



## RELATIONSHIP OF ABSTINENCE BEHAVIOR, *BEING FAITHFUL*, *CONDOM USE*, AND *DRUG USE* TO THE INCIDENCE OF SEXUALLY TRANSMITTED INFECTIONS IN MARRIED MEN SEX MEN IN INDONESIA

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### Abstract

**Background:** The monogamous sexual behavior of married men who have sex with men (MSM) increases their risk of acquiring sexually transmitted infections (STIs). This study aims to examine the influence of ABCD behaviors on the incidence of STIs among married MSM in Indonesia. **Method:** A cross-sectional study was conducted in 24 provinces in Indonesia. The study population comprised MSM who had ever engaged in sexual intercourse, either occasionally, once, or frequently, totaling 6,000 individuals. A sample of 775 participants who were married MSM was selected using the Respondent Driven Sampling (RDS) method. Data from the Integrated Biological and Behavioral Survey (STBP) 2018-2019 was utilized. The data was analyzed using multivariate analysis with STATA 14 software. **Results:** The variables of no vaginal sex, no anal sex, condom use, and needle drug use behavior are associated with the incidence of STIs when controlled by the variable of alcohol consumption behavior. **Conclusion:** Practicing ABCD behaviors among married MSM can help reduce and prevent STIs.

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## INTRODUCTION

Sexually transmitted infections (STIs) are a significant public health problem, especially in the MSM group; the same thing was also found in the UK, where around 77,371 new STI sufferers were found in the MSM group.<sup>1,2</sup> STIs are caused by more than 30 pathogens (bacteria, germs, and parasites), which are transmitted through sexual intercourse or oral sex between heterosexual groups and homosexual groups (gays and MSM).<sup>2,3</sup> MSM themselves bear a heavier burden of Sexually Transmitted Infectious Diseases (STIs) than the general population.<sup>1</sup> They are more vulnerable to rectal health problems, such as *fissures/fistulas*, injuries, and so on, that can lead to *genital/mouth ulcers*, warts, and frequent vaginal discharge.<sup>1</sup> In Indonesia, about 1.4% of MSM have symptoms of genital warts, 14.1% feel burning when urinating, and 2.6% have *ulcers* on the genitals.<sup>4</sup> MSM in Europe have more than one STI symptom.<sup>5</sup> Another impact is that STIs followed by HIV and Hepatitis B virus can cause about 2.5 million deaths and 1.2 million cancer cases every day.<sup>6</sup>

In 2022, the number of STIs cases infecting adults is around 374 million people, or about 1 million new people infected with STIs every day.<sup>6</sup> The number of STIs occurs in almost all regions, one of which is the *South East Asian Region* (SEAR), which contributes about 1/3 of new STI cases or around 87%, with the main actors most infected with STIs are MSM with a proportion of around 90%.<sup>7,8</sup> The proportion of MSM infected is still far from the *World Health Organization* (WHO) target of 2030, which requires a reduction in the proportion of STIs to 60%. The high proportion of MSM infected with STIs is also common in all member countries, including Indonesia. MSM are part of the homosexual group in Indonesia, with the proportion of STI cases ranging below 20%. This can be seen in the HIV/AIDS Information System (SIHA) report data, where there was a decrease in cases of about 4.7% of cases from the third quarter (16.3%) - fourth quarter (11.6%) in 2022, then increased to 7.7% from the third quarter of 2022 to the first quarter (19.3%) in 2023.<sup>9-12</sup> The low proportion of MSM who know their STI status is because many MSM do not identify as MSM and marry women to assimilate into Indonesian cultural norms.<sup>13</sup>

Married MSM is more vulnerable to STI Infection, and this is due to sexual behavior before marriage, whether it is anal or vaginal found in India, about 11.4% of MSM have had anal sex, and 36.2% of MSM have had vaginal sex before marriage infected with STIs.<sup>14</sup> Multiple sexual behaviors, known as *Men Who Have Sex with Men and Women* (MSMW) or not *being faithful* to one's partner (*be faithful*) by MSM, also contribute to the spread of STIs.<sup>15</sup> A San Diego study found that *MSM who* were unfaithful to their partners had an estimated 2.32 times higher risk of STIs compared to *MSM who* were faithful to their partners.<sup>16</sup>

Married MSM who engage in sex without disclosing their sexual status or orientation with female partners are at risk of transmitting STIs to their female partners. This is often exacerbated by

the lack of condom use in sexual relationships with female partners due to the notion of monogamy.<sup>17</sup> A US study found that approximately 59% of married MSM who did not use condoms had one of the STIs.<sup>18</sup> Involvement of married MSM in sexual relationships with multiple partners, especially without condoms, will significantly increase the transmission of STIs to both male and female partners.<sup>19</sup> Cohort studies conducted in Africa found that about 33.5% of MSM who did not use condoms during sex experienced one of the symptoms of STIs.<sup>20</sup> Injection drug use among MSM also contributes to STI transmission among MSM, as seen from a retrospective study in Tokyo, which found significant transmission of Syphilis due to injection drug use among MSM.<sup>21</sup>

Other factors that influence this include: MSM who are married are often reluctant to access sexual and reproductive health services due to social stigma, discrimination, and fear of being found out by their partners.<sup>15</sup> A study conducted in Melbourne explained that MSM who do not test regularly or are not honest about their sexual status with their partners are at risk of spreading STIs outside the MSM group, especially to female partners.<sup>22</sup> To prevent the transmission of STIs in married MSM in Indonesia itself has been regulated in a special regulation. The regulation is contained in Ministry of Health Regulation Number 22 of 2022 (Permenkes) related to efforts to prevent HIV and STI transmission by implementing 11 preventive measures, but this is not heeded, especially by married MSM, because married MSM are not open about their orientation to their partners, so that *be faithful* behavior, not using condoms when having sex with partners and social stigma are key in STI transmission in married MSM. This study aims to analyze the relationship between ABCD behaviors in married MSM and the incidence of STIs in Indonesia. This study also contribute to help in decreasing number of STIs incidence in Indonesia.

## METHODS

The research design used was *cross-sectional*, using secondary data from the 2018-2019 IBBS data conducted in 24 provinces in Indonesia, with the population being MSM in 24 provinces with a total of 4,290 people, with a sample of 775 MSM with mental status with inclusion criteria in the form of: MSM who in the past year had sex once, occasionally and often and MSM who were at least 15 years old. Sampling in this study used the *Respondent Driven Sampling* (RDS) technique. The variable used in this study is the incidence of STIs, with the categorization of 0. Having symptoms of STIs, if it has one of the 8 (eight) symptoms of STIs based on the results of anamnesis and physical examination with the categorization of 0. Having one of the eight symptoms of STIs or all symptoms of STIs and 1. Having no symptoms if it does not have one of the symptoms. In contrast, the independent variable is: *Vaginal sex abstinence* variable with categorization 0. Yes, and 1. No; *Anal sex abstinence* variable with categorization 0. Yes, and 1. No; Variable *be faithful* to the partner (*be*

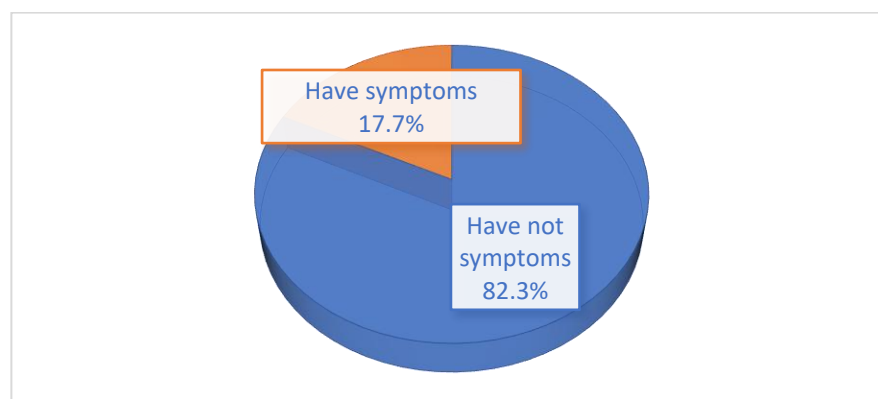
*faithful*) with categorization 0. No, and 1. Yes; variable *condom use* with categorization 0. Do not use and 1. Use and variable do not use injecting drugs (*drug use*) with categorization 0. Yes, and 1. Not.

The confounding variable is the history of condom leakage with categorization: 0. Ever, more than 1 time, 1. Never used condoms, 2. Never leaked; variable of how to get condoms with categorization: 0. did not have condoms, 1. bought, 2. free, and 3. bought and free; variable number of condoms used in the last month with categorization: 0.  $\leq 9$  pieces and 1.  $\geq 10$  pieces; variable of sex giving behavior with men in the last month with categorization: 0. Yes and 1. No; variable behavior of selling sex with men in the past month with categorization: 0. Yes and 1. No; variable of alcohol consumption behavior with categorization: 0. Yes and 1. No, lastly, there is the variable of drug use with categorization in the form of 0. Yes, and 1. No.

The analysis used in this study began with univariate tests, bivariate tests with the type of *chi-square* test, and multivariate tests with logistic regression risk factor models using STATA 14 *software*. This study already has an ethical review with number 035/KEPK-FKM-UC/2023 issued by the Faculty of Public Health Ethics Committee, Cenderawasih University.

## RESULTS

The proportion of married MSM with any or all of the STI symptoms is higher than that of non-symptomatic married MSM at 82.3%, as shown in Figure 1:



**Figure 1.** Distribution of STI Symptoms among Married MSM in Indonesia

The proportion of married MSM who have symptoms of more than 10% is only in MSM who have symptoms of pain when urinating, namely 12.7%, warts around the genitals (3.1%), warts around the anus (0.8%), scabs around the genitals (2.2%), sores or scabs around the anus (0.5%), abnormal discharge from the penis (3.5%), abnormal discharge from the anus (0.9%) and symptoms of lumps/swellings around the anus (0.8%) as shown in Table 1.

**Table 1.** Distribution of Married MSM by Types of Sexually Transmitted Infection (STI) Symptoms in Indonesia in 2018-2019

Types of STI Symptoms	n	%
<b>Pain when urinating</b>		
Yes	99	12.7
No	676	87.2
<b>Warts around the genitals</b>		
Has symptoms	24	3.1
No symptoms	751	96.9
<b>Warts around the anus</b>		
Has symptoms	6	0.8
No symptoms	769	99.2
<b>Scabs around the genitals</b>		
Has symptoms	17	2.2
No symptoms	758	97.8
<b>Sores or scabs around the anus</b>		
Has symptoms	4	0.5
No symptoms	771	99.5
<b>Abnormal discharge from the penis</b>		
Has symptoms	27	3.5
No symptoms	748	96.5
<b>Abnormal discharge from the anus</b>		
Has symptoms	7	0.9
No symptoms	768	99.1
<b>Lump/swelling around the anus</b>		
Has symptoms	6	0.8
No symptoms	3769	99.2.5

The results of the analysis showed that there was an association between vaginal sex behavior before marriage and the incidence of STIs (*p-value*: 0.001 with an OR value: of 0.41; 95% CI: 0.27-0.63). There was an association between *anal sexual* behavior before marriage and the incidence of STIs (*p-value*: 0.001 with OR: 0.47; 95%CI: 0.32-0.69). The results of the analysis did not find an association between *being faithful* to a partner (*Be Faithful*) and the incidence of STIs (*p-value*: 0.207), as well as the variable *condom use* (*Condom use*), which has no association with the incidence of STIs in married MSM (*p-value*: 0.359), which can be seen in Table 2.

The variable of needle and syringe drug use was associated with the incidence of STIs among married MSM (*p-value*: 0.006 with OR: 1.69 and 95% CI: 1.16 - 2.47). Similarly, the variable history of condom leakage also had no association with the incidence of STIs among married MSM, whether it was not using condoms (*p-value*: 0.456) or never leaking (*p-value*: 0.871). Hal Similarly, the variable of how condoms were obtained, whether condoms were purchased (*p-value*: 0.651), free (*p-value*: 0.762) and purchased and free (*p-value*: 0.514), and the number of condoms in the last month (*p-value*: 0.508) also had no association with STI incidence among married MSM. The behavior of

buying sex with men was associated with the incidence of STIs among married MSM (*p*-value: 0.027), whereas the behavior of not buying sex with men is a factor in preventing the transmission of STIs through sexual intercourse (AOR: 0.77 with a value of 95% CI: 0.61-0.97) shown in Table 2.

Selling sex with men in the past month was also associated with STI incidence among married MSM (*p*-value: 0.028 with OR: 0.78 with 95% CI: 0.63-9.97). In contrast, alcohol consumption behavior was associated with STI incidence among married MSM (*p*-value: 0.001 with OR:0.72 with 95% CI: 0.61 – 0.87). Drug use variable had no association with STI incidence among married MSM (*p*-value: 0.891), as shown in Table 2.

Based on the bivariate analysis results, several variables were selected as candidates based on the *p*-value below 0.25. However, for the independent variables, all of them are still included in the multivariate analysis candidates, as for the variables included in the multivariate analysis modeling in the form of variables: variables of not having sex before marriage (vaginal), variables of not having sex before marriage (anal), variables of being faithful to a partner (Be faithful), variables of condom use (Condom use), syringe drug use (Drug use), variables of behavior of buying sex with men, variables of behavior of selling sex with men in the last month and variables of alcohol consumption behavior.

The results of multivariate analysis in this study obtained if *abstinence* behavior both in *anal* sex behavior (*p*-value: 0.010) and *vaginal* sex (*p*-value: 0.004) has an association with the incidence of STIs in married MSM. The results of the analysis also found that *abstinence* behavior both in *vaginal* sex (AOR: 0.51 with 95% CI: 0.33 - 0.81) and *anal* sex (AOR: 0.59 with 95% CI: 0.39 - 0.88) can protect married MSM can prevent STI transmission to their partners after controlled by alcohol consumption variables. Spousal loyalty behavior was not associated with STI incidence among married MSM after controlling for alcohol consumption (*p*-value: 0.585), as shown in Table 3.

Married MSM who do not use condoms during sex with their partners will have a 1.62 times higher risk of STI infection compared to married MSM who use condoms during sex (OR: 1.62 and *p*-value 95% CI:0.93 – 2.82), condom use during sex has an association with STI incidence among married MSM (*p*-value: 0.050) after controlling for alcohol consumption. Likewise, married MSM who consume drugs by injection using non-sterile equipment will have a risk of about 1.91 times being infected with STIs compared to married MSM who do not consume drugs by injection (OR: 1.91 and 95% CI:0.81 – 2.32) from the analysis results, it was found that drug consumption by injection had an association with the incidence of STIs in married MSM after controlling for alcohol consumption (*p*-value: 0.008) as shown in Table 3.

**Table 2.** Results of Bivariate Analysis of the Relationship between ABCD behaviours with the Incidence of Sexually Transmitted Infections (STIs) among Married Men in Indonesia

Variabel	STIs				p-value	OR (95% CI)
	Yes		No			
	n	%	n	%		
<b>ABCD Behavior</b>						
<b>Vaginal sex abstinence</b>						
Yes	367	77.8	105	22.3	0.001	reference
No	271	89.4	32	10.6		0.41 (0.27 – 0.63)
<b>Anal Sex abstinence</b>						
Yes	294	76.9	88	23.1	0.001	reference
No	344	87.5	49	12.5		0.47 (0.32 – 0.69)
<b>Be faithful to your partner</b>						
No	193	79.8	49	20.2	0.207	reference
Yes	445	83.5	88	16.5		0.77 (0.52-1.15)
<b>Condom Use</b>						
No	114	85.1	20	14.9	0.359	reference
Yes	524	81.8	117	18.2		1.27 (0.75 – 2.13)
<b>Injecting drug use /Drug use</b>						
Yes	330	86.2	53	13.8	0.006	reference
No	308	78.6	84	21.4		1.69 (1.16 – 2.47)
<b>History of condom leakage</b>						
Ever, more than once	43	68.3	20	31.7		reference
Never use condoms	40	74.1	14	25.9	0.456	0.75 (0.62 – 0.82)
Never leaks	342	84.5	63	15.6	0.871	0.39 (0.30 – 0.46)
<b>How to get condoms</b>						
Not having condoms	187	84.6	34	15.4		reference
Purchase	179	80.6	43	19.4	0.651	1.32 (1.24 – 1.45)
Free	127	78.9	34	21.1	0.762	1.47 (1.36 – 1.56)
Buy and free	119	86.6	20	14.4	0.514	0.92 (0.83 – 0.10)
<b>Number of condoms in the last month</b>						
≤ 9 pieces	165	83.8	32	16.2	0.508	reference
≥ 10 pieces	133	81.1	31	18.9		1.20 (0.69 – 2.07)
<b>Sex buying behavior with men in the past month</b>						
Yes	91	75.2	30	24.8	0.027	reference
No	547	83.6	107	16.4		0.77 (0.61 – 0.97)
<b>Sex selling behavior with men in the past month</b>						
Yes	123	76.4	38	23.6	0,028	reference
No	515	83.9	99	16.1		0.78 (0.63 – 0.97)
<b>Alcohol consumption behavior</b>						
Yes	228	76.5	70	23.5	0.001	reference
No	410	85.9	67	14.1		0.72 (0.61 – 0.87)
<b>Drug consumption</b>						
Yes	44	63.0	9	17.0	0.891	reference
No	594	82.3	128	17.7		1.02 (0.71 – 1.49)



**Table 3.** Final Results of Multivariate Analysis

Variables	Final Modelune		
	p-value	AOR	95% CI
Sex Behavior before marriage (Vaginal)/ <i>Abstinence</i>			
Yes	0.004	0.51	reference
No			0.33 – 0.81
Sex behavior before marriage (Anal)/ <i>Abstinence</i>			
Yes	0.010	0.59	reference
No			0.39 – 0.88
Be loyal to your partner/ <i>Be faithful</i>			
No	0.585	1.14	reference
Yes			0.71 – 1.84
<i>Condom Use</i>			
No	0.050	1.62	reference
Yes			0.94 – 2.82
Injecting drug use/ <i>Drug Use</i>			
Yes	0.008	1.91	reference
No			0.81 – 2.32
Alcohol consumption behavior			
Yes	0.015	0.78	reference
No			0.65 – 0.95

## DISCUSSION

Married MSM is more at risk of contracting STIs compared to *single* MSM due to several factors related to sexual behavior and susceptibility to infection, including STI *coinfection*, where STI *coinfection* common among sexually active MSM, especially men with multiple sexual partners and a history of STIs are more susceptible to multiple STIs such as syphilis and chlamydia, which will exacerbate the risk of transmission and treatment difficulties.<sup>23</sup> This study also found that most of the married MSM had more than one STI symptom, with the most common symptom for married MSM being painful urination. Similarly, in Kenya, 49.9% of married MSM had at least 2 STIs, namely Gonorrhea and Chlamydia.<sup>24</sup> Research in Mozambique consistently found that married MSM had about 1.8 times greater risk of STI infection compared to *single* or unmarried MSM.<sup>25</sup> Studies in South Africa consistently found that married MSM had multiple STIs, namely Gonorrhea and Syphilis.<sup>26</sup> This could be due to *co-habitation* or complex multiple sexual behaviors of MSM that increase the risk of STI transmission, especially when there is a change or uncertainty in their relationship status.<sup>23,27</sup>

MSM who are married or have female partners often face greater complexity in the risk of contracting STIs. Even though they practice *abstinence* from *vaginal* sex with their female partners, the risk of STI transmission remains significant, especially if they engage in *non-vaginal* sexual intercourse, such as anal sex.<sup>27</sup> This study also found the same thing married MSM who *abstain* from *vaginal* sex behavior can help prevent STI transmission among married MSM. Similarly, A Meta



analysis study found that although married MSM *abstain* from *vaginal* sex, they are still at risk of STIs if they engage in *anal* sex.<sup>19</sup> While abstinence from vaginal sex may reduce the risk of certain STIs, such as trichomoniasis (which is more common in vaginal sex), it does not necessarily protect against other infections, such as syphilis and gonorrhea, which are more commonly transmitted through anal sex.<sup>17</sup> MSM who have sex with both men and women are more likely to be at risk of STIs compared to MSM who have sex with men due to the possibility of engaging in unprotected multiple-sex partnerships and exacerbated by their sexual orientation and non-monogamous sexual practices, which in turn makes married MSM reluctant to seek testing and treatment.

*Abstinence* from *anal* sex in married MSM can reduce the risk of STI transmission, especially those transmitted through rectal mucosal contacts, such as HIV, syphilis, gonorrhea, and chlamydia.<sup>28</sup> Anal sex is one of the riskiest routes of STI transmission, as the rectal mucosa is more susceptible to tears and infection than the genital or oral mucosa. Therefore, MSM who choose to *abstain* from anal sex can significantly reduce their risk of developing STIs.<sup>17</sup> This study found a similar relationship between *abstinence* from *anal* sex and preventing MSM from transmitting and acquiring STIs through sex, *oral* sex, or the use of unhygienic sex toys or if their sexual partners have STIs.<sup>15</sup> Such prevention should be followed by protected sex behavior, such as the use of condoms when having sex with a partner, considering that married MSM is a monogamous sexual group. This is also supported by the results of this study, where around 18.9% of married MSM used more than 10 condoms in a month during sex. A Systematic review research consistently found that reducing or stopping anal sex can have a major impact in lowering STI transmission among MSM, especially for those who are in a married relationship with a female partner but remain at risk if they engage in non-monogamous sexual behavior or other risky behaviors.<sup>29</sup>

Married MSM who behave *faithfully to their partners (be faithful)* are not always associated with reduced STI incidence; this could be due to the existence of *double* sexual behavior (*double life*), where MSM are heterosexually married but still engage in sexual activity with same-sex partners.<sup>20</sup> The same thing was also found in this study, that there was no association between being faithful to a partner and the incidence of STIs in married MSM. Previous studies have suggested that many MSM, despite wanting to be faithful to their marriage partners, continue to have sexual relationships with other partners, which increases the risk of STIs.<sup>30</sup> A study in Ghana also found that faithfulness to a partner was not always associated with a lower risk of STIs.<sup>31</sup> Married MSM, despite their desire to be faithful, many are unable to discuss their sexual orientation with their partners openly and thus engage in behaviors that increase STI risk.<sup>32</sup> Married MSM may experience a mismatch between their desire to meet social norms (such as heterosexual marriage) and their actual sexual behavior (engaging in same-sex sexual intercourse). This misalignment may lead to

inconsistent behaviors, such as having extramarital relationships that increase the risk of STIs despite the intention to be faithful to their heterosexual partners.

Heterosexually married MSM often do not use condoms when having sex with same-sex partners, putting them at risk of STIs.<sup>33,34</sup> The same is found in the results of this study, where condom use during sex can protect against the incidence of STIs in married MSM, other studies have consistently found that married MSM who do not use condoms during sex have a 1.8 times higher risk of STI infection compared to MSM who use condoms during sex.<sup>25</sup> *Structural Equation Modeling* (SEM) analysis conducted in China found that condom use prevented STIs among married MSM.<sup>35</sup> This association is influenced by the stigma, fear of social consequences, and reluctance to admit same-sex sexual behavior in the presence of heterosexual partners that lead to high-risk sexual behavior. As a result, although condoms are known to be effective, many married MSM do not use them consistently.

Injection drug use among married MSM significantly increases the risk of STIs, especially HIV and hepatitis, as MSM who engage in injection drug use tend to engage in high-risk sexual behaviors, such as not using condoms and having sex with multiple partners, both male and female, which increases the risk of STIs.<sup>36</sup> This study also found the same thing, where the results of this study are consistent with several previous studies, including syringe drug use has a greater risk of STI transmission in married MSM groups, which is about 2 times greater transmission in MSM who use unstructured syringes compared to MSM who use sterile syringes.<sup>17</sup> A longitudinal study conducted in urban Baltimore found the same, where married MSM who injected drugs were at about 3.7 times the risk of STIs compared to those who did not inject drugs.<sup>37</sup> MSM who are married and inject drugs tend to engage in high-risk sexual behavior, which exacerbates the risk of STIs.<sup>38</sup>

This study has advantages; where the questionnaire in this study was used by several academics to look at sexual behavior in at-risk groups the IBBS research questionnaire was tested as valid and also reliable before the questionnaire was used nationally to obtain risky sexual behavior in MSM so that the data collected from this study can be able to represent the relationship between ABCD behavior and STI incidence even though there are several limitations such as not all data were taken in all districts in Indonesia because of security constraints, while the weakness of this study in terms of data processing that does not use the RDSA method. Another limitation of this study is that not all of the confounding variables to be studied were included in the IBBS *raw* data, such as the type of drugs used, sterile syringe exchange services, and other variables that theoretically affect the incidence of STIs in MSM.

## CONCLUSIONS

ABCD behaviors that have an association with the incidence of STIs are *abstinence* variables in both vaginal and anal sex. Then there are variables of *condom use* during sex and *drug use* after controlling for the variable of alcohol consumption behavior while the variable of *being faithful* to a partner (*be faithful*) has no association with the incidence of STIs in married MSM after controlling for alcohol consumption behavior.

## RECOMMENDATION

Recommendations from the results of this study in the form of promoting sexual health interventions, such as working with several Non-Governmental Organizations (NGOs) with local governments to ensure the supply and demand of condoms in several spots where MSM gather, in several regions in Indonesia, considering the problem of condom availability in several spots in MSM groups have difficulty in accessing condoms, besides ensuring that the sterile syringe exchange program at puskesmas in several districts in Indonesia can run and be implemented by ensuring the supply and demand of sterile syringe availability. Integrate STI testing with HIV screening at the time of MSM to screen for MSM with STIs so that HIV testing results can find MSM with STIs so that STIs in MSM can be treated.

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#### Declarations

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