

# FACTORS INFLUENCING HIV/AIDS PREVENTIVE MEASURES AMONG INJECTING DRUG USERS IN MAKASSAR CITY

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## Abstract

Human Immunodeficiency Virus (HIV) is a serious infection that attacks the body's immune system, and its means of transmission include the use of injecting drugs. Effective preventive measures are crucial for reducing the prevalence of HIV in society. Therefore, this study aims to determine the factors influencing HIV/AIDS preventive measures among injecting drug users (IDUs) in Makassar City. A cross-sectional study design was employed, and 124 IDUs were enrolled as participants through an accidental sampling technique. The data collected were analyzed with chi-square bivariate analysis and multivariate logistic regression. The results showed knowledge (p-value = 0.005), attitude (p-value = 0.013), peer influence (p-value = 0.004), support from health workers and NGOs (p-value = 0.029), availability of sterile injecting equipment services (p-value = 0.029), and voluntary counseling and testing (VCT) services were significantly correlated with the preventive measures among IDUs in Makassar city (p-value < 0.001). Furthermore, VCT services were found to be the most influential factor in HIV/AIDS preventive measures (OR = 6.369; 95% CI = 2.181-18.597; p-value = 0.001). In conclusion, knowledge, attitudes, peer influence, support from health workers and NGOs, the availability of sterile injecting equipment services, and VCT services have a relationship with HIV/AIDS preventive measures among IDUs. Participants who engaged in VCT are advised to disseminate information about HIV and the associated services to their partners and communities.

**Keywords:** HIV, Injecting Drug Users, Voluntary Counseling and Testing

## Introduction

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) are still recognized as significant public health problems globally. Despite HIV incidence decreasing from 0.40 to 0.26 per 1000 uninfected population in 2016 (1), it remains a cause for concern. At the end of 2017, the World Health Organization (WHO) reported 36.9 million people living with HIV/AIDS, 940,000 resultant deaths, and 1.8 million new infections, equating to approximately 5,000 new infections daily (2).

The most vulnerable group to HIV infection is the key population, including injecting drug users (IDUs). The Joint United Nations Programme on HIV/AIDS (UNAIDS) stated that more than 90% of new HIV infections recorded in Central Asia, Europe, North America, the Middle East, and North Africa in 2014 were among people from different key populations. In 2018, the distribution of new HIV infections according to key populations was sex workers (6%), IDUs (12%), men who copulate with other men (17%), shemale

(1%), and clients of sex workers and sex partners from other key populations (18%) (3).

The AIDS epidemic affects IDUs in 158 countries, and according to estimates from the United Nations Office on Drugs and Crime (UNODC), those injecting drugs globally are 12.19 million. In 2013, 1.65 million of these people were detected to be living with HIV. Furthermore, UNAIDS reported that there are 33,500 key population members in the IDUs group, of which 28.8% suffer from HIV (1). Despite these alarming statistics, the availability of HIV prevention services for IDUs remains low in most countries (4).

The data from the Indonesian Ministry of Health in 2018 showed the number of infections reported according to the risk factors of IDUs fluctuated yearly, but the cases were still considered high (5). Makassar is one of the cities with a high prevalence of HIV. The data from Makassar City's testing services indicated that 23,476 people were diagnosed with HIV since 2019. Moreover, HIV cases among the IDUs group examined from 2017-2019 were relatively high (6).

The high rate of HIV transmission through blood due to non-sterile injecting behavior among IDUs necessitates the implementation of HIV and AIDS preventive measures for this population, which are commonly known as harm reduction efforts (7).

Effective prevention of HIV infections in key population groups requires the active participation of these communities in adopting preventive measures. Several studies have examined the preventive actions that can control or limit the spread of HIV infection in these communities (8, 9). According to Lawrence Green's theory, as stated by Notoatmodjo et al 2007 (10), behavioral actions that cause HIV infection are influenced by predisposing factors, namely age, occupation, education, marital status, knowledge, and attitudes. These factors are manifested in the availability and proximity of health facilities, as well as reinforcing factors including support from family, friends, and community leaders in taking HIV/AIDS preventive measures, and supported by the Harm Reduction Program such as VCT. The term VCT is a form of uninterrupted two-way coaching or dialogue between counselors and their clients, intended to prevent HIV transmission, provide moral support, and offer information and other assistance to People Living with HIV/AIDS (PLWHA), including their families and communities. Therefore, this study aims to examine some of the aforementioned factors that may influence the adoption of HIV/ADS preventive measures among IDUs.

## Materials and Methods

### Sample collection

This observational study with a cross-sectional design was conducted in the work area of the Gaya Celebes Foundation in Makassar from December to February 2021. The population under investigation comprised 240 IDUs, of whom 124 were selected based on the Lemeshow formula using the accidental sampling method, and none refused to become a participant.

A set of questionnaires developed based on previous studies were validated and tested for reliability ( $\alpha = 0.747$ ; 69 items), then used to conduct a direct interview after obtaining written informed consent from each participant. The questionnaires were designed to cover various aspects such as sociodemographic information, including gender, age, education, and marital status. They also consisted of questions on HIV/AIDS preventive measures (e.g., *do you use a sterile syringe?*), knowledge about HIV/AIDS (e.g., *have you heard about HIV/AIDS?*), the attitude towards HIV/AIDS (e.g., *are you aware that HIV/AIDS can infect people through the use of injecting drugs?*), peer influence (i.e., *do you receive advice from friends?*), support from health workers and NGOs (e.g., *do health workers and NGOs give you information about HIV/AIDS?*), the availability of sterile injecting equipment services (e.g., *do you obtain a sterile syringe from the health center?*), and VCT services (e.g., *have you been offered a blood test for HIV/AIDS detection?*).

The variables in this study were categorized as follows: HIV/AIDS preventive measures were considered positive once the respondent engaged in positive preventive measures and negative in case they did not. Additionally, there were high vs. low knowledge, positive vs. negative attitude, positive vs. negative peer influence, high vs. low health workers and NGOs support, and available vs. not available sterile syringes and VCT services. Scores used for the categorization process were  $\geq 50 = \text{high}$  and  $< 50 = \text{low}$ .

### Data analysis

The data obtained were subjected to univariate analysis to determine the characteristics of the respondents. Furthermore, bivariate analysis was conducted using chi-square to assess the correlation between the dependent variable, namely HIV/AIDS preventive measures, and the independent variables including knowledge, attitudes, peer influence, support from health workers and NGOs, the availability of sterile injecting equipment services, and VCT services. Multiple logistic regression with a backward stepwise method was employed to analyze the factors that have the greatest influence on HIV/AIDS preventive measures. Variables with a p-value less than 0.250 (p-value  $< 0.250$ ) were selected as candidates for the multiple logistic regression. All statistical tests were performed using STATA version 15, with a confidence level of 95% ( $\alpha = 0.05$ ).

## Results

### Demographic characteristics of respondents

The distribution of participants based on gender and age was mostly males (92.7%) ranging from 26-35 years old (49.19%). According to Table 1, the majority of the participants had high school education (74.2%) and only a few (0.8%) did not complete elementary school, while half of the entire population was married (50.0%).

**Table 1:** Distribution of Respondents' Characteristics

Respondents Characteristics	n	%
<b>Gender</b>		
Man	115	92.7
Woman	9	7.3
<b>Age (years)</b>		
17-25	22	17.74
26-35	61	49.19
36-45	38	30.65
46-55	3	2.42
<b>Level of education</b>		
Did not complete primary school	1	0.8
Elementary School	4	3.2
High school graduate	16	12.9
Finished high school	92	74.2
D3/College	11	8.9
<b>Marital status</b>	51	41.1
Single	62	50
Married	10	8.1
Divorced	1	0.8
Death divorce		
<b>Total</b>	<b>124</b>	<b>100</b>

Source: Primary Data, 2021

**Variables characteristics of study**

Based on Table 2, 114 participants have a high level of knowledge (91.94%), while 10 possess low knowledge (8.06%). Up to 72 showed a positive attitude (58.06%), while 52 showed a negative attitude (41.94%). Up to 104 participants (83.87%) received positive influence from their peers, while 20 experienced negative influence (16.13%). A total of 115 (92.74%) reported high support from health workers and NGOs and stated the availability of sterile injecting equipment services, but 9 complained of low support and equipment absence (7.26%). Furthermore, 105 (84.6%) received VCT services, while 19 did not (15.32%). Most of the participants have taken action to prevent HIV/AIDS (82.26%).

**Table 2:** Distribution of the Variables in this Study

Study Variables	n	%
<b>Knowledge</b>		
High	114	91.94
Low	10	8.06
<b>Attitude</b>		
Positive	72	58.06
Negative	52	41.94
<b>Peer Influence</b>		
Positive	104	83.87
Negative	20	16.13
<b>Support from Health Workers and NGOs</b>		
High	115	92.74
Low	9	7.26
<b>Availability of Sterile Syringe Services</b>		
Available	115	92.74
Not available	9	7.26
<b>VCT Services</b>		
Available	105	84.68
Not available	19	15.32
<b>HIV AIDS Preventive Measure</b>		
Yes	102	82.26
Not	22	17.74
<b>Total</b>	<b>124</b>	<b>100</b>

Source: Primary Data, 2021

**Correlation between independent variables and HIV AIDS preventive measures**

Table 3 shows the results of the bivariate analysis conducted to determine the correlation between the status of HIV/AIDS preventive measures and six independent variables. Concerning the knowledge variable, 97 participants (85.09%) had high knowledge of practicing the prevention measures. The statistical test produced p-value = 0.005, indicating a relationship between knowledge and HIV/AIDS preventive measures (Ho was rejected). Moreover, out of the total sample, 54 (75%) exhibited a positive attitude toward taking HIV/AIDS prevention measures. The results showed a p-value = 0.013, signifying a correlation between attitudes and HIV AIDS preventive measures (Ho was rejected).

**Table 3:** Correlation between Independent Variables and HIV AIDS Preventive Measures for Injecting Drug Users in Makassar City

Independent Variables	Preventive Action		p-value
	Yes (n = 102)	No (n = 22)	
<b>Knowledge</b>			0.005
High	97(85.09)	17 (14.91)	
Low	5 (50.0)	50 (50.0)	
<b>Attitude</b>			0.013
Positive	54 (75.0)	18 (25.0)	
Negative	48 (92.31)	4 (7.69)	
<b>Support from Health Workers and NGO</b>			0.004
High	97 (84.35)	18 (15.65)	
Low	5 (55.56)	4 (44.44)	
<b>Availability of Sterile Syringe Services</b>			0.029
Available	97 (85.35)	18 (15.65)	
Not Available	5 (55.56)	4 (44.44)	
<b>VCT Services</b>			<0.001
Available	92 (87.62)	13 (12.38)	
Not Available	10 (52.63)	9 (47.37)	

Data presented by n (%)  
Source: Primary Data, 2021

In terms of peer influence, 90 out of 104 participants (86.54%) reported having positive peer influence towards HIV/AIDS preventive measures, and 14 received positive influence but did not take any HIV/AIDS preventive measure. The statistical test showed a p-value of 0.004, indicating rejection of the null hypothesis (Ho) and suggesting a correlation between peer influence and HIV/AIDS prevention.

Up to 97 participants (84.35%) received high support from health workers and NGOs, and took HIV AIDS preventive measures, while 18 (15.65%) received high support but did not take any preventive measures. The statistical test yielded a p-value of 0.029 (Ho was rejected), indicating a correlation between support and preventive measures.

The results showed that out of 115 participants who had access to sterile injecting equipment services, 97 (84.35%) took HIV/AIDS preventive measures, while 18 (15.65%) did not. The statistical test produced a p-value of 0.029 (Ho was rejected), indicating a correlation between equipment availability and preventive measures.

Participants who received VCT services and practiced HIV AIDS preventive measures were 92 (87.62%), while only 13 (12.38%) received VCT services and failed to carry out the preventive measures. The statistical tests yielded a

value of  $p < 0.001$  ( $H_0$  was rejected), meaning there was a correlation between VCT and preventive measures.

**Factors affecting HIV transmission preventive measures among injecting drug users**

Table 4 shows that all the independent variables, namely knowledge, attitudes, peer influence, support from health workers and NGOs, the availability of sterile injecting equipment services, and VCT services, were eligible to be included as candidate variables for the multiple logistic regression test.

**Table 4:** Probability value (p-value) results of candidate variable selection for multiple logistic regression test

Independent Variables	p-value
Knowledge	0.121*
Attitude	0.057*
Peer Influence	0.062*
Support from health workers and NGOs	0.181*
Availability of Sterile Syringe Services	0.112*
VCT Services	0.070*

Note: (\*) Candidate variable (p-value < 0.250)

Table 5 presents the first model derived from the six candidate variables included in the analysis, and the result showed that it was not significant. However, further modeling was conducted by removing variables with the highest p-values sequentially until a significant model was obtained. The support from health workers and NGOs had the highest p-value of 0.136, leading to being excluded from the model.

**Table 5:** The Results of Logistic Regression Analysis of Factors Affecting HIV Transmission Preventive Measures among Injecting Drug Users in 2021

Variables	OR (95%CI)	p-value
<b>Step 1</b>		
Knowledge	3.657 (0.711-18.801)	0.121
Attitude	1.934 (0.797-3.819)	0.057
Friends of the same age	3.379 (0.940-12.147)	0.062
Support from health workers and NGOs	3.502 (0.557-21.986)	0.181*
Availability of Sterile Syringe Services	4.502 (0.705-28.750)	0.112
VCT Services	3.246 (0.907-11.612)	0.070
<b>Step 2</b>		
Knowledge	3.568 (0.741-17.172)	0.113

**Table 5:** The Results of Logistic Regression Analysis of Factors Affecting HIV Transmission Preventive Measures among Injecting Drug Users in 2021 (continued)

Variables	OR (95%CI)	p-value
Attitude	1.899 (0.968-3.724)	0.062
Friends of the same age	2.976 (0.864-10.254)	0.084
Availability of Sterile Syringe Services	4.037 (0.643-25.331)	0.136*
VCT Services	3.815 (1.106-13.156)	0.034
<b>Step 3</b>		
Knowledge	3.862 (0.810-18.414)	0.090
Attitude	1.806 (0.933-3.495)	0.079
Friends of the same age	2.682 (0.798-9.005)	0.110*
VCT Services	3.446 (1.023-11.605)	0.046
<b>Step 4</b>		
Knowledge	3.769 (0.844-16.829)	0.082*
Attitude	1.816 (0.941-3.504)	0.075
VCT Services	4.448 (1.407-14.059)	0.011
<b>Step 5</b>		
Attitude	1.893 (0.988-3.625)	0.054*
VCT Services	5.068 (1.672-15.469)	0.004
<b>Step 6</b>		
VCT Services	6.369 (2.181-18.597)	0.001

\*Variables that will be excluded in the modeling step by step because p-value > 0.05 starts from the highest p-value. Note: the multiple logistic regression test used the backward stepwise method.

The second model still showed several candidate variables that were not significant (p-value > 0.05). The sterile injection service had the highest p-value of 0.136 and was excluded from the third model. The variable known to be significant was VCT with a p-value of 0.046. In the fourth model, VCT services remained significant with a p-value of 0.011. The fifth model discovered that VCT services were significant with a p-value of 0.011. However, an attitude with a p-value (0.054) greater than the threshold of 0.05, was excluded from the modeling.

After passing through six stages of candidate variable selection, the significant variable detected was the VCT services (p-value = 0.001). Therefore, it can be concluded that the prevention of HIV transmission among IDUs can be predicted with VCT services. IDUs using available VCT services have a 6.3 times possibility (95% CI = 2.18-18.59) of taking steps in preventing HIV transmission.

**Discussion**

Participants' knowledge is their ability to know about HIV/AIDS preventive measures. Based on the results, those with

high knowledge (85.09%) practiced preventive measures. The chi-square test showed a significant correlation between knowledge and HIV/AIDS preventive measures. The results obtained are in line with a study that proved the existence of a correlation between knowledge levels and HIV/AIDS transmission prevention (11). A higher level of knowledge can prevent or avoid the risk of HIV transmission. This is in accordance with Notoatmodjo's statement that knowledge about health behaviors related to HIV will provide a direct understanding of self-protection and health promotion (12).

Attitude is described as a reaction or response from someone to a stimulus or object. The results showed that participants who take preventive measures (75.0%) had a positive attitude. Furthermore, the study conducted by Sri and Septiawan (13) indicated the significant influence of attitude on HIV/AIDS preventive behavior. The attitude of the IDUs Community plays an important role in preventing HIV/AIDS because those with a positive attitude tend to practice the prevention measures effectively.

Peer influence is one of the dominant factors in shaping one's attitude. Sri and Septiawan (13) stated that support from the colleagues of Female Sex Workers (FSW) had a significant positive impact on HIV/AIDS preventive behavior. This is in line with Aryanti et al. (14) result which indicated a significant correlation between peer attitudes and the use of Methadone Maintenance Treatment (MMT) services. Similarly, Yanti (15) showed that all examined participants received positive social support from peers. Positive behavior among peers is expected to create a positive influence on one another. Therefore, this current study discussed the association of positively behaved IDUs with their peers, specifically in the health sector. For instance, the information received by a friend about VCT services tends to be shared with other friends.

Health workers and NGOs play an important role in the multi-health care approach to PLWHA. Moreover, Yuliza et al. (16) reported a significant correlation between staff support and HIV/AIDS preventive behavior. The officers are meant to counsel risky groups in increasing knowledge, attitude, and motivation toward practicing preventive measures. This is in line with the result stated by Ertiana et al. (17) that most of the staff support HIV counseling and testing. Similarly, Rahmatin (18) demonstrated a significant correlation between officer support and the variables studied. Establishing a good relationship with health workers who have a friendly attitude and provide counseling can make the IDU community more motivated to seek health services and adopt preventive behaviors.

Sterile Injecting Equipment Services along with counseling for behavioral change were directed as a promotional effort to stop IDUs from using Napza. The chi-square test conducted showed a significant correlation between the availability of sterile injecting equipment services and HIV/AIDS preventive measures. This is consistent with the result reported by Sumini (19) that the use of sterile injection equipment services by IDUs did not promote HIV/

AIDS incidence. Similarly, Aspinal et al. (20) stated that the provision of sterile needle services to IDUs will help to reduce the risk of HIV transmission.

VCT is a form of uninterrupted two-way coaching or dialogue between counselors and clients, aimed at preventing HIV transmission, offering moral support, and providing information and other assistance to PLWHA, including their families and communities (21). Therefore, this current study is in line with Markwick et al. (22) and Wang et al. (23) who investigated the availability of VCT in IDUs communities. The availability of VCT services has been found to motivate people to engage positively in HIV/AIDS preventive measures.

The multivariate analysis conducted employed a logistic regression method to examine the dominant variable affecting the prevention of HIV/AIDS transmission among IDUs. The results showed VCT services as the dominant variable, hence VCT is 6.3 times more effective in predicting HIV transmission prevention among IDUs.

Utilization of the current health services is crucial for enhancing one's quality of life, as evidenced by Arsin's study (24), which identified access to antiretroviral (ARV) medication as a factor for improving the quality of life among PLWHA. Similarly, Burhanuddin (25) stated a significant positive correlation between attitudes and VCT, with a higher number of patients using the services. For instance, mobile VCT was reported to reach communities with difficulties accessing health centers, and respondents found VCT more comfortable as it avoids potential stigma and discrimination. These services are usually held once a month and moved across different locations. VCT is considered one of the public health strategies and serves as an entry point for all sustainable HIV/AIDS health services (26).

The several limitations observed included a small sample size and limited study area, which might not represent the entire population of Makassar City. Additionally, the design used was restricted to explaining only causal effects.

## **Conclusion**

In conclusion, this study confirms the existence of a correlation between knowledge, attitude, peer influence, support from health workers and NGOs, availability of sterile injecting equipment services, and VCT services with HIV/AIDS preventive measures among IDUs in Makassar City. Furthermore, the most influential factor in preventing HIV transmission towards IDUs can be predicted by the VCT services variable based on the Odd Ratio. From the overall results, it is recommended that all parties, specifically health workers and NGOs, should play a more active role in educating the community to reduce stigma related to HIV/AIDS.

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### **Competing interests**

The authors declare that they have no competing interests.

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### **Ethical Clearance**

The Faculty of Public Health ethics commission at Hasanuddin University approved all procedures of this study with approval number 553/UN4.14.1/TP.02.02/2021.

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