The PRIDE study on the effectiveness and cost-effectiveness of a digital training programme to increase competency of non-specialists in delivering brief psychological treatments to adolescents in India.

Statistical Analysis Plan

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INTRODUCTION

Low-intensity problem-solving interventions have been implemented in India to address the scarcity of evidence-based interventions for common adolescent mental health problems nationally and in low-resource settings more widely [1], [2]. The goal of these programmes has been to develop and evaluate a suite of scalable, transdiagnostic psychological interventions (i.e., suitable for a variety of mental health presentations) that can be delivered by non-specialist ('lay') counsellors in resource-poor school settings. Whilst an increasing number of studies demonstrate the effectiveness of “low-intensity” psychological interventions among adolescents [3], [4], few studies have explored effective and scalable methods of training intervention providers in delivering these interventions with high competency.

There is an evidence-gap on how to make these solutions work *sustainably at scale*. The current study will advance knowledge and practice in these areas by generating evidence on scalable approaches aimed at improving non-specialists’ competency to deliver an evidence-based adolescent mental intervention, including a training condition (involving supplementary coaching) that specifically addresses attitudinal factors among trainees.

The study includes a pre-post analysis component assessing the effectiveness of digital coaching, as well as a nested randomized controlled trial comparing the effectiveness of digital training alone with digital training plus coaching.

Research hypotheses

The study hypotheses are:

1) Self-guided Digital Training (DT) will lead to increased competency for non-specialists to deliver an evidence-based problem-solving intervention for common adolescent mental health problems

2) Digital Training with Coaching (DT-C) will be superior to DT in increasing the competency of non-specialists to deliver the problem-solving intervention

Our specific objectives are to:

1) evaluate the effects of digital training on knowledge-based competency of trained non-specialists to deliver an evidence-based problem-solving intervention for common adolescent mental health problems;
2) evaluate the incremental effect of digital training with coaching (DT-C) in comparison with self-guided digital training (DT) on non-specialists’ competency to deliver the problem-solving intervention; and
3) investigate the implementation of the training intervention in both arms.

This Statistical Analysis Plan (SAP) covers the analysis required for both hypotheses and the corresponding first two objectives.

STUDY DESIGN

The study is a parallel, two-arm, individually randomized controlled trial design nested within a pre-post intervention study with equal allocation of participants between arms to evaluate both the DT and DT-C interventions. The results of the randomized controlled trial will be reported using the CONSORT guidelines for reporting individually randomised controlled trials.

Selection of participants
The study will be conducted remotely in partnership with four universities (two co-educational colleges in Delhi-NCR region, one co-educational college in Bangalore, Karnataka region and one girls-only college in Mumbai, Maharashtra region, all metropolitan cities in India) and five NGOs (four in Delhi-NCR region and one in Mumbai, Maharashtra region) working on adolescent health, education and mental health counselling.

The participants are i) university students who have not yet completed a qualification in psychology, education or allied fields, or ii) NGO employees who are working as teachers, social workers or mental health advocates. The participant pool is representative of the intended users of this digital training. The participants comprise mainly from urban backgrounds with mixed socio-economic status.

Eligibility criteria are:

1) Age 18 years or older
2) Fluent in written and spoken Hindi or English
3) Regular access to an internet-enabled smartphone or computer able to view the digital course

Participants meeting the eligibility criteria will be excluded from the study if they have prior training in psychological therapies or counselling.

Self-Guided Digital Training (DT; Control Condition)
Participants randomized to the control condition will be enrolled in a digital training course with 16 modules that addresses non-specific counselling skills and skills specific to an evidence-based problem-solving intervention. The course will be available online on a smartphone app as well as a website that can be accessed through an internet-enabled device. Participants will also have an option to message a centralized helpline for assistance with accessing and navigating the digital interface.

Digital Training with Coaching (Intervention Condition)
In addition to receiving the same DT as control condition participants, those randomized to the intervention condition will receive up to 4 weekly individualized telephone calls from a coach who will motivate them and troubleshoot.

Endpoint
Outcome data will be collected at baseline and 6 weeks post-randomization.

OUTCOME EVALUATION AND DATA DESCRIPTION
The outcome assessments are summarized in Table 1.

Primary outcome
The primary outcome is the Knowledge Quiz, a knowledge-based competency measure that incorporates a case scenario followed by a 17-item MCQ that examines various aspects of counselling in the context of the given case scenario. Two parallel forms of the case scenario and linked Knowledge Quiz will be used at baseline and endline assessments respectively (i.e. respondents will be assessed on the same domains but with different cases and alternative question formulations at each timepoint). The sequencing of the two forms will be determined at random.

Following Rasch analysis of the Knowledge Quiz items, we have determined that items related to brainstorming (item 10 in form A; item 11 in form B) should be removed from the main analysis. A sensitivity analysis using the full 17-item scale will also be completed (see also MCQ validation section below.)

Secondary outcome (RCT only)
The secondary outcomes are 5 measures of training satisfaction. This will be assessed post-training only using subscales from a 26-item questionnaire adapted from MUSIC (eMpowerment, Usefulness, Success, Interest, Caring; [5], an established measure of satisfaction with educational programs that has previously been used in the study setting [6], [7]. Items on the questionnaire are rated on a 6-point Likert scale, covering feasibility, acceptability, adoption and appropriateness of the training program. The purpose is to identify strengths and weaknesses related to course content that may influence participants' engagement and thus to inform improvements. **Appendix A** describes coding of the MUSIC subscales.

Table 1: Outcome assessments at baseline and 6 weeks post randomization

Instrument	Description	Outcome
Knowledge Quiz	The primary outcome is a knowledge-based competency measure that incorporates a 17-item multiple-choice quiz, with questions related to case scenarios. Two parallel forms of the quiz (Forms A and B) will be used at baseline and endline assessments, the sequencing of which will be determined at random. The Knowledge Quiz is scored as the total number correct out of 17. For respondents who attempted the knowledge quiz, missing answers are counted as incorrect.	Total score (out of 17)[1]
MUSIC	5 subscales from a 26-item questionnaire adapted from MUSIC (eMpowerment, Usefulness, Success, Interest, Caring) cover the feasibility, acceptability, adoption and appropriateness of the training program. These are rated on 6 point likert scale ranging from Strongly Agree to Strongly Disagree.	Mean score within each subscale (5 total)[1]
Training completion	Completion of all 16 modules in the digital training program	Completed 16 v. completed fewer than 16 (binary outcome)

This assumes normally distributed outcomes. If substantial departures from normality occur, transformations or inference using robust (Sandwich) errors will be considered. If a suitable transformation cannot be found, a non-parametric analysis will be considered.

Sample size calculation
The sample size was calculated to ensure sufficient power to identify differences in the primary outcome (total competency after completion of digital training). The sample size estimations are made on the following assumptions:

- Participants are randomised within each of the 2 strata
- Total of four full-time coaches, and two back-up coaches
- Loss to follow-up 20%

- Equally sized groups

The sample size was based on assuming a 20% drop-out rate, and a 5% two-sided Type-I error rate. A total of 262 participants will be recruited in the trial and randomised 1:1 into the DT-C or DT-only arms (131 per arm). We anticipate that 210 (80%) participants will complete follow-up and contribute to the endline analysis (105 per arm). For the primary hypothesis that the digital training intervention improves competency score, this sample size provides 80% power to detect an effect size of 0.19 (i.e. a standardised mean difference (SMD) of post vs pre-training scores on all 210 participants, regardless of trial arm). For the second hypothesis that the DT-C intervention is superior to the DT-only intervention), this sample size (105 per arm) provides 80% power to detect an effect size (SMD) of 0.39 between the DT and DT-C arms.

Duration of intervention

The digital training will be implemented for 4-6 weeks, with primary endpoint data collected 6 weeks after randomisation.

Study arms, stratification, randomisation, masking

The trial will take place across 4 Universities and 5 NGOs in Delhi-NCR region, Mumbai, Maharashtra region, and Bangalore, Karnataka region all metropolitan cities in India).

Randomisation of participants

The randomisation list, in randomly sized blocks of 4-6 stratified by type of organization (non-governmental organizations [NGOs] or universities), was generated by BL, a statistician independent of the trial on 29.03.22. The randomisation code was shared only with the data manager at the study site for deployment on the REDCap platform. All other study team members were masked to the randomization sequence.

Randomization was stratified by type of organization: NGO v. university. Organizations by type are listed below:

NGOs (5)

- Agragami India
- Ballygunj Society for Children in Pain (CHIP)
- Youth for Mental Health (YMH)
- The YP Foundation
- World Health Partners

Universities (4)

- Christ University
- Al- Falah University
- Maniben Nanavati College
- Acharya Institute.

We maximised allocation concealment by a daily check by the data manager to evaluate if allocations done were consistent with the allocation code.

Masking

The trial PI, trial co-ordinator, trial statisticians and members of the Trial Steering Committee will remain masked to allocation arm throughout the trial and until the final analysis is complete.

Statisticians involved in the analysis (MN, LB, HW) will also be masked to allocation until both data collection and the analysis of the primary outcome is complete. It is not possible to mask allocation for participants, or coaches (intervention providers) because of the nature of the intervention. The data manager (JEJ) will not be masked.

Instances of unblinding of the research team members (outcome assessors) to the intervention arm will be summarised based on overall prevalence and the exact point during the process that the team member is unblinded and reported to the Trial Steering Committee (TSC).

STATISTICAL METHODS
Below, we have described the analysis of pre-post differences in competency (**pre-post differences)** and the analysis of the trial outcomes (**randomized controlled trial analysis).**
Trial analysis will be conducted according to the arm participant have been allocated to, regardless of intervention effectively received (intention-to-treat principle).
. All analyses will be completed in Stata 17.0. For all analyses, Transformations of the data and/or non-parametric methods will be considered depending on the distribution of the outcome.

For all analyses, the primary analysis will use multiple imputation (MI) to account for missingness in the data; MI methods are described below. Complete case analysis will be conducted and reported as a sensitivity analysis for the primary outcome.

Recruitment and representativeness of sample
A CONSORT flow diagram (**figure 1**) will illustrate participant recruitment and follow-up.

Comparability of arms
Before beginning analysis of the impact of the intervention, we will summarise baseline data by arm and overall for the following individual characteristics.

1) Age
2) Education
3) Occupation
4) Number of years of experience
5) Knowledge quiz score

Frequencies and percentages will be used to present categorical variables (Table 2). The study team will identify substantial differences between arms in terms of the above factors, and may adjust for these differences in sensitivity adjusted trial analyses. No formal statistical testing will be performed to examine differences in baseline characteristics between the trial arms, as any difference will be due to chance if the randomisation was correctly performed.

Analysis of pre-post differences
There is 1 outcome in the analysis of pre-post differences: knowledge quiz score.
Change in knowledge quiz score will be measured using OLS regression. The equation is:

$(KQS_{endline} - KQS_{baseline}) = \beta_0 + e$

Where $(KQS_{endline} - KQS_{baseline})$ represents the difference between each individual's baseline and endline score. The null hypothesis (of no difference between baseline and follow-up mean score) is $\beta_0=0$.

Randomized controlled trial analysis of the primary outcome
The primary outcome, change in knowledge quiz score, will be analysed using OLS regression. The outcome will be the individual-level change in competency score between baseline and endline, testing for a difference between arms. This analysis will be adjusted for stratum (centred) and baseline competency score. The null hypothesis is $\beta_1=0$.

$$(KQS_{endline} - KQS_{baseline}) = \beta_0 + \beta_1 arm + \beta_2 stratum_c + \beta_3 KQS_{baseline} + e$$

Randomized trial analysis of the secondary outcomes

Secondary outcomes using the MUSIC subscales (5 total) will be analysed using OLS regression. The mean score on each of 5 subscales will be analysed separately, and analysis will be adjusted for stratum. The null hypothesis is $\beta_1=0$.

$$Subscale\_mean = \beta_0 + \beta_1 arm + \beta_2 stratum_c + e$$

The secondary outcome related to training completion will be assessed using logistic regression, adjusted for stratum. The null hypothesis is $\beta_1=0$.

$$logit(completed) = \beta_0 + \beta_1 arm + \beta_2 stratum_c$$

Analysis of effect modification
We will assess effect-modification on the primary analysis of the pre-post analysis and primary RCT outcomes by *a priori* defined modifiers (age [coded as 18 to less than 23 years and 23 years and greater], gender (male vs. female), language [Hindi vs. English, as defined by the preferred language for the course content], type of organisation [NGO vs. other, as defined by the stratum variable]). In the pre-post analysis, we will adjust model for each modifier and test for heterogeneity of effects. In the randomized controlled trial analysis, we will fit and test interaction terms between each modifier and arm.

Missing outcome data
Missing data on outcomes and key covariates will be assessed prior to analysis. In situations where >10% of data are missing, we will use multiple imputation methods to impute missing data for analyses of primary outcomes.

Data will be assumed to be missing at random (MAR), and respondents with missing data will be described by key sociodemographic characteristics. We will use the *mi* command in Stata 17.0 to calculate multiple imputation (MI) models by chained equations.

We will adjust for stratum and factors associated with missingness as fixed effects in imputation models. We will aim to use the same set of imputations for all the analyses. The imputation model should impute primary and secondary outcome measures, and the imputation model will include variables such as baseline knowledge score, age in years, sex, language of instruction, the number of training sessions received, the number of coaching sessions received, and respondent's organisation. Imputation will be conducted separately by trial arm.

Where MI models are used, these will be the primary analysis results, provided they are able to be estimated with no difficulty. Complete case analysis will be conducted and reported as a sensitivity analysis, and will be used as the primary analysis if there are difficulties obtaining estimates in the MI models.

Compliance analysis
We will report descriptively adherence to the intervention (number of training modules and coach sessions completed).

Change in KQS score will be reported descriptively by level of digital training completion (no login; non-completers [completed between 0-7 modules]; partial completers [completed between 8-15 modules]; full completers [completed all 16 modules]), and by number of coach sessions completed (0; 1-3; or 4) in a dose-response type analysis. Final cut points will be determined after reviewing the data.

MCQ Validation
The baseline data of knowledge quiz score (KQS) obtained from all participants will be used to establish the psychometric properties of the measure. Prior to unblinding the trial dataset, a two-parameter Rasch model will be fitted to estimate the item characteristic curves (ICC), discrimination and difficulty parameter for each item on both forms of the questionnaire. In addition, the test information function will be estimated to look at the overall characteristics of the forms. The test information function will be used to assess overall how the information the MCQs provide varies as a function of participants' knowledge. If the overall test information function is centred approximately at 0 and is spread sufficiently around 0 to suggests that the test provides information at a range of abilities, this will be taken as evidence that overall the test is informative. Next, the ICCs, discrimination and difficulty parameters of individual items will be examined. The MCQs should show a range of difficulty scores. Items will be scrutinized for having low discrimination (they are not differentiating participants of different abilities). We will also identify items where the probability of a correct response for a person of average ability is unusually large (suggesting the item is too easy), or unusually low (suggesting the item is too hard).

Items that have poor discrimination or are at the very extremes of difficulty may be removed in the interests of a test information function that suggests that the scale as a whole provides information across a range of abilities. The primary outcome of the main analysis will be based on the retained items, but in this eventuality a sensitivity analysis will be conducted in which the main trial analysis is replicated using an outcome measure based on the full 17-item version.

Additional analyses for initial study analysis

We will complete the following analyses as part of the initial study analysis:

- **Descriptive analysis of coaches:** Coaches will be described in terms of education, training, area of residence and caseload. We will also assess variability in coaching fidelity. Coaching fidelity will be assessed by mean therapy quality ratings of counsellor sessions assessed by supervisor at group supervision as assessed on a Coaching Quality Rating Scale (CQRS) developed for the study. Additionally, coaching fidelity will be independently assessed by an expert, not directly involved in the study on a random selection of 10% of all sessions in DT arm. This will be assessed by a coaching fidelity checklist developed for the study.

Serious adverse events (SAE) like suicide or death will be summarised (proportion of individuals with each type of SAE, and total number of SAEs) by arm. If there are a sufficient number of these, the risks and 95% CIs will be reported and the risks will be compared between intervention arms.

Suggested further analyses

While we will not include the following analyses in the initial trial analysis, we suggest that the following analyses may be appropriate extensions of the trial analysis to be completed after unblinding.

The first set of suggested further analyses include analyses of effect modification for secondary RCT outcomes, including the 5 MUSIC subscales and training completion.

The second set of suggested further analyses include additional sensitivity analysis to account for missing data in primary outcomes analysis. We have removed these to reduce the number of analyses of the primary outcomes in the initial dataset, but would suggest that these be conducted if there are difficulties interpreting the initial MI and CC analyses, or concerns that the data are not MAR. These include:

(1) Complete case analysis adjusting for factors associated with missing data;

(2) Sensitivity analysis accounting for data assumed to be missing not-at-random (MNAR). Note that the exact models for the sensitivity analysis under “Missing Not at Random” assumptions will be decided a posteriori. For example, we may consider conducting reference-based multiple imputation under “Baseline Mean Carried Forward” assumption. This is likely to correspond to a “worst-case” scenarios for the pre-post analysis (i.e. assuming no change in competency score). Alternatively, we may conduct a “delta-adjustment” after imputation, for example assuming competency score may be up to 1 standard deviation lower than imputer under MAR, allowing for this parameter to vary by arm for the trial analysis.

Finally, we note that complier average causal effect (CACE) may be useful to understand the effectiveness of the outcome among participants receiving the full dose of training.

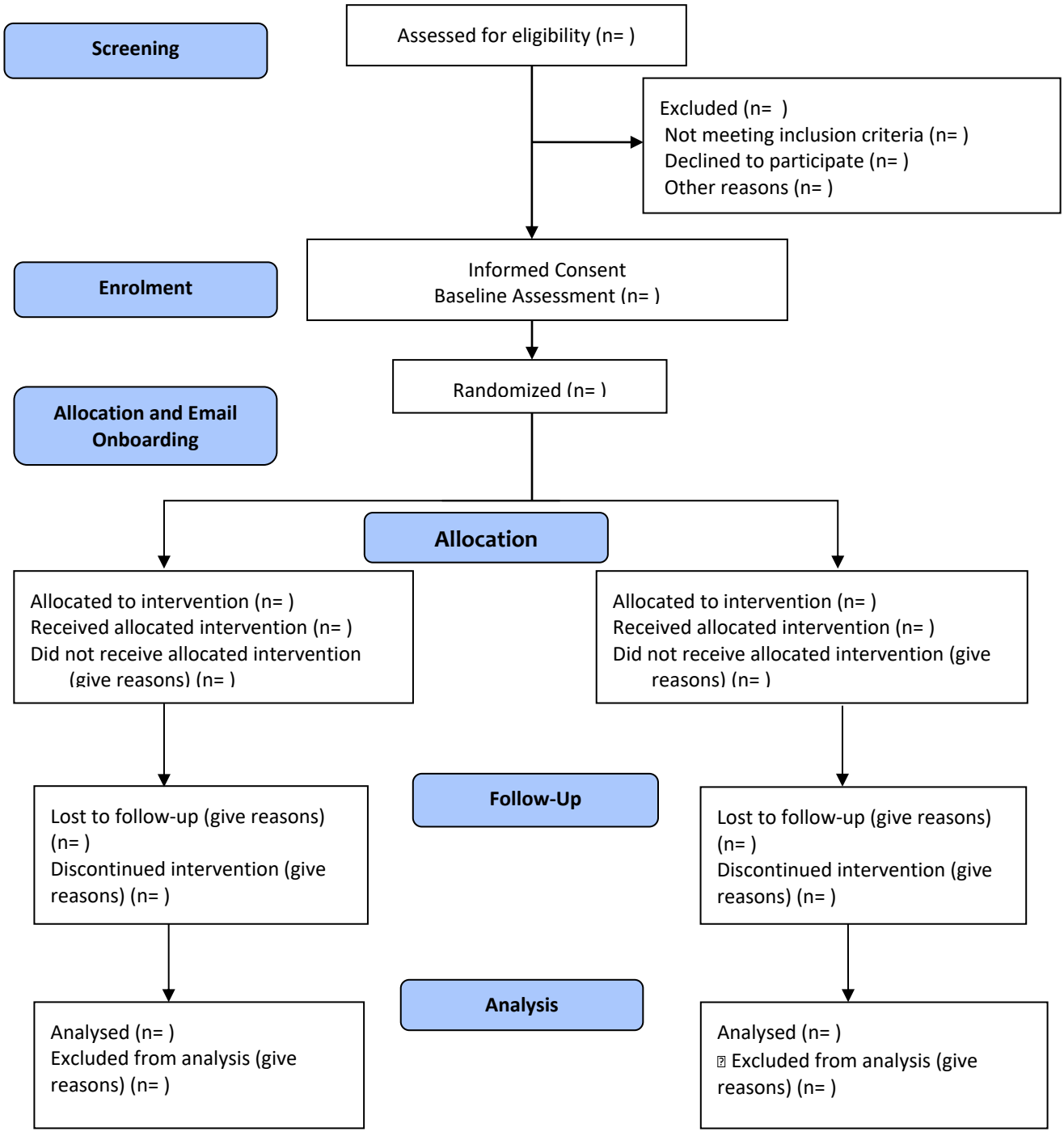
Data analysis plan

Analyses of the randomized component will follow CONSORT guidelines for parallel-group randomised trials[6]. Analyses will be conducted in Stata version 17. Do-files will be prepared based on blinded data, and data will not be unblinded until the dataset is finalised and locked.

Recruitment and representativeness of recruited patients

Initial analyses will compare baseline characteristics of individuals who consented and did not consent and participants who did and did not complete outcome assessments respectively. A CONSORT flow chart will be constructed (Figure 1). The flow diagram will include the number of eligible participants, number of participants agreeing to enter the study, number of participants refusing and reasons, then by intervention arm: the number of participants allocated to each arm, the number seen at baseline and 6 week respectively.

Figure 1 – CONSORT flow diagram



5. Reference List

[1] D. Michelson *et al.*, “Development of a transdiagnostic, low-intensity, psychological intervention for common adolescent mental health problems in Indian secondary schools,” *Behaviour Research and Therapy*, 2019, doi: 10.1016/j.brat.2019.103439.

[2] D. Michelson *et al.*, “Effectiveness of a brief lay counsellor-delivered, problem-solving intervention for adolescent mental health problems in urban, low-income schools in India: a randomised controlled trial,” *The Lancet Child and Adolescent Health*, vol. 4, no. 8, pp. 571–582, Aug. 2020, doi: 10.1016/S2352-4642(20)30173-5.

[3] K. Stasiak, S. Hatcher, C. Frampton, and S. N. Merry, “A pilot double blind randomized placebo controlled trial of a prototype computer-based cognitive behavioural therapy program for adolescents with symptoms of depression,” *Behavioural and Cognitive Psychotherapy*, vol. 42, no. 4, pp. 385–401, 2014, doi: 10.1017/S1352465812001087.

[4] K. Malik *et al.*, “Effectiveness and costs associated with a lay counselor–delivered, brief problem-solving mental health intervention for adolescents in urban, low-income schools in India: 12-month outcomes of a randomized controlled trial,” *PLoS Medicine*, vol. 18, no. 9, Sep. 2021, doi: 10.1371/journal.pmed.1003778.

6. Appendices: dummy tables

6.1 Study tables

Table 1. Baseline characteristics of study participants by arm and total

	DT (n=)	**DT-C (n=)**	**Total (N=)**
Age (years) (mean [SD])	### (###)	### (###)	### (###)
Age group (n [%])			
18-24 years	### (##.#)	### (##.#)	### (##.#)
25+ years	### (##.#)	### (##.#)	### (##.#)
Gender (Female) (n [%])	### (##.#)	### (##.#)	### (##.#)
Education (n [%])			
Up to 12th	### (##.#)	### (##.#)	### (##.#)
Technical or graduate	### (##.#)	### (##.#)	### (##.#)
Post-graduate	### (##.#)	### (##.#)	### (##.#)
Occupation (n [%])			
Student	### (##.#)	### (##.#)	### (##.#)
Counsellor	### (##.#)	### (##.#)	### (##.#)
Teacher	### (##.#)	### (##.#)	### (##.#)
Social Worker	### (##.#)	### (##.#)	### (##.#)
Others (Specify)	### (##.#)	### (##.#)	### (##.#)
Number of Years of Mental Health Work Experience (n [%])			
None	### (##.#)	### (##.#)	### (##.#)
1 year or Less	### (##.#)	### (##.#)	### (##.#)
2+ Years	### (##.#)	### (##.#)	### (##.#)
Mean Knowledge Quiz score (mean, SD)	### (###)	### (###)	### (###)

Table 2. Mean (SD) change in KQS score by number of modules completed, all participants, and by number of DT-C coaching sessions (DT-C only)

Process indicator	Number	Mean KQS (SD)
Module completion level (all respondents, n=##)		
No login	###	### (###)
Completed 0-7 modules	###	### (###)
Completed 8-15 modules	###	### (###)
Completed 16 modules	###	### (###)
Number of DT-C Coaching sessions received (DT-C only, n=##)		
0- 1	###	### (###)
1	###	### (###)
2-3	###	### (###)
3		
4		
Average Mean (SD) Duration of Coaching Sessions	### (###)	-

Table 3. Intervention effect on primary and secondary outcomes

	Baseline (Mean SD)	**Endline (Mean SD)**	**Mean difference; 95% CI; p-value)**
Pre-post analysis: Change in Knowledge Quiz Score (Mean [SD])			
Change in Knowledge Quiz score			
	DT	**DT-C**	**Mean difference; 95% CI; p-value)**
Primary outcome: Change in Knowledge Quiz Scores (mean [SD])[1]			
Secondary outcome: MAGIC subscales (mean [SD])[2]			
Empowerment			
Usefulness			
Success			
Interest			
Caring			
			aOR; 95% CI; p-value
Secondary outcome: Training completion[2]			
Training Completed			
1 Adjusted for stratum and baseline KQS 2 Adjusted for stratum			

Table 4. Primary Outcomes by effect modifiers: adjusted* Knowledge Quiz at 6 weeks [table not complete]

	DT-C (mean [SD])	**DT (mean [SD])**	**Intervention effect: adjusted mean difference [95% CI; p value])**
Gender			
Male			
Female			
Number of Years of Mental Health Work Experience			
None			
1 year or Less			
2-4 years			
5+ Years			
Host Organization			
NGO			
University			
* All will be adjusted for stratum			

Table 3. Baseline characteristics of completers of outcome evaluation and those lost to follow-up (LTFU)

	Lost before 6 Weeks evaluation (n=)	**Completed 6 weeks outcome evaluation (n=)**
Age (years) (mean [SD])		
Gender (Female) (n [%]) (Male) (n [%])		
Education (n [%]) Below 12th 12th Graduation Post-graduation Doctoral		
Occupation (n [%]) Student Counsellor Teacher Social Worker Mental Health Advocate Others (Specify)		
Number of Years of Mental Health Work Experience (n [%]) None 1 year or Less 2-4 years 5+ Years		
Mean Knowledge Quiz score (Mean, SD)		

Table 2. Characteristics of trial participants at baseline and non-participants

	Participants (n=)	**Non-participants (n=)**
Age (years) (mean [SD])		
Gender (Female) (n [%]) (Male) (n [%])		
Education Below 12th 12th Graduation Post-graduation Doctoral		

Appendix A: coding of MUSIC subscales.

Each item in the MUSIC scale will be allocated to a subscale as described in the table below.

Table A1. MUSIC items and associated subscales

Item	Subscale
1. The coursework held my attention	Interest
2. I had the opportunity to decide for myself how to meet the course goals.	Empowerment
3. In general, the coursework was useful to me.	Usefulness
4. I could find answers to questions I had about the coursework.	Caring
5. The coursework was beneficial to me.	Usefulness
6. The instructional methods used in this course held my attention	Interest
7. I was confident that I could succeed in the coursework.	Success
8. I had the freedom to complete the coursework my own way.	Empowerment
9. I enjoyed the instructional methods used in this course.	Interest
10. I felt that I could be successful in meeting the academic challenges in this course.	Success
11. The instructional methods engaged me in the course.	Interest
12. I had options in how to achieve the goals of the course.	Empowerment
13. I enjoyed completing the coursework.	Interest
14. I was capable of getting a high grade in this course.	Success
15. The coursework was interesting to me.	Interest
16. Answers to questions about the coursework were easy to understand	Caring
17. I had control over how I learned the course content.	Empowerment
18. Throughout the course, I felt that I could be successful on the coursework.	Success
19. I found the coursework to be relevant to my future.	Usefulness
20. The recorded lecture cared about helping me to learn.	Caring
21. I will be able to use the knowledge I gained in this course.	Usefulness
22. The recorded lecture used a respectful tone in the recording.	Caring
23. The knowledge I gained in this course is important for my future.	Usefulness
24. The recorded lecture used a friendly tone.	Caring
25. The recorded lecture used familiar language and expressions.	Caring
26. I had flexibility in what I was allowed to do in this course.	Empowerment

Subscales will be calculated as the mean value within the subscale, as follows:

- Empowerment score = (item 2 + item 8 + item 12 + item 17 + item 26) / 5

- Usefulness score = (item 3 + item 5 + item 19 + item 21 + item 23) / 5
- Success score = (item 7 + item 10 + item 14 + item 18) / 4
- Interest score = (item 1 + item 6 + item 9 + item 11 + item 13 + item 15) / 6
- Caring score = (item 4 + item 16 + item 20 + item 22 + item 24 + item 25) / 6

Coding was taken from the college student version of the MUSIC scale as described in Jones, BD. *User Guide for Assessing the Components of the MUSIC® Model of Motivation.* Accessed on 22 August 2022 at https://www.themusicmodel.com/wp-content/uploads/2021/12/User-Guide-for-the-MUSIC-Model-Inventory.pdf.