to policy suggest a transformative impact on the delivery of mental health intervention programmes in schools, especially in addressing anxiety and depression. Moreover, the study's findings have the potential to catalyse changes in education policy by advocating for the integration of intervention modules into the mainstream curriculum at the school level. This strategic inclusion can contribute to a holistic approach, embedding mental health support within the educational framework and fostering a more comprehensive understanding and proactive management of anxiety and depression among school-going adolescents. Furthermore, the employment of task-shifting by including teachers (non-specialist) to deliver the intervention not only strengthens mental health human capacity in schools but also advocates for the expansion of access to child and adolescent mental health services, initiating sustainable efforts and reinforcing the implementation of mental health programmes at the school level, ultimately enhancing overall mental health services.

This study represents one of the initial endeavours in Pakistan to assess the effectiveness of school-based interventions. It seeks to contribute novel insights to local literature, offering foundational data for healthcare providers, educators and the education ministry to shape national policies. The research holds potential for advancing comprehension of adolescent mental health, implementing preventive measures at the school level and establishing a basis for mental health enhancement, with potential implications for future research, recommendations and cost-effective mental wellness programmes in Pakistani schools, potentially impacting psychiatric service referrals and support facilities for vulnerable adolescents, thus reducing psychiatric illness prevalence among youth and positively influencing their later lives.

Limitations

While this protocol aims to provide a comprehensive framework for evaluating the intervention, we acknowledge certain limitations that may influence its implementation and outcomes. Reliance on self-reported measures is a recognised limitation of this protocol, as it may introduce response bias and potentially affect the validity of the data collected. To address this, the study incorporates validated tools and outlines steps such as providing clear instructions to participants and ensuring anonymity during data collection. These measures aim to mitigate the risks associated with response bias and enhance the reliability of the findings.[44 58 59]

Another limitation pertains to the feasibility of implementing the intervention in real-world school settings, which may vary significantly depending on contextual factors such as resource availability, school infrastructure and cultural acceptability. These variations could influence the generalisability of the findings.[60] Previous research has highlighted similar challenges in scaling school-based interventions in diverse contexts, emphasising the importance of adaptability and robust implementation strategies.[61] The protocol accounts for this by including plans to document contextual factors that may impact implementation and outcomes. Furthermore, the need for future research to evaluate the scalability and adaptability of the intervention in diverse settings has been emphasised.[62]

X Lubna Ghazal @Ghazal5

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terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

ORCID iD

Lubna Ghazal http://orcid.org/0000-0001-7494-3536

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