The prevalence of sexual compulsivity and its correlates among adults living with HIV/AIDS attending antiretroviral therapy clinic in Gambella town, Southwest Ethiopia, 2020

Seid Shumye1*, Chalachew Kassaw1 and Getnet Melaku2

Abstract

Introduction: Sexual compulsivity is a concealed psychiatric disease marked by intrusive thoughts followed by ritualized sexual acts. In Ethiopia, the prevalence of HIV/AIDS has recently increased. Furthermore, sexual compulsivity among adults living with HIV/AIDS receives less attention, particularly in Ethiopia. Therefore, this study aimed to assess the prevalence of sexual compulsivity and its correlates among adults living with HIV/AIDS attending ART clinic in Gambella town, Southwest Ethiopia, 2020.

Method: A hospital-based study employing cross-sectional design and simple random sampling technique was used to select the study participants. Data were collected by using interview technique. A 10 item Sexual Compulsivity Scale (SCS) questionnaire was used to assess sexual compulsivity. The translated version of the questionnaire was used for data collection. Bivariate and multivariable logistic regression was conducted to determine factors associated with the outcome variable at \( p \)-value < 0.05 with a 95% confidence interval.

Result: Out of 300 respondents, 27% (24.3, 29.2) of them were scored above the mean score of the Sexual Compulsivity Scale. Age less than 31 years old, widowed, involving in risky sexual behaviors, current substance use, not received any skill training about safer sex behaviors, and not attending support group discussion on HIV prevention were significantly associated with sexual compulsivity.

Conclusion: Almost one fourth of the respondents have high score for Sexual Compulsivity Scale score. Therefore, there is a need of routine sexual behavior screening program and collaboration with mental health workers for addressing the problem. Furthermore, the emphasis should be given on the identified high-risk categories.

Keywords: Sexual compulsivity, HIV/AIDS, Gambella, Ethiopia

Introduction

Sexual intercourse is a sexual sensation and intimate activity that involves the insertion and thrusting of the penis into the vaginal canal for sexual pleasure, reproduction, or both. It can be done alone, between two people, or in groups [1]. Humans are compelled to have sex with their sexual partners for biological and psychological reasons [2]. Sexual intercourse boosts the immune system, relieves depression, promotes bladder control and cardiovascular fitness, lowers blood pressure, and improves self-esteem [3, 4].

Sexual compulsivity, also known as sexual dependency, hyper-sexuality, excessive sexuality, or problematic

*Correspondence: seidshumye22@gmail.com
1 Department of Psychiatry, College of Health and Medical Science, Dilla University, Dilla, Ethiopia
Full list of author information is available at the end of the article
sexual behavior, is defined by persistent and intense problems with sexual desires, impulses, and painful behavior in humans, as well as a psychosocial deficit [5].

Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome (HIV/AIDS) is one of the most frequent chronic medical disorders spread from person to person through unprotected sexual contact, particularly in Sub-Saharan African nations including Ethiopia [6]. According to the 2016 Ethiopian demography and health survey (EDHS), the Gambella region (4.8%) and Addis Ababa (3.4%) have the highest HIV prevalence rates, while Somali (0.1%) and Southern Nation, Nationalities and People (0.4%) regional states have the lowest rates [7]. Patients with HIV/AIDS have a higher level of sexual desire and conduct than those who are HIV-negative [8]. Patients with HIV/AIDS in low and middle-income countries have a low awareness of safe sexual behaviors and activities, which are critical for preventing transmission from infected to non-infected individuals [9]. The social and self-stigma associated with marriage and sexual partners has been observed among HIV/AIDS patients, contributing to risky sexual behavior. For such risky individuals who transfer the disease to another sexual partner with seronegative status, training the varied safest sexual behaviors such as using condoms, dolls, traps, and masturbations are the safest indicated [10]. Individuals with a higher sexual compulsivity score had more sex partners, engaged in more sexual risk behaviors with casual or one-time sex partners, and were roughly four times more likely to have recently been diagnosed with multiple STIs [11, 12]. Compulsive sexual activity was also linked to the use of alcohol and other drugs [13].

Despite the above facts and the rapidly rising incidence of seropositive people in Sub-Saharan African countries like Ethiopia, where unprotected sexual intercourse is the mainstay of transmission, discussing sexual conduct is fraught with sociological, cultural, and religious taboos, all of which contribute to the spread of a virus [14]. The country’s health ministry and a specialized non-governmental group concentrate on preventing virus transmission, with a focus on condom use. However, there is a lack of research on how to measure and handle patients’ sexual compulsivity, demanding a joint effort from all stakeholders participating in the prevention program. As far as we know, there hasn’t been a published article on this burning issue. Therefore, this study aimed to assess sexual compulsivity and its correlates among adults living with HIV/AIDS attending ART clinic in Gambella town, Southwest Ethiopia, 2020.

Methods and materials
Study setting, design and period
A hospital-based cross-sectional study design was conducted at Gambella town ART clinics from March to April, 2020. The town is 778 km away from the capital city, Addis Ababa. It is divided into five kebeles, each with 12,928 houses and 59,468 population. In the town, there are three government health institutions and 12 private clinics. Only two of the facilities offer ART, and on average a total of 2, 567 customers were actively following their therapy.

Eligibility Criteria
The inclusion criteria of the current study were adults (age 18 years or above) living with HIV/AIDS and attending antiretroviral therapy in the selected health institutions of Gambella town. Respondents with acute or severe physical and mental illness during the data collection period were excluded from the study.

Sample Size and Sampling Technique
A total of 300 participants from the town’s two ART clinics were involved in the current study. On a monthly basis, a total of 1352 consumers (768 in the first health center and 584 in the second) attended ART clinics. To get the required number of samples, proportional allocation (768*300/1352 = 170, 584*300/1352 = 130) was utilized. Finally, data was collected using a random sampling technique until the needed sample size was attained.

Data Collection and Instruments
The data was collected by five health professionals working in the ART clinic using a structured interview technique. The first part of the questionnaire was about the socio-demographic of the respondents. The second part was about the respondent’s sexual compulsivity. The validated Sexual Compulsivity Scale (SCS), which has strong acceptability and psychometric properties, was employed in this study. The Sexual Compulsivity Scale (SCS) was developed to assess two characteristics of sexuality: hypersexuality and sexual preoccupation, with items indicating “extreme preoccupation” with sexual behaviors and encounters. Individuals who scored at or above the mean score were considered as sexually compulsive. Each SCS item is scored on a four-point scale ranging from 1 to 4 (never applies to me) with a minimum of 10 and a maximum of 40. The sum of all components is used to calculate a total score. With a Cronbach’s alpha of 0.87, it has strong internal validity and reliability [15]. As a result, Sexual Compulsivity Scale were found to be reliable, valid, and helpful in predicting HIV-related risk behaviors. The third part of the questionnaire was factors associated with the outcome variables such as; The
PHQ-9 is a nine-item depression screening instrument that detects the presence and frequency of the DSM-V’s core depression symptoms during the past 2 weeks. Scores vary from 0 to 27, with a score of 10 or higher usually indicating the existence of a depressive disorder that requires treatment. The PHQ-9 screening instrument comprises nine items and was validated in Ethiopia with an 86% sensitivity and a 67% specificity [16]. The social support level of study participants was measured using the Oslo Social Support Scale. For epidemiological and population-based surveys, the OSSS-3 has been recommended. The tool comprises three questions that are used to determine the number of people who are close enough to be counted during major personal issues, the level of interest and worry that people display, and the availability of practical support from neighbors if needed, respectively. The first item includes four responses ranging from 1 (none) to 4 (more than five), but the second and third questions each have five responses. The OSSS-3 overall score ranges from 3 to 14. The overall score with a greater value indicates higher levels of social support, and vice versa. The level of social support is also classified into three levels based on the OSSS-3 total score (poor = “3–8,” moderate = “9–11,” and strong = “12–14”) [17]. With acceptable sensitivity and specificity, the tool has been employed in a variety of research. The GAD-7 scale is a seven-item questionnaire designed to assess the severity of anxiety symptoms experienced by participants in the past 2 weeks. The GAD-7 is based on the DSM-5’s concept of anxiety symptoms. Each item is scored on a Likert scale ranging from 0 (not at all) to 4 (very) (nearly every day). All of the components’ scores are combined together to provide a final score that ranges from 0 to 21. Respondents scored > 5/21 was considered as having General anxiety disorder. Test-retest reliability, diagnostic validity, convergent validity, factorial validity, and internal consistency are all acceptable psychometric properties of the GAD-7 in various populations [18]. Adherent to ART medication was assessed using ratio scale of adherence measurement. Those respondents scored above 95% of the division taken number of pills/pills to be taken * 100 [19].

The current substance use history was assessed using ASSIST version 2.0 and those who have recent 1 month history of any substance use was considered as current substance user [20].

The 10-item perceived HIV stigma measure, which consisted of four-point Likert scale items (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = highly agree) regarding their HIV status, was used to collect the outcome variable, HIV-related perceived stigma felt by HIV patients. The Cronbach alphas of the 10-item perceived scale ranged from 0.86 to 0.94, and they were tested in a variety of settings, languages, and populations [21, 22]. Those with score of above the mean considered as having perceived stigma [23].

CD4 count, stage of the illness and recent history of STI diagnosis was recorder from the patients’ medical chart. Risky sexual practice, operationalized as engaged at least in one of the following practices such as condom-protected sex with any sexual partner, having two or more sexual partners and casual sex in the last 3 months prior to the date of data collection [24].

HIV disclosure status, Attending support group discussion on HIV prevention and receiving any skill training on safer sex behaviors were assessed using safest sexual practice guideline [25].

Data Quality Control
To assure the data quality and consistency, the English version of the questionnaire was translated to Amharic and the local language of the study area and then back-translated to English by a language expert. The pretest study was done on 5% population of near town. Both data collectors and investigators checked data for its completeness daily.

Data Management and Analysis
The collected data was entered into Epi-data 3.4 and then exported to SPSS (Statistical Package for Social Science 25 version). Descriptive statistics such as frequency, percentage, mean and standard deviation were used to describe the socio-demographic and clinical results of the respondents. Variables with P-value of less than 0.25 were entered together to the multivariate logistic regression analysis. A binary logistic regression analysis at $p \leq 0.05$, 95% CI was used to interpret the association between the independent and dependent variables.

Result
Socio-demographic results of respondents
The mean (SD) age of respondents was 31 (±4) years old. More than half of them were living in urban areas, and one thirds of the respondents had no formal education (Table 1).

Psychosocial and clinical related factors of respondents
Out all of the respondents, 87(29%) and 129(43%) of them had depression and anxiety symptoms, respectively. Among all respondents, 200(66.8%) of them had scored <500 CD4 count. Those respondents with the mean score of perceived stigma scale 31/50 or 35% had perceived stigma (Table 2.)
The mean score for sexual compulsivity scale was 17.40. Out of all, 27% (24.3, 29.2) of them scored above the mean and labeled as high sexual compulsivity score.

During multivariable logistic regression analysis at 95% CI \( (p < 0.05) \), risky sexual behavior, widowed, < 31 years old, not receiving any skill training on safer sexual behaviors, current substance use and not attending support group discussion on HIV prevention were associated with the outcome variable (Table 3).

**Table 1** Socio-demographic characteristics of respondents \( (N = 300) \)

| Variables         | Category | Frequency | Percentage (%) |
|-------------------|----------|-----------|----------------|
| Age               | Below 31 | 177       | 59%            |
|                   | Above 31 | 123       | 41%            |
| Sex               | Male     | 112       | 37.3%          |
|                   | Female   | 190       | 62.7%          |
| Educational status| Non-formal| 105       | 35%            |
|                   | Formal   | 195       | 65%            |
| Marriage          | Divorced | 14        | 4.8%           |
|                   | Single   | 16        | 5.2%           |
|                   | Widowed  | 86        | 28.8%          |
|                   | Married  | 181       | 60.4%          |
| Residence         | Urban    | 254       | 84.5%          |
|                   | Rural    | 46        | 15.5%          |
| Religion          | Protestant| 79        | 26.2%          |
|                   | Muslim   | 29        | 9.8%           |
|                   | Orthodox | 192       | 64%            |
| Occupations       | Employed | 204       | 68%            |
|                   | Un employed| 96     | 32%            |
| Income            | < 500    | 171       | 57%            |
|                   | > 500    | 129       | 43%            |
| Family size       | < 3      | 198       | 66%            |
|                   | > 3      | 102       | 34%            |

This result demonstrates a higher sexual compulsivity score among adults living with HIV/AIDS in Gambella Region, Ethiopia compared with reports from South Africa and the United States [12, 26, 27]. The discrepancy could be due to their inclusion criteria: they only included men and used a longitudinal study design. However, consistent results were found from research conducted in China, Germany, and Botswana [28–30].

The chances of developing sexual compulsivity were 3.35 times \( \text{AOR} = 3.35 (2.11, 5.31) \) higher in the under 31-year-old group than in the older population. These findings matched those of Israel, a public university in the Midwest of the United States, and Denmark [31–33]. This might be due to the natural difference of sexual impulses which young's have immature and primitive sexual impulses, excessive preoccupation with sexual words, sexual body parts and sexual activity contribute for compulsive and risky sexual practices which then lead to the negative mental and physical consequences [34].

When compared to married participants, widowed respondents were 1.83 times \( \text{AOR} = 1.83 (1.09, 3.08) \) more likely to have a higher score for sexual compulsivity. The findings were supported by a research conducted in New Zealand [35]. After the death of their sexual partner, bereaved people's sexual lives become disrupted. Masturbation, multiple sexual partners, and causal sexual activity will be used to fulfill sexual desire, which is closely linked to compulsive ideas, impulses, and behaviors.

This study found that people who engaged in risky sexual behavior were 2.58 times \( \text{AOR} = 2.58 (1.59, 4.19) \) more likely to feel sexual compulsivity which was consistent with research conducted in the UK and Milwaukee, USA [11, 31, 36]. Sex is similar to taking a drug that makes feel good, happy, and gives a strong sense of pleasure as a result of dopamine release, a neurotransmitter that activates the brain's reward center. Furthermore, the brain's reward region adapted to sexuality's repeating experience, and it became a compulsive behavior.

When compared to their counterparts, those who did not get any skill training about safer sex behaviors had a 9-fold \( \text{AOR} = 9.00 (5.10, 15.88) \) higher chance of developing sexual compulsivity. The findings matched those of studies conducted in the United States and China [13, 36, 37]. Self-awareness, emotional adjustment, and education are all important for managing sexual desires and ritualistic habits. Therefore, life skill training is essential. Individuals who are well-versed in various safe sexual practices, such as the use of toys, traps, and masturbations, are also important in resolving recurrent sexual impulses, thoughts, and behaviors [37].

When compared to non-substance users, respondents with a current history of substance use were 2.36 times \( \text{AOR} = 2.36 (1.34, 4.14) \) more likely to acquire sexual

| Magnitude of compulsive sexual behavior of the respondents |
|-----------------------------------------------------------|
| The mean score for sexual compulsivity scale was 17/40. Out of all, 27% (24.3, 29.2) of them scored above the mean and labeled as high sexual compulsivity score. |

| Predictor variables of compulsive sexual behavior |
|--------------------------------------------------|
| During multivariable logistic regression analysis at 95% CI \( (p < 0.05) \), risky sexual behavior, widowed, < 31 years old, not receiving any skill training on safer sexual behaviors, current substance use and not attending support group discussion on HIV prevention were associated with the outcome variable (Table 3). |

**Discussion**

Sexual compulsivity has been linked to changes in executive functions, impulsivity, and difficulties in emotional control. HIV/AIDS is primarily transmitted through sexual contact. Screening for sexual compulsivity is required among infected clients in order to comply with the virus's national and international prevention protocols. Examining sexual compulsivity and its correlates in these populations is therefore critical in order to apply various psychological and pharmacological treatments. |
compulsivity. This outcome was similar to those studies conducted in China and the United States [28, 38]. According to neuroimaging research, substance abuse causes aberrant neurotransmitter transmission and anatomical changes that contribute to sexual compulsivity [39]. The last predictor variable linked to sexual compulsivity was not attending HIV prevention support group discussions which was consistent with a study conducted in China [28, 29]. Without fear of being judged or stigmatized, peer support discussion provides an opportunity to share information, expertise, and skills about the control mechanism of sexual urges, feelings, and thoughts.

Many mental health professionals utilize the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a tool for diagnosing mental health issues. Because compulsive sexual behavior lacks its own diagnostic category in the DSM-5, it may be classified as a subset of another mental health disease, such as impulse control disorder or behavioral addiction. Treatment for compulsive sexual behavior typically involves psychotherapy, medications and self-help groups. A primary goal of treatment is to help manage urges and reduce excessive behaviors while maintaining healthy sexual activities. The treatment of sexual compulsivity in HIV/AIDS patients would lower the number of newly infected people.

**Limitation of the study**

This study has a few drawbacks that should be mentioned. First, given this was a cross-sectional study, drawing a causal inference should be approached with caution. Furthermore, because the questionnaire surveys were conducted in conjunction with face-to-face

| Variables                          | Categories       | Frequency | Percentage |
|-----------------------------------|------------------|-----------|------------|
| Depression                        | Yes              | 87        | 29%        |
|                                   | No               | 213       | 71%        |
| General Anxiety Disorder          | Yes              | 129       | 43%        |
|                                   | No               | 171       | 57%        |
| Current Substance use             | Yes              | 81        | 27%        |
|                                   | No               | 219       | 73%        |
| Adherent to ART                   | Yes              | 234       | 78%        |
|                                   | No               | 66        | 22%        |
| Current stage of illness          | Stage I & II     | 97        | 32.3%      |
|                                   | Stage III & IV   | 203       | 67.7%      |
| CD4 cell – count                  | < 500 cells/mm³  | 200       | 66.6%      |
|                                   | > 500 cells/mm³  | 100       | 33.2%      |
| Perceived stigma                  | Yes              | 105       | 35%        |
|                                   | No               | 195       | 65%        |
| HIV disclosure status             | Yes              | 126       | 42%        |
|                                   | No               | 174       | 58%        |
| Attending support group discussion on HIV prevention | Yes | 219 | 73% |
|                                   | No               | 81        | 27%        |
| Recent history of STI diagnosis   | Yes              | 66        | 22%        |
|                                   | No               | 234       | 68%        |
| Risky sexual behavior             | Yes              | 111       | 37%        |
|                                   | No               | 189       | 63%        |
| Receiving any skill training on safer sex behaviors | Yes | 75 | 25% |
|                                   | No               | 225       | 75%        |
| Social support                    | Poor             | 126       | 42%        |
|                                   | Moderate         | 75        | 25%        |
|                                   | Strong           | 99        | 33%        |
| Duration of the illness           | < 5 year         | 162       | 54%        |
|                                   | > 5 year         | 138       | 46%        |
| Variables | Category of variables | SCS H | SCS L | Crude odd ratio (COR) | Adjusted odds ratio (AOR) | P-value | P-value |
|-----------|-----------------------|-------|-------|-----------------------|--------------------------|---------|---------|
| RSB       | Yes                   | 111   | 71    | 40                    | 2.47 (1.52, 4.01)         | 0.01**  | 0.02**  |
|           | No                    | 189   | 79    | 110                   | 1                        | 1       | 1       |
| Age       | < 31                  | 177   | 122   | 55                    | 3.66 (2.30, 5.82)         | 0.00**  | 0.01**  |
|           | > 31                  | 123   | 54    | 89                    | 1                        | 1       | 1       |
| Sex       | Male                  | 110   | 71    | 39                    | 2.02 (1.25, 3.28)         | 0.00*   | 0.09    |
|           | Female                | 190   | 90    | 100                   | 1                        | 1       | 1       |
| ES        | Non-formal           | 105   | 63    | 42                    | 1.86 (1.15, 3.01)         | 0.09*   | 0.14    |
|           | Formal                | 195   | 87    | 108                   | 1                        | 1       | 1       |
| Residence | Rural                | 46    | 24    | 22                    | 1.36 (0.73–2.55)          | 0.45    | 1       |
|           | Urban                 | 254   | 113   | 141                   | 1                        | 1       | 1       |
| Occupations | Un employed      | 96    | 41    | 55                    | 0.89 (0.55, 1.45)         | 0.41    | 1       |
|           | Employed             | 204   | 93    | 111                   | 1                        | 1       | 1       |
| Income    | > 500ETB             | 129   | 60    | 69                    | 1.01 (0.64, 1.60)         | 0.32    | 1       |
|           | < 500ETB             | 171   | 79    | 92                    | 1                        | 1       | 1       |
| Family size | > 3                | 102   | 47    | 55                    | 0.93 (0.57, 1.50)         | 0.26    | 1       |
|           | < 3                 | 198   | 95    | 103                   | 1                        | 1       | 1       |
| Religion  | Protestant           | 79    | 44    | 35                    | 1.18 (0.70, 2.00)         | 0.32    | 1       |
|           | Muslim               | 29    | 13    | 16                    | 1                        | 1       | 1       |
| Mortal status | Widowed        | 87    | 51    | 36                    | 1.89 (1.13, 3.17)         | 0.04*   | 0.05*   |
|           | Married              | 182   | 78    | 104                   | 1                        | 1       | 1       |
| RSTSSB    | Yes                  | 213   | 167   | 46                    | 10.1 (5.67, 18)           | 0.00**  | 0.001***|
|           | No                   | 87    | 23    | 64                    | 1                        | 1       | 1       |
| CSU       | Yes                  | 81    | 60    | 21                    | 2.27 (1.29, 3.99)         | 0.01**  | 0.03*   |
|           | No                   | 219   | 122   | 97                    | 1                        | 1       | 1       |
| ASGDHIVP  | Yes                  | 113   | 43    | 70                    | 1                        | 1       | 1       |
|           | No                   | 187   | 108   | 79                    | 2.23 (1.38, 3.59)*        | 0.02*   | 0.04*   |
| Depression | Yes                | 87    | 40    | 47                    | 0.81 (0.49,1.34)          | 0.19    | 1       |
|           | No                   | 213   | 109   | 104                   | 1                        | 1       | 1       |
| GAD       | Yes                  | 129   | 97    | 32                    | 1.95 (1.18,3.23)          | 0.09*   | 0.11    |
|           | No                   | 171   | 104   | 67                    | 1                        | 1       | 1       |
| Adherent to ART | Yes            | 234   | 109   | 125                   | 1                        | 1       | 1       |
|           | No                   | 66    | 44    | 22                    | 2.29 (1.29,4.07)          | 0.07**  | 0.09    |
| Current stage of illness | Stage I & II | 97    | 42    | 55                    | 0.79 (0.48,1.28)          | 0.35    | 1       |
|           | Stage III & IV       | 203   | 100   | 103                   | 1                        | 1       | 1       |
| CD4 cell – count | < 500 cells/mm³ | 200   | 94    | 106                   | 1                        | 1       | 1       |
|           | > 500 cells/mm³      | 100   | 45    | 55                    | 0.92 (0.57,1.49)          | 0.27    | 1       |
| Perceived stigma | Yes            | 105   | 37    | 68                    | 0.31 (0.19,0.51)          | 0.16*   | 0.32    |
|           | No                   | 195   | 124   | 71                    | 1                        | 1       | 1       |
| HDS       | Yes                  | 126   | 47    | 79                    | 0.56 (0.35,0.89)          | 0.14*   | 0.17    |
|           | No                   | 174   | 90    | 84                    | 1                        | 1       | 1       |
| RHSTID    | Yes                  | 66    | 31    | 35                    | 0.96 (0.56,1.67)          | 0.39    | 1       |
|           | No                   | 234   | 112   | 122                   | 1                        | 1       | 1       |
| Social support | Poor            | 126   | 67    | 59                    | 1                        | 1       | 1       |
|           | Moderate             | 75    | 36    | 39                    | 0.81 (0.46,1.44)          | 0.10    | 1       |
|           | Strong               | 99    | 47    | 52                    | 0.80 (0.47,1.35)          | 0.19    | 1       |
| DI        | < 5 year             | 162   | 84    | 78                    | 1                        | 1       | 1       |
|           | > 5 year             | 138   | 72    | 66                    | 1.01 (0.64,1.60)          | 0.23    | 1       |

SCS Sexual compulsivity score, ASGDHIVP Attending support group discussion on HIV prevention, GAD General Anxiety Disorder, CSU Current Substance use, HDS-HIV disclosure status, RHSTID Recent history of STI diagnosis, RSTSSB Receiving any skill training on safer sex behavior, H High, L Low, DI Duration of the illness, RSB Risky sexual behavior, COR Unadjusted odds ratio /Crude odds ratio, AOR Adjusted odds ratio, ES Educational status, *, p-value < 0.05, **, P-value < 0.01, ***, P-value < 0.001, model fitness-79%, 1-references
interviews, social desirability may have influenced the results, causing participants to be hesitant to give honest replies.

Conclusion
This study found a higher score of sexual compulsivity among adults living with HIV/AIDS. The outcome variable was also linked to a number of socio-demographic and psychological variables in this study. Therefore, it is important to have a systematic sexuality assessment screening program in place. Furthermore, there should be a collaboration between mental health services providers and relevant stakeholders (both government and non-government) organizations to combat the rapid spread of virus and its complications. The focus should also be given to the high-risk categories that have been identified.

Abbreviations
AIDS: Acquired Immune Deficiency Syndrome; ART: Antiretroviral Therapy Treatment; CI: Confidence interval; DSM: Diagnostic and Statistical Manual; EDHS: Ethiopian demographic and health survey; HIV: Human Immunodeficiency Virus; IRB: Institutional Review Board; OSSS: Oslo social support scale; PHQ-9: patient health questionnaire; SCS: Sexual Compulsivity Scale; SD: Standard deviation; SPSS: Statistical Package for Social Science; STI: Sexually transmitted infection.

Acknowledgments
The authors would like to thank the staffs for their unreserved support in all stages of this research work. The authors would also like to thank the participants.

Authors’ contributions
SS and CK participated in study design, data entry, analysis, and interpretation of data. GM prepared the manuscript. All authors gave final approval of the manuscript.

Funding
Not applicable.

Availability of data and materials
The data used for the study was accessible from corresponding author upon reasonable request.

Declarations
Ethics approval and consent to participate
Ethical clearance was taken from Dilla University Institutional Review Board (IRB) numbered with DU/IRB/1045/20. Permission to conduct the study was obtained from Gambella regional health bureau and Gambella town health (IRB) numbered with DUIRB/1045/20. Permission to conduct the study was also linked to a number of socio-demographic and psychological variables of Helsinki declaration. Written and informed consent was obtained from Gambella regional health bureau and Gambella town health.

Consent for publication
Not applicable.

Competing interests
No competing interests.

Author details
1 Department of Psychiatry, College of Health and Medical Science, Dilla University, Dilla, Ethiopia. 2 Department of Midwifery, College of Health and Medical Science, Dilla University, Dilla, Ethiopia.

References
1. Kaplan HS. New sex therapy: Active treatment of sexual dysfunctions: Routledge, 2013.
2. Thornhill R, Palmer CT. A natural history of rape: Biological bases of sexual coercion: MIT press; 2001.
3. Schaller M. The behavioral immune system. The handbook of evolutionary psychology, 2015. p. 1–19.
4. Shnier LA, Harris SK, Sternberg M, Beardslee WR. Associations of depression, self-esteem, and substance use with sexual risk among adolescents. Prev Med. 2001;33(3):179–89.
5. Fong TW, Reid RC, Parhami I. Behavioral addictions: Where to draw the lines? Psychiatric Clin. 2012;35(2):279–96.
6. Kharsany AB, Karim QA. HIV infection and AIDS in sub-Saharan Africa: current status, challenges and opportunities. Open AIDS J. 2016;10:34.
7. Csa I. Central statistical agency (CSA)Ethiopia and ICF. Ethiopia demographic and health survey, Addis Ababa, Ethiopia and Calvert, Maryland, USA; 2016.
8. Wamoyi J, Mbonye M, Seeley J, Birungi J, Jaffar S. Changes in sexual desires and behaviours of people living with HIV after initiation of ART: Implications for HIV prevention and health promotion. BMC Public Health. 2011;11(1):1–11.
9. Fonner VA, Armstrong KS, Kennedy CE, O’Reilly KR, Sweat MD. School based sex education and HIV prevention in low and middle-income countries: a systematic review and meta-analysis. PLoS One. 2014(9)(3):e89692.
10. Nobre N, Pereira M, Roine RP, Sutinen J, Sintonen H. HIV-related self-stigma and health-related quality of life of people living with HIV in Finland. J Assoc Nurses AIDS Care. 2018;29(2):254–65.
11. Kalichman SC, Cain D. The relationship between indicators of sexual compulsivity and high risk sexual practices among men and women receiving services from a sexually transmitted infection clinic. J Sex Res. 2004;41(3):233–41.
12. Wang X, Wang Z, Jiang X, Li R, Wang Y, Xu G, et al. A cross-sectional study of the relationship between sexual compulsivity and unprotected anal intercourse among men who have sex with men in Shanghai, China. BMC Infect Dis. 2018;18(1):1–9.
13. Benotsch G, Kalichman SC, Pinkerton E SD. Sexual compulsivity in HIV-positive men and women: Prevalence, predictors, and consequences of high-risk behaviors. Sex Addict Compuls. 2001;8(2):83–99.
14. Kassa TA, Luck T, Bekele A, Riedel-Heller SG. Sexual and reproductive health of young people with disability in Ethiopia: a study on knowledge, attitude and practice: a cross-sectional study. Glob Health. 2016;12(1):1–11.
15. Kalichman SC, Rompa D. Sexual sensation seeking and sexual compulsivity scales: Validity, and predicting HIV risk behavior. J Pers Assess. 1995;65(3):586–601.
16. Gelaye B, Williams MA, Lemma S, Deyessa N, Bahreteeb Y, Shibire T, et al. Validity of the patient health questionnaire-9 for depression screening and diagnosis in East Africa. Psychiatry Res. 2013;210(2):653–61.
17. Abiola T, Udofia O, Zakari M. Psychometric properties of the 3-item oslo social support scale among clinical students of Bayeuro University Kano, Nigeria. Malays J Psychiatry. 2013;22(2):32–41.
18. Nyongesa MK, Mwangi P, Koot HM, Cuijpers P, Newton CR, Abubakar A. The reliability, validity and factorial structure of the Swahili version of the 7-item generalized anxiety disorder scale (GAD-7) among adults living with HIV from Kilifi, Kenya. Ann General Psychiatry. 2020;19(1):1–10.
19. Angelou AT, Almayehu DS. Adherence and Its Associated Factors Among Adult HIV-Infected Patients on Antiretroviral Therapy in South Western Ethiopia, 2020. Patient Pref Adher. 2021;15:299.
20. Humeniuk R, Henry-Edwards S, Ali R, Poznyak V, Monteiro MG, Organization WH. The Alcohol, Smoking and Substance involvement Screening Test (ASSIST): manual for use in primary care, 2010.
21. Jones MP, Keeler L, Bratten J, Taf TH, Crowell MD, Levy R, et al. Development and initial validation of a measure of perceived stigma in irritable bowel syndrome. Psychol Health Med. 2009;14(3):367–74.
22. Zhao J, Li X, Fang X, Hong Y, Zhao G, Lin X, et al. Stigma against children affected by AIDS (SACAA): psychometric evaluation of a brief measurement scale. AIDS Behav. 2010;14(6):1302–12.
23. Berger BE, Ferrans CE, Lashley FR. Measuring stigma in people with HIV: Psychometric assessment of the HIV stigma scale. Res Nurs Health. 2001;24(6):518–29.
24. Wilson G, Bryan J, Cranston K, Kitzes J, Nederbragt L, Teal T. Good enough practices in scientific computing. PLoS Comput Biol. 2017;13(6):e1005510.
25. Alemayehu YK, Bushen OY, Muluneh AT. Evaluation of HIV/AIDS clinical care quality: the case of a referral hospital in North West Ethiopia. Int J Qual Health Care. 2009;21(5):356–62.
26. Thurman TR, Brown L, Richter L, Maharaj P, Magnani R. Sexual risk behavior among South African adolescents: is orphan status a factor? AIDS Behav. 2006;10(6):627–35.
27. Storholm ED, Satre DD, Kapadia F, Halkitis PN. Depression, compulsive sexual behavior, and sexual risk-taking among urban young gay and bisexual men: the P18 cohort study. Arch Sex Behav. 2016;45(6):1431–41.
28. Liao W, Lau JT, Tsai HY, Gu J, Wang Z. Relationship between sexual compulsivity and sexual risk behaviors among Chinese sexually active males. Arch Sex Behav. 2015;44(3):791–8.
29. Luo M, Zhu L, Dong Y, Wang Z, Shen Q, Mo D, et al. Sexual compulsivity and its relationship with condomless sex among unmarried female migrant workers in Shanghai, China: a cross-sectional study. BMC Womens Health. 2018;18(1):1–7.
30. Delmonico MM, David L. Compulsive sexual behavior and HIV in Africa: A first look. Sex Addict Compuls. 2001;8(2):169–83.
31. Dodge B, Reece M, Cole SL, Sandfort TG. Sexual compulsivity among heterosexual college students. J Sex Res. 2004;41(4):343–50.
32. Efrati Y, Gola M. Adolescents’ compulsive sexual behavior: The role of parental competence, parents' psychopathology, and quality of parent–child communication about sex. J Behav Addict. 2019;8(3):420–31.
33. Odlaug BL, Lust K, Schreiber L, Christenson G, Derbyshire K, Harvanko A, et al. Compulsive sexual behavior in young adults. Ann Clin Psychiatry. 2013;25(3):193–200.
34. Kasif T, Band-Winterstein T. Older widows’ perspectives on sexuality: A life course perspective. J Aging Stud. 2017;41:1–9.
35. Burri A. Sexual sensation seeking, sexual compulsivity, and gender identity and its relationship with sexual functioning in a population sample of men and women. J Sex Med. 2017;14(1):69–77.
36. Storholm ED, Fisher DG, Napper LE, Reynolds GL, Halkitis PN. Proposing a tentative cut point for the compulsive sexual behavior inventory. Arch Sex Behav. 2011;40(6):1301–8.
37. Ni Y, Liu H, Gong R, Shi M, Zhang S, Wang S, et al. The role of sexual compulsivity in unprotected intercourse among STI patients in Shanghai, China. BMC Public Health. 2021;21(1):1–8.
38. Benotsch EG, Kalichman SC, Kelly JA. Sexual compulsivity and substance use in HIV-seropositive men who have sex with men: Prevalence and predictors of high-risk behaviors. Addict Behav. 1999;24(6):857–68.
39. Kraus SW, Voon V, Potenza MN. Should compulsive sexual behavior be considered an addiction? Addiction. 2016;111(12):2097–106.

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.