Peer-delivered Problem-solving Therapy for Adolescent Mental Health in Kenya: Adaptation for Context and Training of Peer-counselors

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Abstract

Peer-delivered interventions for adolescent mental health can help address poor access to mental health interventions. Questions remain about how interventions can be adapted for peer delivery and whether peers can be trained. In this study, we adapted problem solving therapy (PST) for peer-delivery with adolescents in Kenya and explored whether peer counselors can be trained in PST. We adapted treatment prior to and during training using the Cultural Adaptation and Contextualization for Implementation framework. Nine peer counselors (Ages 20–24) were selected and trained over 10 days. Peer competencies and knowledge were measured pre-post using a written exam, a written case study, and role plays rated using a standardized competency measure. We chose a version of PST used in India with secondary school adolescents originally delivered by teachers. All materials were translated into Kiswahili. Language and format were adapted to Kenyan adolescents as well as for delivery by peers with a focus on understandability and relevance (e.g., noting shared experience). Metaphors, examples, and visual materials were adapted for the context to reflect the culture and vernacular of Kenyan youth. Peer counselors were able to be trained in PST. Pre-post competencies and understanding of content showed improvements with peers minimally meeting patient needs (pre) on average to moderate/fully meeting patient needs (post). Post-training written exam score showed an average 90% correct. There is an adapted version of PST for Kenyan adolescents and peer delivery. Peer counselors can be trained to deliver a 5-session PST in a community context.

Keywords Problem-solving therapy · Adolescents · Mental health · Peers · Adaptation · Lay-counselors

Introduction

Around 10–20% of youth experience a mental health disorder like depression or anxiety (WHO, 2021). Mental health disorders like these are one of the leading causes of disability among youth globally (Erskine et al., 2015). Despite the need for effective interventions globally, treatment for youth experiencing mental health problems in low and middle-income countries (LMICs) is lacking (Kieling et al., 2011).

In Kenya, youth experience a significant burden of mental health problems. Adolescents and young adults ages 10–24 comprise 60% of Kenya's population with a 10.3% prevalence of mental health disorders (Memiah et al., 2022). Based on a 2022 survey, there are around 53 psychiatrists in public facilities for a population of 47 million people in Kenya (Kenya Ministry of Health, 2022). This shortage of professional mental health providers leaves a majority of youth without access to treatment. Delivery methods that do not solely rely on professionals are needed to bridge the treatment gap.

One solution to the provider shortage is task-sharing – the training of non-specialists, such as teachers or nurses – to deliver mental health services typically conducted

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by specialists (Joshi et al., 2014). Task-sharing has been implemented in many LMICs, including Kenya, and has been shown as an effective approach for delivering mental health services and increasing access to treatment (Atif et al., 2019; Chibanda et al., 2015; Devassy et al., 2022; Giusto et al., 2021; Spedding et al., 2020). Task-sharing has the potential to reduce the mental health treatment gap for youth in Kenya (Wasil et al., 2021).

For youth, task-sharing treatment to peer-aged providers may be an especially beneficial approach. Peer-providers, with similar lived experience or social proximity to the patient, in this case age, can not only increase the number of providers to deliver care but potentially improve the relevance of treatment. Peer-providers proximity to youth can increase youth engagement in mental health treatment and reduce stigma around treatment (Druss et al., 2010; van Ginneken et al., 2013). Despite the promise of peer approaches few studies have explored peer-delivered interventions for youth mental health problems like depression and anxiety. The studies that have used peer delivered programs often focus on outcomes proximal to mental health or on promotion of well-being. For instance, a 2021 study examining a peer-led intervention of mental health promotion among university students in Hong Kong using a one group pre-posttest saw improvements in students' mental health awareness (Ahorsu et al., 2021). Questions remain regarding whether, and how, youth peer-providers can be trained to deliver a mental health intervention for adolescents. Studies describing training and peer provider outcomes are needed to generate knowledge on training strategies that may or may not work for such providers.

In addition to task-sharing, brief interventions that target shared factors across disorders (e.g., emotion regulation in anxiety and depression) may be more scalable, flexible, and cost-effective solutions for addressing mental health when compared interventions focused on single-disorders (e.g., depression only). Problem-solving therapy (PST) is a treatment that targets comorbid disorders (Bell & D'Zurilla, 2009; Eskin et al., 2008). PST focuses on increasing capacity to cope with stress through problem- and emotion- focused coping skills to allow engagement in positive, healthy activities (D'Zurilla & Nezu, 2010). In a recent review, PST was shown to alleviate symptoms of depression among youth ages 14–24 (Michelson et al., 2022), and PST has been shown to reduce youth suicide risk in a randomized waitlist control trial (Eskin et al., 2008). Further, PST has been delivered by community health workers via a mobile application in a pilot cohort study in Kenya with adults with improvements in common mental health problems (Doukani et al., 2021). Yet, to our knowledge, a peer-provider PST for adolescents has yet to be adapted or delivered in Kenya or any context.

A key step for appropriate implementation of an evidence-based intervention like PST in a new context, culture, or delivery model is adaptation for these elements. Adaptation consists of the deliberate alteration of an intervention's design or delivery to improve its fit or effectiveness in a given context (Stirman et al., 2019). Using a structured tool to adapt an intervention to a new context can increase the likelihood that the intervention will be delivered and will be effective for the target population (Bernal et al., 2009). For instance, in a meta-analysis of treatments adapted for culturally diverse populations compared to non-adapted interventions, adaption increased intervention effectiveness especially for Non-English speaking individuals or for a single culture or ethnic group (Griner & Smith, 2006; Rathod et al., 2018). Despite the importance of tracking and understanding adaptation processes for implementation, few studies report on these methods. Recent efforts from implementation scientists have focused on using standardized frameworks to report and track the adaptation of psychosocial interventions (Bernal et al., 1995; Sangraula et al., 2021; Wiltsey Stirman et al., 2019). Reporting and tracking of adaptations can inform the fields of implementation science and youth psychology, presenting roadmaps for understanding how to tailor treatments to later test what works best for whom. No studies to date have explored the systematic adaptation of PST for youth peer-delivery.

In this study, we systematically adapt a PST intervention for peer-delivery to treat youth presenting to a community center in western Kenya and evaluate whether peer counselors can be trained on the intervention. We adapted the intervention using the mental health Cultural Adaptation and Contextualization for Implementation (mhCACI) framework, a model for adapting interventions for implementation in new contexts (Sangraula et al., 2021). Adaptations were coded using Bernal's Ecological Validity Model (EVM) framework that helps organize types of adaptation (Bernal et al., 1995; Michelson et al., 2020; Sangraula et al., 2021). To evaluate peer counselor outcomes following training, we used quantitative and qualitative tools to explore changes in general counseling competency and intervention specific competencies pre and post training. This study is one portion of a larger project in which the resulting adapted intervention will be piloted with youth by trained peer providers. We focus here on implementation process data to inform other clinical researchers on processes of adaptation for cultural relevance and context and inform the potential use of peer delivery for adolescent mental health interventions.

Methods

Setting

This study was conducted in Eldoret, Kenya in collaboration with Moi Teaching and Referral Hospital (MTRH), Family Health Option Kenya (FHOK), and Indiana University (IU). MTRH is part of the Academic Model Providing Access to Healthcare (AMPATH), a service and research Consortium including MTRH, Moi University, and several North American and European Universities. MTRH is a tertiary care center in Western Kenya, receiving referrals for specialty medical and surgical care from hospitals throughout the region. MTRH houses many AMPATH research and care programs, including the AMPATH Mental Health Program team. The Mental health offices at MTRH Nawiri Recovery and Skills Centre served as the training site for peer counselors and site for all collaborative adaptation work leading up to intervention implementation.

Training was conducted in collaboration with FHOK which operates a health center and youth drop-in center located in Eldoret town. FHOK is a non-profit organization whose work centers on reproductive health, HIV, and adolescent and youth health. FHOK's -youth drop-in center serves as a place where young people receive health education and engage in recreational activities such as music and dance. The youth drop-in center has peer mentors who have already received training in how to deliver health education. About 40 youth visit the center daily; during COVID-19, this was closer to 20. There are about 400 unique youth and adolescents aged 10–24 years currently regularly visiting the center. The center has trained 300 peer mentors aged 15–24 years over the past decade.

All study procedures were approved by the Moi Teaching and Referral Hospital/Moi University Institutional Research and Ethics Committee (MTRH/MU IREC) and the Institutional Review Board at Indiana University (IU) as well as by New York State Psychiatric Institute (ceded oversight to IU) and Duke University (ceded oversight to IU).

Team Description

A team of local Kenyan researchers, clinicians, and community leaders and clinical researchers in the United States (US) contributed to the processes of adaptation, training, and evaluation. This was an interdisciplinary group of psychologists, physicians, and researchers. Physician contributors included two Kenyan psychiatrists and an adolescent medicine pediatrician–all based at MTRH, an American adolescent medicine pediatrician, and an American internal medicine and pediatrics physician– both based part-time in Kenya, part-time in the US at Indiana University School of Medicine (IUSM). Our psychologist contributors included a Kenyan medical psychologist based at MTRH and two American psychologists, who primarily conduct work in Kenya to support mental health intervention adaptation and evaluation, based in the US. The Kenyan psychologist serves as project coordinator for the study. A Kenyan with significant experience working with youth organizations in Eldoret served as the lead research assistant and coordinator for implementation at FHOK. This core team led initial adaptation conceptualization and training planning. An additional team helped support training implementation and the process of adapting materials. This team included two Kenyan research assistants and counseling psychologists, an American medical student from IUSM, an American clinical psychology doctoral student, and two US-based undergraduate students. The majority of the team worked in-person in Eldoret with regular tele-communication via zoom and cloud-sharing platforms to facilitate full team meetings.

Guiding Adaptation Frameworks

Adaptation Process Framework

We used the mental health Cultural Adaptation and Contextualization for Implementation (mhCACI) framework to guide adaptation. mhCACI is designed specifically for implementing psychological intervention adaptation in low resource settings (Sangraula et al., 2021). It has three phases with ten specific steps across phases. See Fig. 1 for phases and steps used to guide adaptation in this study. mhCACI phases and steps were modified to match specific study goals. Phases broadly consisted of (1) understanding context need and selecting an intervention, (2) customizing delivery, and (3) implementing elements with iterative adaptation. Steps included the following. First, identifying key mechanisms and targets of change. Second, reviewing the literature. The third step had three parts consisting of initial adaptation. This began with (3a) contacting intervention developers for materials, and then (3b) authors AG and EP conducted an initial manual adaptation. They reviewed the selected manual and materials, noting areas for potential adaptation, and then discussed proposed adaptations with the local team. Local team experts FJ and EK reviewed the adaptations and changes were incorporated. Then (3c), visual materials underwent initial adaption via 'Storyboard That' software with iterative expert team feedback. Fourth, materials were translated (note: local team members indicated some peers may prefer English as opposed to Swahili so two versions were created). Fifth, the local team reviewed and role-played materials. Sixth, we trained peer counselors and iteratively adapted materials based on daily feedback. Training was planned and conducted over a series of hybrid in-person/virtual meetings. Seventh, the team discussed and reached
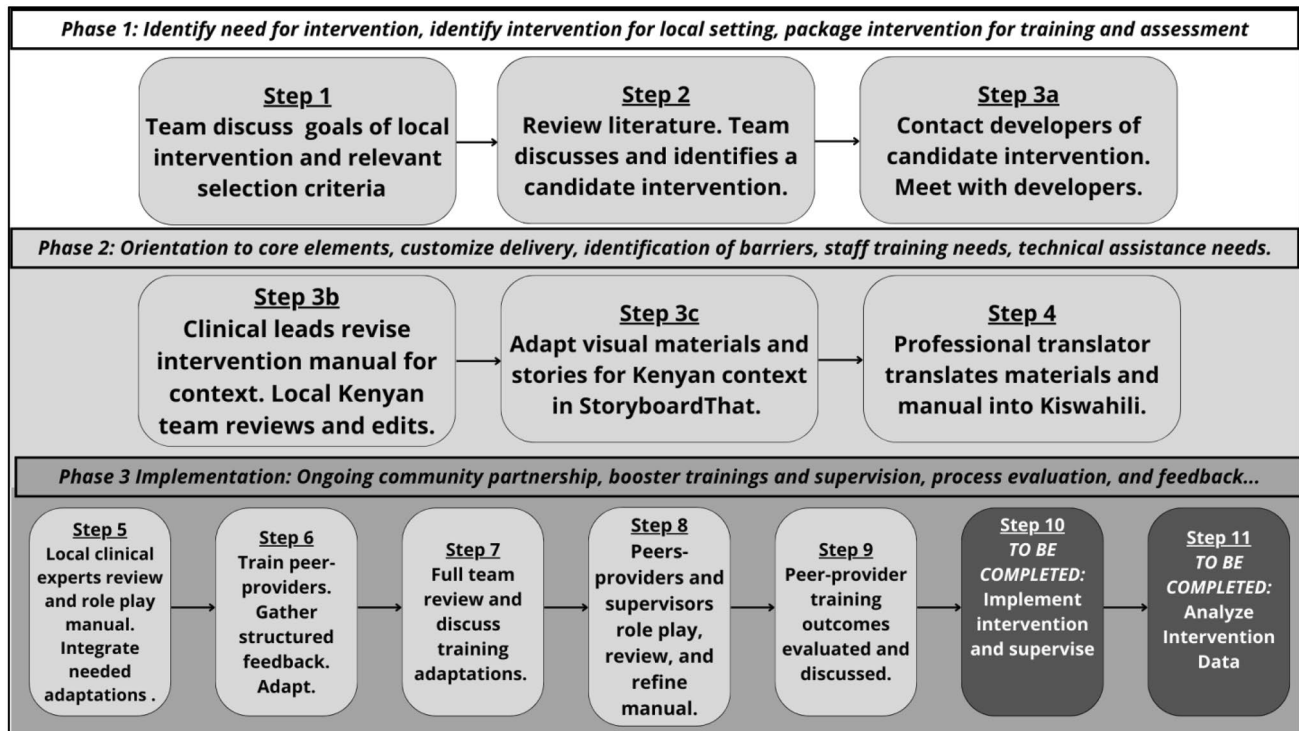
Fig. 1 Process of Adaptation guided by the mental health Cultural Adaptation and Contextualization for Implementation Framework

consensus on adaptations. Eighth, peer counselors reviewed the intervention during a refresher training. Ninth, and lastly, materials were reviewed, and training data analyzed. Step 10, implement treatment and supervise, is ongoing, and as such these results are not covered here. Across steps adaptations focused on cultural, contextual, and delivery relevance.

Adaptation Coding Domain Framework

To classify and track resulting adaptations from each step, we used the Ecological Validity Model (EVM). EVM was originally designed as a guide for developing culturally sensitive treatments or adapting existing psychosocial treatments (Bernal et al., 1995). EVM outlines eight dimensions into which adaptations might fall: language, persons, metaphors, content, concepts, goals, methods, and context. *Language* relates to translation and ensuring culturally and locally appropriate terms. *Persons* pertains to the provider-client relationship and relevant identities. *Metaphors* pertains to images, ideas, and symbols used in the target population's culture. *Content* refers to values, customs, and activities in the target population. *Concepts* refers to belief structures from the target population's culture. *Goals* pertain to the aims of treatment as they relate to broader goals in the population's culture. *Methods* refers to accounting for cultural acceptability in intervention procedures. For our study, we modified methods to include Technical and Logistical elements to

capture adaptations made to materials to enhance usability that did not require alteration of cultural content. *Context* relates to designing the intervention with awareness of the broader experience of the target population, including social, economic, and political contexts. Final adaptations made over the course of the steps were coded using the EVM framework (below we describe tracking and coding).

Selected Intervention: Problem-Solving Therapy (PST)

Step 2 in the mhCACI framework is choosing the intervention. Given that, the intervention choice is a result of the process; however, for clarity, we describe the intervention here to set the stage for describing adaptations as part of results. For this study, Problem Solving Therapy (PST) was selected. PST is an individual treatment with multiple sessions. The 5 core components of PST include: problem identification, problem exploration, action plan development, implementation, and follow-up. We considered PST a candidate intervention for multiple reasons. First it has shown transdiagnostic effects across common mental health disorders (Bell & D'Zurilla, 2009). Second, it has been used with lay providers, it is brief, and it has a straightforward step-wise approach (e.g., identify the problem, generate options, try the option) (D'Zurilla & Nezu, 2010; Sorsdahl et al., 2015). Lastly, PST had been used internationally in Zimbabwe and with new trials being

undertaken in Kenya to explore its effectiveness (Chibanda et al., 2015; Doukani et al., 2021; Osborn et al., 2020).

The PRemIum for aDolEscents (PRIDE) Study manualized PST was chosen as the specific PST package to adapt (Michelson et al., 2020). The PRIDE study designed and evaluated this brief lay-counselor delivered PST intervention for adolescent students in India (Chorpita et al., 2020; Malik et al., 2022, 2023; Please see the PRIDE website for full details: http://sangath.in/pride/). PRIDE PST is 5-sessions. It was designed to be delivered in-person and has also been adapted for remote delivery. The goal of the treatment is to address common mental health difficulties in students (12–20 years) and enhance their ability to cope with future difficulties. Treatment centers on teaching and practicing problem solving and new coping through a structured problem-solving frame: "Problem-Option-Do It"; this consists of understanding the problem, generating options to solve it, and doing that option. PRIDE PST materials consist of a structured written manual, visual 'comic books' or stories that support learning and homework, as well as fidelity checklists.

We chose PRIDE PST as the manualized PST due to their focus on lay counselors, youth clients, and intervention designed for a low-resource setting. The PRIDE study team generously shared their PST manual and supporting materials for use and adaptation.

Peer Counselors: Procedures and Outcomes

Recruitment

Peer mentors at FHOK are usually recruited from the community based on interest and willingness to volunteer time. Peer counselors for this study were recruited at FHOK drop-in center sites across Western Kenya. Recruitment occurred via flyers, text messages, presentations about the study, and word of mouth. Those who were interested completed an application process consisting of an initial application and interview. From this process, we invited 10 peers to attend the PST training with compensation. At the training, an RA completed consent to research with peers.

Peer counselors' eligibility criteria included the following: aged 18–24, completed form 4 education, and volunteered with FHOK for a minimum of 6 months prior to recruitment.

Demographics

Nine Kenyan peer counselors (Ages 20–24; $M = 22.75$) began training and eight completed all training sessions. One counselor missed the final day. Gender distribution for peer counselors trained was: 11% nonbinary, 33% male, 56% female.

Training

A 2-week training for nine peer counselors was conducted (10 days, 80 h). Curriculum included core counseling skills, mental health psychoeducation, an introduction to PST, and six days focused on reviewing and role-playing the adapted PST intervention. Peers also provided and received clinical feedback guided by standardized tools (described below). Table 1 shows training content.

The training was delivered in person by the multidisciplinary team with local team members leading each day of training. Two sessions were hosted in a hybrid format (i.e., virtual and in person) with team members assisting live presenters via video call. Sessions were delivered in English and Swahili, by bilingual facilitators or by multiple facilitators. Role plays were conducted both in English and Kiswahili using both manuals to practice both languages since both would be used by peer counselors during the PST sessions. In didactic sessions focused on teaching content, such as the mental health overview, one facilitator taught the session to all the peer counselors. In interactive role play sessions, three facilitators first read through and demonstrated

Table 1 Training Schedule Topics by Day

Training Day	Day 1	Day 2	Day 3	Day 4–7	Day 8–9	Day 10
Training Topic	Project Overview	What is Mental Health	Validation and Normalization	Session Read Through of PST Intervention Manual	Research Ethics, Assent/Consent	Post Evaluations Graduation
	What is Counseling	Core Counseling Skills: *Body Language, Active Listening, Reflection/ Restatement & Open-Ended Questions*	Problem Solving Therapy (PST) Overview	Session Role Play	Suicidal Risk Assessment	
			Screening for Mental Health	Home Practice Assignments for Problem-Solving Method & Coping Skills	Role Plays & Reviewing Adaptations to Intervention	

PST Problem Solving Therapy

the intervention, then peers divided into small groups and practiced with supervision from facilitators who provided individualized feedback.

Data Collection and Analysis

Adaptations

Tracking Adaptations at each phase were recorded by a team member in a shared excel document and tracked in the materials themselves. During training, facilitators and peer counselors documented feedback in structured notes while learning the manual and role-playing. At the close of each training day, the training team and the peers discussed and summarized feedback to reach consensus on adaptations that should be proposed. These adaptations were emailed to the full team for daily review and final approval. Approved adaptations were documented, codified, and executed. Adaptations recorded across phases were then compiled and coded.

Coding and Analysis We coded each adaptation by EVM-dimensions (e.g., language, metaphor) (Bernal et al., 1995) One clinical researcher initially coded adaptations (MVM) in consultation and review by AG. Coding dimensions were straight forward so we opted to use one primary coder with oversight. After coding, descriptive statistics were performed in Excel to calculate the number of adaptations by dimension and phase. We then reviewed all coded adaptations for salient examples to highlight in results.

Peer Counselor Outcomes

Peer counselor competencies clinically and with PST were evaluated prior to training and immediately following training.

General Counseling Competency: The Working with Children – Assessment of Competencies Tool (WeACT) WeAcT was used to assess general clinical counselor competencies in structured role plays prior to and following training (day 10). These are core skills foundational to providing therapy, such as reflection and validation, rated on a scale of 1 to 4. WeACT was specifically designed to evaluate the competency of non-specialist providers' core counseling skills (Jordans et al., 2021). It is part of a battery of tools to evaluate competency-based training by the World Health Organization (WHO) called the Ensuring Quality in Psychological Support (EQUIP) platform (Kohrt et al., 2020). WeACT has shown sensitivity to change, reliability, and clinical utility with lay providers internationally (e.g., alpha 0.94 with lay

providers in Gaza; Jordans et al., 2019, 2021, 2022). Here, a group of 3–5 raters individually rated peer counselor competencies during pre- and post-training role plays using the WeACT. After rating independently, raters discussed scores to reach a consensus score for each peer counselor's pre- and post-role plays. Scores were summed and averaged with higher scores indicating higher competency.

Consensus WE-ACT scores across individuals from role plays on Day 1 and Day 10 of training were compared using dependent-sample Wilcoxon signed rank test and evaluated for statistical significance with ($\alpha = 0.05$). Effect sizes (r) were calculated by dividing the z-score by the number of scores in the sample (Field et al., 2012). Completed WeAct evaluations were qualitatively reviewed for peer counselors' strengths and areas needing improvement.

Clinical Knowledge A written exam was administered to peer counselors before and after training to assess general knowledge of relevant mental health constructs such as depression and anxiety symptoms, coping strategies, and potential approaches to counseling. The exam consisted of 8 multiple choice questions covering PST and core counseling skills and 4 short answer questions about mental health and general treatment strategies. A rubric for scoring answers was developed and one team member trained in scoring. Exams were scored by this researcher and documented in a database for review. Any questions on scoring were directed to the team for review. Mean scores from written exams administered on Day 1 and Day 10 of training were compared using dependent-sample Wilcoxon signed rank test and evaluated for statistical significance with ($\alpha = 0.05$). Effect sizes (r) were also calculated (Field et al., 2012). Written exam responses were qualitatively evaluated for areas of strength and areas needing improvement.

PST Knowledge Application A written post-exam case study was administered to peer counselors after training to assess application of PST knowledge to cases. The post-exam case consisted of 7 questions specific to a written case description of an adolescent presenting to care with general distress. Questions covered the steps of PST and how peer counselors would engage with the client. Appendix 1 includes the full exam. For example, one question was: "Generate some options to cope with or solve this problem. Which option would you encourage Frank to choose and why?". The exam was in English, using simple language. Case studies were scored by one researcher using a rubric following the same process for assessing clinical knowledge. Scores were documented in a database for review; mean scores are reported. We also reviewed case study responses across trainees to explore any patterns of correct answers and incorrect answers to help identify areas of strength and areas needing improvement.

Results

Intervention Adaptations

Steps 1–8 of mhCACI resulted in over 135 adaptations to original PRIDE PST materials. The overall session structure (i.e., number of sessions), type of material (i.e., manual, booklets), and core components (i.e., problem and emotion-focused coping to address stressors) did not change. As shown in Fig. 2, adaptations by EVM dimension were as follows: 35.3% language, 3% persons, 3.8% metaphors, 8.2% content, 5.3% concepts, 1.5% goals, 38.3% methods/technical/logistics, and 4.5% context. Primary changes focused on manual readability and flow (methods/ technical/logistics), translation (language), enhancing relevance of peer counselor shared identity with patients (persons), and integrating concepts of cultural and contextual relevance in the scripts and examples in the PST manual and supporting materials (content).

A summary of the adaptations resulting from this iterative process and salient examples of each adaptation stratified by EVM dimension can be found in Table 2. The most substantial adaptations resulted from training feedback (Step 6), preliminary adaptation and clinical review of the PST manual (Steps 3b, 5), and visual and content adaptation of the homework booklets and PST manual (Steps 3b, 3c). Earlier steps in the adaptation process primarily led to adaptations in language and understandability because translation and edits for comprehension occurred early in the process. At this early stage, elements of the original intervention not relevant for this implementation context were discussed and removed. For instance, remote delivery was not possible, so we removed original manual content focused on remote delivery. Additionally, we removed scripts across sessions focused on the peer counselor and patient discussing the need for a higher level of stepped-care specific to the original PRIDE project. We did maintain discussion of next steps and need for potential referrals to higher care particularly in the final session.

Earlier steps also produced more adaptations to better reflect Kenyan culture, values, and traditions in the intervention, corresponding to the EVM dimension of content. Later steps in the process focused primarily on adaptations in EVM dimensions methods/technical/logistics and context, situating the intervention for implementation in a Kenyan setting and making changes based on practical application and role-play.

Peer Counselor Outcomes

Training Outcomes

General Counseling Competency Average group pre-training scores were 2.29 ($SD = 0.73$; $Median = 2.38$), which corresponds to a score between minimally meeting patient needs (score = 2) and moderately meeting patient needs (score = 3). Average group post-training scores ($M = 3.11$, $SD = 0.19$; $Median = 3.11$) fell between moderately meeting patient needs (score = 3) and advanced therapeutic skills (score = 4). Differences in group pre-post training counseling competencies were significant in the expected direction ($W = 35 \pm 7.11$; $p = 0.017$) with a large effect ($r = 0.84$). Looking at individual-level change, WeAct scores improved for eight of the nine peer counselors. See Fig. 3 for pre-post competencies for each peer counselor. Patterns in the data showed post-training strengths included use of skills such as active listening, open-ended questions, and summarizing. Use of empathy, warmth, and understanding as well as ability to receive and implement feedback improved the
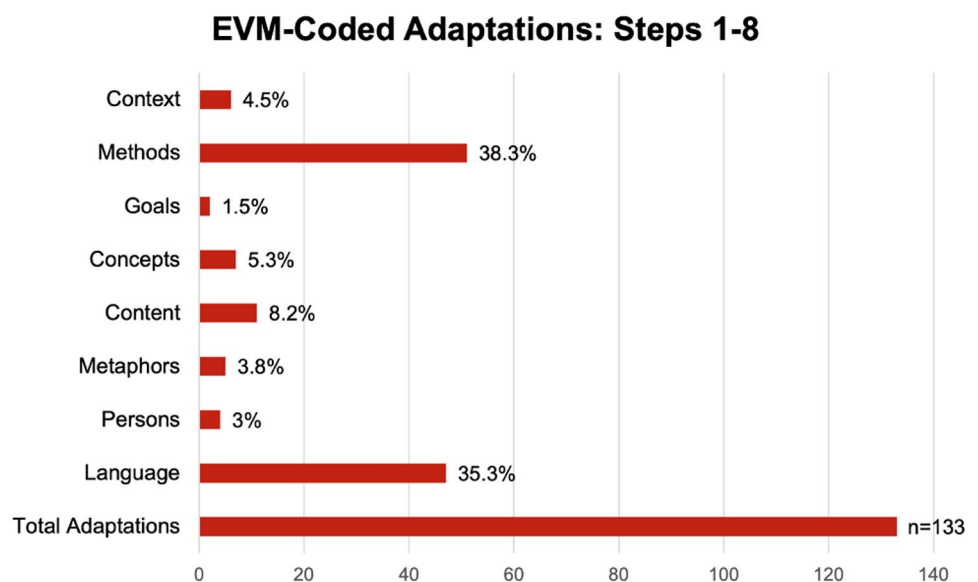
Fig. 2 Total Adaptations by EVM Dimensions

EVM-Coded Adaptations: Steps 1-8

- Context — 4.5%
- Methods — 38.3%
- Goals — 1.5%
- Concepts — 5.3%
- Content — 8.2%
- Metaphors — 3.8%
- Persons — 3%
- Language — 35.3%
- Total Adaptations — n=133

Table 2 Adaptations and Examples by Ecological Validity Model Type

| Dimension	Summary of Main Adaptation	Example	Step
Language *Culturally appropriate, syntonic language*	• Translated manual: English to Kiswahili • Changed manual phrases and vocabulary to increase understandability for peers • Edited manual scripts to increase understandability for patients • Standardized language and key terms across material to promote fidelity	• Offer manual in English and Kiswahili because "*youth and peers will better understand Swahili.*" • Change terms from the original like "student" to "youth" to be relevant • Change words like 'priority' to 'goal' or 'agenda' to 'plan' for understandability	3b; 6
Persons *Role of client and patient*	• Use of peer-adjacent counselors to deliver treatment • Youth attending community centers (not students)	• Collaborated with a community center to recruit youth patients and recruit and train peer counselors serving as mentors at the center	3b, 3c
Metaphors *Symbols and concepts shared in the population*	• Modification of visual material booklets to be relevant to youth and Kenyan culture	• Homework comic booklets remade to visually represent Kenyan ethnicity and typical clothes and hair style. See Appendix 2 for adapted booklet.	5; 3b, 3c
Content *Cultural Values*	• Tailored references to culturally specific activities/examples to reflect Kenyan youth culture • Tailored manual content to enhance opportunities to build rapport/reduce stigma by shared identity. • Adapted booklet stories for relevance	• 'Family store' changed to 'family farm'; 'yoga' changed to 'exercise' • Changed school grades to match Kenyan school system • Homework stressed relevant activities like football, hair braiding • Booklet characters names changed to common Kenyan names (Jane, Mary, James, John)	3b; 3c
Concepts *How consistent with the culture*	• Added increased emphasis on confidentiality to emphasize youth autonomy and rights	• Added script to each session introduction to include reminder and brief questions around confidentiality and recording session for supervision	6;7
Goals *Explanation of goals*	• Enhance and tailor language around the goal of treatment engagement	• Include some script noting potential for longer term interactions with peer-mentor within the community center • Removed mentioned of voluntary withdrawal (i.e., 'you can end treatment at any point') in sessions 2–5 due to concerns youth would believe the counselor wanted them to drop out	3b; 6
Methods: Technical and Logistics *Treatment methods and technical changes*	• Added more scripts and specific resources for peer counselor to increase ease with intervention content. • Tailored manual elements to increase ease of accessing information in manual. • Adapted screening and referral to care mechanisms for the resources and organizations in the area. • Streamlined use of supporting materials across sessions for ease of use	• Updated screening protocols, phone contacts and call hours for clinical referrals. Created standard operating procedures. • Organized manual information into tables, boxes, and bullet points • Removed progress journey graph (assessment) explanation from session 1 to session 2 to increase session 1 acceptability because the explanation was perceived as somewhat complex.	6–8
Context *Consideration of larger context in treatment*	• Tailored training and manual to support management of financial and contextual barriers to care. • Adapted reminder methods to consider differential access to phones, computers, and transportation	• Resources for trouble-shooting financial and transportation issues for youth clients. • In training, role-played ways to provide solutions to youth clients facing contextual barriers.	6–8
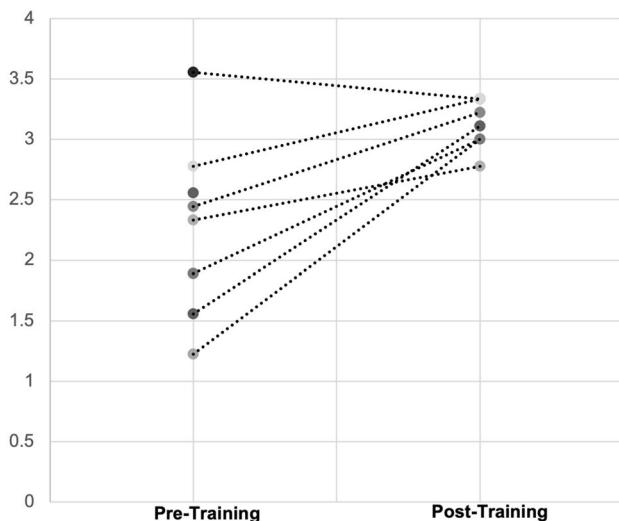
Fig. 3 Pre-Post Training Clinical Competencies among Peer Counselors

Fig. 4 Pre-Post Mental Health and Problem-Solving Therapy Knowledge among Peer Counselors

most pre-post across participants (84.6% and 73.3% change pre-post). Appendix 3 includes a table showing pre-post change scores across competency domains. Areas for continued relative improvement included reframing thoughts/feelings for clients, conveying empathy, and identifying and understanding the client's needs; notably all these domains were still above average post-training.

Clinical and PST Knowledge Knowledge of mental health conditions and the PST intervention showed improvements based on written exam results. The pre-training, the mean reflected relatively poor scores around 51.80% ($M = 10.88$ points, $SD = 4.36$; $Median = 9$). This reflected low knowledge about what mental health was, what coping skills are, and how to apply coping skills. Post-training scores improved to 73.23% ($M = 15.38$, $SD = 2.88$; $Median = 15$). Scores in this range reflect an improved understanding of what constitutes depression and anxiety, what a coping skill is as well as it's application. Pre-post score change met the significance threshold ($W = 36 \pm 7.12$; $p = 0.011$) with a large effect size ($r = 0.90$). Written exam scores improved for all peer counselors; see Fig. 4 for individual pre-post test scores. Patterns in written exam responses showed overall improvements in knowledge of mental health conditions as well as the problem-solving therapy intervention, such as problem-solving steps and suggesting coping skills, with few errors. The main areas for improvement on the post-written exams were listing evidence-based strategies to help clients experiencing depression and/or anxiety; notably this was a more advanced question focused on generalizing knowledge and less relevant to being able to understand the intervention itself.

Post-Training Application of Knowledge to a Case The mean score on the standard written post-exam case study was 16.13
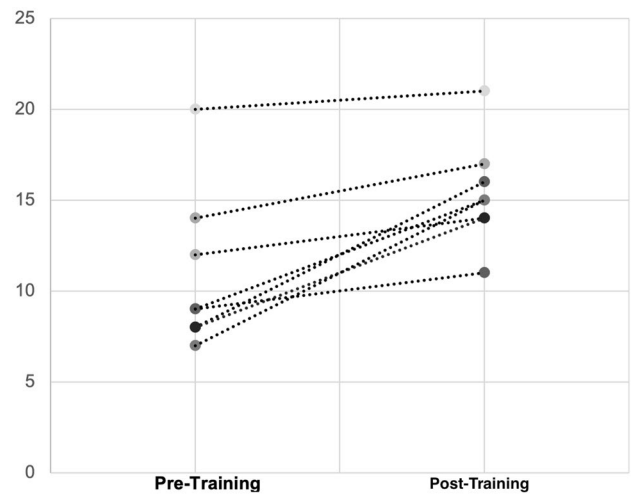
out of 18 points, an average of 89.58% ($SD = 1.55$; Range: 14–18 points; 77.77%-100%). This score reflects an overall ability to apply knowledge of the intervention to a patient. Reviewing answers qualitatively (i.e., reviewing response text), areas of strength included peers' application of the PST intervention specifically, such as identifying problems suitable to address during PST. An area of minor difficulty across trainees was troubleshooting barriers to implementing a problem-solving plan with a patient.

Discussion

We systematically adapted a problem-solving therapy (PST) for peer-counselor delivery for youth experiencing anxiety and/or depression in Eldoret, Kenya attending a community center. We then trained peer-counselors to deliver the intervention. Using the mhCACI framework, adaptation resulted in over 100 modifications to the treatment primarily focused on improving understandability and ease of material use and relevance to the culture, context, and delivery method. No core treatment functions, such as using coping skills to deal with stressors, were changed. Processes resulted in PST for adolescents in Kenya for peer delivery. This is the first adaptation to our knowledge for adolescents in Kenya. This is also one of few examples of treatment adapted for adolescent peer delivery in any context. Results contribute to literature on systematic adaptation of mental health interventions for relevance and context and adaptations important for peer-delivery of a youth mental health intervention in a community setting. Further, it demonstrates proof-of-concept for the ability to train peer-counselors in evidence-based mental health treatment for youth mental health, as opposed to prevention, promotion, or support programs.

The adapted PST adds to emerging work in Kenya using PST with adolescents. Here PST was adapted to be delivered in person by young adults, peer-counselors using a manualized protocol for youth presenting with anxiety or depression problems to a community center. PST has also been piloted with adults in Kenya as part of the Friendship Bench model via a mobile application (Doukani et al., 2021); the Friendship Bench is a specific delivery model of PST originally designed in for adults in Zimbabwe for lay-provider delivery (Chibanda et al., 2016). As these programs of research grow, future work would benefit from broader comparison of tailored PST approaches to understand their effectiveness and utility when tailored for specific contexts, delivery systems, or issues. This can add to implementation science about the level and types of adaptations needed for positive clinical and implementation outcomes (e.g., scale up, sustainability of interventions).

In this study, most adaptations focused on increasing the understandability and usability of the manual and materials for the peer counselors, while a smaller number centered on adaptations to concept, content, context (i.e., deeper level adaptations). Although studies often use different approaches to coding or reporting adaptations, this appears to be consistent with some recent literature showing minimally guided interventions were most often adapted at this more surface level (e.g., changes to language) (Shehadeh et al., 2016). It is possible fewer adaptations to elements like treatment concept (e.g., functions of the intervention) in this study reflect the straightforward nature of the PST intervention. Notably, PST was selected for adaptation because it is straightforward. Further, the course of PST focuses on the problem the youth identifies and wants to address. As such, it follows the youth's lead and may inherently reflect problems often embedded within the youth's context. Use of such idiographic (i.e., specific to an individual's problems/values) and straightforward interventions is reflective of the broader literature in global mental health (Giusto et al., 2022).

A study strength was the use of a systematic, collaborative approach to adaptation and training. Systematic adaptation and tracking allow us to add to the growing evidence for understanding the role of adaptations in implementation and clinical science. There were unique aspects of our adaptation and training approach that may be relevant to other researchers. First, we used the training as a means for iterative intervention feedback with peers that proved pragmatic and efficient. This aligns with emerging adaption models employing rapid, participatory adaptation processes to mental health interventions (Puffer & Ayuku, 2022). Second, due in part to COVID and other restrictions, elements of training were hybrid with pre-recorded psychoeducation videos presented to peer-counselors with facilitation by the local team. This was supplemented with virtual question and answer sessions. These sessions were successful and have potential for scale. Lastly, systematic note taking on training adaptations

each day allowed for quick, iterative decision making by team experts. This process across Kenya and the US was facilitated by technology. Email and use of shared deidentified cloud-based documents allowed for quick decisions on changes that could then be brought back to peers. Frequent communication across team members was foundational to this process.

Although results are exploratory, peer-counselors were able to be trained in the intervention as well as core counseling competencies. Although descriptions and evidence of best training practices for lay providers are generally scarce in the literature, our training approach fit with best practices emphasized in previous research including role-play practices, open discussion, built-in opportunities to shape intervention material, and daily feedback. Results further add to the small but growing literature on peer-counselor training and outcomes for youth mental health. Much of this research has focused on use of peer-supports in school-based settings. We extend this research working with youth embedded in a community setting using an intervention (King & Fazel, 2021). Next, within an ongoing pilot trial, we will explore peer-counselors' ability to implement the intervention with fidelity (i.e., adherence to manual steps) and competency. Next steps may then include exploring the influence of peer-counseling on counselors' well-being as well as the effectiveness of peer-delivered interventions for youth.

As with any study, limitations exist. First, this is an exploratory study, and results should be interpreted with caution. In other words, results do not indicate the effectiveness of the training or adaptation approach. Second, in part given the exploratory nature, our sample was small, and we only examined peer outcomes pre-post within one group. As such, results are not generalizable and should only be interpreted as promising in the pursuit of a larger pilot trial. Third, although adaptation coding was straightforward, we relied primarily on one coder with a high-level review which may have resulted in coding errors. Future work might consider the benefits of double coding. Similarly, scoring of the written exams may have benefited from double scoring or independent scoring to more fully ensure scores reflected knowledge and application of skills. Additionally, while adaptions were tracked throughout, given the large nature of the team, it is possible some adaptations may have been missed. Lastly, although not the focus of this study, it is important to note the adapted intervention is in the process of being tested, as such the effectiveness of the adapted intervention itself has yet to be tested.

A systematic, collaborative adaptation process and training was feasible in a youth community center in Kenya for peer-counselors. The adaption process developed a problem-solving therapy specific to the context of peer-counselor delivery of the intervention between Kenyan youth. Further, peer-counselors embedded within the community center were able to be trained on the adapted intervention. As a next step, peer-counselors will deliver the treatment to youth attending

the community center in a pre-post pilot trial. Delivery outcomes, such as fidelity to treatment, will be monitored and evaluated. Youth mental health symptoms will also be evaluated. Results from this adaptation and training process can inform other practitioners and researchers working with adolescents and/or interested in peer-delivered treatments in Kenya or globally.

Appendix 1: Post-training Case Exam

INSTRUCTIONS: *Read the scenario & answer the following questions*.

Franck arrives at school. He has a big test in two weeks. He can't stop thinking about this test. He has been having trouble sleeping because he is thinking too much about what grade he will get on his test. He feels on edge and nervous. He finds himself getting mad when very small things go

If Franck comes to you for counseling, after you have engaged him and discussed what counseling entails, describe what steps you might take to improve his problem solving coping?

Describe what Franck's Target Problem might be? Why did you pick this?

Generate some options to cope with or solve this problem. Which option would you encourage Franck to choose? Why?

Franck has trouble doing his plan (i.e., the option he chose). He tells you he forgot the option in the moment because he felt very stressed. How might you address this?

For this question there are no right or wrong answers. Tell us a few things (in bullet points, 1–2 words) that you feel like are very important in counseling.

Appendix 2: Sample of Original PRIDE and adapted Husisha Homework Booklet

| Original | Adapted |

wrong. He also has been feeling so stressed that he is finding it hard to concentrate on studying which then just makes him more stressed!

What is the Problem Franck is dealing with?

Describe some (at least 3) of Franck's stress reactions?

Note: Original Comic Book reproduced from Sangath and Harvard Medical School Department of Global Health and Social Medicine. (2020). Book 3 Ajay and Priyanka's 'POD' Adventure. [Electronic Comic Book]. Retrieved from URL: https://sangath.in/pod-booklets/

Appendix 3: Pre-post Training We-ACT Domain Scores

	Non-verbal Communication	Verbal Communication (Active Listening)	Rapport and Relationship Building	Empathy, Warmth and Genuineness	Reframing Thoughts and Feelings	Ensure Meaningful Participation	Problem-Solving	Identify and Understand the client's needs	Giving and Receiving Feedback
Average Pretest score	2.625	2.75	2.5	1.625	1.875	2.25	2.5	2.625	1.875
Average post-test	3.125	4	3.375	3	2	3.25	3	3	3.25
% change	19.04761905	45.45	35	84.62	6.67	44.44	20	14.29	73.33

Compliance with Ethical Standards

Conflict of Interest The authors have no relevant financial or non-financial interests to disclose.

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