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Integrating Mental Health and HIV Care: Evaluating a Structured Counseling Program for Depression Reduction in Southwest Ethiopia

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Abstract

Background: *Depression is a prevalent comorbidity among people living with HIV/AIDS (PLWHA), particularly in sub-Saharan Africa, where high HIV prevalence intersects with limited mental healthcare resources. In Ethiopia, depression affects 30-50% of PLWHA; however, mental health services remain poorly integrated into HIV care programs. This study evaluates a structured counseling intervention designed to reduce depression among PLWHA in Southwest Ethiopian ART clinics, addressing a critical treatment gap in a resource-limited setting.*

Methodology: *A quasi-experimental design using pre-test and post-test assessments was conducted with 128 participants (64 intervention, 64 control) recruited from four hospitals. The intervention included structured psychological counseling, stress management techniques, and peer-led support groups, delivered over four months alongside routine ART visits. Depression and suicide were assessed using the PHQ-9 and PSS-3, respectively, with data analyzed using SPSS version 24. Ethical approvals were obtained, and informed consent/assent was secured from all participants.*

Results: *The intervention group showed a 48% reduction in mean depression scores (Cohen's d = 1.19), with severe depression nearly eliminated (17.2% to 0.8%). Age-specific analyses revealed the most significant improvement among early adults (35-44 years; 76.9% to 7.7% moderate/severe depression), while youths and older adults exhibited less robust responses. The intervention also led to a 34.8% reduction in suicidal ideation. Notably, depression persisted among long-term ART patients (42.2% with >5 years on treatment), and substance use patterns remained unchanged, highlighting unmet psychosocial needs.*

Conclusion and recommendations: *This study shows that a structured counseling intervention effectively lowers depression levels among HIV-positive individuals in ART clinics in Southwest Ethiopia, with a 48% reduction in depression scores and significant declines in suicidal thoughts. The intervention's success varied by age, emphasizing the necessity for customized approaches, particularly for younger individuals and patients with substance use issues. It is advisable to integrate mental health services into HIV care programs to tackle this important comorbidity. Future research should investigate long-term effects, scalability, and methods for handling ongoing depression and substance use in this demographic.*

Background

Mental health disorders, particularly depression, frequently co-occur with HIV/AIDS infection, presenting a significant comorbidity that adversely affects patient outcomes. Research consistently demonstrates that people living with HIV/AIDS (PLWHA) experience depression at substantially higher rates than the general population (1). This mental health burden is especially pronounced in sub-Saharan Africa, where the dual challenges of high HIV prevalence and limited mental healthcare resources create a perfect storm for poor health outcomes (2). The relationship between HIV and depression is bidirectional and cyclical; depressive symptoms impair medication adherence and immune function, while HIV-related complications and stigma worsen mental health status (3).

The Ethiopian context presents unique challenges, with studies reporting depression prevalence rates of 30–50% among PLWHA (4). Despite this significant burden, mental health services remain poorly integrated into HIV care programs, creating a critical treatment gap (4, 5). Several factors contribute to depression risk in this population, including gender disparities, age-related vulnerabilities at both younger and older extremes, and the duration of ART treatment (6). Additional psychosocial stressors, such as concerns about HIV status disclosure, financial insecurity, and lack of social support, further compound this risk (7).

Notably, depression in PLWHA often occurs independently of markers of disease severity, suggesting that social determinants, including stigma and poverty, may be more significant contributors than clinical HIV indicators (4). While various psychological interventions have shown promise in other African settings, including task-shifted counseling approaches in Malawi and Zambia (5, 6), their applicability to the Ethiopian context remains uncertain due to cultural differences and constraints within the healthcare system.

Southwest Ethiopia's unique sociocultural landscape and disparities in healthcare access present both challenges and opportunities for implementing mental health interventions for PLWHA. The region's high HIV prevalence, coupled with limited mental health infrastructure, creates an urgent need for evidence-based, culturally appropriate interventions that can be effectively delivered within existing healthcare systems. To enhance this study, it is essential to acknowledge that protocol-based interventions for mental well-being originated with the World Health Organization (WHO) and have since been adapted by Ethiopia's Ministry of Health to fit the local context (7). This study addresses this critical gap by evaluating a structured, protocol-based psychological intervention designed to reduce depressive symptoms among PLWHA in ART clinics, with potential implications for integrated care models across similar low-resource settings.

Methodology

A quasi-experimental study with pre-test and post-test assessments was conducted to evaluate the effects of a structured counseling program on depression among HIV-positive patients. The study was set in four hospitals in Southwest Ethiopia. To assess the intervention within existing healthcare structures and prevent cross-contamination between groups, a clinic-based allocation method was employed. Two hospitals were assigned to deliver the intervention alongside routine Antiretroviral Therapy care (Jimma University Medical Center and Mizan Teppi University Teaching Hospital), while the other two provided standard ART care only and served as control sites (Jimma Shenen Gibe Hospital and Teppi General Hospital).

The sample size was determined a priori using G*Power software (version 3.1). For an independent samples t-test, with a medium effect size (d = 0.5), an alpha level (α) of 0.05, and 80% power, a total sample of 128 participants was required. Consequently, 128 participants were enrolled, with 64 naturally

allocated to the intervention group and 64 to the control group based on the ART clinic they routinely attended.

The intervention group received a structured, protocol-based counseling program over four months, delivered during their routine ART visits. The program integrated three core components: structured psychological counseling, stress management techniques, and peer-led support groups. Following the intervention, minor adjustments were made to the program based on participant feedback to enhance cultural appropriateness and acceptability.

Data were collected at baseline and immediately following the 4-month intervention period. Depression severity was measured using the Patient Health Questionnaire-9 (PHQ-9), and suicidal ideation was assessed with the 3-item Paykel Suicide Scale (PSS-3). All data collection procedures adhered to strict confidentiality protocols.

Data were analyzed using SPSS version 24. Descriptive statistics were used to summarize sample characteristics. Independent samples t-tests were conducted to compare depression scores between the intervention and control groups at pre-test and post-test, with effect sizes calculated using Cohen's d.

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Jimma University. The study protocol was conducted in accordance with the ethical principles of the Declaration of Helsinki. Informed consent was obtained from all participants.

Results

The sample included 128 participants evenly distributed across four healthcare institutions in Southwest Ethiopia. The study maintained an ideal gender balance (50% male, 50% female) with equal allocation to intervention and control groups. Participants represented various age groups, with significant representation from older adults (39.1% aged 55–64 years) and youth (25.0% aged ≤ 24 years). The distribution of marital status indicated that 42.2% of participants were married, while 30.5% were single. Religious affiliation was predominantly Orthodox Christian (50.0%), followed by Protestant (24.2%) and Muslim (23.4%). Occupational status revealed that 42.2% fell into unspecified "other" employment categories, while 29.7% were employed in the private sector. Clinical characteristics showed that most participants had been on ART for extended periods (42.2% for more than 5 years). Sexual contact was the most commonly reported transmission route (59.4%), and 46.9% were unaware of their partner's HIV status. Importantly, 90.6% reported no current ART side effects, and 85.2% had no opportunistic infections. The sample characteristics are summarized in Table 1, while Table 2 highlights socioeconomic and clinical features. Table 3 further outlines HIV-related data.

Table 1
Sample Characteristics (N = 128)

Variable	Categories	N (%)	Cumulative %
Institution	Jimma Shenen Gibe hospital	32 (25.0%)	25.0%
	Jimma University medical center	32 (25.0%)	50.0%
	Mizan Teppi University teaching hospital	32 (25.0%)	75.0%
	Teppi General hospital	32 (25.0%)	100.0%
Study Group	Intervention	64 (50.0%)	50.0%
	Control	64 (50.0%)	100.0%
Age Distribution	Youths (≤ 24 years)	32 (25.0%)	25.0%
	Young adults (25–34)	6 (4.7%)	29.7%
	Early adults (35–44)	13 (10.2%)	39.8%
	Middle adults (45–54)	15 (11.7%)	51.6%
	Old adults (55–64)	50 (39.1%)	90.6%
	Elders (≥ 65 years)	12 (9.4%)	100.0%
Gender	Male	64 (50.0%)	50.0%
	Female	64 (50.0%)	100.0%

Table 2
Socioeconomic and Clinical Characteristics (N = 128)

Variable	Categories	N (%)
Marital Status	Single	39 (30.5%)
	Married	54 (42.2%)
	Divorced	16 (12.5%)
	Separated	6 (4.7%)
	Widowed	13 (10.2%)
Religion	Orthodox	64 (50.0%)
	Muslim	30 (23.4%)
	Protestant	31 (24.2%)
	Others	3 (2.3%)
Occupation	Government employed	11 (8.6%)
	Private sector	38 (29.7%)
	Student	25 (19.5%)
	Others	54 (42.2%)
Residence	Urban	72 (56.3%)
	Rural	56 (43.8%)

Table 3
HIV-Related Characteristics (N = 128)

Variable	Categories	N (%)
ART Duration	< 1 year	25 (19.5%)
	1–5 years	49 (38.3%)
	> 5 years	54 (42.2%)
Current Partner	Yes	74 (57.8%)
	No	54 (42.2%)
Partner HIV+ Status	Confirmed positive	59 (46.1%)
	Negative	9 (7.0%)
	Unknown status	60 (46.9%)
Transmission Mode	Sexual contact	76 (59.4%)
	Mother-to-child	29 (22.7%)
	Unknown	23 (18.0%)
ART Side Effects	Present	12 (9.4%)
	Absent	116 (90.6%)
Opportunistic Infections	Present	19 (14.8%)
	Absent	109 (85.2%)

The study compared depression scores before and after the intervention across both groups. Descriptive statistics for depression scores are shown in Table 4, while Table 5 provides the independent samples t-test findings. Additionally, Table 6 summarizes effect sizes, and Table 7 breaks down shifts in depression severity by age group.

Table 4
Descriptive Statistics of Depression Scores (N = 128)

Measurement Time	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-Test	Control	64	11.45	5.413	0.677
	Intervention	64	11.27	5.373	0.672
Post-Test	Control	64	9.97	4.339	0.542
	Intervention	64	5.11	3.814	0.477

Table 5
Independent Samples t-Test Results (N = 128)

Variable	Levene's Test		t-test Results			95% CI of Difference		
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Pre-Test Scores	0.011	.917	0.197	126	.844	0.188	-1.699	2.074
Post-Test Scores	0.447	.505	6.730	126	.000	4.859	3.430	6.288

The analysis compared depression scores between the intervention and control groups at both the pre-test and post-test intervals. At baseline, the groups displayed equivalent levels of depression, with the control group (M = 11.45, SD = 5.413) and the intervention group (M = 11.27, SD = 5.373) showing no statistically significant difference (t (126) = 0.197, p = .844). The 95% confidence interval for the mean difference (-1.699 to 2.074) included zero, confirming baseline equivalence between the groups. Following the intervention, a highly significant difference appeared in post-test scores (t (126) = 6.730, p < .001). The intervention group exhibited substantially lower depression levels (M = 5.11, SD = 3.814) compared to the control group (M = 9.97, SD = 4.339), with a mean difference of 4.859 points (95% CI: 3.430 to 6.288). This large and statistically significant treatment effect indicates the intervention's effectiveness in reducing depression symptoms.

Table 6
Effect Size Summary *(N = 128)*

Time Point	Mean Difference	Pooled SD	Cohen's d	Magnitude	95% CI
Pre-Test	0.188	5.393	0.035	Negligible	[-1.70, 2.07]
Post-Test	4.859	4.085	1.19	Very Large	[3.43, 6.29]

Baseline Equivalence: The negligible effect size at pre-test (d = 0.035) with overlapping confidence intervals confirms that the groups were statistically equivalent before the intervention (t (126) = 0.197, p = .844). This baseline comparability enhances the study's internal validity, suggesting that any post-intervention differences are likely attributed to the treatment rather than pre-existing group differences. Intervention Effectiveness: Post-intervention analysis revealed a statistically significant and clinically meaningful difference with a very large effect size (d = 1.19, t (126) = 6.73, p < .001). The intervention group exhibited substantially lower depression scores (M = 5.11, SD = 3.81) compared to controls (M = 9.97, SD = 4.34), indicating a 48% reduction in mean depression scores. The narrow confidence interval (3.43 to 6.29) suggests a precise estimation of this treatment effect.

Independent samples t-tests revealed no significant pre-test difference between groups (t (126) = 0.20, p = .844, d = 0.04), confirming baseline equivalence. Post-intervention, the treatment group showed

significantly lower depression scores (M = 5.11 vs. M = 9.97) with a very large effect size (t (126) = 6.73, p < .001, d = 1.19, 95% CI [3.43, 6.29]). This represents a clinically important reduction in depressive symptoms following the intervention.

This study compared pretest and posttest depression levels, measured by the PHQ-9, across six age groups (Youths, Young Adults, Early Adults, Middle Adults, Old Adults, and Elders; N = 128) to evaluate the effectiveness of the intervention. Descriptive analyses revealed a significant reduction in depression severity post-intervention, with moderate cases decreasing from 57.8% to 32.0% and severe cases nearly eliminated (17.2% to 0.8%). Age-specific analyses showed that Early Adults demonstrated the most substantial improvement (76.9% to 7.7% moderate/severe depression), while Youths and Old Adults maintained higher posttest rates (40.6% and 34.0%, respectively). A chi-square test confirmed that these overall changes were statistically significant (χ^2 [5] = 35.72, p<.001, Cramer's V = 0.32). Although the intervention was broadly effective, the variability in outcomes across age groups suggests the need for tailored approaches, particularly for Youths and Old Adults who showed less robust improvement. Study limitations include small subgroup samples and the absence of a control group, highlighting the necessity for future research with larger, balanced samples to validate these findings and explore age-specific intervention strategies.

Table 7
Changes in Depression Severity by Age Group (N = 128)

Age Group	Pretest Moderate/Severe %	Posttest Moderate/Severe %	Reduction	Key Findings
Total Sample	75.0%	32.8%	-42.2%	Significant overall improvement (χ^2=35.72, p<.001)
Youths(n = 32)	71.9%	40.6%	-31.3%	Persistent moderate cases
Early Adults (n = 13)	76.9%	7.7%	-69.2%	Most dramatic improvement
Old Adults (n = 50)	74.0%	34.0%	-40.0%	Second-best responders
Elders (n = 12)	75.0%	33.3%	-41.7%	Maintained highest minimal depression

This study examined gender differences in depression severity before and after an intervention among 128 participants (50% male, 50% female) using PHQ-9 measures. Cross-tabulation and chi-square analyses revealed no statistically significant gender differences in depression distribution at either pretest (χ^2 [4] = 1.158, p = .885) or posttest (χ^2 [4] = 5.045, p = .283). At baseline, both genders exhibited comparable depression profiles, with 42.2% of males and 46.9% of females reporting moderate depression, and similar proportions experiencing severe symptoms (4.7% males, 7.8% females). Post-intervention, while statistical significance was not achieved, descriptive trends emerged: females

demonstrated greater improvement in minimal depression (32.8% vs. 18.8% males), whereas males showed slightly higher retention of mild symptoms (40.6% vs. 28.1% females). Notably, severe depression was nearly eliminated in both groups. The lack of significant gender differences (Cramer's V = .095-.199) suggests the intervention was equally effective across genders, though the observed trends regarding minimal symptom attainment in females may warrant further investigation with larger samples to explore potential clinically meaningful differences. These findings indicate that while gender does not appear to be a primary moderator of treatment response, the intervention successfully reduced depression severity for both male and female participants.

The analysis examined the relationship between depression levels (pretest and posttest) and substance use (pretest and posttest) among participants in an intervention and a control group, each consisting of 64 individuals, for a total sample size of 128. Cross-tabulations were conducted to assess frequency distributions across different categories of depression severity and substance use. The case processing summary confirmed complete data with no missing values, ensuring robust analysis.

At baseline, both groups exhibited similar distributions of depression and substance use. Participants with moderate depression had the highest frequency of substance use in both the intervention (19 cases at substance use level 0) and control (14 cases at level 0) groups. Those with minimal depression showed lower substance use frequencies, suggesting a possible association between higher depression severity and increased substance use. Post-intervention, the intervention group demonstrated a significant reduction in depression severity, with most participants shifting to minimal (25 cases) or mild (27 cases) depression. In contrast, the control group maintained higher depression levels, particularly in the moderate (29 cases) and moderately severe (9 cases) ranges, reinforcing the intervention’s effectiveness in alleviating depressive symptoms.

However, substance use patterns largely remained unchanged from pretest to posttest in both groups, indicating that while the intervention successfully reduced depression severity, it did not significantly affect substance use behaviors. This finding suggests that targeted strategies addressing both depression and substance use may be necessary for comprehensive treatment outcomes. Future research should incorporate longitudinal assessments and advanced statistical analyses, such as logistic regression, to further explore these relationships and identify potential moderating factors. Overall, the results highlight the intervention’s effectiveness in managing depression but emphasize the need for integrated approaches to effectively address comorbid substance use. The cross-tabulation analysis examined the relationship between depression severity and suicidal ideation before and after the intervention program. The sample consisted of 128 participants equally distributed between the intervention (n = 64) and control (n = 64) groups, with complete data for all variables.

At baseline, participants with moderate depression exhibited the highest frequency of suicidal thoughts, with 24 intervention-group and 25 control-group participants reporting no suicidal ideation ("Not at all"). However, those with more severe depression showed a greater risk, as evidenced by 5 intervention and 8 control participants reporting thoughts lasting "Several days" or longer. Notably, the control group had

more individuals with frequent suicidal ideation in the moderately severe (11 vs 6 reporting "Not at all") and severe (4 vs 1) depression categories. Post-intervention results revealed substantial improvements in the treatment group. While 46 intervention participants initially reported no suicidal thoughts, this number increased to 62 post-treatment - representing a 34.8% improvement. Conversely, only 2 intervention participants continued to experience occasional suicidal ideation ("Several days"), compared to 12 at baseline. The control group showed minimal change, with 63 of 64 participants reporting no suicidal thoughts at posttest (up from 53), suggesting natural fluctuation rather than intervention effects.

When analyzed by posttest depression severity, the intervention's effectiveness became particularly evident. All 25 intervention participants who achieved minimal depression reported no suicidal ideation, compared to only 8 of 33 controls in this category. The persistence of suicidal thoughts among control participants with moderate (28/41) and moderately severe (9/9) depression underscores the intervention's protective effects.

These findings demonstrate three key patterns: First, baseline depression severity strongly predicted the frequency of suicidal ideation. Second, the intervention produced clinically significant reductions in suicidal thoughts, particularly among those transitioning to milder depression categories. Third, the stagnant outcomes of the control group highlight that reducing symptoms necessitates targeted treatment rather than time alone. From a clinical perspective, these results support the integration of depression and suicide risk interventions, as addressing depressive symptoms appears to lessen suicidal ideation. Future research should incorporate longitudinal designs to evaluate whether these effects persist beyond immediate post-treatment assessments. The nearly complete elimination of frequent suicidal thoughts ("More than half days" and "Nearly every day") in the intervention group suggests particular promise for reducing acute suicide risk through depression-focused treatments.

Discussion

Our findings significantly contribute to the growing body of evidence regarding mental health interventions for PLWHA in resource-limited settings. The 48% reduction in depression scores achieved through our structured counseling intervention not only confirms the effectiveness of psychosocial approaches but also demonstrates their superior performance compared to similar interventions in other African contexts (8). The very large effect size (Cohen's d = 1.19) suggests that our culturally adapted, protocol-based approach may have successfully addressed some of the implementation challenges that have limited the impact of mental health interventions in comparable settings. This is particularly noteworthy given the complex psychosocial environment of Southwest Ethiopia, where HIV-related stigma and economic hardships create substantial barriers to mental health recovery.

The intervention's differential effectiveness across age groups raises important considerations for program implementation. While the significant improvement among early adults (35–44 years) validates our core intervention model, the more modest outcomes among youths and older adults highlight the need for targeted adaptations. For younger participants, developmental factors such as identity

formation and future uncertainty may require additional focus, while older adults might benefit from integrated approaches addressing physical comorbidities and social isolation. These findings align with life-course perspectives on mental health (8) and suggest that a one-size-fits-all approach may be insufficient for comprehensive depression management in this population.

The intervention's success in reducing suicidal ideation represents a particularly significant finding, given the elevated suicide risk among PLWHA in sub-Saharan Africa. The 34.8% improvement in participants reporting no suicidal thoughts suggests that depression-focused interventions may have important secondary benefits for suicide prevention. This aligns with recent evidence showing that psychosocial interventions can reduce suicidal ideation even when not specifically targeting suicide risk (9). The mechanism may involve the program's emphasis on building coping skills and social connections, both known protective factors against suicide. Future implementations should consider incorporating explicit suicide risk assessment and prevention components to maximize this benefit.

Several unexpected results deserve attention. The enduring depressive symptoms in long-term ART patients (42.2% after over 5 years of treatment) question the typical beliefs about the mental health advantages of ongoing HIV treatment. This indicates that, while ART is essential for physical well-being, it might not sufficiently tackle the ongoing psychosocial stressors experienced by PLWHA. Likewise, the lack of correlation between reductions in depression and patterns of substance use suggests that more specialized or integrated interventions may be necessary for patients with dual diagnoses. These outcomes emphasize the need for more comprehensive HIV care models that cater to both biomedical and psychosocial requirements (10).

From an implementation perspective, the intervention's success can be attributed to several key design elements. Synchronizing mental health sessions with routine ART visits likely improved adherence by reducing the additional burden on participants. The use of peer supporters who shared similar life experiences seems to have enhanced engagement and lowered stigma-related barriers to care. These findings support the growing evidence for task-shifting approaches in global mental health (11) while highlighting the importance of cultural adaptation in intervention design.

The study's limitations, including its quasi-experimental design and relatively short follow-up period, suggest caution in interpreting the results. While the baseline equivalence between groups strengthens internal validity, the lack of randomization allows for the possibility of selection bias. The short evaluation period prevents assessing whether the observed benefits persist over time. Future research should address these limitations through randomized controlled designs with longer follow-up periods, while also exploring cost-effectiveness and scalability considerations.

These findings carry significant policy implications for HIV care across sub-Saharan Africa. The proven effectiveness of this relatively inexpensive intervention reinforces the need to incorporate routine mental health screening and counseling into standard HIV care protocols. The task-shifting model employed in this study presents a feasible solution to workforce shortages while ensuring the quality of interventions. The results offer strong evidence that meeting the mental health needs of people living with HIV/AIDS

(PLWHA) through structured and culturally adapted interventions can greatly enhance both psychological well-being and HIV treatment outcomes.

Looking forward, several research priorities emerge from these findings. First, there is a need for studies examining the long-term sustainability of intervention effects and their impact on HIV treatment outcomes. Second, research should explore optimal strategies for addressing comorbid substance use within depression interventions. Third, implementation science approaches could help identify the most effective strategies for scaling up such interventions within diverse healthcare systems. Finally, economic evaluations are necessary to assess the cost-effectiveness of integrated mental health-HIV care models in resource-limited settings.

Conclusion and Recommendations

This study offers strong evidence that a structured and culturally tailored counseling intervention can significantly lessen depression among people living with HIV/AIDS (PLWHA) in ART clinics across Southwest Ethiopia. The intervention resulted in a 48% reduction in depression scores (Cohen's d = 1.19) and nearly eradicated severe depression cases, showcasing greater effectiveness than comparable interventions in other African locations. Remarkably, the program was particularly successful in decreasing suicidal thoughts, with a 34.8% improvement, and showed consistent effectiveness across genders, although variations in outcomes by age indicate the necessity for targeted adaptations. These findings challenge prevailing beliefs by revealing that depression remains prevalent among long-term ART patients, highlighting that biomedical treatments alone cannot address the psychosocial aspects of HIV care. The intervention's success can be attributed to its protocol-based yet adaptable approach, its integration with regular ART visits, and the inclusion of peer support—factors that helped to mitigate implementation challenges typically encountered in resource-limited environments.

To translate these findings into practice, we recommend that Ethiopia's Ministry of Health integrate this structured counseling intervention into national HIV care guidelines, ensuring mental health services become a standard component of ART programs. Given the intervention's success with task-shifting, we advocate for training programs that equip ART nurses and peer educators with counseling skills, creating a sustainable workforce without requiring additional mental health specialists. Program implementers should schedule counseling sessions to coincide with routine ART visits, minimizing patient burden while maximizing adherence. The peer support component should be formalized and expanded, as it proved particularly effective in reducing stigma and fostering engagement.

At the clinical level, we recommend implementing mandatory PHQ-9 screenings during ART visits to promote early detection and intervention for depression. Considering the varying outcomes among different age groups, the intervention should be tailored to meet developmental needs, integrating youth-oriented modules focusing on identity and future planning, while incorporating geriatric elements that address issues like isolation and physical comorbidities in older adults. Protocols for assessing suicide

risk should be established for patients experiencing moderate to severe depression, leveraging the intervention's proven secondary benefits for suicidal ideation.

Future research should focus on longitudinal randomized controlled trials to assess the durability of treatment effects beyond the current study period. Implementation science approaches are essential for identifying optimal strategies to scale this intervention across diverse healthcare settings in Ethiopia and similar contexts. Additional studies should investigate integrated approaches for comorbid depression and substance use, as our findings suggest these conditions may need targeted strategies beyond standard depression treatment. Cost-effectiveness analyses would bolster the case for resource allocation, while biomarker studies could clarify the biological mechanisms linking depression improvement to enhanced immune function and ART adherence.

By adopting these recommendations, policymakers and healthcare providers can advance toward truly integrated HIV care that addresses both the physical and mental health needs of PLWHA in resource-limited settings. The intervention model presented here offers a practical, evidence-based approach to closing the mental health treatment gap for this vulnerable population.

Declarations

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Authors’ contribution

WA designed the study, collected data, analyzed it, and reviewed the manuscript. FA designed the study, supervised data collection, analyzed it, drafted the manuscript, and provided critical feedback on it. GA designed the study, supervised data collection, analyzed it, drafted the manuscript, and provided critical feedback on it.

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Availability of data and materials

The datasets generated and analyzed during this study can be obtained from the corresponding author upon reasonable request. Since the study follows a quasi-experimental design rather than a randomized

controlled trial (RCT), clinical trial registration does not apply. Therefore, we have included the following clarification: Clinical trial: not applicable.

Ethics approval and consent to participate

The study protocol was reviewed and approved by the Institutional Review Board (IRB) of Jimma University. All procedures complied with the ethical guidelines outlined in the Declaration of Helsinki. We are fully committed to upholding the highest ethical and editorial standards and will implement any necessary revisions without delay.

Consent for publication

Not Applicable

Competing interests

The authors declare that they have no competing interests.

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