

# Effect of Condom Use on Sexually Transmitted Infection in Female Sex Workers in Tulungagung District, Indonesia

## Pengaruh Penggunaan Kondom terhadap Kejadian Infeksi Menular Seksual pada Wanita Pekerja Seks di Kabupaten Tulungagung, Indonesia

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### Abstract

One effective strategy for preventing sexually transmitted infection (STI) incidence and providing protection for female sex workers (FSWs) from their sexual partners is correct and consistent condom use behavior. This study examined the effect of condom use on STI among FSWs in Tulungagung District, East Java. This analytic and observational study using a cohort prospective design was conducted at Ngujangan ex-prostitution area and Gunung Bolo prostitution area, Tulungagung District, from November to January 2017. The total sample selected was 90 FSWs. Data was collected through a set of questionnaires and tracking condom use in a diary. Data were analyzed by using Pearson's chi-square, t-test and logistic regression models at a significance of 0.05. Bivariate analysis with chi-square test showed that STI was affected by period of condom use, ratio of number of condom used to number of times the FSW had sex, condom use, age, number of customers, skill in using condoms, tariffs for sexual services, and length of working as an FSW. Results of multivariate logistic regression showed an influence in ratio of condom use to having sex, number of condoms, and number of customers. In conclusion, the incidence of STI is influenced by the ratio of condom use to having sex, number of condoms used, and number of customers in Tulungagung District.

**Keywords:** Condom use, female sex workers, sexually transmitted infection

### Abstrak

Salah satu strategi efektif untuk mencegah terjadinya infeksi menular seksual (IMS) dan memberikan perlindungan pada wanita pekerja seks (WPS) dengan mitra seksualnya adalah dengan perilaku penggunaan kondom yang benar dan konsisten. Penelitian ini bertujuan menguji pengaruh penggunaan kondom terhadap IMS pada WPS di Kabupaten Tulungagung, Jawa Timur. Penelitian observasional analitik dengan desain penelitian kohort prospektif ini dilakukan di eks lokalitas Ngujangan dan tempat prostitusi Gunung Bolo, Kabupaten Tulungagung pada bulan November sampai Desember 2017. Sampel sebanyak 90 orang terpilih. Pengumpulan data menggunakan kuesioner, daftar penggunaan kondom dan lembar catatan harian penggunaan kondom. Analisis statistik dilakukan dengan uji kai kuadrat Pearson, uji t dan model regresi logistik pada tingkat signifikansi 0.05. Analisis bivariat dengan uji kai kuadrat menunjukkan bahwa kejadian IMS dipengaruhi oleh periode waktu menggunakan kondom, rasio penggunaan kondom dengan hubungan seks, penggunaan kondom, usia, jumlah pelanggan, keterampilan penggunaan kondom, tarif layanan seks, dan lama bekerja menjadi WPS. Hasil multivariat dengan regresi logistik menunjukkan adanya pengaruh rasio penggunaan kondom dengan hubungan seks, jumlah kondom yang digunakan, dan jumlah pelanggan. Sebagai kesimpulan, IMS dipengaruhi oleh rasio penggunaan kondom dengan hubungan seks, jumlah kondom yang digunakan, dan jumlah pelanggan di Kabupaten Tulungagung.

**Kata kunci:** Penggunaan kondom, wanita pekerja seks, infeksi menular seksual

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## Introduction

Sexually transmitted infection (STI) is a global public health problem. STI is caused by more than 30 bacteria that have a direct impact on sexual and reproductive health. The high prevalence of STI is related to the lack of prevention behavior among at-risk populations such as female sex workers (FSWs).<sup>1,2</sup>

Direct FSWs are women who openly sell sexual services in the street or other prostitution areas. Indirect FSWs are women who have other main jobs but operate as disguised commercial sex peddlers through entertainment venues such as massage parlors or karaoke rooms. FSWs play an important role in the incidence of pandemic STI/HIV. A systematic review and meta-analysis published in 2012 concluded that FSWs were at a greater risk of having STI/HIV compared with non-FSWs. A study in Kenya estimated that FSWs and sexual partners accounted for 14% of STI/HIV incidence. Openly commercial sex behavior nowadays is resulting in an increased number of FSWs, creating a rapidly increasing impact of STIs.<sup>3,4</sup>

HIV prevention programs in Indonesia and other countries have implemented a variety of strategies to increase safe sex behavior by FSWs. The core strategy is to promote the correct and consistent use of condoms across all activity. HIV/STI prevention programs should be applied for more than 80% of FSWs. Thus, building capacity for FSWs to improve their negotiation skills with their sexual partners should receive more attention. However, some literature indicate that the practice of anal sex, alcohol consumption, number of sexual partners, frequency of having sex, drug use (including injecting drugs), sexual transactions with sexual partners, sexual counseling, sexual tariffs, and old or new FSW status are important factors that also affect the incidence of STIs. Hence, STI prevention and treatment should be improved in consideration of its determinants.<sup>1,5,6</sup>

An empirical study in Mobasa, Kenya showed that more than two-thirds of FSWs have been involved in a high-risk sexual behavior. Their most common characteristics were older age (older than 35 years), married, working as a FSW for more than 10 years, and having three sexual partners in a day. The younger FSWs tend to show the most inconsistent use of condoms and the older FSWs are more likely to drink alcohol before having sex.<sup>5</sup>

This study aimed to examine the effect of condom use on STI among FSWs. The findings from this study could be used to assist in the implementation and evaluation of STI control programs, as well as to find a proper solution for the prevention and treatment of STI/HIV cases.<sup>7</sup>

## Method

This was observational, using a prospective cohort.

The population was all FSWs in Tulungagung District. The samples were 90 and 50 FSWs at Ngujang ex-prostitution area and Gunung Bolo prostitution area, respectively. This study employed purposive sampling to select the study location, and total sampling to select samples. Ngujang ex-prostitution area and Gunung Bolo prostitution area were then selected as locations of study.

The Ngujang ex-prostitution area was selected because it is one of the largest ex-prostitution area in Tulungagung District. In general, this area consists of a guesthouse with a total of 80–100 FSWs who have tariffs within the range of IDR 200,000 to IDR 80,000 for each transaction. Gunung Bolo was selected as a unique and interesting representative of prostitution because of its Chinese cemetery place. Each FSW has their own space for Chinese cemetery plots and sexual transactions with cheap tariffs in the range of IDR 15,000 to IDR 30,000.

This study used the total sampling to select respondents who were available for on-site research. Respondents met the following inclusion criteria: FSWs who were willing to be respondents, who were available at the time of the study, and who could read and write. Exclusion criteria for this study included FSWs who withdrew from the study or who had incomplete observations and/or STI tests. Observations were recorded every day using a sheet diary for 28 days.

The principal investigator checked the diary every day for a month to obtain information about condom use and sexual behavior such as oral/vaginal sexual activities and consistency of condom use. Statistical analysis was performed with Pearson chi-square test, t-test, and multivariate analysis with logistic regression. This study obtained ethical clearance No.832/X/HREC/2016.

## Results

The characteristics of FSWs in Tulungagung District include age, number of sexual partners, condom use, tariffs for sexual services, and the length of time working as an FSW.

Age was another factor that influenced STI incidence. The average age of positive STI-infected respondents was 47 years. Negative STI-infected respondents had an average age of 38 years. A statistical test using t-test obtained p-value < 0.001; hence, there was a significant influence of age on STI incidence.

The monthly average number of FSWs' customers who had positive STI results was 94, at an average of 3–4 customers per day. For those with negative results, the monthly average was 55 customers, with an average of 1–2 customers per day. The results of statistical tests using t-test obtained p-value 0.001; hence, there was a significant influence of number of customers on STI incidence.

The majority of respondents who had good condom

**Table 1. Characteristics of Female Sex Workers in Tulungagung District, East Java, Indonesia**

Other Factors Affecting STI Incidence	Category	STI		OR (95% CI)	p-Value
		Positive	Negative		
Age		47.37 ± 6.27	38.01 ± 7.86		<0.001*
Number of sexual partners	Month	93.95 ± 46.32	54.80 ± 20.27		<0.001*
	Day	3.42 ± 1.68	1.90 ± 0.76		<0.001*
Skill of using condom	Good	8 (13.8)	50 (86.2)	0.31 (0.11–0.87)	0.022*
	Not good	11 (34.4)	21 (65.6)	Ref	
Tariffs for sexual services	<IDR 80,000	19 (51.4)	18 (48.6)	0.49 (0.35–0.68)	<0.001*
	IDR 80,000	0 (0.0)	53 (100)	Ref	
The length of time working as an FSW	Dichotomy	88.42 ± 44.04	43.80 ± 43.80		<0.001*
	>12 months	16 (28.1)	41 (71.9)	0.26 (0.07–0.96)	0.033*
	≤12 months	3 (9.1)	30 (90.9)	Ref	

Notes:

\*A significant statistical result with Pearson’s chi-square and t-test, FSW = Female Sex Workers, STI = Sexual Transmitted Infection

**Table 2. Effect of Condom Utilization on Sexual Transmitted Infection (Temporal Period Using Condom Use, Ratio Condom Use, Condom Use)**

Condom Utilization	Variable	Category	STI		OR (95% CI)	p-Value
			Positive	Negative		
Temporal period start	Time using condom	≤3 months	4 (66.7)	2 (33.3)	0.11 (0.12–0.65)	0.005*
		>3 months	15 (17.9)	69 (82.1)	Ref	
Ratio of condom use with having sex	Month		51.42 ± 19.99	74.83 ± 14.2	NA	<0.001*
	Day		0.47 ± 0.51	0.93 ± 0.26	<0.001*	
	Dichotomy	≥50%	9 (12)	66 (88)	4.67 (4.08–52.7)	<0.001*
Condom use	Dichotomy	<50%	10 (66.7)	5 (33.3)	Ref	
		Yes	18 (20.2)	71 (78.9)	4.94 (3.27–7.5)	0.052
		No	1 (100)	0 (0.0)	Ref	
Number of condoms	in 2 weeks		24.37 ± 12.78	20.61 ± 8.33	NA	0.125
	Day		1.84 ± 0.90	1.54 ± 0.63	NA	0.90*
New condom used	Dichotomy	Yes	18 (20.2)	71 (78.9)	4.94 (3.27–7.5)	0.052
		No	1 (100)	0 (0.0)		

\*A significant statistical result with Pearson chi-square and t-test

use skills with mostly negative STI results 50 or 86.2% (p-value 0.022). There was a significant influence of condom use skill on STI incidence by 0.31 times (95% CI 0.11–0.87). The FSWs who had a sexual services tariff IDR 80,000 gave a negative STI result were 53 or 100% (p-value 0.001). Hence, there was a significant influence of sexual services tariff on STI incidence by 0.49 times (95% CI 0.35–0.68).

The average length of time respondents worked as FSWs with positive STI results was 88.42 ± 44.04, and 43.80 ± 43.80 for negative results. The t-test obtained p-value 0.001; hence, the length of working as an FSW influenced STI incidence. This is in accordance with dichotomous data where the majority of respondents who had worked more than 12 months also had negative STI results, obtaining 41 or 71.9% (p-value 0.033) (Table 1).

The majority of respondents who already used condoms for more than three months had mostly negative STI results of 69 or 82.1% (OR 0.11; p-value –0.005; CI 0.12–0.65). Length of condom use was related to STI incidence. The longer the condom use, the lower was the

STI incidence.

The ratio of condom use while having sex on positive STI test results obtained a monthly average of 19.99% ± 51.42 and a daily average of 0.47 ± 0.51%; meanwhile, the negative STI test results obtained a monthly average of 74.83 ± 14.2% and a daily average of 0.93 ± 0.26% with p <0.001. There was a significant influence of the ratio of the condom use while having sex to STI incidence. Based on the dichotomous results, most FSWs used condoms with a ratio of 50% (p-value = 0.001). There was a significant influence of the ratio of condom use on STI incidence by 4.67 times (95% CI 4.08–52.7).

The FSWs used condoms with negative STI results were 71 or 78.9% (p-value 0.052). There was no significant influence of condom use on STI incidence. Those with positive STI results had a monthly average of 42.47 ± 22.42, with a daily average of 1.84 ± 0.90, while negative STI results had a monthly average of 36.73 ± 13.12, with a daily average of 1.54 ± 0.63 condoms with p-value 0.160. There was no significant influence of the number of condoms used on STI incidence. The respondents who used new condoms with negative STI

**Table 3. Effect of Condom Use and Other Factors on Sexually Transmitted Infection**

Variable	Exp B OR (95% CI)	p-Value
Measurement scale of ratio of condom use with having sex	1.26 (1.006–1.576)	0.045
Number of condoms	0.69 (0.507–0.936)	0.017
Number of new condoms	0.87 (0.639–1.173)	0.351
Age	1.05 (0.929–1.191)	0.422
Number of sexual partners	1.282 (0.077–4.713)	0.011
Skill of condom use	0.602 (0.077–4.713)	0.629
The length of work	0.996 (0.974–1.019)	0.731

results, obtaining 71 or 78.9% (OR 4.94; p-value 0.052; CI 3.27–7.5). There was no significant influence of new condom use on STI incidence (Table 2).

The results of multivariate analysis associated with STI incidence were obtained from nine independent variables. There were three significant results: the ratio measurement scale of condom use (p-value 0.045); the number of condoms (p-value 0.017); and number of sex customers (p-value 0.001) that have a significant influence on STI incidence. However, variables were excluded from the model, including sexual services tariffs and temporal period of condom use due to their extreme precision values. Insignificant variables were kept and included in the model because their precision values were good; hence, the variables were likely not significant because of less number of samples. With more samples, heterogeneous data would be obtained that allowed it to be significant (Table 3).

## Discussion

This study found that most FSWs had negative STI results with a monthly average use of condoms at 74.83% (SD  $\pm$  14) and a daily average of 0.93 (SD  $\pm$  0.3; p-value < 0.001). The results of dichotomous data showed that most had a ratio of condom use >50%, and multivariate results with OR 1.26 (CI 1.006–1.576 and p-value 0.045). Hence, the ratio measurement scale (the ratio of condom use with having sex) influenced STI incidence, where the higher the ratio of condom use, the lower the rate of STI incidence.

The ratio of condom use to having sex is the same as measuring the consistency of using condoms. The majority of respondents were using condoms, although there were still some who rarely used condoms in sexual transactions. In fact, the most inconsistent condom use usually occurred with indirect FSWs or illegal prostitutes, because most of them worked as FSWs due to economic reasons; therefore, they cannot refuse to engage in sex if their sex partners are unwilling to use condoms. This is supported by the study conducted by Li et al,<sup>8</sup> it found that a fairly high proportion of indirect FSWs (FSWs that usually exist as illegal prostitutes) have the most inconsistent level of condom use.

A study by Fonner *et al*,<sup>7</sup> states that five studies reported results in the form of a ratio of sex acts using condoms to the total number of sex acts. Consistent condom use is categorized by the number of protected sex acts being nearly the same as the number of overall sex acts. The VCT intervention study was measured using the ratio of condoms per couple, with a regular condom use defined as when both members of the couple reported a ratio of above 0.90 condoms. The obtained results were that fewer than half of the respondents used condoms consistently and had a low risk of STI.

The large number of respondents who were already using condoms has made it easier for them to receive information from health workers in the form of counseling and leaflets, although most of them are elementary school educated. Condom use alone is not effective in preventing STI when its use is not routine, correct, and consistent.

There were also several FSWs who offered to use condoms in sexual transactions with their customers, but most of their customers refused the offer. There were many cases of FSWs who used condoms, but the results of STI tests were positive because, after being examined, it was clear that the majority of them did not use condoms routinely and consistently for various reasons; hence, the ratio between condom use and sexual intercourse was < 90%. Few or no respondents showed consistent use of condoms because all respondents used condoms in sexual transactions only if their customers wanted to do so or offered to do so. This study aligns with the results of a study by Ghimire *et al*,<sup>9</sup> in Nepal, which concluded that FSWs are reluctant to use condoms due to helplessness (low self-efficacy) and poverty.

This study found that dichotomous data for condom use in which most respondents used condoms and for whom STI results were mostly negative was 71 (78.9%). Respondents who had positive STI results apparently used the higher number of condoms at 44.47  $\pm$  22.99 (monthly) compared with the negative results at 36.64  $\pm$  13.47 (monthly). The multivariate analysis obtained the results of OR = 0.69 (95% CI = 0.936 0.507 with p-value 0.017) meaning that the number of condoms influenced the incidence of STIs.



The right and consistent use of condoms can be measured by observing sexually active people; thus, the number of condoms used must comply with the occasion of sexual intercourse, or, the minimum limit for those not using condoms is 10% of the total number of sexual intercourse occasions.<sup>10</sup>

There was an influence of condom use on STI incidence; most FSWs had used condoms with negative STI results. However, the highest incidence of condom use was found with FSWs who had positive STI results. This is because FSWs claimed to be more careful in serving customers by using condoms, but only during the healing period. After being declared positive, they typically returned to their previous behavior of carelessly receiving customers and carrying out sexual transactions without using condoms. A study by Vandenhoudt *et al*,<sup>2</sup> also concluded that condoms were associated with a decreased risk of HIV and STI infection. Its analysis of condom use explained that HIV/STI-infected women reportedly had a higher percentage of condom use. This suggests that counseling, specifically for HIV and STI in women who have already been infected, does have a positive impact on condom use.

Many FSWs in this study reported that they sometimes did not use condoms because they believed that some customers might not have STI. They believed that even if they did not use condoms, they would not get STI. FSWs reported that they judged their customers by body cleanliness, face, and general appearance. Customers who are attractive, have pretty faces, are clean, and who smell good are believed to not have infections.

This statement also agrees with study by Kawangung,<sup>11</sup> which stated that one of the reasons sex workers or customers not using condoms is because a feeling of trust exists for each other. They feel more secure because of a long-time or loyal relationship between FSWs and certain customers. In addition, FSWs showed reluctance to use condoms for financial reasons. That is, they fear losing customers if they demand condom use, which would reduce their income. Another study conducted by Jie *et al*,<sup>12</sup> reported that personal assumptions, feelings for loyal partners, and financial incentives are all factors that cause barriers to condom use by sex workers in China.

Considering that there are no medicines or other interventions to prevent STI, consistent condom use during sexual intercourse is the most effective way to prevent STI transmission, other than sexual abstinence. The high incidence of STI is due to visitors who do not use condoms and FSWs' willingness to serve guests even when they do not use condoms.

This study found the dichotomous data that most of the respondents had used new condoms with negative

STI test results were 71 or 78.9% (OR 4.94, CI 3.27–7.5, and p-value 0.052). Multivariate results with logistic regression found OR 0.87 (CI 0.64–1.17, and p-value –0.351); hence, it cannot be concluded that there was a significant relation between the use of new condoms and STI incidence.

The results of respondents' use of new condoms returned a balance of positive and negative STI results, where almost all respondents used new condoms during every sexual transaction. This aligns with the use of condoms according to the condom checklist, where it is explained that a new condom must be used for each customer service. However, there are still FSWs with positive results even though they used new condoms because of other reasons, such as non-routine and inconsistent use of condoms. The use of condoms was adjusted to customer demand. Many FSWs carried condoms with them, but did not use them. In fact, condoms were always routinely divided among FSWs by their respective managers, and if someone runs out of condoms, they are welcome to immediately ask the management for more. However, this still does not optimize condom use. The reality is that the main cause for use or non-use is the customer.

Other factors influencing STI incidence include age, number of customers, skill in using condoms, and length of working as an FSW. This study showed that the average age for respondents with positive STI was  $47.37 \pm 6.27$  years, while the average age for those with negative STI was  $38.01 \pm 7.86$  years with p-value < 0.001. The results of multivariate analysis with logistic regression obtained OR 1.05 (CI 0.929–1.191, p-value 0.422 from the p-value and 95% CI) seen, the probability of data precision was not good enough. If the number of samples was added, the significance of influence on age to STI incidence could be concluded. Older FSWs would increase the STI incidence. This aligns with the study by Mahaputra *et al*,<sup>13</sup> which stated that approximately 51% of FSWs are involved in risky sexual practices. The average age for FSWs is >35 years; most of them have already worked for so long that they have many partners who are vulnerable to STIs. In addition, older FSWs who are married and have been working for long periods of time typically have sexual intercourse with partners three or more times per day, and tend to have the riskiest sexual behavior.

This study found that the average number of customers for respondents with positive STI was  $93.95 \pm 46.32$  people/month or  $3.42 \pm 1.68$ /day, while the average number for those with negative STI was  $54.80 \pm 20.27$  people/month or  $1.90 \pm 0.76$ /day, (p-value < 0.001). Multivariate results with logistic regression obtained OR 1.282 (CI 1.060–1.551, p-value 0.011) meaning that the number of sex customers influenced STI

incidence. Younger FSWs tend to have more sexual partners, but they usually limit the total number of customers. If they have enough money, many FSWs will stop making transactions, unlike older FSWs who want to wait for their guests even until the early mornings. Almost 90% of younger FSWs had boyfriends; with a non-commercial partner such as a boyfriend or husband, FSWs typically did not use condoms while having sex because the boyfriend or husband is considered a life partner and is, therefore, trusted. This creates a high risk of STI for FSWs. These results are consistent with Mahaputra *et al.*,<sup>13</sup> study from India, which indicated that consistent condom use is quite high with commercial partners, but it remains low with non-commercial partners such as boyfriends, husbands or partners. The proportion of FSWs involved in simultaneous relationships with commercial and non-commercial partners results in faster transmission of STI/HIV infection.

This study found data showing that most FSWs have skills in good condom use, with negative STI results of 50 (86.2%). The results of multivariate analysis with logistic regression found OR 0.602 (CI 0.077–4.713, p-value 0.629), hence there was no significant influence of the skill of using condoms on STI incidence.

This aligns with the results of a study by Febiyantin *et al.*,<sup>14</sup> showing that age, number of customers, knowledge, and length of work are related to the STI incidence. Meanwhile, level of education, attitude, preventive practices of condom use, and health checks did not influence STI incidence. FSWs' skills were obtained using a checklist for condom use that was directed at the FSWs; however, the data may not be able to accurately represent the actual skill of using condoms. This is in part because, when asked, many FSWs claimed they had forgotten. Many said they had known about condoms for a long time, but they had forgotten much about good and correct condom use. Most of them reported that they forgot to check the expiration date, consequently, some respondents even received torn condoms. This aligns with Widyastuti *et al.*,<sup>15</sup> theory that expired condoms easily tear, allowing fluid to touch genitals, resulting in infected skin lesions that can transmit STIs; clearly, this type of condom use is ineffective.

This study found data showing that most FSWs who have worked more than 12 months at 41 (71.9%) with negative STI results. The results of multivariate analysis obtained were OR 0.996 (CI 0.974–1.019, p-value 0.731). If viewing p-value and 95% CI, the data precision most likely is not significant. If the number of samples is added, it can be concluded that the influence of the working period does influence STI incidence. The longer the period of working as an FSW increases STI incidence. This is according to study by Mahaputra *et al.*,<sup>13</sup> which

showed that FSWs who have worked for 10 years or longer and have three or more clients per day are more likely to engage in anal sex as compared with their peers. Similar findings were noted in another study in East Africa showing that 62% of FSWs working for 10 years or longer and aged 35 years or older are more likely at risk. Evidence suggests that younger FSWs get fewer clients to serve compared with older FSWs. Therefore, FSWs who succumb to their client's demands relating to type of sex, especially anal sex, location of sex, or alcohol consumption before and/or during sex are the most at risk for STI incidence.

### Conclusion

This study found that age, number of sex customers, skill at using condoms, tariff for sexual services, length of working as an FSW, and the measurement scale for the ratio of number of condoms used all influence STI incidence.

### Recommendation

Based on this study, it is recommended to provide condoms for at-risk groups, testing for STIs in FSWs engaged in undercover prostitution, evaluating 100% condom use regularly and continuously, running STI examination programs, especially on undercover prostitution, mobilizing Peer Educators to be more active in working to improve the correct, routine, and consistent use of condoms to effectively prevent STI incidence.

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