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Effect of integrated psychosocial support on retention in care and viral suppression among women living with HIV in the Central African Republic: a retrospective cohort study

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Abstract

Background

Mental health disorders are highly prevalent among women living with HIV (WLHIV) in sub-Saharan Africa and negatively affect treatment adherence and retention in care. However, evidence on the effectiveness of integrated psychosocial support interventions in fragile health systems such as the Central African Republic (CAR) remains limited. This study aimed to assess the effect of psychosocial support integrated into routine HIV care on treatment outcomes among WLHIV in Bangui.

Methods

We conducted a retrospective cohort study including WLHIV aged ≥ 15 years who initiated antiretroviral therapy (ART) between January and December 2022 in two HIV treatment centers in Bangui. One center provided integrated psychosocial support, while the other delivered standard care. Participants were followed for 24 months. Primary outcomes were retention in care, attrition, and viral suppression (< 40 copies/mL).

Results

A total of 598 women were included (314 with psychosocial support and 284 without). At 24 months, attrition was significantly lower in the psychosocial support group (21% vs. 39%; $p < 0.001$), and retention probability was higher (log-rank $p < 0.001$). Viral suppression was also higher among women receiving psychosocial support (93.0% vs. 85.2%; $p = 0.002$). In multivariable analysis, psychosocial support was independently associated with reduced attrition (aHR 0.44; 95% CI 0.31–0.61). Disclosure of HIV status to a partner was also protective (aHR 0.69; 95% CI 0.49–0.96).

Conclusions

Integrated psychosocial support was associated with improved retention in care and viral suppression among WLHIV. These findings highlight the importance of integrating mental health and psychosocial interventions into HIV programs in resource-limited settings to improve long-term treatment outcome.

Clinical trial registration

Clinical trial number

INTRODUCTION

The human immunodeficiency virus (HIV) is a retrovirus that targets CD4 + lymphocytes, leading to progressive immunosuppression which, in the absence of antiretroviral (ARV) treatment, can evolve into acquired immunodeficiency syndrome (AIDS) [1]. In 2024, the number of people living with HIV (PLHIV) worldwide was estimated at 40.8 million, 53% of whom were women and girls [2]. Despite therapeutic and programmatic advances, 1.3 million new infections and 630,000 AIDS-related deaths were recorded that same year, demonstrating persistent inequalities in access to prevention, testing, and care [2].

Sub-Saharan Africa remains the epicenter of the epidemic, accounting for 50% of new global infections in 2024.[3]. Women bear a disproportionate burden: they accounted for 62% of new infections in 2023, with a particularly high prevalence among adolescent girls and young women, whose risk of acquisition is three times higher than that of their male peers [4].

In the Central African Republic (CAR), the prevalence of HIV among 15–49 year olds was estimated at 2.7% in 2021, with ARV coverage limited to 26.7% [5, 6]. This illustrates the scale of the challenges in screening, care, and retention within the healthcare system. Beyond structural and logistical constraints, the mental health of people living with HIV appears to be a major determinant of treatment adherence, influenced by depression, anxiety, stigma, and gender-based violence [7, 8].

Among women living with HIV in Africa, mental health disorders are highly prevalent. A 2024 systematic review reported a prevalence of depression ranging from 5.9% to 61% and anxiety ranging from 28.9% to 61% [7]. Similarly, a 2025 meta-analysis estimated the prevalence of depressive symptoms among African people living with HIV at 33%, with increased vulnerability among women [8]. In the Central African Republic, the prevalence of mental disorders among women living with HIV is estimated at 54.7%, exacerbating the risks of late initiation, poor adherence, and increased mortality [9, 10].

Psychosocial support interventions, delivered as part of an integrated, person-centred HIV care package and including mental health services, combine psychological, clinical, and social components. These interventions have been shown to reduce emotional distress, improve treatment adherence, and enhance retention in care [11, 12]. These approaches improve both psychiatric symptoms and treatment adherence when integrated into care pathways [13]. Moreover, some studies have shown that depression increases the risk of ART non-adherence by up to 2.19 times among women living with HIV [14], reinforcing the need for targeted interventions. However, evidence on the effectiveness of such interventions in fragile and resource-limited settings, including the CAR, remains limited. This study aimed to assess the effect of integrated psychosocial support implemented within routine HIV care on retention in care, attrition, and viral suppression among women living with HIV in Bangui.

METHODOLOGY

Study design and setting

We conducted a retrospective analytical cohort study in two antiretroviral therapy (ART) centers in Bangui, Central African Republic (CAR). These facilities were selected based on their key role in the

national HIV program and their high patient volume. One center the Red Cross Outpatient Treatment Center (OTC) provides routine HIV care integrated with psychosocial support, while the other the National Reference Center for Sexually Transmitted Infections and Antiretroviral Therapy(CNRISTAR) delivers standard HIV care without a formalized psychosocial component.

Study population

The study included women living with HIV (WLHIV) aged 15 years or older who initiated antiretroviral therapy (ART) between January 1 and December 31, 2022, in the two selected treatment centers. Participants were eligible if they initiated ART during the study period, had at least one follow-up visit after treatment initiation, and had complete records containing the required study variables. Patients who were transferred out at the time of initiation or had incomplete baseline data were excluded.

A total of 673 patients were initially assessed for eligibility. Of these, 37 records were excluded due to incomplete data. The remaining 636 patients were considered eligible, among whom 38 additional cases were excluded based on predefined criteria.

A final sample of 598 patients was included in the analysis, comprising 314 patients managed at the center offering psychosocial support and 284 patients followed at the center without such support. The participant selection process is illustrated in Fig. 1. The sample size was based on all eligible patients during the study period.

Exposure

The main exposure was receipt of an integrated psychosocial support intervention delivered as part of routine HIV care at the Red Cross Outpatient Treatment Center (OTC). This intervention, implemented in accordance with WHO recommendations and supported by the Central African Red Cross, combined psychological, clinical, and social components aimed at improving treatment adherence and retention in care. It included structured psychological counseling, routine mental health screening, adherence support, peer support groups, and community sensitization activities to reduce stigma. Socio-economic assistance, including transport support, was also provided to address barriers to care.

This integrated psychosocial support was delivered during routine consultations; however, individual-level data on the intensity of exposure were not systematically collected. Participants receiving care at the National Reference Center for Sexually Transmitted Infections and Antiretroviral Therapy (CNRISTAR) were considered unexposed to psychosocial support.

Outcomes

The primary outcomes of the study were retention in care, attrition, and viral suppression at 24 months after initiation of antiretroviral therapy (ART).

Retention in care was defined as being alive and actively receiving HIV care at the study site 24 months after ART initiation. Attrition was defined as a composite outcome including loss to follow-up or death during the follow-up period. Loss to follow-up was defined as missing a scheduled visit for more than 90 days without documented transfer or death.

Viral suppression was defined as a plasma HIV viral load of less than 40 copies/mL measured at 24 months. When multiple measurements were available within the time window, the most recent result was considered.

Time-to-event outcomes were calculated from the date of ART initiation to the occurrence of attrition or censoring. Patients who were transferred out or remained in care at the end of follow-up were censored at their last documented visit.

Covariates

Covariates included socio-demographic, behavioral, and clinical variables selected a priori based on their relevance in the literature and their potential role as confounders in the relationship between psychosocial support and HIV treatment outcomes.

Socio-demographic variables included age (< 25 vs ≥ 25 years), marital status (living alone vs in a relationship), educational level (no formal education vs any formal education), occupational status (unemployed vs employed/self-employed), and place of residence (urban vs peri-urban).

Behavioral and social variables included family support (yes/no) and disclosure of HIV status to a partner (yes/no), both considered important determinants of adherence and retention in HIV care.

Clinical variables comprised WHO clinical stage at ART initiation (stage 1–2 vs stage 3–4), presence of opportunistic infections (yes/no), CD4 cell count (< 350 vs ≥ 350 cells/mm³), and baseline viral load (< 40 vs ≥ 40 copies/mL).

All covariates were included in univariate analyses, and those with a p-value < 0.20 were considered for inclusion in the multivariable Cox regression model to adjust for potential confounding.

Data sources and data collection

Data were collected retrospectively from routine clinical records, antiretroviral therapy (ART) registers, and electronic databases available at the selected treatment centers. A standardized data extraction form was used to ensure consistency and completeness of data collection across sites.

The collected variables included socio-demographic characteristics (age, marital status, education level, occupation, and place of residence), behavioral factors (family support and disclosure of HIV status), and clinical and biological parameters (WHO clinical stage, presence of opportunistic infections, CD4

cell count, and viral load). Information on ART initiation and follow-up outcomes, including retention, attrition, and viral suppression, was also extracted.

To ensure data quality, double data entry was performed, and consistency checks were applied to identify and correct discrepancies. Missing or inconsistent data were verified using source documents. All data were anonymized prior to analysis to ensure confidentiality.

Statistical analysis

Descriptive statistics were used to summarize baseline characteristics. Continuous variables were presented as means with standard deviations and compared using Student's t-test. Categorical variables were reported as frequencies and percentages and compared using Pearson's chi-square test or Fisher's exact test, as appropriate.

The evolution of viral suppression over time was assessed at predefined time points (M0, M6, M12, M18, and M24) and compared between groups using chi-square tests.

Retention in care was analyzed using Kaplan–Meier survival curves, and differences between groups were assessed using the log-rank test.

Cox proportional hazards regression models were used to identify factors associated with attrition. Univariate analyses were first performed, and variables with p-values < 0.20 were included in the multivariable model to control for potential confounders. Results were expressed as hazard ratios (HR) and adjusted hazard ratios (aHR) with 95% confidence intervals (CI).

Time-to-event was calculated from the date of ART initiation to the occurrence of attrition. Patients who were transferred out or remained in care at the end of follow-up were censored at their last known visit.

All statistical tests were two-sided, and a p-value < 0.05 was considered statistically significant. Data analysis was performed using Epi Info version 7.2.6.

This study was conducted and reported in accordance with the STROBE guidelines for cohort studies.

RESULTS

Baseline sociodemographic characteristics of women living with HIV in Bangui

Baseline sociodemographic characteristics were generally comparable between participants receiving psychosocial support and those receiving standard care. No statistically significant differences were observed between the two groups at baseline, except for family support.

Age

There was no statistically significant difference in mean age between the two groups (36.8 ± 10.9 vs. 36.5 ± 10.5 years; p = 0.72), indicating similarity in age distribution.

Marital status

Marital status was also comparable between groups (p = 0.08). The proportions of married or cohabiting women were similar (42.0% vs. 45.8%), as were those living alone (37.6% vs. 34.5%) and widowed (20.4% vs. 19.7%).

Educational level

Educational level did not differ significantly between groups (p = 0.06). In both groups, most participants had primary or secondary education, with relatively comparable proportions across all levels of education, including university attainment.

Occupational status

Occupational status showed no statistically significant difference between groups (p = 0.09). Unemployment was the most common category in both groups (38.9% vs. 36.6%), followed by self-employment, with smaller proportions of participants in formal employment, informal sector, or student status.

Place of residence

All participants were predominantly urban residents, consistent with the location of the study sites. A small proportion lived in peri-urban areas and commuted to access care, with no statistically significant difference between groups (87.3% vs. 83.8%; p = 0.18).

Family support

Family support showed a modest but statistically significant difference (p = 0.04), with a higher proportion of participants reporting family support in the standard care group (57.7%) compared to the psychosocial support group (49.7%). **(Table 1)**

Table 1
Baseline sociodemographic characteristics of participants according to availability of psychosocial support

Variables	With psychosocial support (n = 314) n (%)	Without psychosocial support (n = 284) n (%)	Total (N = 598) n (%)	p-value
Age (years)				
Mean ± SD	36.8 ± 10.9	36.5 ± 10.5	—	0.72
Marital status				
Married / cohabiting	132 (42.0)	130 (45.8)	262 (43.8)	0.08
Living alone	118 (37.6)	98 (34.5)	216 (36.1)	
Widowed	64 (20.4)	56 (19.7)	120 (20.1)	
Education level				
No formal education	48 (15.3)	38 (13.4)	86 (14.4)	0.06
Primary	82 (26.1)	60 (21.1)	142 (23.7)	
Secondary	130 (41.4)	120 (42.3)	250 (41.8)	
University	54 (17.2)	66 (23.2)	120 (20.1)	
Occupation				
Unemployed	122 (38.9)	104 (36.6)	226 (37.8)	0.09
Trader / self-employed	88 (28.0)	84 (29.6)	172 (28.8)	
Informal sector	34 (10.8)	38 (13.4)	72 (12.0)	
Employed	34 (10.8)	36 (12.7)	70 (11.7)	
Student	36 (11.5)	22 (7.7)	58 (9.7)	
Place of residence				
Urban (Within city)	274 (87.3)	238 (83.8)	512 (85.6)	0.18

Variables	With psychosocial support (n = 314) n (%)	Without psychosocial support (n = 284) n (%)	Total (N = 598) n (%)	p-value
Age (years)				
Peri-urban (Outside city)	40 (12.7)	46 (16.2)	86 (14.4)	
Family support				
Yes	156 (49.7)	164 (57.7)	320 (53.5)	**0.04***
No	158 (50.3)	120 (42.3)	278 (46.5)	

* $p < 0.05$ considered statistically significant

Clinical and immunovirological characteristics of women living with HIV in Bangui

Baseline clinical, biological, and virological characteristics were comparable between participants receiving psychosocial support and those receiving standard care.

The distribution of WHO clinical stages did not differ significantly between groups ($p = 0.62$), with the majority of participants classified in stages 1 and 2 in both groups (59.2% vs. 58.1%). The proportions of stage 3 (24.8% vs. 24.6%) and stage 4 (15.9% vs. 17.3%) were also similar.

The prevalence of opportunistic infections was comparable between groups (52.2% vs. 54.2%; $p = 0.58$).

CD4 cell count distribution did not differ significantly ($p = 0.55$), with similar proportions of participants presenting CD4 counts < 350 cells/mm³ (53.5% vs. 53.5%), 350–499 cells/mm³ (24.2% vs. 24.6%), and ≥ 500 cells/mm³ (22.3% vs. 21.8%).

Baseline virological status at M0 was also comparable ($p = 0.65$). The proportion of participants with viral suppression (< 40 copies/mL) was 43.9% in the psychosocial support group and 45.8% in the standard care group. (**Table 2**).

Table 2
Clinical and immunovirological characteristics of women living with HIV in Bangui WHO clinical stages

Variables	With psychosocial support (n = 314) n (%)	Without psychosocial support (n = 284) n (%)	Total (N = 598) n (%)	p-value
WHO clinical stage				
Stage 1 et 2	186 (59.2)	165 (58.1)	351 (58.7)	0.62
Stage 3	78 (24.8)	70 (24.6)	148 (24.7)	
Stage 4	50 (15.9)	49 (17.3)	99 (16.6)	
Opportunistic infections				
Yes	164 (52.2)	154 (54.2)	318 (53.2)	0.58
No	150 (47.8)	130 (45.8)	280 (46.8)	
CD4 count (cells/mm³)				
< 350	168 (53.5)	152 (53.5)	320 (53.5)	0.55
350–499	76 (24.2)	70 (24.6)	146 (24.4)	
≥ 500	70 (22.3)	62 (21.8)	132 (22.1)	
Viral load (copies/mL)				
< 40 (suppressed)	138 (43.9)	130 (45.8)	268 (44.8)	0.65
≥ 40 (non-suppressed)	176 (56.1)	154 (54.2)	330 (55.2)	

Evolution of viral suppression from month (M0 to M24) according to psychosocial support

Viral suppression increased progressively over time in both study groups. At baseline (M0), the proportion of participants with viral suppression was comparable between the structured psychological support group and the standard care group (43.9% vs. 45.8%), with no statistically significant difference (χ^2=0.20; p = 0.65).

At 6 months (M6), viral suppression improved substantially in both groups, reaching 65.3% in the psychological support group and 62.3% in the standard care group. However, this difference was not statistically significant (χ^2=0.60; p = 0.44).

At 12 months (M12), viral suppression continued to increase, with proportions of 75.8% in the psychological support group and 78.5% in the standard care group. The difference remained non-significant (χ^2=0.70; p = 0.40). A similar pattern was observed at 18 months (M18), where viral

suppression rates were 86.0% and 84.9% in the psychological support and standard care groups, respectively (χ^2=0.15; p = 0.70).

By 24 months (M24), viral suppression reached 93.0% in the psychological support group compared to 85.2% in the standard care group. This difference was statistically significant (χ^2=9.10; p = 0.002). Detailed proportions at each time point are presented in Table 3.**(Table 3)**

Table 3
Evolution of viral suppression over 24 months according to psychosocial support

Time point (Month)	With Psychosocial support (n = 314) n (%)	Without Psychosocial support (N = 284) n (%)	χ^2	p-value
M0	138 (43.9)	130 (45.8)	0.20	0.65
M6	205 (65.3)	177 (62.3)	0.60	0.44
M12	238 (75.8)	223 (78.5)	0.70	0.40
M18	270 (86.0)	241 (84.9)	0.15	0.70
M24	292 (93.0)	242 (85.2)	9.10	**0.002***

χ^2: chi-square test; n: number of participants; * p < 0.05 considered statistically significant.

Figure 2 illustrates the evolution of viral suppression over time in both groups, highlighting the progressive divergence observed at later stages of follow-up.**(Fig. 2)**

Effect of psychosocial support on retention in HIV care and attrition

Kaplan-Meier survival analyses revealed a statistically significant difference in patient retention between the two groups studied (p < 0.001). At 24 months, the attrition rate observed in patients receiving psychosocial support was 21%, while it reached 39% in the group of patients followed at a center without psychosocial support. The probability of remaining in treatment was higher in the group of patients with access to psychosocial support, peaking at over 80% at 24 months, compared to approximately 66% for those followed at the center without this intervention **(Fig. 3).**

Determinants of attrition among patients on antiretroviral therapy

In the univariate Cox proportional hazards analysis, psychosocial support and disclosure of HIV status to a partner were significantly associated with attrition.

Participants receiving psychosocial support had a lower hazard of attrition compared to those receiving standard care (HR = 0.49; 95% CI: 0.36–0.67; p < 0.001). Similarly, disclosure to a partner was associated with reduced attrition (HR = 0.62; 95% CI: 0.45–0.84; p = 0.002).

Other variables, including age (p = 0.62), education level (p = 0.61), marital status (p = 0.49), place of residence (p = 0.23), occupation (p = 0.30), family support (p = 0.77), WHO clinical stage (p = 0.24), opportunistic infections (p = 0.15), CD4 count (p = 0.09), and baseline viral load (p = 0.62), were not significantly associated with attrition.

In the multivariable Cox regression model, psychosocial support remained independently associated with attrition (aHR = 0.44; 95% CI: 0.31–0.61; p < 0.001).
Disclosure of HIV status to a partner also remained significantly associated with attrition (aHR=0.69; 95% CI: 0.49–0.96; p=0.027).

No statistically significant associations were observed for age (p=0.82), education level (p=0.69), marital status (p=0.77), place of residence (p=0.41), occupation (p=0.56), family support (p=0.91), WHO clinical stage (p=0.52), opportunistic infections (p=0.39), CD4 count (p=0.23), or baseline viral load (p=0.76). **(Table 4).**

Table 4. Determinants of attrition among patients on antiretroviral therapy: Cox proportional hazards analysis

Variable	Attrition Yes n (%)	Attrition No n (%)	Crude HR (95% CI)	p-value	aHR (95% CI)	p-value
Age (years)						
<25	23 (34.8)	43 (65.2)	1.00	0.62	1.00	0.82
≥25	158 (29.7)	375 (70.3)	0.90 (0.58–1.38)		1.05 (0.67–1.66)	
Education level						
No formal education	17 (35.4)	31 (64.6)	1.00	0.61	1.00	0.69
Schooled	164 (29.0)	401 (71.0)	0.88 (0.53–1.45)		0.90 (0.53–1.52)	
Marital status						
Living alone	73 (32.0)	155 (68.0)	1.00	0.49	1.00	0.77
In a relationship	108 (29.2)	262 (70.8)	0.89 (0.67–1.21)		0.95 (0.69–1.32)	
Place of residence						
Peri-urban	51 (38.6)	81 (61.4)	1.00	0.23	1.00	0.41
Urban	130 (27.9)	336 (72.1)	1.21 (0.88–1.68)		1.15 (0.82–1.61)	
Occupation						
Unemployed	66 (28.0)	170 (72.0)	1.00	0.30	1.00	0.56
Employed/self-employed	115 (31.8)	247 (68.2)	1.17 (0.87–1.59)		1.10 (0.79–1.52)	
Family support						
No	95 (29.9)	223 (70.1)	1.00	0.77	1.00	0.91
Yes	86 (30.7)	194 (69.3)	1.05 (0.78–1.40)		0.98 (0.72–1.34)	
Disclosure to partner						
No	60 (41.7)	84 (58.3)	1.00	**0.002***	1.00	**0.027***

Yes	121 (26.7)	333 (73.3)	0.62 (0.45–0.84)		0.69 (0.49–0.96)	
WHO clinical stage						
Stage 1–2	102 (29.1)	249 (70.9)	1.00	0.24	1.00	0.52
Stage 3–4	79 (32.0)	168 (68.0)	1.18 (0.89–1.57)		1.10 (0.81–1.49)	
Opportunistic infections						
No	75 (26.8)	205 (73.2)	1.00	0.15	1.00	0.39
Yes	106 (33.3)	212 (66.7)	1.23 (0.92–1.64)		1.15 (0.84–1.56)	
CD4 count (cells/mm³)						
≥350	72 (25.9)	206 (74.1)	1.00	0.09	1.00	0.23
<350	109 (34.1)	211 (65.9)	1.29 (0.96–1.72)		1.21 (0.88–1.66)	
Baseline viral load						
<40 copies/mL	78 (29.1)	190 (70.9)	1.00	0.62	1.00	0.76
≥40 copies/mL	103 (31.2)	227 (68.8)	1.08 (0.80–1.45)		1.05 (0.76–1.45)	
Psychosocial support						
No	113 (39.8)	171 (60.2)	1.00	**<0.001***	1.00	**<0.001***
Yes	68 (21.7)	246 (78.3)	0.49 (0.36–0.67)		0.44 (0.31–0.61)	

HR: hazard ratio; CI: confidence interval; crude HR: crude (unadjusted) hazard ratio; aHR: adjusted hazard ratio ; * $p < 0.05$ considered statistically significant.

DISCUSSION

Socio-demographic characteristics of the study participants

Baseline sociodemographic characteristics were largely comparable between groups, supporting the internal validity of the study and minimizing potential confounding in subsequent analyses.

Age

In this study, the mean age of participants was comparable between those who received psychosocial support and those who did not (37.6 ± 11.5 years vs. 36.9 ± 10.7 years; p = 0.405), indicating no significant difference at baseline. This finding is consistent with the literature, which suggests that mental health needs among people living with HIV are more strongly influenced by psychosocial and structural factors than by age. [13].

Furthermore, although some longitudinal studies have reported an association between age and attrition ,particularly among older adolescents, this effect tends to emerge during follow-up rather than at baseline. [15]. In our context, age does not appear to be a differentiating factor between groups at inclusion.

Marital status

Marital status was comparable between groups (p = 0.08), with similar proportions of married or cohabiting women, those living alone, and widows. This lack of significant difference at baseline is consistent with previous studies suggesting that, although marital status may influence adherence and social support, its effect is not systematic and may not be apparent at the time of inclusion [16]. More broadly, HIV-related outcomes are often shaped by wider social determinants rather than marital status alone.

Education level

Educational level did not differ significantly between groups (p = 0.06), with the majority of participants in both groups having primary or secondary education.

Although education is often identified as a key determinant of HIV-related outcomes, previous studies have shown that low educational attainment, particularly the absence of formal education, is associated with an increased risk of attrition [15]. In our study, the similarity in educational levels between groups suggests comparable health literacy, thereby limiting its potential role as a confounding factor.

Occupational status

Occupational status did not differ significantly between groups (p = 0.09), with unemployment being the most common category in both groups, followed by self-employment. This finding is consistent with the literature suggesting that, although economic factors influence HIV-related outcomes, their effects are highly context-dependent, particularly on access to care and social support mechanisms.[16]. In our study, the absence of difference between groups strengthens baseline comparability and supports the internal validity of the analyses

Place of residence

The majority of participants resided in urban areas, with a small proportion living in peri-urban settings and commuting to access care, with no significant difference between groups (87.3% vs. 83.8%; p = 0.18). This finding is consistent with the literature indicating that urban populations generally have better access to HIV services and support interventions [17]. It also reflects the geographical location of the study sites.

Family support

In contrast to other variables, family support differed significantly between groups (p = 0.04), with a higher proportion of participants reporting family support in the group without psychosocial support (57.7% vs. 49.7%). This finding is consistent with the literature highlighting the role of family support in treatment adherence and retention in care [18]. The observed difference suggests that psychosocial support may, in part, compensate for lower levels of family support.

Clinical and immunovirological characteristics of women living with HIV in Bangui

WHO clinical stages

WHO clinical stages

The distribution of WHO clinical stages did not differ significantly between groups (p = 0.62), with the majority of participants classified in stages 1 and 2 and comparable proportions in advanced stages.This pattern is consistent with findings reported by Mayasi et al. in Kinshasa within the context of the “test and treat” strategy, which promotes early diagnosis and timely initiation of treatment.[19]. It reflects improved access to HIV testing and earlier linkage to care.

Opportunistic infections

The prevalence of opportunistic infections was comparable between the two groups (52.2% vs. 54.2%; p = 0.58), suggesting a similar clinical profile at baseline. This finding is consistent with observations reported by Mayasi et al. in Kinshasa [19], indicating that opportunistic infections at baseline are primarily associated with disease stage and immune status rather than group allocation.

CD4 cell count

The distribution of CD4 cell count at baseline did not differ significantly between groups (p = 0.55), with comparable proportions of participants across CD4 categories. This finding suggests a similar immunological status at baseline. In the literature, it is well established that poor baseline immunological status is associated with an increased risk of attrition, as demonstrated by the multicenter study by Gezahegn Guyo T et al. in Ethiopia .[15]. In our context, the similarity in

immunological profiles between groups reduces the likelihood that this factor influenced the comparison of outcomes.

Baseline virological status

Baseline virological status (M0) was also comparable between groups (p = 0.65), with similar proportions of participants achieving viral suppression (< 40 copies/mL). This observation is consistent with the literature, which indicates that comparable levels of viral suppression at baseline are expected when groups do not differ clinically, although early viral suppression remains a key determinant of long-term treatment success.[16] In our study, this similarity confirms the comparability of the groups in terms of virological status at the start of follow-up and helps to limit potential confounding bias in assessing the effect of psychosocial support.

Evolution of viral suppression from month (M0 to M24) according to psychosocial support

Early phase (M0 to M12)

The absence of significant differences between groups during the early stages of follow-up is consistent with existing literature showing that ART initiation is the primary driver of early virological response. Studies conducted in sub-Saharan Africa have consistently demonstrated rapid improvements in viral suppression within the first year of treatment, largely independent of additional interventions[20].

Similarly, large-scale trials such as the PopART study found no significant differences in viral suppression between intervention arms during early follow-up periods, suggesting that ART effectiveness dominates initial outcomes[21].

Intermediate phase (M12 to M18)

During the intermediate phase, our findings showed no statistically significant difference in viral suppression between the psychosocial support group and the standard care group. This finding may reflect the time required for psychosocial interventions to influence behavioral determinants such as treatment adherence, motivation, and coping strategies.

Indeed, several studies have shown that improvements in adherence mediated by psychological or social support tend to occur gradually rather than immediately [22, 23]. At this stage of follow-up, patients in both groups may still benefit predominantly from routine clinical care, structured follow-up, and counseling typically integrated into standard HIV care programs. As a result, the added value of psychosocial support may not yet be strong enough to translate into measurable differences in virological outcomes [24].

This phase may therefore represent a transition period, during which the cumulative effects of psychosocial support begin to emerge but remain insufficient to produce significant differences between groups [22, 24].

Late phase (M18 to M24)

In our study, a statistically significant difference was observed at 24 months, with a higher proportion of viral suppression in the group receiving psychosocial support compared to the standard care group. This finding highlights a delayed but clinically meaningful effect of the psychosocial intervention.

This late improvement suggests that psychosocial interventions exert cumulative effects over time, primarily through a progressive and sustained enhancement of treatment adherence and engagement in care [22]. The higher level of viral suppression observed in the intervention group also indicates that psychological support may promote long-term retention, strengthen adherence behaviors, and reduce psychosocial barriers such as stress, stigma, and mental health disorders [25].

These findings are consistent with the literature, which shows that psychosocial support plays a critical role in maintaining long-term virological control by influencing the behavioral and emotional determinants of adherence [22, 25].

Effect of psychosocial support on retention in HIV care and attrition

In our study, Kaplan–Meier analysis showed significantly higher retention in the psychosocial support group ($p < 0.001$), with lower attrition at 24 months (21% versus 39%) and a higher probability of remaining in care (> 80% vs 66%). These findings are consistent with studies from sub-Saharan Africa reporting retention rates of 70–77% at 24 months, indicating substantial attrition under routine care [19, 26]. In contrast, the improved retention observed in our intervention group supports evidence that psychosocial interventions, including peer support, can enhance retention in care [27, 28]. This effect is likely mediated by improved patient engagement, reduced stigma, and strengthened adherence support, as highlighted in qualitative studies [29]. The progressive separation of survival curves suggests that the benefit of psychosocial support is cumulative and becomes more pronounced over time.

Determinants of attrition among patients on antiretroviral therapy

In our study, psychosocial support and disclosure of HIV status to a partner were associated with a significantly reduced risk of attrition in univariate analysis (HR = 0.49 and 0.62, respectively). After adjustment, these two factors remained the only independent predictors (aHR = 0.44 and 0.69), while no socio-demographic or clinical variables were significantly associated.

These findings are consistent with those reported in other African settings. In Ethiopia, lack of psychosocial support was identified as a major determinant of loss to follow-up, with unsupported patients having nearly five times higher risk of treatment discontinuation [30]. Similarly, in Uganda, a

structured intervention combining psychosocial support and socio-economic assistance significantly reduced attrition (aHR = 0.52) [31]. In Kenya, integrated programs including counseling also improved retention in care, with a reduced risk of loss to follow-up (aHR = 0.57) [32].

Taken together, these findings confirm the central role of psychosocial support in sustaining continuity of HIV care, particularly in settings characterized by socio-economic vulnerability and stigma.

Furthermore, disclosure of HIV status to a partner emerged as an important protective factor, reducing the risk of attrition by 31%. This observation aligns with findings from Ethiopia, where non-disclosure significantly increased the risk of loss to follow-up. [30]. These results highlight the importance of partner support and disclosure as key mechanisms to strengthen adherence and retention in HIV care.

Strengths and study limitations

This study has several limitations that should be considered when interpreting the findings.

First, the retrospective design may have introduced information bias due to missing or incomplete data. However, data quality was strengthened through the use of a standardized data extraction tool, double data entry, and systematic consistency checks, which likely minimized errors and improved reliability.

Second, psychosocial support was defined at the facility level rather than at the individual level, and detailed information on the intensity or adherence to the intervention was not available. Nevertheless, the intervention was routinely and consistently implemented within the intervention center, reducing the likelihood of substantial exposure misclassification.

Third, the study was conducted in two urban centers, which may limit the generalizability of the findings to rural settings or other contexts with different health system capacities. However, these facilities are among the major HIV care centers in the country and reflect real-world programmatic conditions in urban settings.

Finally, although multivariable analyses were performed to control for confounding, residual confounding cannot be entirely excluded. To mitigate this, key sociodemographic, behavioral, and clinical variables were selected a priori based on existing evidence and included in the analytical models.

Despite these limitations, the study has important strengths, including a relatively large sample size, the use of routine programmatic data, and a 24-month follow-up with robust survival analysis methods. These elements enhance the validity and relevance of the findings for informing HIV care strategies in similar settings.

CONCLUSION

This study shows that integrating psychosocial support into routine HIV care is associated with significantly improved retention in care and viral suppression among women living with HIV in Bangui.

The beneficial effects appear to increase over time, highlighting the cumulative role of psychosocial interventions in strengthening treatment adherence and long-term engagement in care.

Psychosocial support and disclosure of HIV status to a partner were identified as key protective factors against attrition, emphasizing the importance of addressing behavioral and social determinants alongside clinical management.

These findings support the systematic integration of mental health and psychosocial services into HIV programs, particularly in fragile and resource-limited settings, to improve long-term treatment outcomes.

Abbreviations

AIDS
Acquired Immunodeficiency Syndrome
ART
Antiretroviral Therapy
aHR
Adjusted Hazard Ratio
CAR
Central African Republic
CI
Confidence Interval
CNRISTAR
National Reference Centre for Sexually Transmitted Infections and Antiretroviral Therapy
OTC
Outpatient Treatment Center
HIV
Human Immunodeficiency Virus
HR
Hazard Ratio
M0, M6, M12, M18, M24
Time points (months 0, 6, 12, 18, and 24)
PLHIV
People Living with HIV
WLHIV
Women Living with HIV
SD
Standard Deviation
WHO
World Health Organization
χ^2

Chi-square test

Declarations

Ethics approval and consent to participate

The study was approved by the Scientific and Ethics Committee of the University of Bangui (approval no. UB/FACSS/CSCVPER No. 0106/2025). Due to the retrospective nature of the study, the requirement for informed consent was waived.

Clinical trial registration

Clinical trial number

Not applicable

Consent for publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

Data Availability

The data used in this study are accessible from the corresponding author upon reasonable request, subject to ethical approval and institutional authorization.

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Authors' Contributions

ADN and JDL conceptualized the study. ADN and CCFTN developed the methodology. CGNL and RHDW conducted data collection. SHW performed the statistical analysis. ADN drafted the manuscript. All authors critically reviewed, edited, and approved the final version of the manuscript. JDL supervised the study.

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Figures

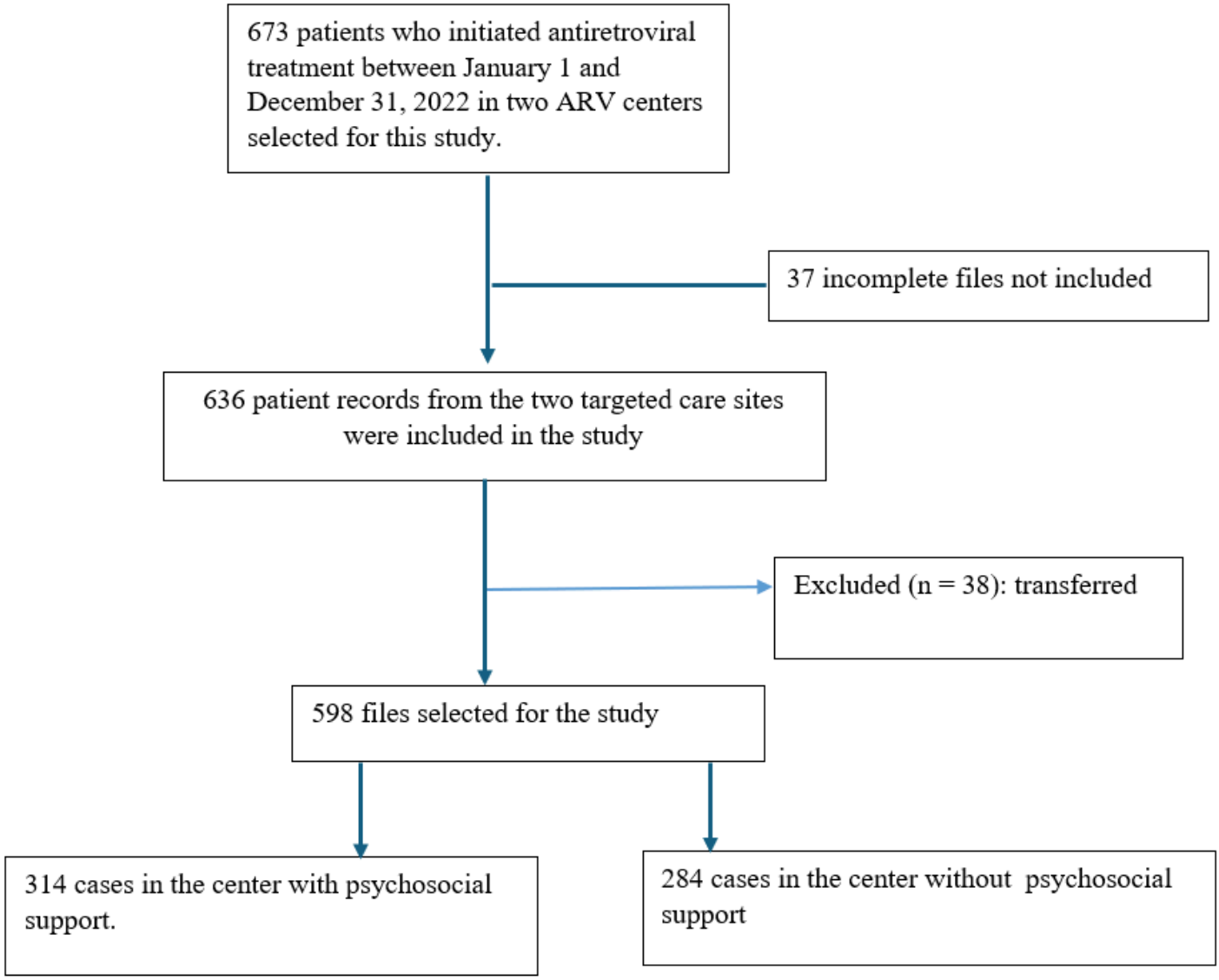


Figure 1

Flowchart of participant inclusion

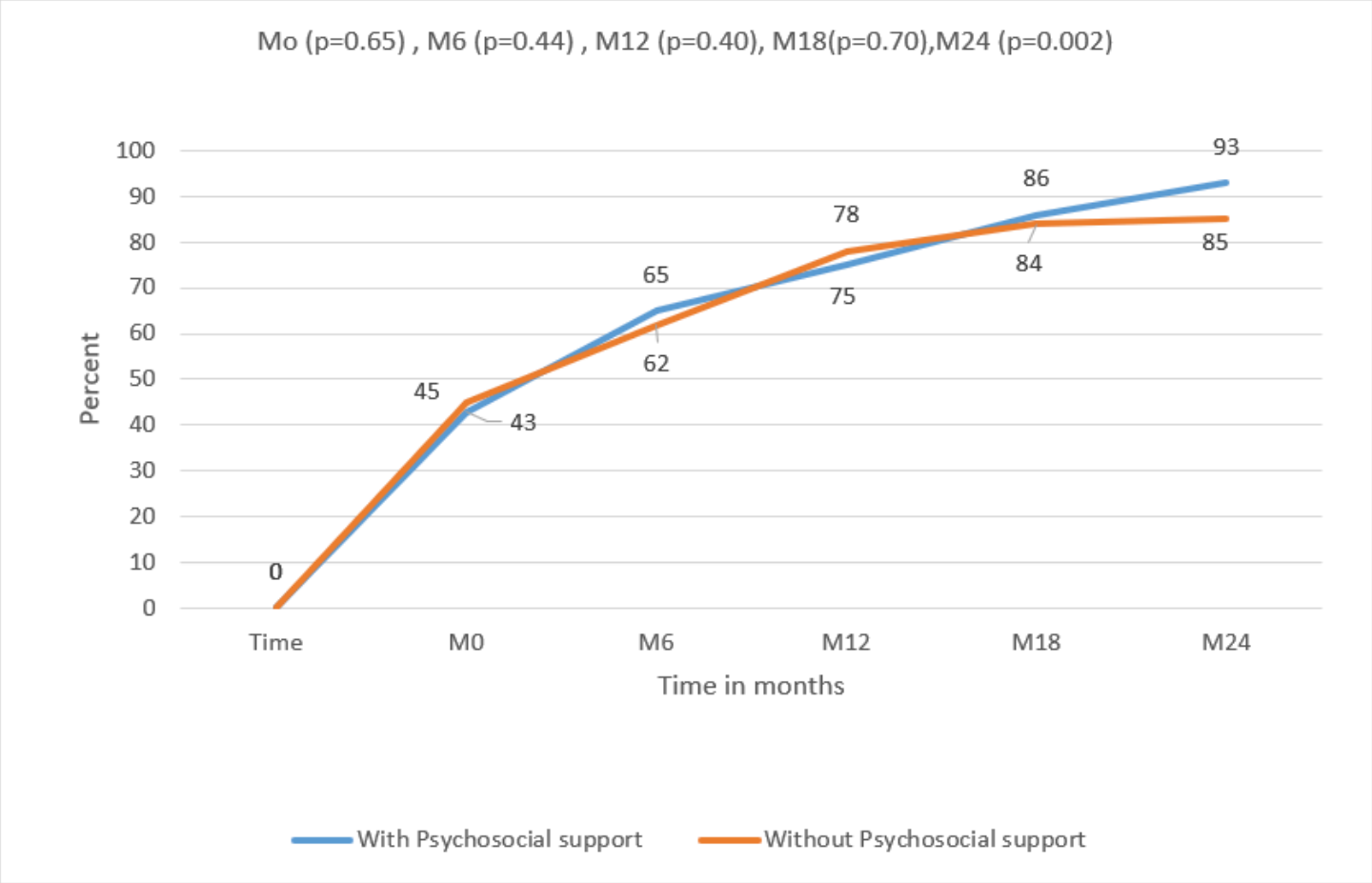


Figure 2

Evolution of virological suppression between month 0 (M0) and month 24 (M24) as a function of the availability of psychosocial support.

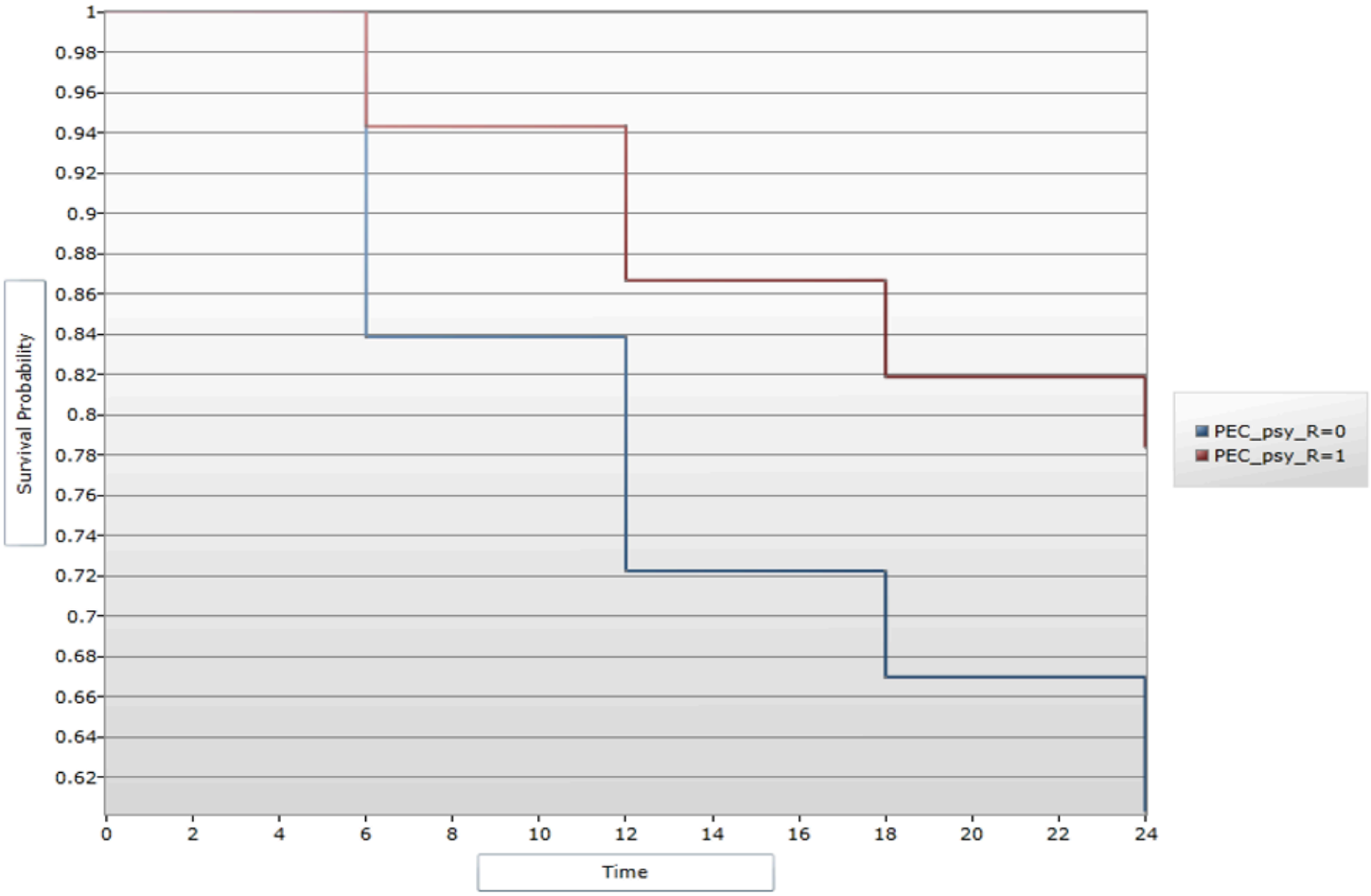


Figure 3

Probability of retention during a 24-month follow-up period

Supplementary Files

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- STROBEchecklistforcohortstudies.docx