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Depression and academic outcomes following school-based Interpersonal Group Therapy among primary school students in Uganda

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Abstract

Adolescent depression is a major public health concern in low- and middle-income countries and is associated with impaired school engagement and performance. School-based mental health interventions may provide an accessible strategy for addressing depression while supporting educational outcomes, but evidence from low-resource settings remains limited. This pre-post evaluation examined changes in depressive symptoms, school attendance, and academic performance among Ugandan adolescents receiving teacher-facilitated Interpersonal Group Therapy (IPT-G), and explored factors associated with follow-up outcomes. We analysed data from 686 adolescents aged 10–19 years who received IPT-G in Ugandan primary schools. Depression severity was measured using the Patient Health Questionnaire-9 (PHQ-9). Educational outcomes were school attendance (%) and academic rank percentile. Baseline-to-follow-up changes were estimated using regression models with standard errors adjusted for clustering at therapy group level, and multivariable linear regression examined factors associated with follow-up outcomes. Mean PHQ-9 scores declined by 11.5 points (95% CI: -11.9 to -11.1; $p < 0.001$), while academic rank percentile improved by 4.9 points (95% CI: 2.6 to 7.2; $p < 0.001$). Attendance increased by 1.6 percentage points, but not statistically significantly (95% CI: -1.1 to 4.4; $p = 0.246$). In adjusted models, additional sessions attended and participation in the six-week format were associated with lower follow-up PHQ-9 scores. Higher baseline academic rank and younger age were associated with better follow-up academic performance. Borderline evidence suggested depression and attendance improvement were associated with better academic performance. Findings suggest that school-based IPT-G may be associated with improved adolescent mental health and academic performance, but controlled studies are needed to establish causality.

Introduction

Adolescent depression presents a significant and growing global mental health concern, adversely affecting developmental processes, academic performance, and social functioning (Lu et al., 2024; Liu & Kuai, 2025). In Uganda, this burden is substantial: a recent meta-analysis estimated that 22.2% of children are experiencing a depressive disorder (Opio et al., 2022), driven in part by poverty, exposure to violence, and limited access to mental health care (Nalugya-Sserunjogi et al., 2016).

The impact of adolescent depression on academic impairment is well-documented (Deighton et al., 2018; Humensky et al., 2010; Kiuru et al., 2011). Depressive symptoms and diagnoses are commonly associated with reduced school performance and lower educational achievements (Fletcher, 2008; Quiroga et al., 2013). Adolescents with depression often show impaired exam performance, experience school burnout, and are at higher risk of not completing secondary or tertiary education (Deng et al., 2022; Reisbig et al., 2012; Salmela-Aro et al., 2009). Furthermore, depressive symptoms are predictive of reduced academic self-efficacy —where students feel less competent in their ability to complete school tasks — and poorer academic functioning, including difficulties with attention and keeping up with coursework, with evidence that these difficulties can persist for at least six months (Jaycox et al., 2009). Collectively, these findings highlight adolescent depression as not only a mental health problem, but also

a major threat to educational participation and attainment, emphasizing the need for effective and accessible interventions within school settings.

Evidence increasingly supports the effectiveness of school-based interventions for adolescent depression (Feiss et al., 2019; Gee et al., 2020; McCarthy et al., 2018). This study focuses on one such intervention: Group Interpersonal Psychotherapy (IPT-G), a structured, evidence-based intervention that addresses depression by strengthening interpersonal relationships and social functioning, which are commonly impaired among individuals with depression (Bolton et al., 2003; Verdeli et al., 2003). IPT-G was first adapted and evaluated in Uganda among adults (Bolton et al., 2003), with sustained benefits reported at six-month follow-up (Bass et al., 2006). It has since shown effectiveness among adolescents in northern Uganda (Bolton et al., 2007), with emerging evidence supporting the feasibility and acceptability of school-based delivery in Uganda and other low-resource settings (Carlson et al., 2021; Rose-Clarke et al., 2022). By targeting interpersonal difficulties that contribute to depressive symptoms, IPT-G offers a relevant approach for school settings, where adolescents' social relationships, emotional wellbeing, and learning are closely connected.

In Uganda, increasing attention has been directed toward integrating mental health support within school settings. The Uganda Ministry of Education introduced a national "mental health hour" initiative in 2022, mandating that schools dedicate at least one hour each week to counselling and psychosocial support (Ministry of Education and Sports, 2022). This initiative aims to provide schools with the necessary framework and time to offer mental health support to students. It is an important step toward integrating mental health services into the educational system, ensuring that students have access to necessary mental health resources within a familiar and accessible environment. In line with this, IPT-G has been implemented in over 251 schools in 11 districts in Uganda through a partnership between the Ministry of Education and StrongMinds, a non-profit organization that delivers depression treatment in Uganda. Delivery began in 2021 through organization-led facilitation and shifted to a teacher-facilitated model in 2022.

Whether this scaled implementation translates into measurable improvements in students' educational outcomes, however, remains unknown. Despite the well-established association between adolescent depression and poor academic performance (Adhiambo Nyayieka et al., 2020; Maurizi et al., 2013) and evidence supporting the efficacy of IPT-G in reducing depressive symptoms (Assefa et al., 2025; Johnson et al., 2016; Kaur Kang et al., 2024), the effect of school-based IPT-G on academic performance has not been examined at program level in Uganda. In particular, no study has yet examined whether integration of IPT-G such as through the Ministry of Education's mental health hour policy and the ongoing, scaled implementation by StrongMinds across hundreds of schools, translates into measurable improvements in students' educational trajectories. This study therefore describes changes in depressive symptoms, academic performance, and school attendance among adolescents who received IPT-G within Uganda's school-based mental health framework, and examines factors associated with outcomes at follow-up. By generating evidence on both mental health and academic outcomes, this

study aims to inform programmatic refinement and policy decisions to better support the holistic well-being and educational success of Ugandan adolescents and may inform efforts in other global settings.

Methods

Setting

This study was conducted in 101 public primary schools across 11 districts in Uganda: Kampala, Wakiso, and Mukono (Central Uganda); Bugweri, Iganga, Luuka, Mayuge, and Mbale (Eastern Uganda); Gulu and Kotido (Northern Uganda); and Mbarara (Western Uganda). Uganda's public primary education system comprises seven years of schooling, from Primary 1 to Primary 7, and enrols over 9 million children, with government-aided schools serving most learners across urban and rural areas (Ministry of Education and Sports, 2025). The study schools were part of a teacher-facilitated IPT-G program implemented by StrongMinds.

Study design

The study employed an uncontrolled pre-post evaluation design using secondary data extracted between July 2023 and June 2024 from StrongMinds' routine monitoring and evaluation activities. The data were originally collected as part of on-going programmatic evaluations to assess the effectiveness of IPT-G implemented in school settings. The study got ethical approval from the Mildmay Uganda Research Ethics Committee (Reference Number: MUREC-2024-467).

Intervention

IPT-G was adapted from the original Interpersonal Psychotherapy model developed by Klerman et al. (1996) and from prior IPT-G adaptations tested in Uganda (Bolton et al., 2003; Verdeli et al., 2003). The school-based protocol was tailored for Ugandan adolescents, drawing on adolescent IPT adaptations and previous adolescent IPT-G work in Uganda (Mufson, 1999; Bolton et al., 2007). The approach aims to reduce depressive symptoms by improving interpersonal functioning, social support, and management of problem areas such as grief, interpersonal disputes, role transitions, and social isolation. For this study, the protocol was tailored for Ugandan adolescents through culturally relevant examples, role plays, and common depression triggers, including family conflict, financial stress, and school pressures.

The intervention consisted of 6–10 weekly group sessions, each lasting approximately 90 minutes and conducted during each school's designated mental health hour. Sessions were delivered by trained teacher-facilitators to groups of 8–12 students, providing an intimate and supportive environment for sharing and learning. The structure of IPT-G included three phases. The initial phase (Sessions 1–2 for 8-session IPT-G and 1–3 for 10-session IPT-G) focused on identifying interpersonal issues contributing to depression, setting therapeutic goals, and establishing group norms such as confidentiality and mutual

respect. This phase aimed to create a safe and collaborative space for participants. The middle phase (Sessions 3–6 for 8-session IPT-G and 4–8 for 10-session IPT-G) addressed core interpersonal problem areas, such as grief, interpersonal disputes, role transitions, and social isolation. Facilitators employed techniques like role-playing, guided discussions, and structured exercises to help participants practice effective communication and conflict resolution. Group members shared personal experiences, received feedback, and offered support to peers, reinforcing a sense of community and shared purpose. In the termination phase (Sessions 7–8 for 8-session IPT-G and 9–10 for 10-session IPT-G), participants reflected on their progress, consolidated the skills they had learned, and discussed strategies for managing future challenges.

As part of program implementation, selected teacher-facilitators underwent a five-day intensive training led by a certified IPT-G trainer from StrongMinds to equip them with the skills needed to deliver IPT-G sessions. The training included interactive workshops and hands-on practice, supported by comprehensive manuals and evidence-based materials specifically adapted for the school context. These resources were designed to ensure the teacher-facilitators could effectively address the unique needs of adolescent students while maintaining fidelity to the IPT-G protocol. Following the training, teacher-facilitators conducted IPT-G sessions and received ongoing supervision and support from StrongMinds clinical supervisors. This continuous supervision included regular check-ins, feedback sessions, and performance evaluations to ensure the intervention was delivered consistently and aligned with established protocols.

Participant identification and eligibility screening

Adolescents with elevated depressive symptoms were identified through a two-stage screening process. The first stage involved a classroom-based screening conducted on a pre-arranged day at each participating school. Teacher-facilitators began with brief psychoeducation on depression and explained the purpose of the screening, after which verbal assent was obtained from each student. Screening was performed using the four-item Patient Health Questionnaire (PHQ-4), which assesses symptoms of depression (little interest or pleasure in activities; and feeling down, depressed, or hopeless) over the previous two weeks. The PHQ-4 was administered as a guided, self-reported paper-and-pen assessment in classroom groups of 40–50 students. PHQ-4 scores range from 0 to 12, and adolescents scoring ≥ 5 (having mild, moderate, or severe symptoms) were eligible for the second round of screening using the PHQ-9.

In the second round of screening, parents of eligible adolescents were invited to school and sensitized about depression, its symptoms, and the IPT-G intervention, including where and how therapy would be delivered. This sensitization process helped parents understand the nature of the intervention and made it possible for them to make informed decisions about their child's participation. The second screening, done within 1–2 weeks of the first screening, was offered to adolescents who assented and whose parents gave consent. The second screening involved individual assessment by the teacher-facilitator using the PHQ-9 to measure the severity of depressive symptoms and questions to identify each

adolescent's triggers for depression (such as disputes, loneliness, life changes, or grief). In addition, adolescents were asked about their goals for participating in therapy, which gave insight into their motivations for engaging in IPT-G. The screened adolescents qualified for the IPT-G intervention if they scored 10 or higher on the PHQ-9.

Sampling

Between July 2023 and June 2024, 17,027 adolescents screened positive for depressive symptoms, defined as a PHQ-9 score of 10 or above, and were enrolled into school-based IPT-G groups. These adolescents constituted the sampling frame for the study. The study employed a two-stage clustered sampling design to survey approximately 10% of students who received IPT-G during this period, corresponding to a target sample of approximately 1,703 students. Given that IPT-G therapy groups typically comprise around 10 students, achieving this target required sampling approximately 171 therapy groups. Rather than surveying entire therapy groups, a partial-cluster sampling approach was adopted to improve feasibility and balance representation across facilitators, with two therapy groups randomly selected per teacher and five students randomly selected from each group, yielding an expected sample of 10 students per teacher. In the first stage, 171 teacher-facilitators were selected from a total of 453 using stratified random sampling by district to ensure geographic representation. In the second stage, two therapy groups were randomly selected per sampled teacher, followed by random selection of five students from each group. This process yielded a sample of 1,710 students.

Variables

Outcome measures

Depressive symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9), a nine-item self-report instrument measuring symptom severity over the previous two weeks. Scores range from 0 to 27, with higher scores indicating greater depression severity (Kroenke et al., 2001).The PHQ-9 was administered by trained teacher-facilitators as part of StrongMinds' routine program monitoring at pre- and post-intervention.

Academic performance was evaluated using two indicators extracted from school administrative records. The first outcome, school attendance, was calculated as the percentage of school days a student was present during a given term. The second outcome, academic performance, was measured using a class-based percentile rank derived from students' aggregate examination scores across all subjects. Students were first ranked within their class based on total scores, with the highest performer assigned rank 1. To standardize comparisons across classes of varying sizes, raw ranks were then converted to percentiles using the formula: percentile = (1 − rank/class size) × 100. This transformation produced scores ranging from 0 to just below 100, with higher percentile scores indicating better relative academic standing. Pre-intervention academic data were drawn from the term immediately preceding the IPT-G intervention. Post-intervention data were obtained from the term after the intervention.

Predictor variables

Predictors included demographic characteristics, baseline depressive symptom severity, implementation exposure, therapy-related factors, and baseline academic indicators. Demographic variables included age and gender. Baseline depressive symptom severity was measured using the PHQ-9 total score. Depression trigger referred to the primary problem area identified during pre-grouping. Implementation exposure included the total number of sessions attended and session of first attendance. Therapy duration was categorized as six-week or ten-week IPT-G. Baseline academic indicators included class rank percentile and percentage of school days attended.

Data collection

Depression-related data, including pre- and post-therapy PHQ-9 scores, depression triggers, session attendance, and therapy duration, were extracted from StrongMinds' routine program monitoring database for adolescents selected into the study. Academic performance data were obtained from school administrative records for two school terms: the term preceding the intervention (baseline), and the term following the intervention (follow-up). Data extraction took place between June and December 2024. To ensure accuracy of academic records, a two-stage verification process was employed. The first extraction was completed by teachers, and the second by trained research assistants. Where discrepancies arose between the two datasets, a third verification was conducted to establish the final record.

Analysis

Descriptive statistics were used to summarise the baseline characteristics of the sample, with continuous variables reported as means and standard deviations (SDs) and categorical variables as frequencies and percentages. Pre- to post-intervention changes in depressive symptom scores, school attendance, and academic performance rank were assessed by regressing each change score on an intercept, with standard errors adjusted for clustering at the therapy group level to account for the non-independence of students within the same therapy group. Results are reported as mean changes with 95% confidence intervals (CIs).

Associations between potential predictors and each outcome at follow-up were first examined using bivariate linear regression, with follow-up outcome scores as the dependent variable. Variables were then entered simultaneously into multivariable linear regression models, with baseline outcome values included as covariates to account for differences at the start of the intervention, allowing estimation of independent associations at follow-up adjusted for potential confounders. Predictors examined varied by outcome. For depressive symptom severity at follow-up, predictors included age, gender, number of sessions attended, session of first attendance, therapy duration, depression trigger, and baseline PHQ-9 score. For school attendance at follow-up, predictors included age, gender, PHQ-9 score change, and baseline attendance. For academic performance at follow-up, predictors included age, gender, PHQ-9 score change, attendance change, and baseline performance rank. The proportion of variance in each

outcome explained by the multivariable model was estimated using the R-squared statistic. Standard errors and confidence intervals were adjusted for clustering at the therapy group level throughout all analyses.

To explore potential pathways linking depressive symptom improvement to academic performance, we conducted an exploratory mediation analysis assessing whether changes in school attendance mediated this relationship. The indirect effect was estimated as the product of the association between PHQ-9 change and attendance change and the association between attendance change and follow-up academic performance, adjusting for baseline performance. Statistical significance of the indirect effect was assessed using bootstrapping with 1,000 replications resampled at the therapy group level.

Results

Sample characteristics

From an initial pool of 1,710 students who received IPT-G, complete treatment records were available for 1,670. Academic records were available for 1,189 students. Of these, 769 had class rank data for both the pre- and post-intervention terms. After excluding 42 students missing class size data and 41 with invalid termination PHQ-9 scores, the final analytic sample consisted of 686 students (Fig. 1).

The mean age of participants was 13.3 years (SD = 1.4; range: 11–19), and the majority were female (60.9%) (Table 1). Nearly all students (97.2%) began therapy in the first session period. On average, they attended 6.6 sessions during the intervention period (SD = 1.9), and the majority (72.3%) participated in the six-week IPT-G program. The most frequently reported trigger for depression was life change (48.5%) while shyness/loneliness (10.0%) was the least reported. At baseline, the mean PHQ-9 score was 13.6 (SD = 3.2), with 67.9% classified as having moderate depression and 5.8% as severe. Mean baseline school attendance was 80.9% (SD = 19.1), and mean class rank percentile was 56.1 (SD = 27.2).

Table 1
Baseline characteristics of participants

Characteristic	Overall (N = 686)
Demographics	
Age, mean (SD)	13.3 (1.4)
Gender, n (%)	
Female	418 (60.9)
Male	268 (39.1)
Intervention participation	
First Session, n (%)	
Session 1	667 (97.2)
Sessions 2 or 3	19 (2.8)
Number of sessions attended, mean (SD)	6.6 (1.9)
Length of therapy, n (%)	
6 weeks	496 (72.3)
10 weeks	190 (27.7)
Triggers of depression, n (%)	
Disagreement	167 (29.2)
Grief/death of a loved one	70 (12.3)
Life change	277 (48.5)
Shyness/loneliness	57 (10.0)
Baseline depression	
Depression PHQ-9 score, mean (SD)	13.6 (3.2)
Depression severity, n (%)	
Moderate	466 (67.9)
Moderately severe	180 (26.2)
Severe	40 (5.8)
Academic performance and attendance	
Baseline attendance (%), mean (SD)	80.9 (19.1)
Baseline academic rank percentile, mean (SD)	56.1 (27.2)

Pre- and post-intervention changes

Over the follow-up period, students demonstrated significant improvements in depressive symptoms and academic performance (Table 2). PHQ-9 scores decreased by a mean of 11.5 points (95% CI: -11.9 to -11.1; $p < 0.001$) and academic rank percentile improved by a mean of 4.9 percentile points (95% CI: 2.6 to 7.2; $p < 0.001$). School attendance improved by a mean of 1.6 percentage points (95% CI: -1.1 to 4.4; $p = 0.246$), though this did not reach statistical significance.

Table 2
Mean change in depression, academic performance rank, and school attendance from baseline to follow-up, adjusted for clustering at the therapy group level

Variable	n	Baseline, Mean (SD)	Follow-up, Mean (SD)	Mean Change (95% CI)	p-value
PHQ-9	683	13.6 (3.2)	2.1 (1.8)	-11.5 (-11.9,-11.1)	< 0.001
Attendance (%)	665	80.7 (19.2)	82.6 (17.5)	1.6 (-1.1, 4.4)	0.246
Academic rank percentile	683	56.1 (27.2)	61.1 (25.5)	4.9 (2.6, 7.2)	< 0.001

Factors associated with depressive symptom severity at follow-up

No variable was significantly associated with the depression score at the end of therapy in bivariate analysis (Table 3). In the multivariable model, however, both the number of sessions attended and therapy duration were associated with depressive symptom severity at follow-up. Each additional session attended was associated with a lower follow-up depression score (adjusted coefficient (β) = -0.26, 95% CI: -0.47 to -0.05; $p = 0.016$). Similarly, participation in the six-week therapy format was associated with a lower follow-up depression score compared with the ten-week format ($\beta = -1.03$, 95% CI: -1.92 to -0.13; $p = 0.024$). There was weak evidence that starting therapy in sessions 2 and 3 was associated with a lower follow-up depression score compared with starting in session 1, although this did not reach statistical significance ($\beta = -0.79$, 95% CI: -1.62 to 0.04; $p = 0.062$). Age, gender, trigger, and baseline PHQ-9 score were not associated with follow-up depression severity in the adjusted analysis. The variables in the model collectively explained only 2.2% of the variance in follow-up PHQ-9 scores.

Table 3
Factors associated with depressive symptoms at termination (N = 568)

Variable	Crude Coefficient	95% CI	p-value	Adjusted Coefficient	95% CI	p-value
Age	-0.03	(-0.15, 0.09)	0.639	0.00	(-0.13, 0.14)	0.967
Gender						
Female	Ref			Ref		
Male	-0.21	(-0.62, 0.19)	0.300	-0.26	(-0.71, 0.18)	0.247
Number of sessions	0.02	(-0.07, 0.11)	0.655	-0.26	(-0.47, -0.05)	**0.016**
First session						
Session 1	Ref			Ref		
Sessions 2 and 3	-0.40	(-1.31, 0.50)	0.377	-0.79	(-1.62, 0.04)	0.062
Duration of session						
10 weeks	Ref			Ref		
6 weeks	-0.26	(-0.66, 0.13)	0.191	-1.03	(-1.92, -0.13)	**0.024**
Trigger						
Disagreement	Ref			Ref		
Grief/ death of a loved one	0.07	(-0.49, 0.64)	0.797	0.08	(-0.46, 0.62)	0.769
Life change	0.23	(-0.19, 0.65)	0.281	0.29	(-0.13, 0.70)	0.176
Shyness/ loneliness	0.18	(-0.35, 0.71)	0.504	0.24	(-0.29, 0.77)	0.373
Baseline PHQ-9 score	< 0.01	(-0.05, 0.05)	0.875	0.01	(-0.04, 0.07)	0.692

Factors associated with school attendance at follow-up

In the bivariable analysis, older age was associated with lower follow-up school attendance, while male students had higher attendance compared with females (Table 4). Baseline attendance was also positively associated with follow-up attendance, whereas change in PHQ-9 score was not associated with attendance. All three associated persisted in the multivariable model. Each additional year of age

was associated with a 1.77-percentage point decrease in attendance (β = -1.77, 95% CI: -3.13 to -0.41; p = 0.011). Male students had higher attendance than females (β = 4.93, 95% CI: 0.56 to 9.30; p = 0.027). Finally, each one-percentage point increase in attendance at baseline was associated with a 0.28-percentage point increase at follow-up (β = 0.28, 95% CI: 0.15 to 0.41; p < 0.001). Change in depressive symptoms was not associated with school attendance in the adjusted analysis. The covariates explained 13.8% of the variance in the follow-up performance.

Table 4
Factors associated with school attendance at follow-up

Variable	Crude Coefficient	95% CI	p-value	Adjusted Coefficient	95% CI	p-value
Age	-1.48	(-2.66, -0.30)	**0.014**	-1.77	(-3.13, -0.41)	**0.011**
Gender						
Female	Ref			Ref		
Male	5.28	(0.81, 9.74)	**0.021**	4.93	(0.56, 9.30)	**0.027**
Change in PHQ-9 scores[1]	0.20	(-0.40, 0.79)	0.515	0.12	(-0.36, 0.61)	0.619
Baseline attendance	0.29	(0.16, 0.43)	**< 0.001**	0.28	(0.15, 0.41)	**< 0.001**

[1]PHQ-9 score change=Termination PHQ-9 - Baseline PHQ-9 (negative values indicate improvement).

Factors associated with school performance at follow-up

Older age, greater improvement in depressive symptoms, and better baseline academic performance were associated with school performance at follow-up in the bivariate analysis (Table 5). Gender and change in attendance were not associated with follow-up performance. In the multivariable model, age and baseline performance rank remained significantly associated with follow-up school performance. Each additional year of age was associated with a 2.64-point lower performance score at follow-up (β = -2.64, 95% CI: -4.32 to -0.95; p = 0.002). Each one-point increase in the baseline performance rank percentile was associated with a 0.61-point increase in the follow-up performance percentile (β = 0.61, 95% CI: 0.55 to 0.68; p < 0.001). Change in PHQ-9 score at follow-up showed borderline evidence of association with follow-up school performance. Each one-point improvement in PHQ-9 score (that is, reduction in depressive symptoms) over the intervention period was associated with a 0.50-point improvement in school performance at follow-up (β = -0.50, 95% CI: -1.00 to 0.00; p = 0.050). There was also borderline evidence that each one percentage point improvement in school attendance was associated with a 0.10-point improvement in school performance at follow-up (β = 0.10, 95% CI: 0.00 to 0.21; p = 0.053). Gender was not associated with school performance in the adjusted analysis. Together, the model covariates explained 45.5% of the variance in follow-up academic performance.

Table 5
Factors associated with school performance at follow-up

Variable		Crude Coefficient	95% CI	p-value	Adjusted Coefficient	95% CI	p-value
Age		-2.79	(-4.55, -1.03)	**0.002**	-2.64	(-4.32, -0.95)	**0.002**
Gender							
	Female	Ref			Ref		
	Male	-2.87	(-8.17, 2.42)	0.286	0.25	(-3.55, 4.05)	0.897
Change in PHQ9 scores[1]		-0.89	(-1.57, -0.21)	**0.010**	-0.50	(-1.00, 0.00)	0.050
Change in attendance[2]		0.00	(-0.12, 0.12)	0.989	0.10	(0.00, 0.21)	0.053
Baseline performance rank		0.59	(0.53, 0.66)	**< 0.001**	0.61	(0.55, 0.68)	**< 0.001**

[2]PHQ-9 score change=Termination PHQ-9 - Baseline PHQ-9 (negative values indicate improvement).

[2]School attendance % point change=Percentage attendance in term after therapy - Percentage attendance in term before therapy.

Exploratory mediation analysis found no evidence that changes in school attendance mediated the association between depressive symptom improvement and academic performance (indirect effect = 0.015, 95% CI: -0.051 to 0.087).

Discussion

This study evaluated the association between participation in teacher-facilitated IPT-G and changes in depressive symptoms, academic performance, and school attendance among adolescents in Ugandan school settings. To our knowledge, this is the first study in Uganda to examine these relationships within a large-scale school-based IPT-G implementation. We observed significant reductions in depressive symptoms following the intervention, accompanied by improvements in academic performance. School attendance showed only a small, non-significant improvement. Borderline evidence suggested that both depressive symptom improvement and attendance improvement were independently associated with better academic performance, though mediation analysis found no evidence that attendance transmitted the effect of depression improvement on academic outcomes. These findings add to the evidence base by suggesting that school-based mental health interventions may be associated with improvements in both psychological well-being and school performance among adolescents in low-resource contexts.

The observed reduction in average PHQ-9 scores, from moderate levels of depression at baseline to minimal symptom levels at termination, is consistent with previous trials of IPT-G conducted in similar contexts (Bolton et al., 2003; Rose-Clarke et al., 2022) and represents a change of likely clinical significance. The group-based delivery format likely contributed to these outcomes, as peer support and shared understanding within therapy groups are established mechanisms through which IPT-G reduces depressive symptoms (Young et al., 2012; Verdeli et al., 2008). These findings should nonetheless be interpreted cautiously given the uncontrolled design. Alongside the mental health improvement, students demonstrated modest gains in academic rank percentile, suggesting that improvements in mental health may be accompanied by changes in academic performance. School attendance, however, did not improve significantly, and depressive symptom improvement was not associated with attendance in the adjusted analysis. Mediation analysis further suggested that depression improvement and attendance improvement each contribute independently to academic outcomes rather than operating sequentially.

We found both therapy duration and number of sessions attended to be independently associated with depressive symptom severity at follow-up. Each additional session attended was associated with a lower follow-up depression score, consistent with literature suggesting a dose-response relationship between treatment intensity and outcomes (Erekson et al., 2015). However, participation in the six-week therapy format was associated with lower follow-up depression scores compared with the ten-week format. One possible explanation for this counter-intuitive finding is that shorter interventions may better align with school calendars, supporting better continuity and retention within the realities of school-based delivery. This interpretation is consistent with qualitative findings suggesting that engagement may decline in longer interventions delivered within school settings (Rose-Clarke et al., 2022).

The improvement in academic rank percentile of 4.9 points, while modest in absolute terms, is meaningful for a mental health intervention not specifically designed to improve academic outcomes. This suggests that improvements in adolescents' emotional wellbeing may have had spillover benefits for school performance. One possible explanation is that improvements in depressive symptoms may be linked to improved concentration, motivation, and academic self-efficacy, all of which are important for learning and classroom performance (Fletcher, 2008; Jaycox et al., 2009). This interpretation is broadly consistent with the adjusted analysis which showed borderline evidence that each one-point improvement in PHQ-9 score was associated with a 0.50-point improvement in academic rank. At the same time, academic performance is influenced by many other factors, including instructional quality, curriculum demands, and individual learning differences. The absence of evidence for mediation through attendance further suggests that any academic benefit may operate through other pathways rather than through increased school presence alone. This has practical implications for how the academic benefits of school-based mental health programmes are conceptualised and measured. However, given the borderline p-value and the uncontrolled design, these findings warrant replication in larger, controlled studies before firm conclusions can be drawn.

Although school attendance improved by a mean of 1.6 percentage points, this did not reach statistical significance. In adjusted analyses, older age and female gender were independently associated with

lower attendance at follow-up, consistent with broader patterns of absenteeism among older and female adolescents in Uganda, where financial constraints, domestic responsibilities, early marriage, and inadequate resources for menstrual health disproportionately affect school participation (Miiro et al., 2018). These findings suggest that mental health intervention alone may be insufficient to address attendance among these subgroups, and that complementary structural interventions addressing socioeconomic barriers are likely needed (Lewin & Sabates, 2012).

Our findings contribute to the growing evidence that schools can serve as effective platforms for delivering large-scale mental health interventions in low- and middle-income countries (Fazel et al., 2014; Michelson et al., 2020). The use of trained teacher-facilitators in delivering IPT-G aligns with task-shifting models designed to expand access to mental health care in resource-limited settings (Cuijpers et al., 2018; van Ginneken et al., 2021). Delivering mental health services within schools may also reduce logistical barriers to care, such as transportation costs and limited availability of specialized providers. However, successful integration of mental health services within educational systems requires careful attention to school readiness, including adequate training and supervision for the teacher-facilitators, access to private spaces for therapy sessions, and efforts to address stigma among both students and staff (Gronholm et al., 2018). In the Ugandan context, where mental health stigma persists (Ssebunnya et al., 2009), culturally sensitive implementation strategies remain essential.

This study has several important strengths. It draws on a relatively large sample of adolescents across multiple districts in Uganda and uses routinely collected programmatic and academic data, enhancing the real-world relevance of the findings. The analysis also integrates both clinical and educational outcomes, providing a broader understanding of how mental health interventions may influence adolescents' functioning within school environments. At the same time, several limitations should be considered. First, the absence of a control group precludes causal inference, as observed improvements may reflect natural symptom fluctuation, regression to the mean, or other contextual factors. Second, missing academic data for some participants may have introduced bias if the data were not missing at random. To assess potential selection bias introduced by the missing academic records, we compared baseline characteristics between the 686 students included in the final analytic sample and the 990 excluded due to incomplete data. The two groups were similar with respect to gender (60.9% against 62.3% female), baseline PHQ-9 score (mean 13.6 against 13.6), and number of therapy sessions attended (mean 6.6 against 6.5), although excluded students were marginally older (mean age 13.3 as compared to 13.8 years). Overall, these findings suggest that participants with and without academic data were broadly similar in their baseline clinical and demographic characteristics. Third, the analysis was restricted to schools using academic ranking systems, which may limit generalizability to schools using different assessment approaches. Finally, depressive symptoms were assessed using self-reported PHQ-9 scores collected by teacher-facilitators, which may have introduced social desirability bias.

Nonetheless, the results suggest that school-based IPT-G may contribute to meaningful reductions in depressive symptoms and gains in academic performance. By addressing interpersonal stressors and

enhancing social support within the school environment, IPT-G may help reduce psychological barriers that interfere with learning and school participation. However, the lack of a significant effect on attendance and the absence of evidence for mediation through attendance suggest that improvements in academic functioning may not depend on increased school presence alone. As countries increasingly seek scalable approaches to address adolescent mental health needs, integrating evidence-based psychological interventions within educational systems may represent a promising strategy for improving both mental health and broader adolescent functioning in low-resource settings.

Conclusions

This study observed substantial reductions in depressive symptoms and modest improvements in academic performance rank following school-based IPT-G delivery among adolescents in Uganda, while changes in school attendance were small and not statistically significant. Borderline associations between depression improvement and academic performance suggest a plausible pathway warranting further investigation. Taken together, these findings highlight the potential for school-based mental health interventions to influence outcomes beyond mental health alone. However, given the uncontrolled design, these results should be regarded as hypothesis-generating rather than confirmatory, and further research using controlled designs is needed to establish causal effects and examine the pathways through which improvements in mental health may translate into academic gains.

Declarations

Competing Interests:

Some authors were employees of StrongMinds, the organization that implemented the Group Interpersonal psychotherapy program evaluated in this study. The authors declare no other competing interests.

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Figures

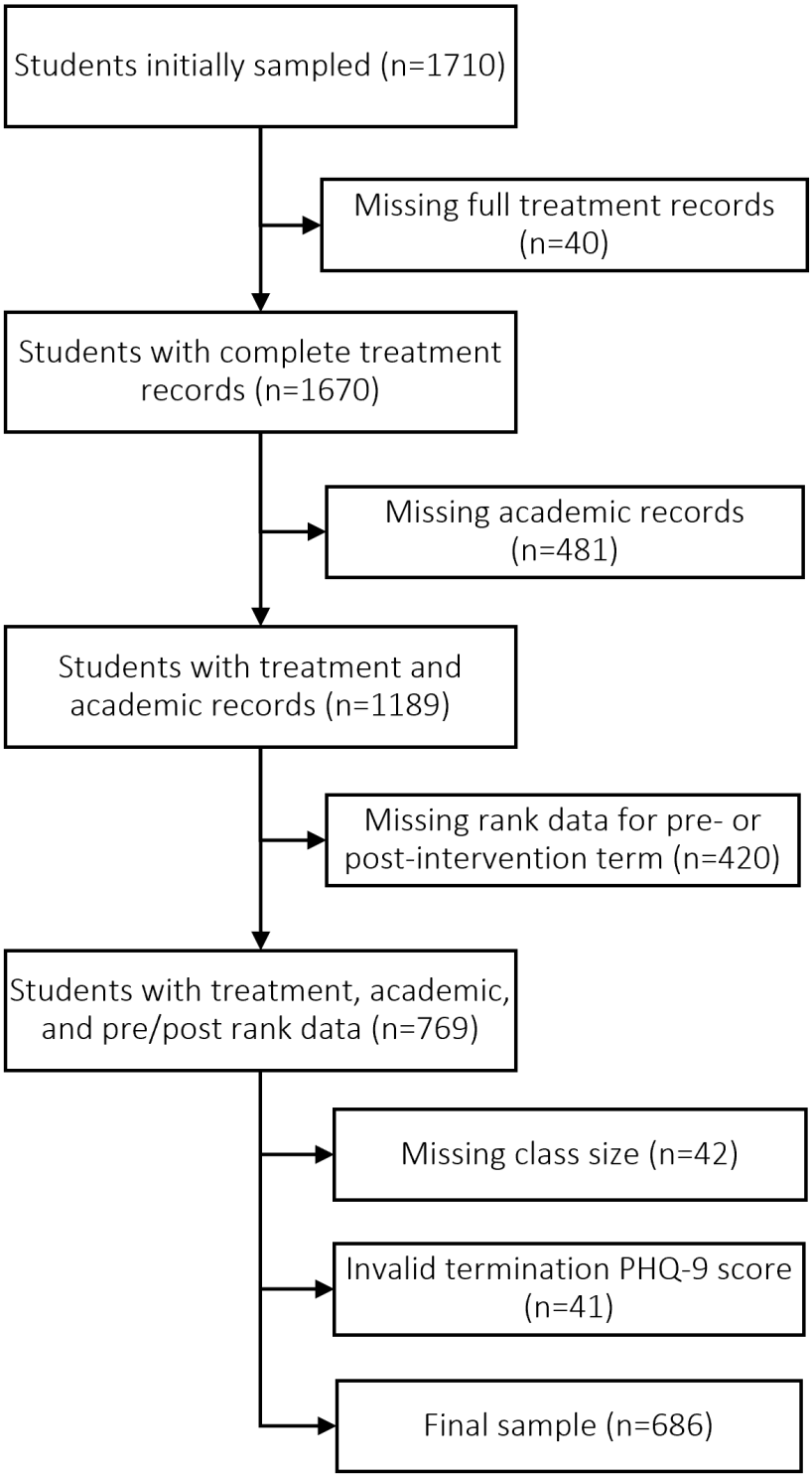


Figure 1

Selection of final sample for analysis