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ORIGINAL RESEARCH

Examining the Prevalence and Associated Factors of Sexually Transmitted Infections in People Living With HIV/AIDS at a Community Health Center in Bandung City, Indonesia

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Purpose: This study aims to investigate the prevalence of sexually transmitted infections (STIs) and associated factors among people living with human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS) (PLWHA) registered in a community health center (CHC) with HIV/AIDS support and treatment services in Indonesia.

Methods: A cross-sectional study that included all PLWHA data from medical records registered in a CHC with HIV/AIDS support and treatment services was conducted in Bandung City, Indonesia, between March 2019 and March 2024. This CHC provides comprehensive and continuous HIV/AIDS services, including HIV testing, antiretroviral therapy (ART), and opportunistic infection management. The factors associated with the prevalence of STIs in PLWHA, including sociodemographic factors such as gender, age, education level, marital status, occupation, population group, referral origin, and clinical factors such as length of illness, duration of ART, clinical stage, and comorbidities, were analyzed by using chi-square analysis.

Results: Total 156 PLWHA data with STIs from medical records were collected (male, n = 152, 97.4%; female, n = 4, 2.6%). The prevalence of STIs among PLWHA was 32.1%, consisting of syphilis (n = 36; 72%), gonorrhea (n = 11; 22%), genital herpes (n = 2; 4%), and condyloma (n = 1; 2%). The following significant factors associated with the prevalence of STIs were population group men who have sex with men (MSM) (p = 0.046), referral origin from non-government organizations (NGOs) (p = 0.030), duration of disease (p = 0.023) and duration of ART ranging from 12 to 36 months (p = 0.023), and early clinical stage (p = 0.010).

Conclusion: STIs affected over one-third of CHC-registered PLWHA, with syphilis being the most common. MSMs and patients referred by NGOs, with illness and treatment durations ranging from 12 to 36 months, as well as the early clinical stage of HIV, are associated with STIs among PLWHA. Intervention strategies to improve STI prevention and control in these populations are urgently needed.

Keywords: STIs, HIV/AIDS, prevalence, CHC, PLWHA

Introduction

Sexually transmitted infections (STIs) refer to infections that can be transmitted through vaginal, anal (anus), and oral (mouth) sexual intercourse. STIs and HIV (human immunodeficiency virus) are currently health issues that negatively impact the quality of human resources and cause socio-economic problems, necessitating immediate countermeasures.[1] Patients with STIs have a higher risk of contracting HIV due to their risky behavior and immune vulnerability, and early detection as well as treatment of STIs is the key to controlling STIs and HIV infection.[2] The risk of HIV infection increases by two to three times in STI patients.[1] Most STI patients do not show significant symptoms; thus, they may be unknowingly transmitted to others and cause adverse health effects, such as infertility, pelvic inflammatory disease, ectopic pregnancy in women, nerve damage, and

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blindness in untreated STI sufferers.[2,3] Previous research demonstrated that high-risk sexual behavior is consistent with the results of STIs (gonorrhea, syphilis).[4] Economic factors, as well as the presence of risky sexual behavior in adolescence, can increase the risk of HIV and STI transmission.[5] A study in Australia has found that almost three-quarters of chlamydia infections that cause STIs occur in 15–29-year-olds.[3]

The global number of people living with HIV/AIDS (PLWHA) in 2023 was 39.9 million.[6] Meanwhile, the WHO estimates that there are more than 374 million new infections each year from curable STIs, such as chlamydia, gonorrhea, syphilis, and trichomoniasis.[7] According to the Indonesian Ministry of Health report on HIV/acquired immune deficiency syndrome (AIDS) and STIs, in the first semester of 2023, the number of PLWHA from January to March 2023 was 13,279, and 10,924 people received antiretroviral (ARV) therapy (ART).[8] PLWHA presentation was found to be reported in the population groups of men who have sex with men (MSM) 27.7%, pregnant women 16.1%, tuberculosis (TB) patients 12.4%, female sex workers (FSW) 3.3%, transgender 1.1%, injecting drug user (IDU) 0.5%, prisoners 0.8%, and STI patients 0.9%.[8] There were 10,954 STI cases based on laboratory examination.[8] These cases included cervicitis proctitis (4084 cases), early syphilis (2981 cases), gonorrhea (1714 cases), non-gonorrhea urethritis (1337 cases), gonorrhea (1153 cases), advanced syphilis (1144 cases), genital herpes (325 cases), trichomoniasis (319 cases), and LGV (lymphogranuloma venereum) (10 cases).[8] According to Bandung City's health profile in 2022, the number of STI patients reported throughout 2022 was 1023 patients consisting of 462 men and 561 women.[9]

Screening for HIV and STIs is vitally important for preventative care. The US Centers for Disease Control and Prevention, for example, recommend that MSM undergo annual HIV testing because the prevalence of these infections is high in the MSM population.[10] The Indonesian government tried to prevent STI transmission by providing free screening HIV tests to key populations such as MSM, FSW, transgender, IDU, and their partners periodically every 3 months in community health centers (CHC).[1]

CHCs with HIV/AIDS support and treatment services in Indonesia were the CHCs that provide continuous, comprehensive HIV/AIDS services, including HIV testing, ART, and opportunistic infection management. These services include those from the primary, secondary, and tertiary health sectors, as well as those from other sectors that are relevant to the needs of PLWHA.[1] The person in charge of the infectious disease control program at CHC, health service facilities, city, district, and provincial health offices, and the ministry of health works to get rid of HIV/AIDS and STIs by making it easier for more people to get comprehensive and high-quality testing, diagnosis, and treatment services.[1]

Many countries have conducted several studies regarding HIV and STI risks and associated factors.[5,11,12] Previous studies in Brazil and China have shown that factors associated with HIV/Syphilis co-infection include male gender, low education, age, multiple partners, irregular condom use, MSM, injection drug use, presence of other STIs, duration of HIV disease, and drug resistance.[11,13] In Indonesia, several studies regarding STIs and the risk factors have been conducted among adolescents,[14] MSMs,[15] FSWs,[16–18] and one study in PLWHA at a hospital.[19] However, there is no study that investigates the prevalence and associated factors of STIs among PLWHA registered in CHCs with HIV/AIDS support and treatment services. Therefore, this study aimed to investigate the prevalence and identify the factors associated with STIs among PLWHA registered in a CHC with HIV/AIDS support and treatment services in Bandung City, Indonesia.

Methods

To promote the transparency of this study and report based on statement guidelines for cross-sectional studies, we followed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (Table S1).[20,21]

Study Design and Setting

This is a cross-sectional study using PLWHA data from collected retrospectively from medical records over the period of March 2019 to March 2024 in a CHC with HIV/AIDS support and treatment services in Bandung City, Indonesia.

Sample Size

This study included all PLWHA data registered at one of the CHC with HIV/AIDS support and treatment services in Bandung City, Indonesia, between March 2019 and March 2024, who have complete sociodemographic and clinical data. STIs included were those with ICD-10 diagnosis codes A53.9 for syphilis, A54.9 for gonorrhea, A74.9 for chlamydia,

and A60.0 for genital herpes. The STI diagnosis is conducted clinically by a medical doctor examining the signs and symptoms that appear and etiologically by conducting simple laboratory tests based on national guidelines. The simple laboratory test used for gonorrhea and chlamydia was examined with a microscope through the Gram staining method. The diagnosis of syphilis is established by using rapid plasma regain (RPR), a syphilis rapid test, and serological tests such as VDRL (Venereal Disease Research Laboratory) and TPHA (Treponema pallidum hemagglutination assay). A medical doctor diagnoses herpes simplex and condyloma based on the patient's medical history and physical examination, which reveals typical lesions/ulcers of the herpes simplex virus (HSV) and condyloma.[22] Patients who had STIs diagnosed but not registered as PLWHA at the CHC were not included in the study.

Variables

The dependent variable in this study is STIs prevalence in PLWHA. STI diagnosis data were obtained from the medical records of PLWHA at the CHC in the period from March 2009 to March 2024, specifically focusing on disease codes A53.9 for syphilis, A54.9 for gonorrhea, A74.9 for chlamydia, and A60.0 for genital herpes.

The independent variables in this study consisted of sociodemographic factors such as gender, age, education level (low education and higher education), marital status, occupation, population group (general population, injecting drug users, men who have sex with men (MSM), transgender and female sex workers (FSW)), referral origin (self-referral, non-government organizations (NGO), and other referral), and clinical factors such as length of illness, duration of ART, clinical stage (early stages 1 and 2), advanced stage (stages 3 and 4), and comorbidities.

Ethics

This study is part of HIV/AIDS research at Universitas Padjadjaran, Indonesia, and has received ethical approval number 628/UN6.KEP/EC/2024 from the Universitas Padjadjaran Research Ethics Committee. The Universitas Padjadjaran Research Ethics Committee waived the requirement for patient consent to review medical records because this study was retrospective and utilized anonymized data. No identifiable patient information was accessed or disclosed, ensuring the confidentiality of all participants. The research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and complied with all relevant standards for studies involving human subjects.

Data Analysis

We descriptively analyzed the data on PLWHA's characteristics by calculating frequencies and percentages. In this study, a two-variable analysis was used to look at the association between PLWHA's gender, age, marital status, occupation, population group (general population, injecting drug users, MSM, transgender, and FSW), referral source (self-referral, NGO, and other referral), length of illness, duration of ART, clinical stage (early stages 1 and 2), advanced stage (stages 3 and 4), and comorbidities with the number of STIs they had. The bivariate analysis was chi-square. If the p value <0.05, there was an association between the variables identified in this study and the prevalence of STIs in PLWHA. We conducted the analysis using the SPSS version 29 (IBM, Chicago, USA).

Results

PLWHA Data Characteristics

The number of PLWHA medical records registered over the period of March 2019 to March 2024 in a CHC with HIV/AIDS support and treatment services in Bandung City, Indonesia, was 161 records. Five records were excluded due to incomplete sociodemographic and clinical data. Table 1 shows the characteristics of the PLWHA registered in the CHC. The majority of PLWHA registered in the CHC were male (n = 152; 97.4%), aged between 16 and 44 years old (n = 149; 95.5%), had a higher level of education (high school-college) (n = 143; 91.7%), unmarried (n = 124; 79.5%), employed (n = 136; 87.2%), MSM (n = 134; 85.9%), and the majority of STI testing referrals came from NGOs (n = 89; 57.1%). The data revealed that 50 patient (32.1%) had received an STI diagnosis, 73 (46.8%) had experienced HIV within the last 12 to 36 months and received ART, 144 (92.3%) were in the early stages, 142 (91%) had no other health problems, and 14 had comorbidities, such as tuberculosis (2.6%) and high blood pressure (1.9%). Table 2 presents the prevalence and

Table 1 Sociodemographic and Clinical Characteristics (n = 156)

Sociodemographic Characteristics	**n (%)**
Sex	
Male	152 (97.4)
Female	4 (2.6)
Age	
Teenage – late Adult (16–44)	149 (95.5)
Early elderly - Elderly (>45)	7 (4.5)
Educational Level	
Primary (Elementary – Junior high school)	13 (8.3)
Secondary (Senior High School – College)	143 (91.7)
Marital Status	
Not Married	124 (79.5)
Married	32 (20.5)
Occupation	
Not working	20 (12.8)
Employed	136 (87.2)
Population Group	
Heterosexual	22 (14.1)
MSM	134 (85.9)
Referral Origin	
Self-Referral	29 (18.6)
NGO	89 (57.1)
Other Referral	38 (24.4)
Clinical characteristics	**n (%)**
STI Disease	
Without STI	106 (67.9)
With STI	50 (32.1)
Duration of disease	
<12 months	29 (18.6)
12–36 months	73 (46.8)
>36 months	54 (34.6)
Duration of ART	
<12 months	29 (18.6)
12–36 months	73 (46.8)
>36 months	54 (34.6)
Clinical Stage	
Early (1 dan 2)	144 (92.3)
Advanced (>3)	12 (7.7)
Comorbidities	
Without comorbid	142 (91)
With comorbid:	14 (9)
Hypertension	3 (1.9)
Tuberculosis	4 (9)
Hypotension	1 (0.6)
Mental disorders	2 (1.3)
Hepatitis C	3 (1.9)
Asthma	1 (0.6)
Total	**156 (100)**

Table 2 The Prevalence of STIs Among PLWHA (n = 156)

Sex	Without STIs		With STIs		Type of STIs							
					Syphilis		Gonorrhea		Genital Herpes		Condyloma	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Female	4	2.6	0	0	0	0	0	0	0	0	0	0
Male	102	65.4	50	32.1	36	72	11	22	2	4	1	2
Total	**156 (100%)**											

types of STIs. The prevalence of STIs among PLWHA was (32.1%) consisting of syphilis (n = 36; 72%), gonorrhea (n = 11; 22%), genital herpes (n = 2; 4%), and condyloma (n = 1; 2%).

Factors Associated the Prevalence of STIs

Table 3 presents factors associated with the prevalence of STIs in HIV/AIDS patients in the CHC. The following significant factors influence the prevalence of STIs: population group of MSM (p = 0.046), referral origin from NGO referral (p = 0.030), duration of disease 12–36 months (p = 0.023), duration of ART 12–36 months (p = 0.023), and early clinical stage (p = 0.010). The other non-significant factors associated with the prevalence of STIs are gender (p = 0.306), age (p = 0.053), education level (p = 0.757), marital status (p = 0.09), occupation (p = 0.833), and comorbidities (p = 0.228).

Table 3 Factors Associated With the Prevalence of STIs in PLWHA in the CHC (n = 156)

Sociodemographic Characteristics	Without STIs	With STIs	p-value (95% CI)
	n (%)	n (%)	
Sex			
Male	102 (65.38)	50 (32.05)	0.306
Female	4 (2.6)	0	
Age			
Teenage – late Adult (16–44)	100 (64.10)	49 (31.41)	0.431
Early elderly - Elderly (> 45)	6 (3.84)	1 (0.7)	
Educational Level			
Primary (Elementary – Junior high school)	8 (8.3)	5 (3.20)	0.757
Secondary (Senior High School – College)	98 (91.7)	45 (28.84)	
Marital Status			
Not Married	80 (51.28)	44 (28.20)	0.071
Married	26 (16.66)	6 (3.84)	
Occupation			
Not working	14 (8.97)	6 (3.84)	0.833
Employed	92 (58.97)	44 (28.20)	
Population Group			
Heterosexual	19 (12.17)	3 (1.92)	0.046*
MSM	87 (55.76)	47 (30.12)	
Referral Origin			
Self-Referral	24 (15.4)	5 (3.20)	0.030*
NGOs	53 (33.97)	36 (23.07)	
Other Referral	29 (18.58)	9 (5.76)	

(*Continued*)

Table 3 (Continued).

Sociodemographic Characteristics	Without STIs	With STIs	p-value (95% CI)
	n (%)	n (%)	
Duration of disease			
<12 months	14 (8.97)	15 (9.61)	0.023*
12–36 months	50 (32.05)	23 (14.74)	
>36 months	42 (26.92)	12 (7.69)	
Duration of ART			
<12 months	14 (8.97)	15 (9.61)	0.023*
12–36 months	50 (32.05)	23 (14.74)	
>36 months	42 (26.92)	12 (7.69)	
Clinical Stage			
Early (1 dan 2)	94 (60.25)	50 (32.05)	0.010*
Advanced (>3)	12 (7.69)	0	
Comorbidities			
Without comorbid	94 (60.25)	48 (30.76)	0.228
With comorbid	12 (7.69)	2 (1.28)	

Note: *p-value <0.05 = statistically significant.

Discussion

Our study revealed that the prevalence of STIs among PLWHA at a CHC with HIV/AIDS support and treatment service in Bandung, Indonesia, was 32.1%. The factors associated with STIs were the MSM population group, referral origin from NGOs, duration of illness of 12–36 months, duration of treatment of 12–36 months, and early clinical stage of HIV.

The prevalence of STIs among PLWHA at a CHC with HIV/AIDS support and treatment services in our study amounted to 32.1%. This is consistent with the data report on Indonesia's HIV/AIDS and STI development in 2023, which is based on laboratory examinations; the prevalence of STI was 10,954 cases.[8] The report shows that syphilis and gonorrhea are the most common STI diseases experienced by HIV/AIDS patients, with early syphilis (2981 cases) and gonorrhea (1714 cases).[8] *Centers for Disease Control and Prevention* (CDC) data estimates that annually there are about 2 million cases of chlamydia, gonorrhea, and syphilis in the United States; gonorrhea is the most common STI with 171.9 cases per 100,000 population, while syphilis is 9.5 cases per 100,000 population.[23] Data from the Swiss HIV Cohort Study (SHCS) reveal an increase in syphilis incidence from 30.1 to 59.2 per 1000 patient-years from 2006 to 2017.[24] HIV/AIDS patients have a high incidence of STIs due to risky behavior and inconsistent use of condoms during sexual activity.[25–27] Canadian research linked risky behavior to the belief that ARVs can reduce the risk of HIV transmission, leading to an increase in unsafe sexual intercourse and an increase in STI cases transmitted through sexual contact and genital ulceration.[23,28] Another impact of HIV infection on immunity can increase susceptibility to STIs because HIV/AIDS patients have weak immunity that does not provide sufficient protection against STIs and other infections.[29] In addition, STIs can cause local inflammation in the genital tract.[29] The increase in STIs in HIV/AIDS patients is also associated with an increase in the frequency of testing during screening, intense screening campaigns, and patient accessibility to testing sites, which contributes to an increase in diagnosed STIs.[24]

In our study, we found that MSM, the most prevalent population group, is one of the factors that influence the prevalence of STIs. This aligns with the HIV/AIDS and sexually transmitted diseases quarter 1 report from the Indonesian Ministry of Health in 2022, which shows that the MSM risk group, comprising 2427 individuals, has the highest prevalence of STIs.[30] A study in Brazil with 459 participants with HIV who started ART found that 51%, or 235 MSM, were a factor that affected the chance of HIV patients also having an STI ($p = 0.024$; OR = 2.21).[11] In the United States, young MSM have an increased risk of STIs.[26] According to a cohort study in the USA, the incidence of STIs (gonorrhea, chlamydia, and syphilis) among MSM significantly increased from 9.3 cases per 100 person-years in 2012 to

15.7 cases per 100 patient-years in 2016 (p = 0.0001).[31] MSM received STI diagnoses more frequently than the general public because they have more sexual partners, have more penetrative and receptive sex, and come into contact with more pathogen-carrying tissues, like the anorectal mucosa, the surface of the foreskin, and the urethral meatus.[26]

PLWHA with STIs who come from NGO referrals are a factor that influences the incidence of STIs in this study. NGOs play a critical role in identifying cases, reaching key populations, and regularly assisting community health centers in identifying new cases.[32] Moreover, NGOs actively utilize social media to provide health promotion and education regarding HIV/AIDS information through social media and websites.[33] The community health center, in collaboration with NGOs, implemented a strategy to control and eliminate STIs in HIV that included STI detection screening and treatment for key populations such as MSM, sex workers, IDUs, and transgender people in CHC and mobile voluntary counseling and testing (VCT) at various locations.[1] According to a study in Thailand, NGOs play a significant role in providing HIV prevention services, particularly for key populations.[34] Those NGOs are able to integrate the RRTTR (Reach-Recruit-Test-Treat-Retain) program into existing programs, effectively reaching difficult populations.[34] In the United States, NGOs also provide the valuable contribution in HIV prevention among MSM through social networks.[35] These social networks have access to populations that can be difficult for health care workers to reach.[35]

Most PLWHA experienced STIs after having the disease and starting treatment between 12 and 36 months in our study. This may be due to the fact that CHCs with HIV/AIDS support and treatment services conduct regular symptomatic STI testing of PLWHA in key populations every 3 months.[1] Longer ART is associated with a lower chance of HIV and syphilis co-infection (p = 0.050), according to a Brazilian study that examined the factors that might lead to HIV and syphilis co-infection in people starting ARVs.[11] Another study from China reported that long-term HIV patients have a lower risk of HIV co-infection and STI, whereas MSM with earlier HIV infection have a higher risk of transmitting STI to their partners.[13] Longer illness and treatment duration may increase knowledge and awareness of PLWHA risky behaviors through health promotion and education activities from CHC, which provides HIV/AIDS support and treatment services. The CHCs also provide assistance in disease management, medication, psychological, and social aspects.[32]

Clinical stage was a variable associated with the prevalence of STIs in our study. Most STIs cases (92.3%) occurred in the early stages. This might be due to the fact that in the early stages, there is a decrease in CD4, which can cause immunodeficiency in PLWHA, resulting in susceptibility to transmission of other diseases[36] including STIs. STIs are one of the risky sexual behaviors, which raises their chances of getting HIV.[37] According to the HIV/AIDS and STIs Control Program at Primary Health Care Facilities in Indonesia, CHCs with HIV/AIDS support and treatment services collaborate with NGOs to implement VCT programs periodically, targeting individuals with risky sexual behaviors. The types of examinations include tests for HIV, STIs, and Hepatitis B. This program enables the diagnosis of new HIV cases and STIs that are detectable in the early stages of HIV.

This study is the first to examine the prevalence of STIs and associated factors among PLWHA receiving HIV/AIDS support and treatment in Indonesian CHCs. The findings could provide evidence to policymakers in enhancing national HIV/AIDS and STI elimination programs in Indonesia by designing targeted intervention strategies for the high-risk PLWHA population, improving CHC services, and conducting regular training for healthcare providers to educate PLWHA. Regular monitoring and evaluation of CHC programs are essential to address challenges and improve prevention and control efforts.

Although this study could reveal the prevalence of STIs and associated factors among PLWHA enrolled in a CHC with HIV/AIDS support and treatment services in Indonesia, it has several limitations. First, this study design is a cross-sectional study that could not determine causal relationships between variables. Second, this study used secondary data of medical records that have limited information to certain socio-demographic and clinical data so that could not explore other factors such as knowledge, attitudes, and risk behaviors among PLWHA. Therefore, a future study with a cohort study design and using primary data with more variables such as knowledge, attitude, and PLWHA behavior in more CHCs with support and treatment services in more regions of Indonesia and using multivariate regression analysis, which allows for the analysis of multiple variables simultaneously, providing a more comprehensive view of how these variables interact and influence outcomes, is suggested.

Conclusion

Over one-third of PLWHA at a CHC with HIV/AIDS support and treatment service in Bandung, Indonesia, were found to have STIs, with syphilis being the most prevalent. Among PLWHA, factors associated with STIs included MSMs, those referred by NGOs, those with illness and treatment durations of 12 to 36 months, and early-stage HIV. Targeted intervention strategies are essential to improving STI prevention and control in these populations.

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Disclosure

The authors declare that they have no competing interests for this work.

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