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Predictors of Syphilis in the Population of Men Like Sex with Men (LSl) in 10 Regencies/Cities In Indonesia

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Abstract

Syphilis is a bacterial sexually transmitted infection (STI) caused by Treponema pallidum. This disease results in significant morbidity and mortality. This study aims to analyze the predictors of syphilis incidence in the MSM population, namely age, education level, HIV status, use of condoms, consumption of drugs/injecting drugs, alcohol consumption, number of sex partners and STI examinations. The research design is cross sectional using secondary data from the 2015 IBBS. The analysis used is Cox regression which estimates the Prevalence Ratio value. The proportion of syphilis infection in the MSM group in 10 districts/cities in Indonesia is 15.7%. There was a significant relationship between HIV status (PR 2.05 (95% CI 1.58-2.66), Age (20-24 years old PR 2.45 (95% CI 1.07-5.64), 25-24 years old. 29 years PR 3.01 (95% CI 1.30-6.95), > 30 years PR 2.42 (95% CI 1.04-5.65) versus 15-19 years), Alcohol (PR 1, 37 (95% CI 1.01-1.86), Education 1.45 (95% CI 1.02-2.06) with the incidence of syphilis infection in MSM while condom use, drugs, number of male sex partners and STI examinations were not statistically related with p value > 0.05.

Keywords: Predictors; Syphilis; MSM.

INTRODUCTION

Syphilis is a bacterial sexually transmitted infection (STI) caused by Treponema pallidum. WHO estimates that 5.6 million new cases of syphilis occurred among adolescents and adults aged 15-49 years worldwide in 2012 with a global incidence rate of 1.5 cases per 1000 women and 1.5 per 1000 men. An estimated 18 million common cases of syphilis in 2012 translate to a global prevalence of 0.5% among women and 0.5% among men aged 15-49 years with the highest prevalence in the WHO region in Africa. (*World Health Organization*, 2016)

Syphilis as a sexually transmitted infection can increase the risk of contracting HIV. According to the 2011 Integrated Biology and Behavior Survey (IBBS) in Indonesia, Men who have sex with men (MSM) who suffer from syphilis are 3.63 times more likely to suffer from HIV than MSM who have not been infected with syphilis. (Direktorat Jenderal Pencegahan dan Pengendalian Penyakit Kementerian Kesehatan RI, 2017). The purpose of this study was to analyze factors associated with the incidence of syphilis, namely age, education, HIV status, drug use, condom use, alcohol consumption, number of partners and STI examination in the population of men who like to have sex with men (MSM) in 10 districts/regencies. Cities in Indonesia based on the 2015 IBBS.

According to the research results of Feny Wartisa and Aldo Yuliano Mas Putra, it was found that there was a relationship between education level (p=0.000, r=0.431), income ((p=0.000, r=-0.435) and employment (p=0.000, r= -0.459) with the incidence of MSM in Bukittinggi City. (Wartisa & Putra, 2020)

Based on clinical findings, syphilis is divided into several stages, which can help to determine treatment and follow-up. The classification divides based on primary syphilis, secondary syphilis, tertiary syphilis and latent infection.

Syphilis is on the rise among gay, bisexual and other men who have sex with men. Recent outbreaks among MSM have been characterized by high rates of HIV coinfection and

high-risk sexual behavior (such as unprotected sex, new or multiple partners, and substance abuse). While the health problems caused by syphilis in adults are serious, it is well known that genital sores caused by syphilis in adults also make it easier to get and transmit HIV sexually. (*Centers for Disease Control and Prevention*, 2017)

The high risk group for syphilis infection is the age group of 20-35 years. (Cwikel G, 2006). All ages are vulnerable. peak levels occur in old age in most STDs; Advanced syphilis is often diagnosed in people > 50 years of age. (Handsfield, 2011).

Everyone who has latent syphilis should be tested for HIV infection. Persons who receive a diagnosis of latent syphilis and have neurological signs and symptoms (eg, cognitive dysfunction, motor or sensory deficits, eye or hearing symptoms, cranial nerve palsies, and symptoms or signs of meningitis or stroke) should be evaluated for neurosyphilis. (Workowski & Bolan, 2015)

Explanations for this behavior include greater trust and intimacy with serious partners, the perception that condoms interfere with intimacy, and the negotiation of agreements about acceptable sexual behavior for partners as a strategy to increase safety. (Means, 2014).

RESEARCH METHODS

The research design chosen to be used was cross sectional with secondary data from the 2015 IBBS. This study was conducted by observing and measuring predictors (age, education level, HIV status, drug consumption, condom use, alcohol consumption, number of male sex partners, STI examination in health services and measurement of the outcome variable (Syphilis) simultaneously at the same time in the MSM group, namely in North Jakarta, West Jakarta, Central Jakarta, South Jakarta, East Jakarta, Bandung, Semarang, Surabaya, Malang Raya, Denpasar.

The population in this study, namely MSM from the districts/cities selected as research sites, are districts/cities with an estimated HIV/STI epidemic situation which is estimated to be worse than other districts/cities in the province. The study population was MSM aged > 15 years in 10 districts/cities in Indonesia.

The respondent sampling method is RDS (Respondent Driven Sampling) with a snowball system taking into account recruitment quotas and to motivate recruiters and recruits with multiple incentives. This was done because the MSM population is a hidden population that is difficult to reach. Data were analyzed using univariate frequency distribution, bivariate analysis (Chi-square) to obtain PR Crude and multivariate analysis with Cox regression to obtain PR Adjusted

RESULTS AND DISCUSSION

Results

From the research conducted, it can be seen the factors associated with the incidence of syphilis infection using univariate, bivariate, stratification and multivariate analysis. In table 1 it can be seen the characteristics of the respondents.

Table 1 Bivariate Analysis of Factors Associated with Syphilis Infection in MSM

Variable	Positive Syphilis		Negative Syphilis		Total		PR (95% CI)	P-Value
	N	%	N	%	N	%		
Age (Years)								

15-19	6	5,3	107	94,7	113	100	1,0	
20-24	61	15,1	343	84,9	404	100	2,84(1,22-6,57)	0,015
25-29	77	19,7	314	80,3	391	100	3,70(1,61-8,51)	0,002
≥ 30	91	15,5	496	84,5	587	100	2,92(1,27-6,67)	0,011
Level of education								
Low	50	15,5	283	85,0	333	100	0,94 (0,70-1,25)	0,739
High	185	16,0	974	84,0	1159	100	1,0	
HIV Status								
Positive	100	25,9	286	74,1	386	100	2,12(1,68-2,68)	0,001
Negative	135	12,2	974	87,8	1109	100	1,0	
Condom Use								
Inconsistent	120	17,0	585	83,0	705	100	1,13 (0,86-1,49)	0,392
Consistent	68	14,9	387	85,1	455	100	1,0	
Drug Use								
Ever	19	17,3	91	82,7	110	100	1,09(0,71-1,67)	0,789
Never	212	15,8	1129	84,2	1341	100	1,0	
Alcohol								
Yes	70	16,5	353	83,5	423	100	1,06 (0,82-1,38)	0.666
No	165	15,5	901	84,5	1066	100	1,0	
Number of sex partners (men in the last month)								
>1 person	88	15,2	492	84,8	580	100	0,94 (0,74-1,20)	0,697
0-1 person	147	16,1	768	83,9	915	100	1,0	
STI check								
Never	156	14,7	904	85,3	1060	100	).77 (0.60-0,99)	0,053
Ever	76	19,0	323	81,0	399	100	1,0	

Based on the results of the previous multivariate analysis, the ims examination variable had a p-value > 0.05 so that it was then excluded from the model. Furthermore, the drug variable was also excluded from the model because the p value of drugs = 0.189 so that the final multivariate model was obtained as shown in the following table:

Table 2 Final Multivariate Model Predictors of Syphilis Infection in MSM

Variable	B	*SE*	PR(95% CI)	*P-Value*
HIV Positive Status	*0,72*	*0,13*	2,05 (1,58-2,66)	0,0001
HIV Negative status			1,0	
Alcohol	*0,31*	*0,15*	1,37 (1,01-1,86)	0,042
No Alcohol			1,0	
Age (Years)				
15-19	*0,89*	*0,42*	1,0	0,034
20-24	*1,10*	*0,42*	2,45 (1,07-5,64)	0,010
25-29	*0,88*	*0,43*	3,01 (1,30-6,95)	0,040
≥30			2,42 (1,04-5,65)	
Low Education	*0,37*	*0,18*	1,45(1,02-2,06)	0,038
Higher education			1,0	
Education*Alcohol	*-1,27*	*0,41*	0,28 (0,12-1,63)	0,002

From table 2 it can be seen that the variables in the model have a p value <0.05 so that the final model is obtained as a predictor of the incidence of syphilis infection.

In this study, the education variable interacts with alcohol, so that the interaction PR value can be calculated as below.

Table 3. PR Interaction Calculation Results

Variable	Alcohol	No Alcohol
Low Education	PR_{11} = 0,47	PR_{10} = 1,34
Higher Education	PR_{01} = 1,40	PR_{00} = 1

Encoding :
Alcohol (1=alcohol, 0=no alcohol), education (1=low, 0=high)
ICR = IC / Roo
= PR11- PR10- PR01+1
= 0,47-1,34-1,40+1
= -1,27

From the above results ICR If ICR < 0 then there is a subadditivity biological interaction in the multiplicative model with indications of antagonistic interactions.

The proportion of syphilis infection in MSM was 15.7%. This proportion is quite high when compared to the proportion of syphilis in MSM in the 2011 IBBS of 13%. From these data it can be seen an increase in cases of syphilis with initial syphilis symptoms that are general in nature such as all genital ulcers, exanthema without itching.

From the results of the study it was found that there was a significant relationship between the age group and the incidence of syphilis infection in MSM. Syphilis based on geographic distribution and prevalence of the disease is an infectious disease that is spread mainly in the young age group of 15-30 years (Chandra, 2013).

Discussion

The results of this study are in line with research by Patton and colleagues examining 2009 to 2012 data from MSM in 34 states and the County/City of Columbia and showing that the largest

percentage increase was in the age group among MSM aged between 25 and 29 years (53.2%, 1.073). (Abara et al., 2016)

From the results of the study it is known that there is a significant relationship between education and the incidence of syphilis infection with a prevalence ratio of 1.45 (95% CI 1.02-2.06) education, meaning that MSM who have low education are at risk of 1.4 times greater to experience syphilis compared to highly educated MSM

In a study conducted on MSM in Brazil, it showed that the prevalence ratio of the education level variable 10-12 years was 1.84 (95% CI 0.51-3.87) meaning that MSM with an education level of 10-12 years had a risk of 1.84 times experiencing syphilis incidence compared to MSM with an education level of > 12 years, as well as an education level < 9 years with a PR value of 1.56 (95% CI 0.51-4.74) meaning that MSM with an education level of < 9 years have a risk of 1.56 times for experienced the incidence of syphilis compared to MSM with an education level of > 12 years (Fernandes et al., 2015)

From the results of the study it was found that there was an interaction between education and alcohol with an ICR value of <0. It can be concluded that there is a subadditivity biological interaction in the multiplicative model with indications of antagonistic interactions. In this study, the interaction of education and alcohol on the incidence of syphilis canceled each other's effect, as MSM who had low education and had drunk alcohol in the last 3 months were not at greater risk than MSM who had higher education and had not drank alcohol in the last 3 months

From the results of the study it was known that there was no significant relationship between STI examination and the incidence of syphilis infection (p value = 0.053) with a PR of 0.77 (95% CI 0.60-0.99). Things to consider are MSM who have had an STI test in the last 3 months who are HIV positive, namely 27.8%, while those who have never had an STI test in the last 3 months who are HIV positive is 25.3%, so it can be seen that a larger proportion of MSM who HIV positive who have had an STI check. People with HIV are known to be more at risk of contracting diseases including syphilis, so they are more likely to have an STI test.

From the results of the study it was known that there was no significant relationship between the number of sex partners in the last month and the incidence of syphilis with a Prevalence Ratio of 0.94 (CI (95% 0.74-1.20).

Syphilis occurs in circumstances where there is a high turnover of sex partners. Commercial sex workers and other temporary individuals with multiple sex partners are at high risk. In a study in Central Brazil, MSM with sex partners > 10 people in the last week > 10 people were more at risk of experiencing active syphilis 3.69 times (95% CI 1.57-8.65) compared to MSM who had partners < 1 people. Likewise, MSM who have 2-10 partners are 1.15 (95% CI 0.52-2.55) more at risk of experiencing active syphilis compared to MSM who have <1 partner. (Fernandes et al., 2015)

The results showed that MSM who had HIV had a 2.05 times greater risk (95% CI 1.58-2.66) of developing syphilis than MSM who did not have HIV with a p-value of 0.0001. These results are in line with the results of a study at the AIDS Information and Prevention Center of Valencia, Spain with a cohort study design from 2000 to 2006, an odds ratio of 2.06 (0.73-5.82) for syphilis in MSM who are voluntary participants in the study. syphilis where MSM who are HIV positive compared to MSM who are HIV negative means that positive MSM are more at risk of suffering from syphilis than negative MSM (Hurtado et al., 2011)

The results showed that the relationship between drug use/injecting drugs did not significantly affect the incidence of syphilis (p-value = 0.78) with PR = 1.09 (0.71-1.67).

Identification of 32 published studies from LMI (Low and Middle Income Countries) countries reporting syphilis prevalence and sexual risk factors in drug users. The overall lifetime prevalence of syphilis ranged from 0.3% to 60.3% in a study of 14 LMI countries. High-risk sexual

behavior is common among drug users and awareness of the risk of transmission is low. High rates of sex work, sex with sex workers and MSM coupled with variable but generally low rates of condom use among drug users may contribute to the high prevalence of syphilis in LMI countries (Coffin et al., 2010)

The results of the multivariate analysis showed that the relationship between condom use and male sex partners was statistically less significant for the incidence of syphilis PR 1.13 (0.86-1.49) with p-value = 0.320.

In a study in China, it showed that there was a significant relationship between consistent use of condoms with male sex partners on the incidence of syphilis with a PR of 0.71 (0.64-079) compared to MSM who did not use condoms consistently with a p-value < 0,0001.

Sometimes sores can occur in areas not covered by a condom, so you can still get syphilis from contact with these sores, even if you're wearing a condom. Sometimes sores can occur in areas not covered by a condom, so you can still get syphilis from contact with these sores, even if you're wearing a condom. (*Centers for Disease Control and Prevention*, 2017)

In this study, it can be seen that there is a significant relationship between alcohol and the incidence of syphilis in MSM (p value = 0.042) with a Prevalence ratio of 1.37 (1.01-1.86) meaning that MSM who in the last 3 months have consumed alcohol until they were drunk before having sex is 1.3 times more risky than MSM who in the last 3 months have never consumed alcohol to the point of being drunk before having sex. In line with research in Beijing, namely using The Alcohol Use Disorders Identification Test (AUDIT) by the World Health Organization (WHO) to identify categories of alcohol drinkers, it appears significant for the High category (AUDIT=C=8-12) to be more at risk with PR 1 .96 (1.01-3.86) compared to non-drinkers (AUDIT=C=0).

As the AUDIT-C score increased, the probability of HIV infection or syphilis also increased significantly (both ptrend < 0.001; Association of drinking patterns and recent syphilis infection among men who have sex with men in Beijing, China (N = 3588) .Persons who have ever drank alcohol are at risk of 1.02 AOR 1.02 (95% CI, 0.80-1.33) compared to those who have not drank alcohol in the last 3 months for syphilis (Liu et al., 2016)

The results showed that there was no interaction between HIV status and condom use among MSM. However, seeing a substantial relationship related to the interaction of condom use and HIV based on data from some manufactures of latex condoms is lubricated using a small amount of nonoxynol-9, a spermicidal ingredient. So far it has been believed that nonoxynol-9 can prevent urinary tract infections (including HIV) but recent studies have shown that nonoxynol-9 increases the risk of HIV transmission. (Jatmiko et al., 2010)

The results of interaction calculations show that ICR > 0 means that there is a superadditivity biological interaction in the multiplicative model with indications of synergistic interactions. There is an interaction between inconsistent condom use in HIV-affected MSM which can increase the risk of syphilis in MSM.

CONCLUSION

The results of the analysis show that the proportion of syphilis infection in the MSM group in 10 districts/cities in Indonesia is 15.7%. There is a relationship between age and the incidence of syphilis infection in the MSM group with PR 20-24 years old 2.45 (95% CI 1.07-5.64), 25-29 years PR 3.01 (95% CI 1.30) -6.95), age > 30 years 2.42 (95% CI 1.04-5.65). There is a relationship between education level and the incidence of syphilis infection in the MSM group with PR 1.45 (95% CI 1.02-2.06). There is a relationship between HIV status and the incidence of syphilis infection in the MSM group with PR 2.05 (95% CI 1.58-2.66). There is a relationship between

alcohol and the incidence of syphilis infection in the MSM group PR 1.37 (95% CI 1.01-1.86). There is an interaction between education and alcohol with an ICR value of -1.27 and there is a biological interaction between condoms and HIV with an ICR value of 0.54.

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