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# Implementation of a school-based risk management protocol within a task-shifted mental healthcare model

Sheldon Kahi[1], Lelo Memba[1], Asavari Syan[1], Veronica Ngatia[1], Katherine Venturo-Conerly[1], Christine Wasanga[1,2] and Tom L. Osborn[1]

[1]Shamiri Institute, Nairobi, Kenya and [2]Kenyatta University, Department of Psychology, Nairobi, Kenya

**Research Article**

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**Corresponding author:**
Sheldon Kahi;
Email: kahi.darren@gmail.com

## Abstract

Adolescent mental health problems are prevalent in low- and middle-income countries, like Kenya, where access to care remains severely limited. Task-shifted, school-based interventions offer solutions but often lack structured protocols for managing risk, such as suicidality or abuse. The Shamiri Risk Management Protocol (Shamiri-RMP) was developed to address this gap through a tiered system for screening, classifying and responding to risk within a stepped-care mental health model. We conducted a mixed-methods implementation study across 149 public high schools in Kenya. Caseworker fidelity and risk classification accuracy were evaluated through a review of 222 student cases. The Consolidated Framework for Implementation Research guided the qualitative analysis of caseworker surveys to identify implementation barriers and facilitators. Of 76,855 students enrolled in the broader Shamiri program, 977 (1.27%) were referred for risk assessment, and 222 (0.28%) were enrolled in the Shamiri-RMP. Among them, 42.71% were low-risk, 35.68% moderate-risk and 21.61% high-risk. Risk reductions occurred in 60.47% of high-risk cases, 56.34% of moderate-risk cases and 51.76% of low-risk cases. Implementation facilitators included supervisory support (50.88% of caseworkers) and protocol clarity (80.70%), while barriers included referral gaps (5.26%) and confidentiality concerns (54.39%). Findings support the feasibility and scalability of the Shamiri-RMP in low-resource school settings.

## Impact statement

In low-resource countries, like Kenya, as high as 85% of adolescents needing mental health treatment cannot access it. Recently, task-shifted school-based interventions have emerged as a promising avenue for closing the treatment gap. However, most of these interventions lack structured protocols for managing elevated risk. This study responds to this critical implementation gap by demonstrating how a risk management protocol can be implemented within these school-based interventions to systematically identify and manage students at risk of suicide, abuse or other serious harm. Here, we provide one of the first comprehensive evaluations of structured risk management protocols within a task-shifted mental health program across 149 Kenyan schools. Non-specialist caseworkers reliably identified and appropriately responded to mental health crises when equipped with clear protocols and ongoing supervision. Among 222 at-risk students, more than half demonstrated meaningful risk reduction, indicating that structured approaches can prevent crises rather than merely responding after they occur, demonstrating the feasibility and effectiveness of using risk management protocols to support frontline providers and the adolescents they serve. Our findings offer valuable insights into the barriers and facilitators to integrating risk management protocols to enhance task-shifted mental health service delivery in school environments. With 70% of the world's adolescents living in low- and middle-income countries, where mental health professionals are scarce, this model offers a potentially replicable blueprint for managing elevated risks when scaling school-based mental health care. The systematic identification of implementation barriers – including referral system gaps and confidentiality concerns – provides actionable guidance for policymakers and practitioners adapting similar interventions across diverse educational contexts.

## Introduction

Mental health problems are one of the leading causes of suffering among young people around the world (The Lancet, 2017; The Lancet Global Health, 2020; World Health Organization, 2022).

This is especially the case in low- and middle-income countries (LMICs), such as those in Sub-Saharan Africa (SSA), where the burden of these disorders is particularly high, but access to care is

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severely limited (The Lancet, 2017; The Lancet Global Health, 2020; World Health Organization, 2022).

In Kenya, for example, studies show that nearly 45% of youth aged 12 to 20 report elevated symptoms of depression and anxiety (Osborn et al., 2020a, 2022a), yet 85% of those who need treatment do not receive it (Chisholm et al., 2016; World Health Organization, 2018; 2019b). This treatment gap reflects a complex interplay of several structural and systemic barriers, including workforce shortages, geographic barriers, financial constraints and persistent stigma surrounding mental health help-seeking (Singla et al., 2017, pp.13-16, Osborn et al., 2022b; Venturo-Conerly et al., 2023). The scarcity of mental health professionals, in particular, represents a fundamental constraint to scaling traditional evidence-based treatments across SSA countries. Kenya, for instance, has only 0.19 mental health providers per 100,000 people (World Health Organization, 2019a). This makes traditional models requiring highly trained professionals unfeasible for most adolescents in these contexts, necessitating innovative approaches that can operate effectively within existing resource constraints (Eckshtain et al., 2019; Venturo-Conerly et al., 2023).

### Closing the treatment gap through strengths-based interventions and task-shifting to lay providers

Recently, a particularly promising approach to closing the treatment gap in adolescent mental health in low-resource contexts has been delivering brief, strengths-based interventions in school settings through task-shifting to non-professionals. These "strengths-based" interventions – sometimes called "character-strengths" (Peterson and Seligman, 2004; Seligman et al., 2005) or "wise" interventions (Walton, 2014; Walton and Wilson, 2018) – are simple and non-stigmatizing and often focused on a single, specific psychological process (Walton and Wilson, 2018; Schleider et al., 2020). Examples include growth-mindset interventions, which teach youth that their abilities can improve through effort (Dweck, 2006; Yeager *et al.*, 2014). Evidence indicates that such interventions can effectively reduce symptoms of depression and anxiety in adolescents while avoiding the stigma associated with traditional mental health services (Schleider and Weisz, 2017, 2018; Schleider et al., 2020).

Task-shifting – delegating specialized tasks to trained non-professionals – has emerged as a World Health Organization (WHO)-recommended strategy for expanding mental healthcare access in LMICs (Joshi et al., 2014; Bolton, 2019). Indeed, this approach has been effectively used widely in several SSA countries, including by high-school graduates in Kenya (Osborn et al., 2020b), grandmothers in Zimbabwe (Chibanda et al., 2016) and community health workers in Uganda (Bolton et al., 2003).

Systematic reviews demonstrate that lay mental health workers can achieve clinically meaningful improvements for common mental health problems like depression and anxiety in LMICs, with effects sometimes comparable to those achieved by professional providers (Mutamba et al., 2013; Singla et al., 2017). Studies across diverse LMIC contexts have found that interventions delivered by community health workers significantly reduced symptoms of depression, trauma, substance use and behavioral disorders when provided with adequate training and supervision (Purgato et al., 2020; Mudiyanselage et al., 2024). Similarly, evidence from other contexts shows that lay providers can effectively deliver structured interventions, including interpersonal psychotherapy in Uganda (Bolton et al., 2003) and cognitive behavioral therapy in Pakistan (Barry et al., 2013; Wainberg et al., 2017).

However, the literature also highlights persistent implementation challenges that threaten scalability and sustainability. These include limited ongoing supervision, variable fidelity to protocols, high attrition rates among lay providers and structural barriers such as weak referral pathways (Murray et al., 2011, 2014; Barnett et al., 2018b; Bolton, 2019). Reviews identify that supervision in many LMICs is often "unsupportive, irregular, and demotivating," with lay providers reporting feeling overwhelmed when encountering complex cases involving risk factors such as suicidality or abuse (Murray et al., 2014; Wainberg et al., 2017; Gronholm et al., 2023; Belz et al., 2024). Additionally, financing issues – including lack of financial incentives for lay providers and their supervisors – pose significant barriers to scaling up (Barnett et al., 2018a; Belz et al., 2024).

In some cases, task-shifting is combined with a stepped- or tiered-care model, where service intensity matches symptom severity (Osborn et al., 2022b; Ladegard et al., 2024). Youth with mild or moderate concerns might receive group-based support from lay providers, while those with complex concerns are referred to professionals (Arora et al., 2019; Kern and Rusnak, 2024; Ladegard et al., 2024). Together, this integrated approach where strengths-based interventions are delivered through task-shifting to lay providers within a tiered-care model offers a practical framework for addressing youth mental health needs while optimizing resource allocation.

### The Shamiri model: An integrated approach to school-based mental health

The Shamiri model is an example of this integrated approach. Developed by the Shamiri Institute – a non-profit organization based in Nairobi, Kenya, that is primarily funded through philanthropic grants and program contracts – the model delivers evidence-based mental health interventions through a three-tier care structure (Osborn et al., 2020b, 2021). In the first tier, lay providers (aged 18 to 24) are trained to lead group-based sessions focused on strengths-based interventions (Venturo-Conerly et al., 2021). The second tier consists of individuals called "clinical supervisors" – those with some early mental health training (*e.g.*, bachelor's degree in psychology or clinical social work experience) who train, supervise and provide oversight over the group sessions, while handling elevated cases (Venturo-Conerly et al., 2022). The third tier consists of a network of a few mental health professionals who manage clinically elevated cases (Venturo-Conerly et al., 2021, 2022).

Within this structure, adolescents participate in a four-week group intervention with sessions focused on teaching growth mindset, gratitude and values affirmation (Osborn et al., 2020b, 2021). Published clinical trials show significant reductions in depression and anxiety, academic improvements and sustained impact up to seven months post-intervention; pilot research has also been conducted in Ethiopia, showing preliminary evidence of cross-cultural adaptability within the East African context (Osborn et al., 2020b, 2021; Venturo-Conerly et al., 2024).

Since 2020, the Shamiri model has scaled across hundreds of high schools in Kenya and Ethiopia, reaching more than 135,000 youth (Venturo-Conerly et al., 2025). In addition to improving outcomes, the model is also highly cost-effective, with implementation costs as low as $15.17 per student (2021 US dollars), and sensitivity analyses estimate that the cost per clinically significant improvement at the 7-month follow-up ranges from $48.28 to $172.72 (Kacmarek et al., 2023; Venturo-Conerly et al., 2025).

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These costs compare favorably to other school-based mental health interventions in SSA and other LMICs. Systematic reviews indicate that school-based interventions in LMICs typically report implementation costs ranging from $15 to $104 per student, depending on program intensity and delivery model (McBain et al., 2016; Greco et al., 2018, p. 4). Moreover, while some estimates suggest that universal adolescent mental health interventions can yield a return of $24 for every $1 invested over 80 years through health savings and improved productivity (Stelmach *et al.*, 2022), the immediate affordability constraints in LMICs make lower-cost models like Shamiri particularly valuable. The economic advantage appears to stem from the use of lay providers, brief intervention format, group-based delivery and integration within existing educational infrastructure (Wasil et al., 2021a; Kacmarek et al., 2023).

### *A critical gap: Risk management in task-shifted models*

While most youth participating in task-shifted school-based intervention models, like the Shamiri model, show mild to moderately severe symptoms and no serious risk-associated issues requiring more intensive and specialized responses, a small number are affected (Wasil et al., 2021b; Venturo-Conerly et al., 2022). These may include issues like suicidality, substance abuse, bullying, child maltreatment and child exploitation (Venturo-Conerly et al., 2021, 2022). Without structured protocols for identifying and managing these cases, there is risk of harm or missed opportunities for timely intervention.

For this reason, effective structured risk management protocols are essential for school-based interventions when responding to risk-associated cases within task-shifted and tiered-care models, especially in low-resource settings (Exner-Cortens et al., 2021; Stevens et al., 2021; Venturo-Conerly et al., 2022). They help guide both specialists and non-specialists through complex clinical decisions, such as when to refer a student, how to involve guardians or what local services to engage (Exner-Cortens et al., 2021; Stevens et al., 2021). Despite this need, few culturally adapted, scalable risk management frameworks exist for school-based programs in LMICs (Purgato et al., 2020). Moreover, existing tools often lack practical strategies for use by lay providers or are not aligned with local, legal and cultural norms (Wasil et al., 2021b; Venturo-Conerly et al., 2022).

The Shamiri Risk Management Protocol (Shamiri-RMP) was developed as a contextually adapted framework for addressing risk-associated mental health concerns within the Shamiri model. The objective of the Shamiri-RMP was to ensure safety, consistency and accountability when responding to risk-associated cases within the Shamiri model. To understand the use of the Shamiri-RMP in Kenyan schools, we applied the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009). This framework guided our analysis of factors that enabled or constrained effective protocol delivery across diverse school contexts.

### *Present study*

This study addresses a critical gap in the literature by systematically evaluating Shamiri-RMP, a structured risk management protocol, within a school-based task-shifted mental health intervention system. Our specific objectives were to: (1) describe the design and adaptation of the Shamiri-RMP, including its risk classification system and intervention pathways; (2) evaluate implementation fidelity and effectiveness through analysis of case outcomes and risk level transitions; and (3) apply the CFIR to identify barriers and facilitators to successful implementation across diverse school contexts.

## The Shamiri Risk Management Protocol (Shamiri-RMP)

### *Design and adaptation of the Shamiri Risk Management Protocol (Shamiri-RMP)*

Most public schools in Kenya do not have mental health professionals on their staff. School-based mental health support often depends on guidance and counselling teachers or social workers who may not have clinical training (Venturo-Conerly et al., 2022). This results in inconsistent responses to mental health crises, with decisions often made informally, under pressure or without appropriate oversight (Venturo-Conerly et al., 2022).

The Shamiri-RMP was designed to address these challenges. Specifically, the protocol aims to:

- Standardize risk identification and categorization across school settings,
- Establish structured intervention pathways for different risk levels, and
- Ensure integration into a tiered-care model that allows non-specialists to identify risk, initiate support and refer students to appropriate services when needed.

### *The Shamiri-RMP framework*

The Shamiri-RMP is a tiered-response model that incorporates key components, including risk assessment, safety planning, escalation pathways and tiered intervention levels (see Supplementary Materials for protocol). At its core, the protocol is built around a decision tree (Figure 1) that guides users through the protocol. This structure supports decision-making among lay providers and caseworkers, improves accountability and helps ensure that students are matched to the appropriate level and type of care.

Students enter the Shamiri-RMP and are referred for screening when they display psychosocial distress indicators, such as withdrawal, trauma symptoms or emotional dysregulation. Lay providers, who deliver group sessions as part of the Shamiri intervention, are trained to recognize these indicators and refer students for further screening. Additionally, students may also self-refer and request individualized support from lay providers or caseworkers if needed. Trained caseworkers then conduct a standardized risk assessment across five domains: (1) suicidality and self-harm – assesses suicidal ideation, intent, history of attempts and access to means; (2) substance use – evaluates the frequency of alcohol or drug use, level of dependence and associated risks; (3) bullying and peer aggression – identifies students who experience or perpetrate peer violence; (4) child maltreatment and neglect – screens for physical, emotional and sexual abuse, with mandatory reporting procedures; and (5) sexual abuse and exploitation – identifies at-risk students and mandates immediate referral to appropriate authorities.

Table 1 outlines the main domains of risk assessment used in the protocol, criteria considered within each domain and example screening questions asked during the assessment.

Based on risk assessment outcomes, students are classified as having low, moderate or high risk using clearly defined clinical

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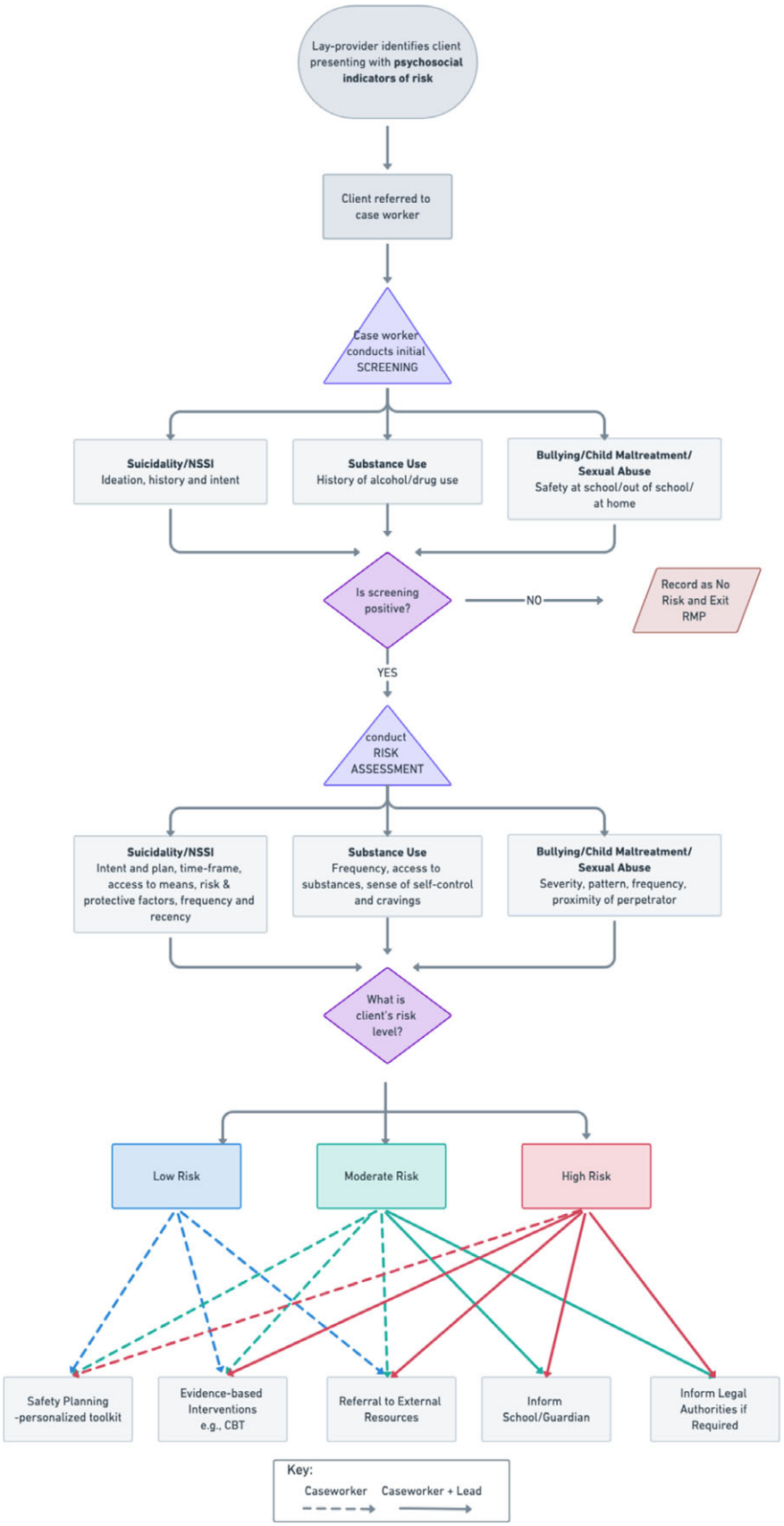



**Figure 1.** Shamiri Risk Management Protocol pathway.

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**Table 1.** Shamiri-RMP risk domains, assessment criteria and screening question examples

| Risk domain assessment | Criteria | Examples of questions used in risk screening/assessment |
|---|---|---|
| Suicidality and self-harm | Ideation, intent, access to means, history | "Have you ever felt like ending your life?" "Have you tried to hurt yourself intentionally?" |
| Substance use | Frequency, control, access, perceived dependence | "Do you use alcohol or drugs to manage stress?" "Can you stop using if you want to?" |
| Bullying and peer aggression | Physical/verbal harassment, victimization, impact | "Has someone at school made you feel unsafe or threatened you?" |
| Child maltreatment | Physical, emotional or sexual abuse, neglect | "Have you felt unsafe at home?" "Has anyone in your home denied you access to basic needs?" |
| Sexual abuse and exploitation | Coercion, non-consensual activity, power imbalance | "Has someone pressured you into sexual activity against your will?" |

criteria. Interventions are matched to the risk level and include: (1) safety planning for all risk levels; (2) brief evidence-based psychological interventions for all risk levels (*e.g.*, cognitive behavioral therapy techniques, mindfulness-based relapse prevention); (3) referrals to external services for moderate- and high-risk concerns; (4) guardian and school staff notification for moderate- and high-risk concerns (where appropriate); and (5) legal reporting when required by Kenyan child protection laws.

Monitoring is continuous, with follow-ups based on the risk level. Students exit the protocol when their concerns significantly reduce in severity, protective factors increase and safety is deemed sustainable.

### Training, supervision and escalation structure

Lay providers receive 10 h of training focused on recognizing psychological distress, initiating referrals, managing disclosures and maintaining professional boundaries (Venturo-Conerly et al., 2021). See Supplementary Materials for detailed personnel characteristics and training. Caseworkers, who possess prior mental health training, complete a 7-week intensive program covering risk assessment, intervention planning and ethical protocols (Venturo-Conerly et al., 2021, 2022). They are supervised weekly by clinical experts – licensed professionals such as psychologists or psychiatrists – who also manage high-risk cases.

The protocol follows a three-tier escalation model: lay provider–caseworker–clinical expert, with each level assuming responsibility based on risk severity. This structured hierarchy ensures clinical rigor while remaining contextually feasible, supporting early detection, appropriate response and sustained care for at-risk youth in resource-limited, school-based settings.

### Evaluating the Shamiri-RMP using an implementation science approach

The Shamiri-RMP has been in use across multiple school settings in Kenya as part of the broader Shamiri model (Venturo-Conerly et al., 2022, 2024, 2025). In this study, we sought to evaluate whether caseworkers consistently followed protocol guidelines, how school environments shaped implementation and what practical factors facilitated or hindered success. Specifically, we aimed to answer the following questions:

- To what extent do caseworkers adhere to the Shamiri-RMP across schools?
- How do school-based factors – such as administrative support, infrastructure and culture – influence implementation?
- What barriers and facilitators shape the effectiveness, sustainability and scalability of the protocol?

To guide our analysis, we used the CFIR, which offers a structured approach for evaluating how interventions are adopted and used in complex settings (Damschroder et al., 2009).

### CFIR as the theoretical framework

The CFIR is a widely used implementation science framework that organizes implementation-related factors into five key domains (Damschroder et al., 2009). Each domain captures a different layer of influence on how an intervention is perceived, applied and sustained. CFIR domains allowed us to map caseworker experiences, school-level variables and contextual constraints in a way that reflects the layered reality of school-based implementation in LMIC settings. Table 2 presents the five CFIR domains, their

**Table 2.** CFIR domains and their application to the Shamiri-RMP

| CFIR | Domain definition | Application to the Shamiri-RMP |
|---|---|---|
| Intervention characteristics | Perceived complexity, adaptability and relative advantage of the intervention | How easy is the Shamiri-RMP to use? Are caseworkers able to make risk classification decisions effectively? |
| Outer setting | External influences such as policies, funding, stigma and resource availability | How do school policies, government regulations and stigma influence Shamiri-RMP adoption? Are there barriers to escalating cases? |
| Inner setting | Organizational culture, leadership support and school infrastructure | Do schools provide adequate support for implementing the Shamiri-RMP? How do administrators and teachers engage with the protocol? |
| Individual characteristics | Skills, beliefs and confidence of those implementing the intervention | Are caseworkers well trained and confident in applying the Shamiri-RMP? How does supervision impact their ability to manage cases? |
| Implementation process | Training, support and adaptation strategies that influence sustainability | What training and supervision strategies are most effective? How has the Shamiri-RMP been adapted based on real-world use? |

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standard definitions and how each domain was operationalized in relation to the implementation of the Shamiri-RMP.

## Methods

### Study design

This study employed a mixed-methods design to evaluate the implementation of the Shamiri-RMP within the Shamiri model, a school-based mental health intervention in Kenya (Osborn et al., 2021; Ochuku et al., 2023; Venturo-Conerly et al., 2025). The study incorporated quantitative and qualitative approaches to comprehensively assess caseworker protocol fidelity, protocol effectiveness and contextual factors influencing implementation.

The quantitative component focused on: (1) caseworker protocol fidelity (2) risk classification trends, examining the distribution of cases across low-, moderate- and high-risk categories and (3) intervention outcomes, assessing the effectiveness of the Shamiri-RMP in providing appropriate support, referrals and follow-up care.

The qualitative component analyzed survey responses from caseworkers focusing on: (1) perceived usability, applicability and clarity of clinical protocols; (2) school environment differences, including challenges in implementation and student help-seeking behaviors; and (3) experience handling risk-associated cases and supervisory support provided.

### Ethical considerations

This study received approval from the Kenyatta University Ethics Review Committee (PKU/2627/E1752) and the National Commission for Science, Technology, and Innovation (NACOSTI/P/23/23559). Parental consent was obtained through the respective school administration, which notified and received consent from parents and guardians *via* school communication channels in line with local research regulations and the Ethical Review Board.

All participants then provided individual consent or assent: minors gave informed assent through age-appropriate procedures, while those aged 18 or older provided informed consent. All participants were informed that participation was voluntary and that they could withdraw at any time without consequence. For the 222 students who participated in the Shamiri-RMP, an enhanced consent process was implemented, in which caseworkers explained confidentiality limits, the purpose and possible outcomes of screening and referral procedures consistent with Kenyan child protection laws.

### Study Setting

The study was conducted in 149 public high schools in Nairobi, Kiambu, Kajiado, Kisumu, Kakamega, Homabay and Migori counties in Kenya. In Kenya, public secondary schools are categorized based on resources and students' performance on national examinations (Ministry of Education, 2020). The top-resourced and top-ranking schools are called national schools, and they enroll students nationwide through government-enforced quotas; these schools are followed by extra-county schools serving four to five neighboring counties and then by county and sub-county schools serving local populations (Ministry of Education, 2020). Additionally, most secondary schools are public single-sex boarding institutions, with day schools typically being mixed-gender schools (Ministry of Education, 2020).

The classification of the schools participated in our study by the Ministry of Education was as follows: 60.4% sub-county (n = 90), 19.5% county (n = 29), 14.1% extra-county (n = 21), 4.0% national (n = 6) and 2.0% community (n = 3). By gender composition, the participating schools were 61.1% mixed-gender (n = 91), 28.2% girls' (n = 42) and 10.7% boys' (n = 16) schools. This distribution broadly aligns with national patterns, where public sub-county schools make up the largest segment, national and extra-county schools are a small minority and mixed-gender enrolment is most common (Ministry of Education, 2020; Kenya National Bureau of Statistics & Usawa Agenda, 2022; Kenya National Bureau of Statistics, 2024).

The recruitment of schools into the Shamiri Program involved acquiring research permits from NACOSTI and school access permits from the relevant national and county levels of government education administrators (Ochuku et al., 2023). Thereafter, school principals and administrators were directly approached by the school recruitment team. Schools voluntarily signed memoranda of understanding (MOU) to participate in the program. No financial incentives were offered (Ochuku et al., 2023). All therapeutic interventions and risk management activities were conducted on school grounds as part of the regular eight-week implementation cycle of the Shamiri intervention (Ochuku et al., 2023).

### Participants

- N = 76,855 youths participating in Shamiri program (61.28% female, 37.75% male and 0.97% other/unspecified).
- N = 1,218 Shamiri fellows (lay providers) responsible for initial student screening and referral to caseworkers.
- N = 114 Shamiri supervisors (trained caseworkers) responsible for risk classification, intervention planning and follow-up care.
- N = 100 school administrators and stakeholders involved in student support and mental health referral.

Students identified as at risk (N = 222) were included in the study based on their presentation of risk-associated clinical concerns as determined by caseworkers using the Shamiri-RMP.

### Data collection

This study utilized two primary data sources. First, we extracted student case data from caseworker session notes with students from the Shamiri Digital Hub (SDH). These notes provided records of caseworker–student interactions, risk assessments, applied interventions and case outcomes. The SDH is a back-office platform supporting the Shamiri program (Lilan et al., 2025). It streamlines data collection, operations and clinical case management. The case management module allows caseworkers to document student information, psychosocial challenges, assessments, treatments and outcomes. The SDH ensures accountability through a centralized system for tracking clinical progress, facilitating supervision and ensuring effective interventions (Lilan et al., 2025). Second, to evaluate protocol implementation, a post-implementation survey was administered to caseworkers. All 114 caseworkers were invited to complete the survey, with 57 (50%) completing the evaluation. The 31-item survey included both multiple-choice and open-ended questions across five domains: case handling, school environment, training and clinical protocols, use of the SDH, and general

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reflections. The survey was specifically developed for use in general Shamiri program and as such has not been previously evaluated for psychometric properties. See Supplementary Materials for the survey. The survey generated qualitative and quantitative insights into implementation barriers and facilitators.

### Data analysis

This study used a mixed-methods approach, and the two primary datasets – case records and caseworker surveys – were analyzed separately using distinct methods aligned with their respective data structures and goals.

#### Case data analysis

Quantitative analysis of case records focused on three primary areas: (1) fidelity to protocol guidelines, (2) student case outcomes and (3) changes in risk levels across the intervention period. To assess fidelity, two independent clinical experts rated case documentation using a standardized assessment rubric that evaluated adherence to risk classification procedures, intervention protocols and follow-up plans. One expert reviewed the entire case dataset, while the second reviewed a stratified sample representing 31.11% of cases (n = 69), selected to ensure representation across all three risk levels. Inter-rater reliability was assessed using the intraclass correlation coefficient (ICC) (Gwet, 2008, 2014).

Student outcomes were categorized according to caseworker documentation at case closure. Possible outcomes included mutual termination (where student and caseworker agreed to close the case), referrals to school-based support, external mental health referrals, student no-shows, administrative cancelations, suspensions or expulsions, and unreported outcomes. Changes in the risk level were calculated by comparing risk classification at intake with the final risk level at case closure, allowing for an assessment of risk trajectory across the intervention cycle.

#### Caseworker survey data

Qualitative data from caseworker surveys were analyzed using a two-step coding process. First, an inductive content analysis was conducted to develop preliminary themes related to protocol usability, school-level barriers and supervision experiences. Two researchers independently coded the responses, and any discrepancies were resolved using a consensual qualitative research (CQR) process to ensure consistency and rigor.

In the second step, emergent themes were mapped to domains within the CFIR. This allowed the data to be analyzed not only descriptively, but also in relation to established implementation science constructs. All codes were classified as either barriers or facilitators to implementation, and CQR procedures were used to refine mappings and address remaining inconsistencies (see Supplementary Materials for codebook).

## Results

### Case data findings

The Shamiri-RMP was implemented in 149 public secondary schools across seven Kenyan counties, reaching a total of 76,855 students during the study period. Of these, 977 students were flagged by lay providers for potential psychosocial concerns and referred for further assessment. Following screening by caseworkers, 222 students were enrolled in the Shamiri-RMP.

### Risk classification and adoption rates

Among students enrolled in the Shamiri-RMP, 42.71% were classified as having a low risk, 35.68% as moderate risk and 21.61% as high risk. During fidelity assessment, a protocol expert reviewed all case documentation using the Shamiri-RMP risk classification criteria as the reference standard. Then, 10.36% (n = 23) were reclassified as having "no risk" when documented information did not meet protocol threshold criteria and were excluded from further analysis.

### Fidelity and inter-rater reliability

Fidelity to the protocol was high, with a mean fidelity score of 4.13 out of 5. Fidelity was evaluated using a structured fidelity rating tool that included five items across two core domains:

#### Risk Assessment and Treatment Planning

A protocol expert reviewed all case documentation using the Shamiri-RMP risk classification criteria as the reference standard. Items assessed whether clinicians (1) gathered comprehensive background information (*e.g.*, history, triggers, protective factors), (2) clearly documented the risk level (*e.g.*, low, moderate, high), (3) developed treatment plans that aligned with assessment findings, (4) ensured interventions were appropriate to the risk level and (5) reviewed or updated plans based on progress. Each item was scored on a scale from 1 (poor) to 5 (excellent) (see Supplementary Materials). The ICC for inter-rater agreement was 0.967 for single measures (95% CI: 0.947–0.979) and 0.983 for average measures (95% CI: 0.973–0.990), indicating strong reliability ($F = 68$, $p < .001$).

#### Accuracy of Risk Classification

Agreement between caseworker risk classifications and expert reviewer assessments was 78.38%. Classification errors were most common in moderate-risk cases, which accounted for 66% of all misclassifications. Of the moderate-risk cases, only 72.15% were correctly classified, compared to 82.29% for low-risk and 80.85% for high-risk cases. Most misclassifications (74.5%) resulted in an overestimation of risk severity, suggesting a conservative approach among caseworkers.

### Case resolution outcomes

Based on reporting by caseworkers, the most common outcome was mutual termination (54.27%), followed by unreported outcomes (28.14%). Other recorded outcomes included school-based referrals (5.02%), student no-shows (4.02%), school administration cancelations of clinical sessions (3.52%), external mental health referrals (3.52%) and suspensions or expulsions (1.51%).

### Outcomes by initial risk level

Table 3 presents the distribution of case outcomes by students' initial risk classification. High-risk students were more likely to be referred externally (11.63%) or released back home to their guardians with instructions to receive treatment before being allowed back to school (6.98%). Moderate-risk cases had the highest rate of school administration cancelations of clinical sessions (7.04%), while low-risk students were most likely to complete the protocol through mutual termination (62.35%).

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**Table 3.** Relationship between initial risk level and case outcome (n = 199)

| | | Case outcome | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mutually terminated | Unreported | Referred | Administration cancelled | No-show | School support | Suspension/ expulsion | Total |
| Initial risk level | High | 18 | 12 | 5 | 0 | 1 | 4 | 3 | 43 |
| | Moderate | 37 | 21 | 1 | 5 | 3 | 4 | 0 | 71 |
| | Low | 53 | 23 | 1 | 2 | 4 | 2 | 0 | 85 |
| Total | | 108 | 56 | 7 | 7 | 8 | 10 | 3 | 199 |

*Note*: Case outcomes are presented by initial risk level (high, moderate, low). Totals (N = 199) reflect total number of risk-associated cases after expert review.

### Risk level transitions

Overall, there was a general trend of risk reduction by the end of the intervention cycle. Among students initially classified as high risk (n = 43), 60.47% showed improvement, while 39.53% remained at the same risk level. Among moderate-risk cases (n = 71), 56.34% improved and 49.46% remained moderate. Among low-risk cases (n = 85), 51.76% transitioned to "no risk," while 48.24% remained at low risk. Notably, no students escalated to a higher risk level during the intervention (Table 4).

We conducted a secondary analysis to address data completeness excluding cases with unreported outcomes (n = 56). This yielded better transition rates: 80.6% of high-risk students improved to moderate or low risk; 72.0% of moderate-risk students improved; and 69.4% of low-risk students transitioned to "no risk."

### Caseworker survey data

To complement the quantitative analysis of protocol fidelity and student outcomes, we conducted a qualitative analysis of caseworker survey responses to understand the implementation experience from the perspective of those applying the Shamiri-RMP on the ground. This analysis sought to identify barriers and facilitators to protocol implementation across diverse school settings and to contextualize findings within a structured implementation science framework.

### Barriers to implementation of the Shamiri-RMP

Caseworkers identified barriers across three CFIR domains: intervention characteristics, outer setting and inner setting. These challenges illustrate the complex, layered factors that affect the successful application of the Shamiri-RMP in real-world school environments.

#### Intervention characteristics

The current Shamiri-RMP protocol has several limitations: (1) 10% of caseworkers raised concerns about protocol accessibility, stating it is structured yet difficult to navigate under time constraints. They suggested developing a mobile-compatible version with streamlined decision pathways for better usability in dynamic school settings. (2) Real-world applicability is another issue, as 19.3% caseworkers noted the protocol is time-intensive, particularly in busy schools. One of the caseworkers said: "Twist them a little so that they can be easily incorporated with the short and brief sessions that we have." They recommended greater flexibility in design to allow adaptation when full adherence is not feasible while ensuring student safety. (3) Clinical scope limitations were highlighted. Respondents advocated for expanding the Shamiri-RMP to address comorbid conditions like trauma, behavioral issues or physical health complaints that often accompany mental health risks.

#### Outer setting

Barriers in the external environment included fragmented mental health services and inadequate referral infrastructure. (1) Gaps in the referral system posed significant challenges, particularly the lack of pathways for high-risk students. 5.3% of caseworkers noted that referrals, especially for child protection or substance abuse, were often delayed by logistical or bureaucratic hurdles. (2) One caseworker noted that the lack of an integrated mental health ecosystem further aggravated the issue. They described Kenya's mental health support system as disjointed, with limited coordination between schools, clinics and community organizations. This

**Table 4.** Relationship between initial risk level and end risk level (n = 199)

| | | | End risk level | | | | |
|---|---|---|---|---|---|---|---|
| | | | High | Moderate | Low | No | Total |
| Initial risk level | High | Count | 17 | 9 | 10 | 7 | 43 |
| | | % | 8.5 | 4.5 | 5.0 | 3.5 | 21.6 |
| | Moderate | Count | 0 | 31 | 28 | 12 | 71 |
| | | % | 0.0 | 15.6 | 14.1 | 6.0 | 35.7 |
| | Low | Count | 0 | 0 | 41 | 44 | 85 |
| | | % | 0.0 | 0.0 | 20.6 | 22.1 | 42.7 |
| Total | | Count | 17 | 40 | 79 | 63 | 199 |
| | | % of Total | 8.5 | 20.1 | 39.7 | 31.7 | 100.0 |

*Note:* Values represent the number of cases and corresponding percentages within the total sample (N = 199). Rows indicate participants' initial risk level, and columns indicate end risk level.

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fragmentation made it challenging to connect students to timely and appropriate care. (3) Deficiencies in post-service care also emerged, as students who were referred to or transitioned out of the school-based system frequently had no access to continued care. Caseworkers emphasized that the lack of follow-up services undermined the longer-term goals of the intervention, particularly for high-risk youth requiring ongoing monitoring.

#### *Inner setting*

Challenges within school environments also emerged as significant barriers to implementation. (1) 54% of respondents noted that school administration and culture posed challenges, raising concerns about professionalism and discretion in sensitive student matters. One caseworker said: "There is lack of professionalism in how the schools handle student cases. The students are skeptical of sharing their issues as it will lead to them being exposed to everyone and shamed about it." Breaches of confidentiality fueled distrust and reduced help-seeking. In schools where leadership did not actively prioritize mental health initiatives, implementation was difficult and inconsistent. (2) 80.7% of responders highlighted that gender-based differences influenced implementation. Caseworkers found it smoother in girls' schools, described as more welcoming with higher student engagement. In contrast, boys' and mixed-gender schools were seen as more resistant due to lower emotional openness and greater stigma around help-seeking. (3) 27% noted that time constraints in day schools were another barrier. One caseworker noted: "Boarding schools are much easier because we can be given a little bit more time as compared to Day schools where students have to leave sessions in a hurry to go home. Boarding school have a more controlled environment."

### *Factors promoting the implementation of the Shamiri-RMP*

Caseworkers identified several factors that supported successful implementation, spanning the CFIR domains of intervention characteristics, inner setting and implementation process. (1) 80.7% of respondents praised the Shamiri-RMP's structured design and practical value for its utility and usability. The protocol's clarity and step-by-step format facilitated implementation with minimal confusion, even in resource-constrained environments. Tools such as safety planning worksheets and tiered intervention guidelines aided decision-making and fostered student trust. (2) School type and context influenced implementation, with boarding schools cited by 57.9% of caseworkers as more conducive due to stable attendance and reduced time constraints, allowing for deeper engagement. Girls' schools were rated as easier to work in and more responsive by 45.6% of respondents, due to greater openness to discussing emotional wellbeing. (3) According to 50.9% of respondents, supervisory support emerged as a key enabler, with ongoing guidance from case managers assisting caseworkers in reflecting, troubleshooting and refining their decision-making. One caseworker had this to say about consulting their case manager: "The client's issue was in the context of bullying but did not qualify for any risk level. The outcome was reliable, efficient, and timely. The insights she offered on how to handle the case and proceed cautiously were appreciated." Regular supervision also helped alleviate stress, especially when addressing complex or high-risk cases. (4) 78.7% highlighted that efficient case-handling systems enhanced implementation, which enabled caseworkers to access escalation pathways, real-time feedback and documentation tools like the SDH. These systems managed caseloads and ensured timely student support, which is crucial in urgent or multiparty coordination.

## Discussion

This mixed-methods implementation study provides, to the best of our knowledge, the first systematic evaluation of a structured risk management protocol within a school-based, task-shifted mental health intervention in SSA. In particular, we investigate the fidelity, effectiveness and contextual factors affecting the Shamiri-RMP, a structured risk management tool within the Shamiri model, a school-based mental health model in Kenyan public high schools (Osborn et al., 2020b, 2021; Ochuku et al., 2023; Venturo-Conerly et al., 2024). Our findings demonstrate that the Shamiri-RMP can be implemented with high fidelity across diverse educational contexts while achieving meaningful clinical outcomes for at-risk adolescents.

Quantitative analyses reveal robust implementation fidelity (M = 4.13/5) with strong inter-rater reliability (ICC = 0.967), indicating that caseworkers consistently applied protocol guidelines despite varying school environments and resource constraints. This level of adherence is particularly notable given the complexity of risk assessment and the non-specialist background of implementers. The finding aligns with implementation science evidence that structured protocols with clear decision pathways enhance fidelity in low-resource settings when paired with ongoing supervision (Murray et al., 2014; Javadi et al., 2017).

Clinical effectiveness data further validate the Shamiri-RMP's utility. Risk level transitions showed an overall trend of risk reduction: 60.5% of high-risk cases improved, and 51.8% of low-risk cases transitioned to no risk. After adjusting for unreported outcomes, 80.6% of high-risk students moved to a lower risk level, 72.0% of moderate-risk students showed improvement and 69.4% of low-risk students transitioned to no risk. Notably, no students escalated to higher risk levels during the intervention, suggesting that the protocol's safety planning and monitoring components effectively prevent deterioration. The conservative misclassification pattern (74.5% overestimated risk severity) reflects appropriate clinical caution, particularly valuable in time-constrained school environments where comprehensive assessment may be limited.

The CFIR analysis reveals that protocol clarity and structured decision-making tools were fundamental facilitators, with 80.7% of caseworkers endorsing these features. The tiered risk classification system and accompanying intervention guidelines reduced decision uncertainty, enabling non-specialists to navigate complex clinical situations confidently. However, caseworkers identified opportunities for enhancement, including mobile-compatible formats and expanded scope to address comorbid conditions – adaptations that could further improve real-world usability.

School-level factors emerged as powerful determinants of implementation success. Qualitative findings highlight a clear hierarchy of conducive environments: boarding schools outperformed day schools due to stable attendance and flexible scheduling, while girls' schools demonstrated greater engagement compared to boys' or mixed-gender institutions. These patterns reflect deeper structural and cultural factors affecting help-seeking behavior and administrative support.

The most significant inner-setting barrier involved confidentiality breaches and administrative resistance, reported by 54% of caseworkers. This finding underscores a critical implementation challenge: while school-based delivery offers accessibility advantages, it

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requires careful attention to privacy protection and staff training. The variation in administrative support across schools suggests that implementation success depends heavily on leadership buy-in and organizational culture. These findings align with broader literature highlighting structured interventions and ongoing supervision as key to sustaining quality delivery in task-shifted models in LMICs (Murray et al., 2014; Javadi et al., 2017).

The fragmented nature of Kenya's mental health referral system emerged as a persistent implementation barrier. Caseworkers reported delays and logistical challenges in connecting high-risk students to external services, reflecting broader systemic deficiencies in care coordination. This finding resonates with the literature documenting weak referral pathways as a common constraint in LMIC health systems, highlighting the need for policy-level interventions to strengthen service integration (Murray et al., 2011; Rajaraman et al., 2012; Wasil et al., 2021b; Venturo-Conerly et al., 2022; Ndetei et al., 2023, p. 163).

Finally, another key barrier to protocol implementation was limited support from school administrations, restricting caseworker access and discouraging help-seeking behavior. Privacy concerns influenced student hesitancy, as students feared that disclosures might be overheard by staff who could punish them. Previous school-based models in LMICs have shown that supportive school management is crucial for program fidelity and efficacy (Rajaraman et al., 2012). Therefore, enhancing buy-in from school administrators is essential. Training programs for school staff have proven effective in increasing the acceptability of mental health programs (Rajaraman et al., 2012) and should be adopted in school-based mental health initiatives.

Taken together, our finding suggests that the Shamiri-RMP addresses a gap in mental health programs in LMICs: the lack of standardized, culturally informed and evidence-based tools for risk response (Barnett et al., 2018b). Although existing task-shifted models have improved access to preventive interventions through lay providers, they often lack mechanisms for triage and escalation (Sangraula *et al.*, 2025). The Shamiri-RMP supports evidence-based stepped-care approaches in youth mental health services, prioritizing scalability and clinical effectiveness (Barnett et al., 2018a, 2018b).

### *Limitations*

This study has limitations worth considering. The analyses did not account for potential differences by gender, age or other socio-demographic characteristics of adolescents, which could affect what risk level was assigned, risk level transitions and case outcomes. Caseworker characteristics such as gender, age or educational background were additionally not examined, though these factors may also shape risk identification and management in different populations. Future research should explore these dimensions and their interactions to better understand how adolescent and caseworker characteristics interact with risk management processes. While case data provided quantitative insights, session notes may not fully capture undocumented realities. The qualitative analysis relied on self-reported data from caseworker surveys, which are subject to response bias. Additionally, the survey design may lack depth compared to in-person interviews. Variations in school administration policies and institutional support could have influenced outcomes, affecting the generalizability of our findings. Furthermore, the cross-sectional design limits insights into long-term implementation dynamics.

Future research should utilize longitudinal designs to assess the sustainability of the Shamiri-RMP and its long-term effects on caseworker practices and student outcomes (*e.g.*, sustained safety, mental health improvements). Monitoring students over time will provide crucial insights into the effectiveness of risk assessment and intervention strategies, sustainability of behavioral and mental health improvements, and opportunities for refining protocols. Comparative studies that examine the Shamiri-RMP alongside other school-based risk assessment frameworks will offer valuable benchmarks for evaluating its efficacy, adaptability and feasibility of implementation. Such research will guide best practices for school-based risk management policies and contribute to developing comprehensive, contextually relevant mental health protocols in educational settings.

## Conclusion

This study demonstrates that structured risk management protocols, like the Shamiri-RMP, can be successfully integrated into task-shifted mental health interventions in low-resource educational settings. The high fidelity rates, positive clinical outcomes and systematic identification of implementation facilitators provide evidence for the feasibility and effectiveness of this approach. However, the findings also highlight that successful implementation requires more than protocol development – it demands attention to supervision systems, administrative engagement, referral pathway development and ongoing adaptation to local contexts. The identification of these implementation drivers offers a roadmap for scaling similar interventions while maintaining quality and safety.

As global attention increasingly focuses on adolescent mental health, particularly in LMICs, where needs are greatest and resources most constrained, this research contributes essential evidence to developing comprehensive, contextually appropriate and economically sustainable care models. The Shamiri-RMP offers a framework for thinking systematically about how to bridge the gap between evidence-based interventions and real-world implementation in resource-limited settings.

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**Data availability statement.** The authors confirm that the data supporting the findings of this study are available from the corresponding author upon reasonable request.

**Author contribution.** SK designed the study, supervised the research process and critically reviewed and edited all sections of the manuscript. TO contributed to the study's conceptualization and supervised the manuscript writing process. LM conducted the quantitative analyses and led the drafting of the results and discussion sections. AS conducted the qualitative analyses and drafted the introduction section. VN and KVC reviewed and provided critical feedback on the manuscript. CW provided oversight and guidance during the research process and contributed to the manuscript review.

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**Competing interests.** SK, LM, AS, VN, KVC and TO are employees of Shamiri Institute, a non-profit organization committed to developing interventions that help young people thrive and improve their life outcomes. Prof Christine Wasanga is an affiliate of Shamiri Institute, serving as a member of

its Board of Directors. The authors acknowledge the potential for a perceived conflict of interest arising from their institutional affiliation with Shamiri Institute, which developed and implements the evaluated intervention. Given that Shamiri Institute is a non-profit organization, none of the authors stand to make any financial gain from this study. The following measures were taken to safeguard the integrity of this research study: (1) the study was funded independently by Fonds d'Innovation pour le Développement (grant number: CKEI19601) with no requirements for positive findings; (2) analytic procedures included independent dual coding with high inter-rater reliability (ICC = 0.967); (3) transparent reporting of both favorable outcomes and implementation barriers; and (4) independent ethical oversight by the Kenyatta University Ethics Review Committee.

**Ethics statement.** This study received ethical approval from the Kenyatta 9University Ethics Review Committee (permit number: PKU/2627/E1752; approval date: 07 February 2023) and was registered with the National Commission for Science, Technology, and Innovation (license number: NACOSTI/P/23/23559; registration date: 21 February 2023). Informed consent and assent, as appropriate, were obtained from all participants included in the study.

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