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Factors Associated with Chlamydia Infection among Female Sex Workers in West Jakarta: Analysis of the 2018-2019 Integrated Biological and Behavioral Survey

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ABSTRACT

Background: Chlamydia is one of the most common sexually transmitted infections globally. Female sex workers (FSW), especially in urban areas, face a higher risk of infection due to their risky work environment and lifestyle. Jakarta is a city that has cosmopolitan and urban characteristics with an active sex industry. This research was conducted to determine the factors associated with the incidence of chlamydia infection among FSWs in West Jakarta.
Methods: The research was conducted using a cross-sectional design by analyzing data from the 2018-2019 Integrated Biological and Behavioral Survey (IBBS). The data were analyzed using univariate and bivariate analysis with the chi-square test. Prevalence ratio (PR) was used as the measure of association.
Result: Of the 283 FSWs involved in the study, the positivity rate of chlamydia infection in West Jakarta reached 42.8%. Significant risk factors for chlamydia infection among FSWs in West Jakarta include younger age, divorced status, recently becoming a sex worker, and having ≥ 5 customers per week.
Conclusion : The high rate of chlamydia infection among FSWs in West Jakarta highlights the need to increase outreach to FSWs in order to educate them about STIs and encourage them to perform regular screenings, especially for young FSWs.

Keywords: Sexually transmitted infections; chlamydia; female sex workers; sexual behavior

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Introduction

Sexually transmitted infections (STIs) are caused by more than 30 different bacteria, viruses, and parasites and are primarily spread through sexual contact, including vaginal, anal, and oral sex. According to the World Health Organization (WHO), the largest incidence of STIs comes from eight main infections, including syphilis, gonorrhea, chlamydia, trichomoniasis, HIV, hepatitis B, genital herpes, and *human papillomavirus* (HPV).[1] Chlamydia infection caused by the bacterium *Chlamydia trachomatis* is a public health problem throughout the world that affects the quality of life of millions of people, and causes serious illness and even death.[2]

Chlamydia is the most common bacterial sexually transmitted infection in the United States. Approximately 1.6 million cases of chlamydia were reported to the Centers for Disease Control and Prevention (CDC) in 2021.[3] The highest infection rates occur among teenagers and young adults of both female and male gender. Globally, the highest prevalence of chlamydia is in the American region, followed by Africa, and then Southeast Asia.[4]

Data regarding the prevalence of chlamydia in the general population in Indonesia is currently still limited, but prevalence is available in several key populations, namely female sex workers (FSW), men who have sex with men (MSM), and transgender people. Based on the 2018-2019 Integrated Biological and Behavioral Survey (IBBS) in Indonesia, the proportion of chlamydia infections in key populations is higher than the incidence of other STIs. Nearly a third of respondents from the FSW and MSM groups experienced chlamydia infection (31.1% and 27.1%). In addition, the proportion of chlamydia in the transgender population reached 13.9%.[5]

Globally, female sex workers face a disproportionate burden of STIs, including chlamydia. FSWs face a higher risk of infection because sex work occurs in the context of risky environments characterized by gendered power dynamics, and acts of violence that enable settings for unprotected sex with multiple high-risk sex partners.[6,7] The risks to sexual health that sex workers face are also influenced by the stigma and discrimination they face, as well as the legal and policy environment in which they operate.[8] Lifestyle-related factors such as alcohol and drug use can also increase the risk of infection in FSWs.[9]

In women, undiagnosed and untreated STIs can cause serious complications and long-term health problems. Chlamydia is a major cause of pelvic inflammatory disease and infertility in women. Chlamydia infection can also increase a person's risk of being infected with the human immunodeficiency virus (HIV). In addition, chlamydia in pregnant women can cause poor outcomes in babies, such as premature birth, low birth weight, eye infections, nasopharyngeal infections, and pneumonia.[10]

Jakarta is one of the main cities serving as Indonesia's point of entry, and this city has cosmopolitan and urban characteristics, with an active sex industry.[11] Prostitution has long been one of the things that fill the nightlife in Jakarta, whether in bars, clubs, karaoke places, or directly in prostitution centers.[12] FSWs who live in urban areas are at high risk of STIs, including chlamydia.[13] The 2018-2019 IBBS revealed that the chlamydia positivity rate among the FSW population in Indonesia was highest in West Jakarta (52.1%).

Based on these data, chlamydia infection is a health problem that threatens the FSW population. However, evidence and literature regarding risk factors for chlamydia infection in FSWs in Indonesia is still limited. A better understanding of the burden of chlamydia infections and its determinants is important to strengthen screening and intervention strategies. Therefore, this research was conducted to determine the factors associated with the incidence of chlamydia infection among FSWs in West Jakarta by analyzing secondary data from the 2018-2019 IBBS.

Methods

Study design

Using secondary data from the 2018–2019 Integrated Biological and Behavioral Survey (IBBS) conducted by the Ministry of Health of Indonesia, this study employed a cross-sectional design.

Inclusion and exclusion criteria

The inclusion criteria in this study include FSWs who were at least 15 years old; offering sexual services as a primary or additional source of livelihood in exchange for money, goods, or services; had sex with at least one customer in the past month; have lived in West Jakarta for at least one month; and have both behavioral and biological examination data related to chlamydia according to the variables studied. On the other hand, FSWs with missing data and a positive gonorrhea status were excluded from the study. Chlamydia and gonorrhea infections have comparable risk factors. Exclusion of FSW with positive status for gonorrhea was carried out to avoid bias, which could occur if in the group negative for chlamydia infection there were still FSWs infected with gonorrhea.

Data collection

The data used in this research is secondary data taken from the 2018-2019 IBBS. The data collected included behavioral data and examination of biological specimens. The research instrument used was the 2018-2019 IBBS behavior questionnaire.

Data analysis

Data analysis consisted of univariate analysis and bivariate analysis. The statistical test used is the chi-square test with $\alpha = 0.05$ and a confidence interval (CI) of 95%. If the analysis produces a *p* value <0.05, then there is a statistically significant relationship between the independent variable and the dependent variable. To determine the magnitude of the relationship between the independent variable and the dependent variable, the association measure used is the prevalence ratio (PR). Data preparation and analyses were conducted using SPSS version 22.

Ethical approval

This study was approved by the Ethics Committee of the Faculty of Public Health, Universitas Indonesia with the reference number KET-16/UN2.F10.D/3.05.01/2023. The dataset in this study was obtained by submitting a letter of request for the use of 2018-2019 IBBS data addressed to the Directorate of Prevention and Control of Infectious Diseases and the Head of the HIV and Sexually Transmitted Infectious (STIs) Department, Ministry of Health of Indonesia. The data obtained is solely utilized for research and does not include the respondents' personal information.

Results

Table 1 shows that the chlamydia infection positivity rate for the 283 FSWs in West Jakarta in 2018–2019 who were included in this study was 42.8%.

Table 1. Positivity rate of chlamydia infection among FSWs in West Jakarta

Chlamydia infection	Frequency (n)	Percentage (%)
Positive	121	42.8
Negative	162	57.2
Total	283	100

The sociodemographic characteristics of the participants are detailed in Table 2.

Table 2. Sociodemographic characteristics of the study participants

Sociodemographic characteristics	Frequency (n)	Percentage (%)
Age (in years)		
15 – 24	106	37.5
25 – 34	113	39.9
≥ 35	64	22.6
Education level		
Never attended school / primary school	48	17.0
Junior high school / equivalent	119	42.0
Senior high school / equivalent	109	38.5
College or university	7	2.5
Marriage status		
Not married	81	28.6
Divorced	138	48.8
Married	64	22.6
Total	283	100

Out of the 283 respondents, the majority of FSWs were young, with 113 (39.9%) and 106 (37.5%) of them being between the ages of 25-

34 and 15-24 respectively. FSWs from the older age group (≥ 35 years old), with 113 (39.9%), came in second. In terms of education level, 119 (42.0%) FSWs had junior high school education or equivalent, the highest percentage of FSWs, followed by 109 (38.5%) FSWs with high school education or equivalent. Based on marital status, the majority of FSWs were divorced (48.8%).

The results in Table 3 show that the *chi-square* test in the 15 – 24 and 25 – 34 year age groups produces p value < 0.001 and p = 0.009, respectively. Therefore, there is a statistically significant association between younger age and the incidence of chlamydia infection among FSWs. Based on the PR value, the younger the FSW, the greater the chance of contracting chlamydia. Aside from that, there is a statistically significant association between divorce status and the incidence of chlamydia infection among FSWs (p = 0.049).

Table 3. Bivariate analysis of sociodemographic factors and chlamydia infection among FSWs

Sociodemographic factors	Chlamydia infection				Total	*p-value*	PR (95% CI)
	Positive		Negative				
	n	%	n	%			
Age (in years)							
15 – 24	59	55.7	47	44.3	106	**<0.001**	2.54 (1.55 – 4.17)
25 – 34	48	42.5	65	57.5	113	**0.009**	1,94 (1.17 – 3.24)
≥ 35	14	21.9	50	78.1	64	ref	
Education level							
Low	68	40.7	99	59.3	167	0.478	0.89 (0.68 – 1.17)
High	53	45.7	63	54.3	116		
Marriage status							
Not married	36	44.4	45	55.6	81	0.147	1.42 (0.92 – 2.20)
Divorced	65	47.1	73	52.9	138	**0.049**	1.51 (1.01 – 2.26)
Married	20	31.3	44	68.8	64	ref	

PR = *prevalence ratio*, CI = *confidence interval*, ref = *reference*

Table 4. Bivariate analysis of behavioral factors and chlamydia infection among FSWs

Behavioral factors	Chlamydia infection				Total	*p-value*	PR (95% CI)
	Positive		Negative				
	n	%	n	%			
Age at first sex (in years)							
< 15	5	55.6	4	44.4	9	0.509	1.29 (0.71 – 2.35)
≥ 15	113	43.1	149	56.9	262		
Length of work							
≥ 10 years	8	24.2	25	75.8	33	**0.038**	0.49 (0.25 – 0.95)
5-9 years	23	32.4	48	67.6	71	0.087	0.65 (0.42 – 1.01)
2-4 years	67	50.4	66	49.6	133	1.000	1.01 (0.72 – 1.41)
≤ 1 years	23	50.0	23	50.0	46	ref	
Customers per week							
≥ 10	48	57.1	36	42.9	84	**0.001**	3.20 (1.42 – 7.24)
5-9	45	42.1	62	57.9	107	**0.032**	2.35 (1.03 – 5.37)
2-4	23	35.9	41	64.1	64	0.137	2.01 (0.85 – 4.75)
≤ 1	5	17.9	23	82.1	28	ref	
Condom use with last customer							
No	15	31.3	33	68.8	48	0.108	0.69 (0.45 – 1.08)
Yes	106	45.1	129	54.9	235		
Condom use with regular partner in the last month							
Consistent	44	40.4	65	59.6	109	1.000	1.06 (0.59 – 1.91)
Inconsistent	8	38.1	13	61.9	21		
Condom use with irregular partner(s) in the last month							
Consistent	24	50.0	24	50.0	48	0.891	0.94 (0.65 – 1.36)
Inconsistent	34	53.1	30	46.9	64		
Alcohol consumption before sex in the last three months							
Yes	54	44.3	68	55.7	122	0.746	1.06 (0.81 – 1.39)
No	67	41.6	94	58.4	161		
Drug use before sex in the last three months							
Yes	8	36.4	14	63.6	22	0.684	0.84 (0.48 – 1.49)
No	113	43.3	148	56.7	261		

PR = *prevalence ratio*, CI = *confidence interval*, ref = *reference*

The findings of the analysis in Table 4 show that the longer the FSW's work period, the lower the proportion of chlamydia infection. A significant association was found among FSWs who had worked for ≥ 10 years, with a PR value of 0.49 (95% CI: 0.25 - 0.95) and a *p-value* of 0.038. Furthermore, the study reveals a significant correlation between ≥ 5 clients per week and the incidence of chlamydia infection. The likelihood of contracting chlamydia increases with the number of FSW's clients per week.

Discussion

It was discovered in this study that 42.8% of FSWs in West Jakarta tested positive for chlamydia which is a relatively high infection rate. This result is different from the 2018-2019 IBBS final report, where the positivity rate for chlamydia infection in West Jakarta among FSWs reached 52.1%.[5] This difference occurred due to re-selection of samples from the 2018-2019 IBBS to meet the inclusion and exclusion criteria of this study.

The prevalence of chlamydia infections among FSWs in this study was higher than the prevalence in cities in other countries. A cross-sectional study conducted in a high-risk population in South Korea revealed that the prevalence of chlamydia infection in FSWs reached 10.9%.[13] Another study in Baltimore, United States showed that the prevalence of chlamydia infection in FSWs reached 15%.[14] In addition, research in Hawassa City, Ethiopia found a prevalence of chlamydia infection of 6.8% in FSWs.[15] These varying prevalence rates may be due to differences in study populations, distribution of sociodemographic risk factors, sampling, laboratory techniques used, and differences in the effectiveness of STI programs.[9]

The findings of this study are in line with the results of a prior study in Jiangsu, China where younger age was a significant risk factor for the occurrence of chlamydia infection among FSWs.[16] In this study, a high prevalence of chlamydia infection was found in FSWs aged < 25 years (Table 3). Another study on FSWs in Zambia showed similar results, where FSWs from the 18 – 24 year age group were 2.05 times more likely (p = 0.02) to be infected with chlamydia compared to FSWs aged 25 years and older.[17]

Key populations including young FSWs (15-24 years) are at high risk of contracting HIV and STIs due to high-risk sexual behavior, which often begins during this period.[18] In addition, the high risk of chlamydia infection in young FSWs may be related to the larger number of clients and the FSWs' lack of knowledge about STI prevention.[15] Younger FSWs face additional challenges related to stigma, discrimination, and criminalization as well as a lack of ability to negotiate condom use with sexual partners.[19,20] Younger FSWs also experience higher levels of sexual and physical violence due to unequal power dynamics and patriarchal social structures.[21] Biological factors also play a role; young women may develop cervical ectopy, a condition in which endocervical cells are found in the ectocervix. Cervical ectopy may increase susceptibility to chlamydia infection.[3]

Our study also found that compared to FSWs who were married, those who were divorced had a 1.51 times higher risk (95% CI: 1.01 – 2.26) of getting a chlamydia infection (p = 0.049). These results are consistent with a study in Hawassa, Ethiopia which showed that FSWs who were divorced had a 1.58 times higher chance of contracting chlamydia infection.[15] The lack of social and economic support for divorced FSWs can encourage them to engage in sex work and be exposed to sexual violence, which increases the risk of contracting chlamydia infection. Social isolation and sexual deprivation may also be the reasons behind their vulnerability to unprotected sex and high-risk sexual behavior.[22]

The length of time spent working as a sex worker is a factor that plays an important role in the incidence of chlamydia infection. In general, a woman who works as an sex worker for a longer period of time serves more sexual partners. This increases the risk of FSWs contracting STIs. According to research on FSWs in Iran, the length of prostitution has a significant correlation with the frequency of STIs; for every year that an FSW works longer, there is a 1% rise in the risk of STIs.[23]

This study, however, reveals contradictory findings, notably that FSWs who work longer are less likely to become infected with chlamydia. Working for ≥ 10 years was found to be a significant but protective factor in the group of FSW who had done so, with a PR value of 0.49 (95% CI: 0.25 – 0.95) and *p* value = 0.038 (Table 4). Similar findings were observed in research conducted in Baltimore, USA: FSWs with at least ten years of work experience had a lower probability of contracting chlamydia ($p < 0.001$), whereas FSWs who had only recently begun working in the commercial sex industry had a higher probability ($p = 0.003$).[14] Park et al. (2019) also conducted a study using an observational cohort technique, which revealed that FSWs with less experience who began working as street sex workers within the last year had a two to three times higher risk of chlamydia infection.[24]

The lower risk for FSWs who have worked longer may occur because customers tend to choose younger FSWs. Additionally, newly employed FSWs may be at higher risk of infection due to shorter duration in sex work indicating less exposure to outreach activities and limited experience of FSWs in negotiating condom use with clients.[25]

This study also discovered that FSWs are more likely to contract chlamydia if they serve a higher number of clients each week (Table 4). Research by Sherman et al. (2021) showed similar results, where FSWs who served ≥ 6 customers per week had a greater likelihood of experiencing chlamydia infection (AOR = 1.99; 95% CI, 1.18–3.35; $p = 0.004$). FSWs who have sexual relations with many customers within a certain period, in this case a week, certainly have a higher risk of contracting chlamydia infection. FSW clients generally have a high prevalence of HIV and STIs, less consistent level of condom use, and high levels of partner exchange.[26] Therefore, a high number of clients per week increases the vulnerability of FSWs to chlamydia infection.

This study has several limitations related to the use of secondary data from the 2018-2019 IBBS. There is the possibility of information bias including recall bias and social desirability bias in conducting surveys using behavioral questionnaires. Social desirability bias may occur in research that explores information about personal or sensitive topics.[27] This bias may cause respondents to be less likely to give socially appropriate answers and may make them look more favorable on questions related to risky sexual behavior.

Conclusions

Significant risk factors for chlamydia infection among FSWs in West Jakarta include younger age, divorced status, recently becoming a sex worker, and having ≥ 5 customers per week. Health promotion outreach to female sex workers needs to be increased by regional health offices to provide information about chlamydia and other STIs. Additionally, outreach needs to motivate FSW to perform routine screening, particularly for younger FSWs. Given the large weekly clientele of FSWs, STI education is also necessary for this community, with a focus on condom use as a means of promoting safe sexual practices.

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