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Pattern and risk factors for suicidal behaviors of people accessing HIV care in Ogun State, Nigeria: a cross-sectional survey

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Abstract

Introduction: People living with HIV are at increased risk of suicidal behaviors. It is critical to assess risk factors in resource-poor settings. Our study aimed to quantitatively assess the prevalence, pattern, and risk factors for suicidal behaviors among HIV-positive adults.

Material and methods: Facility-based cross-sectional study among 412 HIV-positive adults over nine months was conducted. Data on participants' characteristics, prevalence and pattern of suicidal ideation, plan and attempt, and risk factors for suicidal behaviors using structured interviews with closed-ended questionnaires were obtained. Crude and specific prevalence, 95% confidence intervals of suicidal behaviors, and risk factors were computed. Subsequently, we conducted bivariate analyses and binary logistic analysis to assess relevant associations, with statistical significance at 5%.

Results: About two out of every three (68.4%) participants were women. The crude prevalence of suicide behaviors was 7.3%, 6.1%, and 5.8% for suicide ideation, suicide planning, and suicide attempt, respectively. Several risk factors for suicide behaviors were common, such as perception of suicide as a crime (59.7%), lack of access to healthcare (44.7%), social isolation (34.7%), anxiety (32.8%), psychological distress (32.3%), separation or divorce (29.4%), widowhood (23.3%), intimate partner violence (15.5%), and co-existing major medical conditions (14.8). Suicidal behaviors were associated ($p < 0.05$) with anxiety, alcohol consumption, co-existing major medical conditions, rape, and lack of access to healthcare.

Conclusions: Suicidal behaviors and their risk factors are common among people living with HIV. It is critical to prioritize screening for suicide behaviors and their risk factors in HIV care.

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Key words: suicidal behaviors, suicide attempt, suicide ideation, suicide planning, social-ecological model.

Introduction

Comparing with the general population, people living with HIV (PLWH) present a higher risk of death by suicide [1]. About one in five (21%) PLWH have suicidal ideation, 5% attempted suicide within the preceding year, while between one and two percent die by suicide [2-4]. Suicide is the second leading cause of death among virally suppressed PLWH and the prime cause of mortality among those younger than fifty years [5]. Moreover, certain antiretroviral thera-

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pies (ART) are associated with an increased risk of suicide [6]. There is a need to explore the risk factors for suicidal behaviors among PLWH given the evidence of increased risk.

Considering their predictive power among the general population and evidence from other regions [1], mental disorders may be significant risk factors for suicidal behaviors in Nigeria and other parts of sub-Saharan Africa (SSA). Studies have shown independent relationships between suicidal behaviors and insomnia, major depressive disorders, post-traumatic stress disorder, and substance abuse [7-9]. Interestingly, these disorders are more common among PLWH than the general population [1], and even some other high-risk groups [10]. Few studies examined the effect of mental disorders on suicide behaviors among PLWH [1], especially in sub-Saharan Africa where the burden of HIV is the highest. PLWH are five to eight times more likely to report suicidal behaviors following exposure to trauma, compared with the general population [11-13]. Likewise, among PLWH, users of psycho-active substances were three to seven times more likely to attempt suicide than non-users, while sleeping disorders increased the risk of suicide attempts by two to five times among PLWH [14]. These factors independently predict suicide behaviors among PLWH, but may have stronger predictive power when they interact [1]. This thinking is consistent with a syndemic model [15]. The syndemic approach has not been explored among PLWH.

Previous studies have explored the risk factors for suicidal behaviors using either the traditional models (psychodynamic, behavioral, humanistic, and socio-cultural views) or modern approaches (three-step theory) [16-22]. However, the evidence of causation remains inconclusive and the search for the gold standard for treatment is continuing, but social ecological model (SEM) is promising. SEM has successfully contributed to unraveling the link between inter-personal violence and HIV infection [23-26]. Using this model, the risk factors for suicide ideation could be examined at four levels, such as individual, inter-personal, community, and societal. Individual risk factors include age, sex, early sexual debut, mental disorders, major medical conditions, and substance abuse. Criminal, financial, legal, and job challenges are also individual level risk factors. At inter-personal level, rape, inter-personal violence, bullying, childhood adversity, social isolation, major relationship challenges, and family history of mental disorders and suicide are indicated risk factors. Community level risk factors include religious and cultural beliefs, and perception of nobility of suicide. Social risk factors for suicidal behaviors are access to lethal means and healthcare, stigmatization, and criminalization of suicide [27-31]. High-quality, theory-based studies accessing risk factors for suicidal behaviors among PLWH are scarce in Nigeria and SSA, while the need for ensuing evidence is critical considering the high prevalence of HIV in this context.

In this study, we aimed to quantitatively assess the prevalence and risk factors of suicidal behaviors among adults, 18 years or older, accessing HIV care in Ogun State, Southwest, Nigeria. SEM was applied to assess the risk factors at four levels. Syndemic model was also tested by assessing the effect of interaction between risk factors and socio-demographic covariates on suicidal behaviors among PLWH. The present study hypothesized that, given the widespread stigmatization and criminalization, suicidal behaviors and their known risk factors are prevalent within our study population. Moreover, we believed that the syndemic model was likely to cause stronger prediction of suicidal behaviors in the index population.

Material and methods

Study design

A cross-sectional survey among 412 adults accessing HIV care in three comprehensive ART sites between April 2022 and February 2023 was conducted.

Setting

The study was carried out in Ogun State, southwestern part of Nigeria, in the State Hospital, Ijebu Ode, Babcock University Teaching Hospital, Ilishan, and the Federal Medical Center, Abeokuta. Ogun State has an estimated 100,000 PLWH, with over 20,827 accessing care in 27 comprehensive ART sites [32, 33]. Ijebu Ode (5%) accounts for the highest prevalence in the State, followed by Abeokuta (2.7%). HIV prevalence in Ogun State (1.6%) is higher than the national (1.4%) and southwest regional (1.2%) prevalence [34].

Study size

The sample size was derived using Cochran formula for estimating proportions in a cross-sectional study [35], assuming a 95% confidence interval, with a desired level of precision of 0.05, a 20% non-response rate, and a prevalence of 34.7% that is the proportion of people living with HIV in Benin City who reported having suicidal ideation [36]. Our derived sample size was 430 PLWH.

Participants

All HIV-positive adults, 18 years old or more, accessing care at comprehensive ART sites in Ogun State for six months or more were eligible to participate in the study. Individuals, who were too ill to participate were excluded. Three sites by random sampling (balloting) were selected and sample size was allocated to each of them through proportionate allocation, based on the number of patients accessing care in each of ART sites. Subsequently, consenting individuals were recruited as they attended their routine visits in clinics until the sample sizes reached adequate numbers.

Variables

Outcome variable was suicidal behaviors (SB). Consistent with the ideation-to-action framework, SB were conceptualized as consisting of three distinct constructs with different

predictors [22, 37]. In the study, SB included suicidal ideation, suicide plans, and suicide attempts. According to self-directed violence classification system (SDVCS), suicide ideation is "thoughts of engaging in suicide-related behavior" [38]. Suicide plans, on the other hand, are "acts or preparation towards engaging in self-directed violence, but before the potential for injury has begun" [38]. A suicide attempt is considered as "behavior that is self-directed, and deliberately results in injury or the potential for injury to oneself, accompanied by a clear implicit or explicit suicidal intent" [38]. Suicide attempts may be with or without injury, interrupted by self or others, or could lead to fatality (suicide).

Predictor variables consisted of factors identified from previous literature were considered as having the potential to underlie suicide behaviors. Following the CDC framework for preventing health conditions [39], we proposed an integration of influences occurring at multiple levels and dimensions to determine the risk factors of suicide behaviors. According to the social-ecological model (SEM) of behavior [40, 41], we hypothesized that the risk factors operate at four levels, such as individual, inter-personal, community, and societal. The individual variables included age, sex, alcohol and drug abuse, chronic illnesses, and psychological distress. The inter-personal factors involved family history of suicide and mental illness, and relationship challenges. The others were childhood adversities, intimate partner violence, and bullying. The community factors included religious and cultural norms, and access to healthcare. Finally, the societal factors consisted of stigma, access to lethal weapons, and criminalization of suicide.

Data sources and measurement

Study data were collected using an interviewer-administered questionnaire that consisted of three distinct sections. The first part assessed participants' characteristics, such as sex (biological), age (as of last birthday), occupation, highest level of education completed, and marital status. The second part considered prevalence and pattern of suicidal ideation, plan, and attempt, while the last section explored risk factors for suicidal behaviors. The questionnaire was pre-tested among 65 PLWH at a comprehensive ART facility in Lagos State. Data were collected by trained graduate assistants who had experience working in HIV comprehensive treatment sites.

Suicidal ideation was assessed by asking whether during the preceding year, the participant ever seriously considered attempting suicide. Yes was coded as 1, while no was coded as 0. Similarly, suicide plan and attempt were assessed over the preceding year and coded likewise.

Statistical analysis

IBM SPSS Statistics version 22 for data analysis was applied. First, the proportions and means (and standard deviation) of participants' characteristics were derived and disaggregated. Crude and specific prevalence, including sex, age, level of education, living area, and marital status, and 95% confidence intervals of SB were computed. Then, the prevalence of individual, inter-personal, community, and social risk factors for suicidal behaviors were obtained. Subsequently, bivariate analyses were conducted to access the relationship between participant's characteristics and variables outcomes. Further, three binary logistic regression analyses (one for each outcome variable) were done with variables based on literature review, plausibility, and significance with $p < 0.25$ on bivariate analyses. Post-estimation tests on each selected model using Hosmer-Lemeshow goodness-of-fit test were performed. Statistical significance was set at 5%.

Results

Participants' characteristics

Out of 430, 412 appropriately filled data tools with high-quality data were retrieved, giving a response rate of 95.8%. Table 1 highlights the characteristics of our study participants by sex. About two out of every three (68.4%) participants were women, while more than half (58.7%) were married. The participants' mean age was 47.4 years (± 10.3 years), with men being older ($p = 0.010$). Higher proportions of men completed tertiary education, while more women had no education at all ($p = 0.049$). About three of every five (58.7%) participants were married, with higher proportions of men, and women being single and widowed, respectively ($p < 0.001$). A significant proportion (44.7%) of the participants were not living with their partners, with women being more affected ($p = 0.010$). Likewise, of the 30.6% unemployed participants, women were more affected than men ($p < 0.001$). In our study population, the rate of polygamy was 21.8%, while 95.6% accessed healthcare using fee-for-service. The mean estimated time to the nearest healthcare facility usually accessed by the participants were 21.2 (± 20.7) and 34.3 (± 32.1) minutes, respectively. The reported HIV serodiscordance rate was 55.8%, with statistically significantly higher rate among women ($p = 0.007$). Conversely, the average monthly income was higher among men ($p < 0.001$) (Table 1).

Prevalence of suicidal behaviors

Table 2 presents the crude and specific rates of suicidal behaviors among study participants. The crude prevalence of suicide behaviors was 7.3% (suicide ideation), 6.1% (suicide planning), and 5.8% (suicide attempt).

Prevalence of risk factors for suicidal behaviors

Table 3 shows the prevalence of individual, inter-personal, community, and social risk factors for suicidal behaviors. Among the study participants, a significant prevalence of psychological distress (32.3%), anxiety (32.8%), co-existing major medical conditions (14.8%), job loss (15.8%), and previous major financial challenges (57.8%)

Table 1. Participants' characteristics

Participants' characteristics	Overall, *n* (%)	Female, *n* (%)	Male, *n* (%)	χ^2 (*p*-value)
	412 (100.0)	282 (68.4)	130 (31.6)	
Age as of last birthday (in years)*	47.4 ± 10.3	46.5 ± 10.1	49.3 ± 10.5	–2.60 (0.010)
Level of education completed				
None completed	22 (5.3)	19 (86.4)	3 (13.6)	7.88 (0.049)
Primary completed	127 (30.8)	86 (67.7)	41 (32.3)	
Secondary completed	201 (48.8)	142 (70.6)	59 (29.4)	
Tertiary completed	62 (15.0)	35 (56.5)	27 (43.5)	
Marital status				
Single, never married	15 (3.6)	9 (60.0)	6 (40.0)	22.74 (< 0.001)
Currently married	242 (58.7)	150 (62.0)	92 (38.0)	
Separated/divorced	79 (19.2)	54 (68.4)	25 (31.6)	
Widowed	76 (18.4)	69 (90.8)	7 (9.2)	
Relationship living arrangement				
Living with a partner	228 (55.3)	144 (63.2)	84 (36.8)	6.61 (0.010)
Not living with a partner	184 (44.7)	138 (75.0)	46 (25.0)	
Religion				
Christianity	280 (68.0)	199 (71.1)	81 (28.9)	5.33 (0.070)
Islam	126 (30.6)	81 (64.3)	45 (35.7)	
Traditional	6 (1.5)	2 (33.3)	4 (66.7)	
Ethnicity				
Yoruba	341 (82.8)	240 (70.4)	101 (29.6)	5.63 (0.131)
Hausa	14 (3.4)	6 (42.9)	8 (57.1)	
Igbo	39 (9.5)	25 (64.1)	14 (35.9)	
Others	18 (4.4)	11 (61.1)	7 (38.9)	
Occupation				
Unemployed	126 (30.6)	105 (83.3)	21 (16.7)	18.63 (< 0.001)
Employed	286 (69.4)	177 (61.9)	109 (38.1)	
Living area				
Rural	144 (35.0)	91 (63.2)	53 (36.8)	2.83 (0.243)
Semi-urban	147 (35.7)	105 (71.4)	42 (28.6)	
Urban	121 (29.4)	86 (71.1)	35 (28.9)	
Type of marriage (if currently married)				
Monogamous	218 (52.9)	138 (63.3)	80 (36.7)	5.73 (0.057)
Polygamous	90 (21.8)	66 (73.3)	24 (26.7)	
Not married	104 (25.2)	78 (75.0)	26 (25.0)	
Time access to facility (minutes)*	21.2 (20.7)	20.4 (19.3)	23.0 (23.3)	–1.19 (0.234)
Time (social) access to facility (minutes)*	34.3 (32.1)	35.5 (34.2)	31.6 (27.0)	1.16 (0.248)
Health insurance				
No (fee-for-service)	394 (95.6)	271 (68.8)	123 (31.2)	0.47 (0.493)
Yes	18 (4.4)	11 (61.1)	7 (38.9)	
HIV serodiscordance				
No	119 (28.9)	69 (58.0)	50 (42.0)	9.83 (0.007)
Yes	230 (55.8)	171 (74.3)	59 (25.7)	
Unknown	63 (15.3)	42 (66.7)	21 (33.3)	

Table 1. Cont,

Participants' characteristics	Overall, *n* (%)	Female, *n* (%)	Male, *n* (%)	χ^2 (*p*-value)
	412 (100.0)	282 (68.4)	130 (31.6)	
Duration since HIV diagnosis*	78.2 (50.9)	78.5 (52.0)	77.3 (48.7)	0.23 (0.819)
Duration on HAART*	78.2 (51.0)	78.8 (52.0)	76.7 (48.7)	0.40 (0.690)
ART regimen (*n* = 276)				
TDF/3TC/DTG	268 (97.1)	185 (69.0)	83 (31.0)	2.29 (0.514)
ABC/3TC/DTG	1 (0.4)	1 (100.0)	0 (0.0)	
ABC/3TC/ATV/r	4 (1.4)	3 (75.0)	1 (25.0)	
TDF/3TC/ATV/R	3 (1.1)	1 (33.3)	2 (66.7)	
TDF/3TC/LPV/R				
Personal monthly income (thousand Naira)*	32.0 (30.2)	27.8 (20.8)	41.1 (42.8)	–4.24 (< 0.001)
Family monthly income (thousand Naira)*	52.1 (42.0)	49.1 (38.8)	58.7 (947.7)	–2.18 (0.030)

**Quantitative data; mean ± standard deviation; t (p-value)*

Table 2. Prevalence of suicidal behaviors

Specific categories	Suicidal ideation	Suicidal planning	Suicidal attempt
	Proportion (95% CI) (%)	Proportion (95% CI) (%)	Proportion (95% CI) (%)
Crude	7.3 (5.0-10.2)	6.1 (4.0-8.8)	5.8 (3.8-8.5)
Age group			
15-29 years	15.4 (1.9-45.4)	0.0 (0.0-24.7)	0.0 (0.0-24.7)
30-44 years	6.0 (2.8-11.2)	5.4 (2.3-10.3)	5.4 (2.3-10.3)
45-59 years	7.7 (4.4-12.1)	6.7 (3.7-11.0)	6.2 (3.4-10.4)
≥ 60 years	7.3 (1.5-19.9)	7.3 (1.5-19.9)	7.3 (1.5-19.9)
Sex			
Female	7.4 (4.7-11.2)	6.4 (3.8-9.9)	6.0 (3.6-9.5)
Male	6.9 (3.2-12.7)	5.4 (2.2-10.8)	5.4 (2.2-10.8)
Level of education completed			
None completed	4.5 (0.1-22.8)	4.5 (0.1-22.8)	4.5 (0.1-22.8)
Primary completed	7.9 (3.8-14.0)	7.1 (3.3-13.0)	6.3 (2.8-12.0)
Secondary completed	6.0 (3.1-10.2)	5.0 (2.4-9.0)	5.0 (2.4-9.0)
Tertiary completed	11.3 (4.7-21.9)	8.1 (2.7-17.8)	8.1 (2.7-17.8)
Marital status			
Single, never married	13.3 (1.7-40.5)	6.7 (2.0-31.9)	6.7 (2.0-31.9)
Currently married	5.4 (2.9-9.0)	4,1 (2.0-7.5%)	3.7 (1.7-6.9)
Separated/ divorced	10.1 (4.5-19.0)	8.9 (3.6-17.4)	8.9 (3.6-17.4)
Widowed	9.2 (3.8-18.1)	9.2 (3.8-18.1)	9.2 (3.8-18.1)
Living area			
Rural	8.3 (4.4-14.1)	6.2 (2.9-11.5)	5.6 (2.4-10.7)
Semi-urban	6.1 (2.8-11.3)	5.4 (2.4-10.4)	5.4 (2.4-10.4)
Urban	7.4 (3.5-13.7)	6.6 (2.9-12.6)	6.6 (2.9-12.6)

was found. The prevalent inter-personal risk factors included intimate partner violence (15.5%), separation or divorce (29.4%), widowhood (23.3%), and social isolation (34.7%). The common community and social risk factors in the study population were the perception of suicide as a crime (59.7%), lack of access to healthcare (44.7%), stigmatization of mental disorders (67.7%), and criminalization of suicide (62.1%).

Table 3. Prevalence of risk factors for suicidal behaviors

Individual risk factors	*n* (%)
Psychological distress	
No	279 (67.7)
Yes	133 (32.3)
Anxiety	
No	277 (67.2)
Yes	135 (32.8)
Major medical condition	
No	351 (85.2)
Yes	61 (14.8)
Criminal problems	
No	391 (94.9)
Yes	21 (5.1)
Legal challenge	
No	405 (98.5)
Yes	6 (1.5)
Job loss	
No	347 (84.2)
Yes	65 (15.8)
Major financial challenge	
No	174 (42.2)
Yes	238 (57.8)
Early sexual debut	
No	382 (92.7)
Yes	30 (7.3)
Alcohol use	
No	378 (91.7)
Yes	34 (8.3)
Marijuana use	
No	409 (99.3)
Yes	3 (0.7)
Cigarette smoking	
No	404 (98.1)
Yes	8 (1.9)
Interpersonal risk factors	***n* (%)**
Rape	
No	404 (98.1)
Yes	8 (1.9)
Intimate partner violence	
No	348 (84.5)
Yes	64 (15.5)
Bullying	
No	402 (97.6)
Yes	10 (2.4)
Family history of suicide	
No	408 (99.0)
Yes	4 (1.0)

Table 3. Cont.

Interpersonal risk factors	*n* (%)
Family history of mental disorders	
No	407 (98.8)
Yes	5 (1.2)
Childhood abandonment	
No	397 (96.4)
Yes	15 (3.6)
Abuse in childhood	
No	397 (96.4)
Yes	15 (3.6)
Separation/divorce	
No	291 (70.6)
Yes	121 (29.4)
Widowhood	
No	316 (76.7)
Yes	96 (23.3)
Social isolation	
No	269 (65.3)
Yes	143 (34.7)
Community risk factors	***n* (%)**
Religious acceptability of suicide	
No	408 (99.0)
Yes	4 (1.0)
Cultural acceptability of suicide	
No	405 (98.3)
Yes	7 (1.7)
Perception of suicide as crime	
No	166 (40.3)
Yes	246 (59.7)
Nobility of suicide	
No	406 (98.5)
Yes	6 (1.5)
Lack of access to healthcare	
No	228 (55.3)
Yes	184 (44.7)
Social risk factors	***n* (%)**
Stigmatization of mental disorders	
No	133 (32.3)
Yes	279 (67.7)
Access to lethal means	
No	391 (94.9)
Yes	21 (5.1)
Criminalization of suicide	
No	156 (37.9)
Yes	256 (62.1)

Table 4. Association between participants' characteristics and suicidal ideation (logistic regression analysis)

Risk factors	AOR	95% CI (%)	*p*-value
Individual			
HIV serodiscordance			
No			
Yes	1.93	0.62-6.03	0.259
Unknown	1.91	0.40-9.16	0.420
Duration since HIV diagnosis	1.00	0.99-1.01	0.297
Psychological distress			
No			
Yes	1.24	0.46-3.30	0.673
Anxiety			
No			
Yes	4.03	1.33-12.15	0.013*
Major medical condition			
No			
Yes	2.14	0.83-5.54	0.117
Job loss			
No			
Yes	1.74	0.58-5.22	0.326
Alcohol use			
No			
Yes	4.14	1.22-14.08	0.023*
Marijuana use			
No			
Yes	11.22	0.15-832.19	0.271
Cigarette smoking			
No			
Yes	1.39	0.02-101.28	0.810
Inter-personal			
Rape			
No			
Yes	6.91	0.96-49.77	0.055
Intimate partner violence			
No			
Yes	1.33	0.43-4.13	0.626
Bullying			
No			
Yes	2.16	0.25-18.83	0.484
Separation/ divorce			
No			
Yes	0.86	0.31-2.36	0.768
Social isolation			
No			
Yes	1.22	0.50-2.98	0.663
Community and social			
Lack of access to healthcare			
No			
Yes	2.50	1.01-6.26	0.049*

**Statistically significant at p < 0.05*

Association between participants' characteristics and suicidal ideation

Supplementary tables present the results of bivariate analyses between suicidal behaviors and the individual (Table S1), inter-personal (Table S2), and community and social factors (Table S3). Only factors that were statistically significant at $p < 0.25$ were considered to be relevant for logistic regression analyses. The relevant individual factors were HIV serodiagnosis, duration since HIV diagnosis, psychological distress, anxiety, chronic medical conditions, and job loss. The others included alcohol, marijuana, and cigarette use. The inter-personal factors were the experiences of rape, intimate partner violence, and bullying. Also, a family history of mental disorder, childhood abandonment, family separation/ divorce, and social isolation were considered significant. Lack of access to healthcare was the only factor at the community and social levels that was significant.

Table 4 shows that suicide ideation was statistically significantly associated with anxiety (AOR: 4.03; 95% CI: 1.33-12.15%; $p = 0.013$), alcohol consumption (AOR: 4.14; 95% CI: 1.22-14.08%; $p = 0.023$), and lack of access to healthcare (AOR: 2.50; 95% CI: 1.01-6.26%; $p = 0.049$). The Hosmer-Lemeshow model had a good fit with the underlying data ($\chi^2 = 11.936$; df = 8; $p = 0.154$), while Nagelkerke R^2 was equal to 0.242.

Table 5 demonstrates that suicide planning was statistically significantly associated with anxiety (AOR: 4.46; 95% CI: 1.17-17.00%; $p = 0.028$), co-existing major medical conditions (AOR: 3.14; 95% CI: 1.11-8.87%; $p = 0.030$), and alcohol consumption (AOR: 6.55; 95% CI: 1.67-25.69%; $p = 0.007$). Suicide planning was also associated with the experience of rape (AOR: 10.24; 95% CI: 1.13-92.68%; $p = 0.039$). The Hosmer-Lemeshow model had a good fit with the underlying data ($\chi^2 = 8.334$; df = 8; $p = 0.404$), while Nagelkerke R^2 was equal to 0.335.

Table 6 shows that suicide attempt was statistically significantly associated with anxiety (AOR: 4.38; 95% CI: 1.20-16.04%; $p = 0.026$), co-existing major medical conditions (AOR: 3.83; 95% CI: 1.43-10.24%; $p = 0.008$), and alcohol consumption (AOR: 4.52; 95% CI: 1.22-16.81%; $p = 0.024$). The Hosmer-Lemeshow model had a good fit with the underlying data ($\chi^2 = 13.024$; df = 8; $p = 0.111$), while Nagelkerke R^2 was equal to 0.286.

Table 5. Association between participants' characteristics and suicidal planning (logistic regression analysis)

Risk factors	AOR	95% CI (%)	*p*-value
Individual			
HIV serodiscordance			
No			
Yes	1.77	0.48-6.59	0.394
Unknown	1.57	0.24-10.24	0.637
Duration since HIV diagnosis	0.99	0.98-1.01	0.202
Psychological distress			
No			
Yes	1.61	0.52-5.00	0.415
Anxiety			
No	4.46	1.17-17.00	0.028*
Yes			
Major medical condition			
No			
Yes	3.14	1.11-8.87	0.030*
Job loss			
No			
Yes	1.52	0.42-5.55	0.524
Alcohol use			
No			
Yes	6.55	1.67-25.69	0.007*
Marijuana use			
No			
Yes	24.67	0.26-2,315.21	0.167
Cigarette smoking			
No			
Yes	1.7	0.02-162.65	0.820
Inter-personal			
Rape			
No			
Yes	10.24	1.13-92.68	0.039*
Intimate partner violence			
No			
Yes	1.22	0.35-4.27	0.755
Bullying			
No			
Yes	1.21	0.11-13.76	0.876
Family history of mental disorders			
No			
Yes	0.41	0.01-45.08	0.710
Childhood abandonment			
No			
Yes	1.91	0.24-15.29	0.542
Inter-personal			
Separation/ divorce			
No			
Yes	1.25	0.39-3.98	0.711
Social isolation			
No			
Yes	2.34	0.82-6.71	0.114
Community and social			
Lack of access to healthcare			
No			
Yes	2.44	0.83-7.16	0.104

**Statistically significant at p < 0.05*

Discussion

The survey of suicidal behaviors among people living with HIV in Ogun State, Nigeria, shows that suicidal ideation (7.3%; 95% CI: 5.0-10.2%), planning (6.1%; 95% CI: 4.0-8.8%), and attempt (5.8%; 95% CI: 3.8-8.5%) were common. Similarly, individual, inter-personal, community, and social risk factors for suicidal behaviors were prevalent in our study population. The present study demonstrated a statistically significant association between suicidal behaviors and some of these risk factors. Specifically, suicide ideation was associated with anxiety, alcohol consumption, and lack of access to healthcare, while suicide planning showed a statistical association with anxiety, co-existing major medical conditions, alcohol consumption, and the experience of rape. Additionally, suicide attempt was associated with anxiety, co-existing major medical conditions, and alcohol consumption.

Several limitations could potentially bias our study, which the reader should consider in the interpretation of the findings. The study design was cross-sectional and, therefore, the notion of causation could not be established between the independent and dependent factors. Furthermore, the variables were largely self-reported and subject to recall bias, which might have resulted in an underestimation of many of them. Suicide behaviors are highly sensitive, and suicide is criminalized in Nigeria. Criminalization is reported to minimize the risk of suicide behaviors [42], but it may also result in under-reporting. Furthermore, PLWH still experience substantial stigmatization and are therefore not helpful in answering sensitive questions. We mitigated these challenges for validity by engaging graduate assistants with experience working in highly sensitive settings, and trained them specifically for this purpose.

The study demonstrates comparable levels of suicidal behaviors with global, African, and Nigerian rates [43, 44], although the prevalence of suicide ideation (7.3%) is lower

than the pooled crude prevalence estimate of 20.9% (95% CI: 16.5-21.6%) [44]. Several studies from high-income settings have also reported similar rates [2-4]. The pooled prevalence of suicidal ideation rates in Africa (21.7%; 95% CI: 16.80-26.63%), Ethiopia (22.7%), South Africa (18.05%), and Nigeria (25.3%) were higher than our study findings. However, the pooled prevalence from Uganda (9.8%) was similar to our study results [43]. The variation in the prevalence of suicide ideation may be due to multiple factors, including setting and period of assessment, scale used for assessment, study design, and sample size. Cultural differences and suicide-related stigma are known to account for variations in suicidal ideation rates [43]. It is also possible that our suicide ideation rate is underestimated, given the above-mentioned study limitations. Suicidal behaviors are more common among PLWH than the general population [1, 45], and the prevalence seems to be on the increase, as literature demonstrates that rates reported after 2015 are higher than before [43]. Therefore, suicidal behaviors must be given intentional consideration in HIV care, especially in settings such as Nigeria, where prevailing cultures, stigma, and criminalization might mitigate reporting, and aggravate suicide-related morbidity and mortality.

The current study demonstrates the widespread presence of risk factors and their association with suicidal behaviors. Several studies have shown higher rates of mental disorders, including depression, stress, anxiety, and substance use among PLWH by as much as 15% with attending social isolation [46-49]. Mental disorders, particularly anxiety and alcohol misuse, were associated with the three suicidal behaviors considered in this research. HIV infection depletes human immune system and results in significant socio-economic and cultural challenges as well as increases spending on healthcare and leads to severe mental disorders [50]. PLWH have an increased risk of mental disorders and consequent suicide ideation, planning, and attempt [51, 52]. Conversely, mental disorders increase the risk of HIV progression and ART adherence failure. Like the current study, other authors also found that co-existing medical conditions are associated with suicidal behaviors [27-29, 36]. Therefore, there is a urgent need to prioritize screening for mental disorders and co-morbid medical conditions among PLWH [49].

Lack of access to healthcare, particularly mental health services, is thought to contribute significantly to suicidal behaviors [53, 54]. The situation is worse among young people, in rural areas, and low-income settings, such as Nigeria [55, 56]. Considering that more than 50% of the world's population lacks access to essential healthcare with more being pushed into poverty by health expenses [57], it is necessary to urgently scale-up activities towards achieving universal health coverage, especially in low-resource settings like ours, where the outright predominance of out-of-pocket health expenditure excludes the majority of population from accessing basic health services.

The current study suggests that the syndemic approach may better evaluate suicide behaviors among PLWH, while the risk factors are amenable to the social ecological model

Table 6. Association between participants' characteristics and suicidal attempt (logistic regression analysis)

Risk factors	AOR	95% CI (%)	*p*-value
Individual			
Duration since HIV diagnosis	0.99	0.98-1.01	0.259
Psychological distress			
No			
Yes	1.57	0.51-4.86	0.437
Anxiety			
No			
Yes	4.38	1.20-16.04	0.026*
Major medical condition			
No			
Yes	3.83	1.43-10.24	0.008*
Alcohol use			
No			
Yes	4.52	1.22-16.81	0.024*
Marijuana use			
No			
Yes	4.87	0.01-1,979.55	0.606
Cigarette smoking			
No			
Yes	0.39	0.00-168.36	0.761
Inter-personal			
Rape			
No	4.55	0.57-36.58	0.154
Yes			
Intimate partner violence			
No			
Yes	1.23	0.39-3.91	0.722
Family history of mental disorders			
No			
Yes	3.41	0.15-79.25	0.445
Separation/divorce			
No			
Yes	1.43	0.51-4.04	0.496
Social isolation			
No			
Yes	1.94	0.73-5.18	0.185
Community and social			
Lack of access to healthcare			
No			
Yes	2.27	0.77-6.66	0.136

**Statistically significant at p < 0.05*

of behaviors. There is a need for future research, especially larger and longitudinal studies, to further explore the syndemic approach for predicting suicide behaviors in PLWH. Additionally, the SEM is promising for designing suicidal behaviors' interventions.

Conclusions

Suicidal behaviors and their risk factors are prevalent among people living with HIV. The social ecological model of behaviors is a promising tool in unveiling the causation of suicide behaviors, while the syndemic approach may improve prediction. Mental health disorders, such as anxiety and alcohol misuse, co-existing medical conditions, and lack of access to healthcare, are critical to mitigating suicidal behaviors among PLWH. It is crucial to prioritize screening for suicide behaviors and co-existing medical conditions in HIV care. The need for universal health coverage has never been more urgent. Therefore, Nigeria and other resource-poor countries must intensify the efforts towards ensuring the access to essential healthcare for all their citizens. Future research must explore the SEM and syndemic approach to design effective interventions for suicidal behaviors among people living with HIV.

Disclosures

1. Institutional review board statement: The study was approved by the Ethics Committee of the Babcock University Health Research, with approval number: BUHREC/733/22.
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

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