Medication adherence and predictors men who have sex with men with HIV accessing antiretroviral therapy services di south Sumatera, Indonesia: A retrospective study

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Abstract

Men who have sex with men (MSM) are more likely to engage in risky sexual behaviors such as anal intercourse, oral sex, and mutual masturbation, which increase their risk of acquiring human immunodeficiency virus (HIV). Previous studies have emphasized that MSM diagnosed with HIV should initiate antiretroviral therapy (ART) promptly, with strict adherence being critical for treatment effectiveness. This study aims to identify factors associated with treatment adherence among MSM living with HIV. A retrospective cohort study was conducted involving 796 MSM with HIV who accessed health services in South Sumatra up to June 2024. The majority of participants were younger than 40 years (85.1%) and had an education level of senior high school or below (84.9%). Overall, 21.5% of patients were non-adherent to treatment, with 4.8% experiencing side effects and 13.1% presenting with opportunistic infections. Multivariate analysis indicated that treatment side effects and clinical stage were significant predictors of adherence. Treatment side effects and clinical stage play a critical role in determining adherence among MSM with HIV.

1. Introduction

The infestation of men who have sex with men (MSM) by human immunodeficiency virus (HIV) often causes widespread societal rejection, leading to increased pressure due to overlapping stigma [1]. The impact of stigma and societal rejection typically discourages MSM from accessing antiretroviral therapy (ART) services. These conditions also increase the symptoms of depression and anxiety, which can lead to suicidal ideation [2]. In addition, the failure to initiate ART is another significant factor that increases the risk of suicide [3] .

Rico et al. revealed that among 206 men living with HIV, 68.9% had a sexual orientation as MSM [4] .Several studies have also shown that MSM tend to engage in risky sexual behaviors and are at high risk of contracting HIV [5]. This demographic is diverse and includes men who identify as gay, bisexual, or heterosexual. MSM often engage in a variety of sexual behaviors, including anal sex, oral sex, and mutual masturbation [6, 7]. This has led to an increased prevalence of HIV, with an estimated range of 5% in Southeast Asia to 12.6% in East and Southern Africa. MSM have also been reported to be 27 times more at high risk of HIV infection compared to the general male population. In 2021, this demographic accounted for 21% of newly diagnosed cases [8].

According to previous studies, a lack of proper treatment for HIV often leads to the progression of the disease into Acquired Immune Deficiency Syndrome (AIDS), which continues to cause global public health and socioeconomic problems [9]. Therefore, MSM with HIV must immediately initiate ART, which reduces the amount of virus to undetectable levels, maintains a healthy immune system, and prevents transmission [10].

ART can also prevent opportunistic infections and secondary transmission, maintain health status, and reduce viral load by improving adherence [11-13]. Viral load has been reported to be a significant predictor of HIV progression and transmission. MSM with HIV who are not on ART have an increased viral load that can lead to opportunistic infections, [13] indicating the need for strict adherence [14].

In line with these results, consistent and complete adherence is essential for patients undergoing ART. Despite the importance, treatment adherence is still suboptimal, ranging from 60% to 80% [15]. This has led to a greater risk of developing resistance to antiretroviral agents and increased morbidity, mortality, and progression to AIDS [16]. MSM who are treated effectively with an undetectable viral load cannot transmit the virus sexually. Continued efforts to promote lifelong adherence are also needed, specifically for those on long-term treatment. Therefore, this study aims to assess factors associated with treatment adherence among MSM with HIV/AIDS.

2. Method

2.1. Study Setting, Design, and Period

A retrospective cohort study was conducted on MSM with HIV who accessed health services in South Sumatra. This study was conducted in all districts or cities in South Sumatra that had ART services and fill-in patient information in HIV/AIDS Information System (SIHA) until June 2024.

Sample Size Determination

A final sample size of 796 was determined. The study respondents were HIV patients with the population group as MSM with complete medical records and were selected using a total sampling method.

2.2. Study Variables

The independent variable of this study were age, education level, occupation, clinical stage, viral load, duration of therapy, side effects, and opportunistic infections. The dependent variables of the study was Treatment adherence. Data collection was conducted from September 02, 2024, to September 30, 2024. The following data were obtained from HIV information system, namely demographic and clinical information, including age, education level, occupation, clinical stage, viral load, duration of therapy, side effects, opportunistic infections, and treatment adherence. Furthermore, the inclusion criteria were patients who tested positive for HIV, confirmed by rapid 1, 2, and 3 examinations, while patients with incomplete data were excluded from this study.

2.3. Data Processing and Analysis

The first analysis was conducted to describe the characteristics and distribution of each variable, such as age, education level, occupation, and clinical stage. Others included viral load, duration of therapy, side effects, opportunistic infections, and treatment adherence, which were obtained from SIHA. Age was categorized into 2 groups, namely < 40 years (=1) and ≥40 years (=2). In addition, education level was categorized into 2 groups, namely ≤ senior high school (=1) and > senior high school (=2). Occupation was also categorized into 2 groups, namely employed (=1) and unemployed (=2). Clinical stage was classified into stages 3 to 4 (=1) and stages 1 to 2 (=2) while viral load was classified into unsuppressed (=1) and suppressed (=2). Duration of therapy was categorized into 2 groups, namely < 60 months (=1) and ≥ 60 months (=2). Furthermore, side effects were categorized into 2 groups, namely experiencing (=1) and not experiencing (=2), while opportunistic infections were categorized into 2 groups, namely suffering (=1) and not suffering (=2). Treatment adherence was divided into non-adherent (=1) and adherent (=2).

In this study, bivariate statistical analysis used Chi-square test to explore the relationship between independent variables and treatment adherence. Furthermore, the multivariate analysis used a multiple logistic regression test to determine the dominant factors. The covariate selection of the final multivariable model was built upon whether the variable had fulfilled the criteria of p < 0.25 in Chi-square test and whether it constituted the theoretical or clinical

study interests. The significance level of 5% was considered in the multivariate analysis, and when p-value was <0.05, the independent variables could significantly predict treatment adherence.

3. Results and Discussion

The number of HIV patients who accessed ART services was 1606 people. Based on the exclusion criteria with incomplete data, the number of data excluded was 47 people so that the total number of data analyzed further was 1559 people. Based on the inclusion criteria, namely PLHIV with sexual orientation as MSM, the number of data was 798 people. From the amount of data above, 2 outlier data were obtained, so that the final complete data was further analyzed for 796 people (Figure 1).
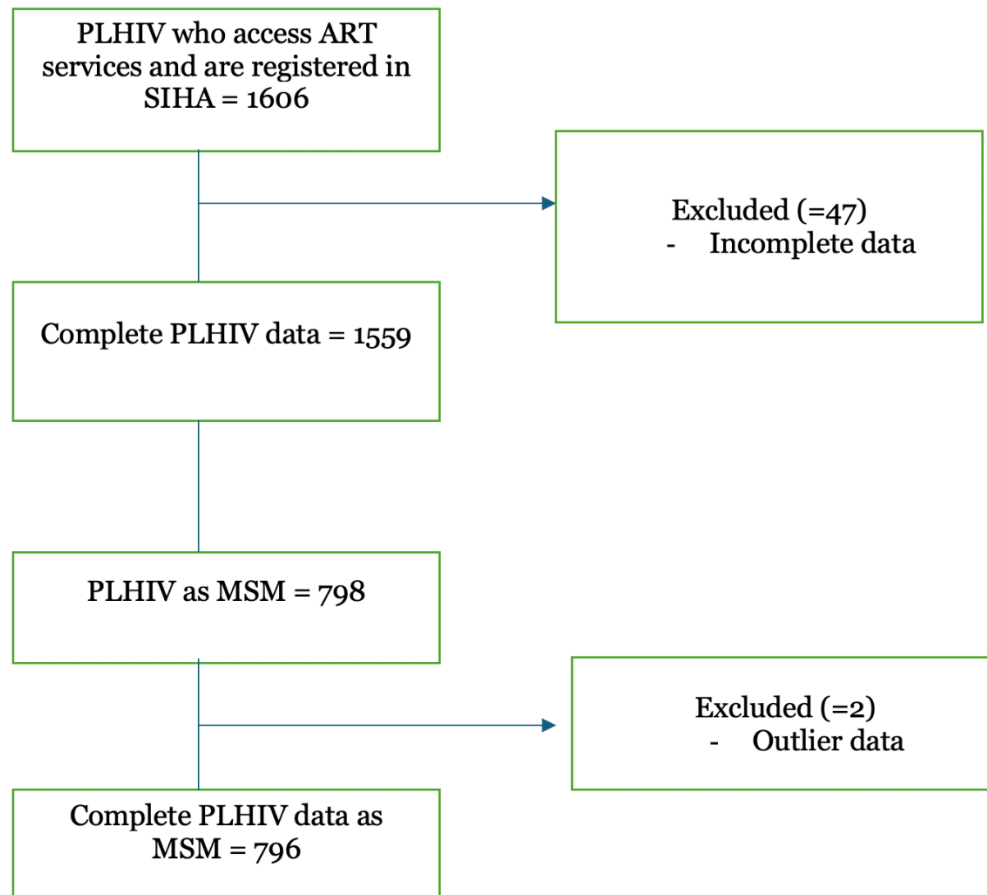
Figure 1.
CONSORT Diagram Showing Participant Flow.

There were a total of 796 MSM, the majority of whom, 85.1% %, were < 40 years old. Most respondents had an education level ≤ senior high school (84.9), and 97.4 were unemployed. Based on the indicators of treatment that had been carried out, the majority of MSM experienced HIV in clinical stage 1 (45.6%), had unsuppressed viral load (35.4%), undergone ART < 60 months, experienced side effects of treatment (4.8%), exhibited opportunistic infections (13.1%), and were not compliant with treatment (21.5%).(Table 1).

Table 1.
The sociodemographic characteristics of the study population (n = 796).

Variable	Category	Number	Percentage (%)
Age (years)	< 40	677	85.1
	≥ 40	119	14.9
Education level	≤ Senior high school	676	84.9
	> Senior high school	120	15.1
Occupation	Unemployed	775	97.4
	Employed	21	2.6
Clinical stage	Stage 1	363	45.6
	Stage 2	240	30.2
	Stage 3	156	19.6
	Stage 4	37	4.6
Viral load	Unsuppressed	282	35.4
	Suppressed	514	64.6
Duration of therapy (months)	< 60	546	68.6
	≥ 60	250	31.4
Side effect	Experiencing	38	4.8
	Not experiencing	758	85.2
Opportunistic infections	Suffering	104	13.1
	Not suffering	692	86.9
Treatment adherence	Non adherent	171	21.5
	Adherent	625	78.5

Bivariate analysis using Chi-square test showed that occupation, clinical stage, viral load, duration of therapy, side effects, and opportunistic infections were not related to treatment adherence. Meanwhile, age and education level were considered significant predictors of treatment adherence. The covariate selection of the final multivariable model was built upon whether the variable had fulfilled the criteria of $p < 0.25$ in Chi-square test and whether it constituted the theoretical or clinical study interests. This included age, education level, clinical stage, viral load, duration of therapy, and side effects. (Table 2)

Table 2.
Predictors of treatment adherence among MSM.

Variabel	Category	Treatment adherence				p- value
		Non adherent		Adherent		
		n	%	n	%	
Age (years)	< 40	154	22.7	523	77.3	0.050·*
	≥ 40	17	14.3	102	93.4	
Education level	≤ Senior high school	154	22.8	522	77.2	0.042·*
	> Senior high school	17	14.2	103	94.2	
Occupation	Unemployed	168	21.7	607	78.3	0.594
	Employed	3	14.3	18	85.7	
Clinical stage	Stage 3-4	32	16.6	161	83.4	0.071
	Stage 1-2	139	23.1	464	76.9	
Viral load	Unsuppressed	64	22.7	218	77.3	0.593
	Suppressed	107	20.8	407	79.2	
Duration of therapy (months)	< 60	125	22.9	421	77.1	0.185
	≥ 60	46	18.4	204	81.6	
Side effect	Yes	13	34.2	25	65.8	0.074
	No	158	20.8	600	79.2	

Opportunistic infections	Yes	27	26.0	77	74.0	0.282
	No	144	20.8	548	79.2	

The variables that predicted treatment adherence among MSM were treatment side effects and clinical stage after controlling for age, education level, and duration of therapy. Furthermore, MSM with clinical stages 3 to 4 (RR = 1.66, 95% CI: 1.03 - 2.57) were 1.66 times more likely to be non-adherent to treatment compared to those with clinical stages 1 to 2. Meanwhile, those who experienced side effects during treatment (RR = 2.37, 95% CI: 1.16 to 4.85) were 2.37 times more likely to be non-adherent to treatment compared to those who did not experience treatment side effects. **(Table 3)**

Table 3.
Multivariate analysis of treatment adherent among MSM.

Variable	Category	β	p- value	RR (95% CI)
Side Effect	Yes	0.86	0.018	2.37(1.16 – 4.85)
	No			reff
Cinical stage	Stage 3-4	0.51	0.023	1.66(1.03 – 2.57)
	Stage 1-2			reff

Note: RR: Risk Ratio, CI: Confidence Interval
ᵃ Analyzed using Logistic regression
*Statistically significant at p=0.05.

The results of this study revealed that the prevalence of MSM with HIV undergoing non-compliant treatment was 21.5%. This result was lower than the results of the survey by Martiana et al., where MSM who had non-compliance with ART was 52% [17]. When compared to women who had sex with men (WSM), the behavior of compliance with treatment in MSM was better [18]. This was consistent with the study by World Health Organization (WHO), which revealed that patients undergoing ART for up to 64 months were 64%, indicating that 36% were not compliant with treatment [19]. Following the study of Ebenezer et al., 3.3% had sufficient ART compliance, while 12.9% exhibited poor ART compliance [20]. MSM who were not compliant and stopped treatment played a major role significantly in treatment failure, unsuppressed viral load, and ART resistance. Treatment compliance with a retention rate of at least 95% could optimize viral suppression [4, 21]. The predictor that influenced this non-compliance was MSM who experienced side effects of treatment. A study by Dominic revealed that one of the causes of non-compliance in undergoing ART was side effects experienced [22]. The prevalence of non-compliant MSM and those experiencing side effects was 34.2%. Side effects of undergoing ART included discomfort with ART program, feeling sick, adverse drug reactions such as heartburn or stomach pain, and skin rashes [23]. Shubber et al. also revealed adverse drug reactions related to adherence to ART [24]. Taking ART drugs irregularly could change the pharmacokinetic and pharmacodynamic effects, thereby worsening the risk of treatment failure, drug resistance, and non-compliance with the treatment schedule [25]. Furthermore, drug resistance could cause those undergoing ART not to continue their treatment. Untreated HIV could further damage the body, lead to shorter life expectancy, and progression of the disease to a higher stage, namely AIDS [26].

The results revealed that clinical stage was associated with adherence to ART. MSM with clinical stages 3 to 4 (RR = 1.66, 95% CI: 1.03 – 2.57) were 1.66 times more likely to be non-adherent to treatment compared to those with clinical stages 1 to 2. As many as 1 million people with advanced HIV died due to complications related to AIDS each year [27].

According to WHO, patients with HIV disease in clinical stage 3 or 4, tended not to respond to treatment [28].This was consistent with the study by Ebenezer et al., who stated that HIV diagnosis at stage 3 according to WHO, was associated with a low chance of good ART adherence [20]. In addition to factors of side effects of treatment and clinical stage, it was necessary to pay attention to other factors that could hinder treatment adherence by MSM, such as social support, family support, friend support, provision of health services, non-judgmental health workers, and reducing stigma [29]. Apart from the side effects of treatment and clinical stage, it was necessary to pay attention to other factors that could hinder treatment adherence, such as social support, family support, friend support, provision of health services, reducing stigma, and non-judgmental health workers.

4. Conclusion

Enhancing adherence to antiretroviral therapy (ART) among men who have sex with men (MSM) in South Sumatra requires addressing treatment-related side effects and the clinical stage of HIV. Patients experiencing adverse effects are at greater risk of non-adherence, while those at advanced clinical stages encounter more complex challenges in maintaining treatment consistency. Optimizing the management of side effects, ensuring rigorous clinical monitoring, and providing sustained psychosocial support are essential to promote adherence. Furthermore, ART services should be designed to be more accessible and MSM-friendly by involving peer counselors and implementing supportive policies for service integration, thereby improving treatment outcomes among MSM living with HIV.

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