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THE CORRELATION BETWEEN EDUCATIONAL LEVEL AND INCIDENCE OF SYPHILIS AMONG FEMALE SEX WORKERS WITHIN 7 CITIES IN INDONESIA IN 2007

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ABSTRACT

Background: Syphilis is a chronic disease that may cause disability among patients and the child that is delivered by the patient. It is a sexually transmitted disease (STD), caused by Treponema pallidum. Syphilis may increase transmission of HIV/AIDS. The objective of this article is to reveal prevalence of syphilis and its risk factors among Female Sex Workers (FSWs) in 7 cities in Indonesia in 2007. Methods: The data analyzed in this article is derived from cross sectional study among FSWs in 7 cities in Indonesia in 2007. The respondents were chosen by cluster random sampling from Kupang, Samarinda, Pontianak, Yogyakarta, Timika, Makassar and Tangerang. Blood specimens were collected from respondents who fulfilled the inclusion criteria. The Diagnosis of Syphilis confirmed in accordance with the results of Rapid Plasma Reagen (RPR) and Treponema Pallidum Haemaglutination Assay (TPHA), and the educational data were collected by using structured questionnaire. Results: There were 1750 respondents who had the complete data, 12,2% respondent were diagnosed as Syphilis. The highest prevalence of Syphilis was in Makassar (64,5%). Indirect FSWs had infections 2,22 times higher compared to direct FSWs (RRa = 2,22 ; 95% CI = 1,67 – 2,96 ; p = 0,000). FSWs that never had formal study had 2.48 times higher incidence of syphilis compared to the high school graduates and university degree holders [Adjusted Relative Risk (RRa) = 2,84 ; 95% CI = 1,46 – 5,52 ; p = 0.002].Conclusion: Lack of knowledge because of low education among FSWs and no clinical symptoms in the early stage of syphilis makes its prevalence remained high. The Risk of syphilis among indirect FSWs was higher than the direct ones because of the difficulty to be reached by STD controlling programed.

Keywords: Syphilis, Female sex workers, Indonesia.

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Contribution/ Originality

This study is one of the few studies which have investigated correlation between syphilis incidence and education level within female sex workers in Indonesia. It uses the Cox regression method backward hierarchy elimination (BHE) for the statistical analyses.

1. INTRODUCTION

Sexually transmitted diseases (STD) and reproductive tract infection (RTI) have been known to facilitate HIV transmission. A high prevalence of STD in a population is an early indication of the risk of the HIV transmission, even the HIV prevalence in the region is low. Syphilis, cancroid, and herpes simplex virus type-2 infection are STDs with ulcer manifestation in genital thus increases HIV transmission. Improving STD controlling has proven effectively in lowering the incidence of HIV in the population [1].

Syphilis is caused by *Treponema pallidum*. Clinical manifestation in early infection is painless ulcer in local infection. Clinical manifestations in advance stage are cardiovascular disorder, neurologic disorder, and gummatous syphilis in several organs like skin, bone, liver, and upper respiratory tract. Syphilis in pregnant women may cause abortus, still birth, premature, low birth weight infant, and congenital syphilis [2].

Total Prevalence of syphilis in high risk population based on 2005-survey within 10 cities in Indonesia was 9%, while the prevalence in each city varies [3]. Based on a research in Africa that conducted 1991-1994 in rural population revealed that syphilis prevalence among man was 7.5% and 9.1% among women, the high prevalence of syphilis and HIV among FSW in Africa [4]. It shows that we also needs to concern in this group since the effects of syphilis in pregnant women can cause congenital syphilis.

The increase in cases of HIV-AIDS in China was also showed an increase in cases of syphilis resulting in increased cases of congenital syphilis in 2005, therefore, the relationship of syphilis-HIV- congenital syphilis need to be aware, especially in the Female Sex Worker (FSW) with a high prevalence of syphilis.

The magnitude of the problem caused by this disease requires special attention to control it. Early detection used serology examination, followed by a case management is expected to break the chain of transmission and to reduce the prevalence of syphilis in Indonesia. Higher Education will make FSWs understand to live in a clean, safe, and healthy behavior thus reducing the risk factors to be infected with STD.

The aim of this article is to define prevalence and risk factor of syphilis among FSWs, especially correlation between syphilis incidence with type of FSWs and education level within several cities in Indonesia in 2007.

2. METHODS

The data analysis used in this article was derived from cross sectional studies among FSWs in Kupang, Samarinda, Pontianak, Yogyakarta, Timika, Makassar, and Tangerang in 2007. The respondents were selected by cluster random samplings from 1750 FSWs consists of 1286

(73.5%) direct FSWs and 464 (26.5%) indirect FSWs. Direct FSWs are women whose profession mainly as sex workers. Indirect FSWs are women whose profession not only as a masseur/ladies club at karaoke/waitress but also give sexual services to their customers.

The survey aims to determine the prevalence of syphilis, gonorrhea, chlamydiasis, herpes simplex type 2, trichomoniasis, bacterial vaginosis, and candidiasis as well as demographic characteristics and high-risk behaviors among FSWs in 7 cities. This 2007-survey was an expansion of surveys conducted in 2003 and 2005 within 13 different cities. Thus, the outcome can complete the previous survey data.

This study was conducted using a cross sectional design, focused on direct or indirect FSWs with an age of 15-50 years, neither menstruating nor pregnant. Prior to implementation, we set the sample frame using secondary data from the cities' health agency and non-governmental organizations working as an outreach in FSWs localization. The respondents were selected from the first 250 FSWs who were invited and met inclusion criteria.

The survey began with initial interviews to the respondents by the researcher, and then followed by a physical examination. For syphilis examination, 5 ml of venous blood was taken by medical personnel.

The diagnosis of syphilis used the rapid plasma regain examination (RPR) and treponemal antibody haemaglutination pallidum (TPHA) in the plasma of respondents as a nontreponemal and treponemal serologic test. Respondents diagnosed with syphilis if the RPR titer results obtained ≥ 1: 2 and TPHA positive. After the laboratory results obtained, respondents were counseled and treated in accordance with the results of a simple laboratory examinations and health workers.

The risk factors were obtained through interviews with a structured questionnaire. Explorations of the risk factors in this study were demographic factors, history of previous sexual transmitted infection (STI), sexual behavior, and treatment seeking behavior.

The data analysis was conducted at the Center for Biomedical and Pharmaceutical, National Institutes of Health and Research Development, Ministry of Health. Data were analyzed using STATA version 9.0, with the Cox regression method backward hierarchy elimination (BHE).

This study has received ethical clearance from the Ethics Commission and the Development Agency research permit from the Ministry of Internal Affairs.

3. RESULTS

Table 1 shows Syphillis prevalence among direct and indirect FSWs within Yogyakarta, Tangerang, Kupang, Pontianak, Samarinda, Makassar, and Timika in 2007. All respondents in Tangerang were direct FSWs.

Total prevalence was 12.2%, and mostly found among indirect FSWs, as much as 19.2%. The highest prevalence of syphilis was found in Makassar (55.2%) and mostly in the indirect FSWs (53%). The lowest prevalence of syphilis was found in Samarinda as much as 0.8%.

Tabel-1. Syphilis prevalence among direct and indirect FSWs within 7 cities in 2007

Provinces	Type of FSWs	Syphillis
Yogyakarta	Direct (n= 215)	10 (4.7%)
	Indirect (n=35)	0 (0%)
	total (n=250)	10 (4.0%)
Tangerang	Direct (n= 250)	26 (10.4%)
	Indirect (n=0)	0 (0%)
	total (n=250)	26 (10.4%)
Kupang	Direct (n=210)	25 (11.9%)
	Indirect (n=40)	1 (2.5%)
	total (n=250)	26 (10.4%)
Pontianak	Direct (n=139)	6 (4.3%)
	Indirect (n=111)	1 (0.9%)
	total (n=250)	7 (3.3%)
Samarinda	Direct (n=200)	2 (1%)
	Indirect (n=50)	0 (0%)
	total (n=250)	2 (0.8%)
Makassar	Direct (n=86)	51 (47.6%)
	Indirect (n=164)	87 (53.0%)
	total (n=250)	138 (55.2%)
Timika	Direct (n=186)	5 (2.7)
	Indirect (n=64)	0 (0%)
	total (n=250)	5 (2%)
Total	Direct (n=1286)	125 (9.72%)
	Indirect (n=464)	89 (19.2%
	total (n=1750)	214 (12.2%)

Table 2 shows that apparently almost in all cities, the FSWs with syphilis mostly had education only as elementary school graduates (42.1%) whereas junior high school graduates are 33.6%. FSWs with syphilis whose university graduates were found mostly in Makassar (23.2%). There were several factors that led well educated women worked as WPS i.e.: economic difficulties, stress due to relationship problems with a husband or a partner, lifestyles, the desire to make easy money, the lack of other employment opportunities, the influence of friends or relatives who prior became FSWs, or initially human trafficking victims.

Tabel-2. Syphilis proportion and education level among FSWs in 7 cities in Indonesia in 2007

	Provinces						
	Yogyakarta (n=250)	Tangerang (n=250)	Kupang (n=250)	Pontianak (n=250)	Samarinda (n=250)	Makasar (n=250)	Timika (n=250)
Level of Education							
Senior High School/ college/University	0%	0%	23,1%	28,6%	0%	23,2%	0%
Junior High school	60,0%	23,1%	26,9%	42,8%	50,0%	34,8%	20,0%
Elementary school	30,0%	69,2%	30,8%	28,6%	50,0%	40,6%	40,0%
Uneducated	10,0%	7,7%	19,2%	0%	0%	1,4%	40,0%

Furthermore, characteristics of respondents with syphilis according to socio demographic factors, clinical and behavioral treatments are described in Table 3 below. The proportion of FSWs with syphilis was ranged in women with reproductive age group. The highest proportions

were in the age of 20-24 years (14.4%) and 25-29 years old (14.3%). Based on the level of education, it appears that the FSWs diagnosed as syphilis mostly found in uneducated group, by 21.4%. While the proportion of syphilis in other educational groups were almost the same. FSWs whose not have formal education had the possibility to have syphilis 1.88 times higher compared with the FSWs syphilis who had formal education [Confident Interval (CI) 95% 0.98 to 3.57; p = 0.056].

The proportion of respondents with syphilis mostly found on the FSWs working as an FSW for more than 4 years equal to 13.9% although was not found to significantly increase the risk of suffer from syphilis. FSWs had clinical symptoms of sexually transmitted infections would normally looking for a treatment, unfortunately sometimes sexually transmitted infections in women does not have clinical symptoms. The proportion of FSWs which have symptoms and syphilis was 13.22%, it was greater than the proportion of FSWs which do not have clinical symptoms but suffer from syphilis in the amount of 11.68%, but this difference was not statistically significant.

The analysis showed only 11.20% of FSWs infected with syphilis always used condoms when having sex with client, while the FSWs who offered condoms inconsistently and never did were 10.4% and 13.7%, respectively. Using condoms consistently and correctly should be able to reduce the likelihood of STI.

In the context to STI-HIV prevention, as much as 20.0% of syphilis-infected female sex workers had attended STI screening more than 3 times in the last three months. However the STI screening coverage is still very low considering the high potential transmission of STI / RTI on FSWs. Thus, improving the performance of each of the relevant sectors is very important to reduce and to eradicate the STI/RTI disease.

Table-3. Characterization of respondents with syphilis based on sosio demographis, clinical symptom, and treatment seeking behavior within 7 cities in Indonesia in 2007

	Syphilis						
Socio demographic factor	**Negative n=1536**		**Positive n=214**		**Crude RR**	**95%CI**	**P value**
	N	**%**	**N**	**%**			
Age (years old)							
< 20	113	86.9	17	13.1	1.00	Ref	-
20-24	403	85.6	68	14.4	1.10	0.65-1.88	0.715
25-29	415	85.7	69	14.3	1.09	0.64-1.85	0.750
30-34	290	91.2	28	8.81	0.67	0.37-1.23	0.198*
35-39	190	92.2	16	7.8	0.59	0.30-1.75	0.135*
>40	125	88.7	16	11.3	0.87	0.44-1.72	0.684
Level of Education							
Senior high school / college/ University	310	88.6	40	11.4	1.00	Ref	-
Junior High School	497	87.3	72	12.7	1.11	0.75-1.63	0.606
Elementary School	685	88.4	90	11.6	1.07	0.70-1.47	0.933
Uneducated	44	78.6	12	21.4	1.88	0.98-3.57	0.056*
Type of FSWs							

Direct	1161	90.3	125	9.7	1.00	Ref	-
Indirect	375	80.8	89	19.2	1.88	1.43-2.46	0.000*
Long term as FSWs							
							Continue
< 6months	379	90.2	41	9.8	1.00	Ref	-
6 months-2 years	556	86.9	84	13.1	1.34	0.92-1.95	0.120*
>2 -4 years	336	87.7	47	12.3	1.25	0.82-1.91	0.284
>4 years	265	86.3	42	13.9	1.40	0.91-2.15	0.124*
Clinical symptom							
No	991	88.32	131	11.68	1.00	Ref	-
Yes	545	86.78	83	13.22	1.13	0.86-1.49	0.377
Medical check up to STI clinics in <3 months							
>3 times	20	80.0	5	20.0	1.00	Ref	-
2-3 times	157	86.7	24	13.3	0.63	0.24-1.67	0.358
1 times	329	91.4	31	8.6	0.47	0.18-1.20	0.117*
Never	1040	87.8	144	12.2	0.64	0.26-1.56	0.329
Condoms usage							
-Always	1069	88.1	145	11.9	1.00	Ref	-
-Sometimes	121	89.6	14	10.4	0.86	0.50-1.50	0.614
-Never	346	86.3	55	13.7	1.15	0.84-1.56	0.382

Multivariate analysis showed that FSWs with no formal education have 2.84 times higher risk for syphilis infection compared to FSWs with high school/college education [Adjusted Relative Risk (RRa) = 2.84; CI = 1.46 - 5.52; p = 0.002]. In this group, knowledge or understanding of the prevention and treatment of STIs, especially syphilis is very low thus, making more difficult to provide them with an understanding through counseling.

Type FSWs groups also affect the incidence of syphilis. Indirect FSWs appeared to have a risk that is 2.22 times higher than the direct WPS (RRa= 2.22; CI = 1.67 - 2.96, p = 0.000).

Tabel-4. Correlation between education level and type of FSWs with syphilis

	Adjusted RR	**95% CI**	**P value**
Level of Education			
Senior high school	1,00	Reference	-
/college/university	1,37	0,92-2,03	0,118
Junior high school	1,40	0,95-2,08	0,090
Elementary School	2,84	1,46-5,52	0,002*
uneducated			
Type of FSWs	1,00	Ref	-
Direct			
Indirect	2,22	1,67-2,96	0,000*

4. DISCUSSION

This study has several limitations. First, the study was only done in seven selected cities in Indonesia, so the data obtained was not a representative of Indonesia. A second limitation was the serological examination that used for diagnosis syphilis. RPR and TPHA is generally used in patients which have symptoms of syphilis, or as a means of screening in-risk populations. This

examination has limitations because it cannot distinguish between primary, secondary, or latent syphilis cases which had never been treated before. With this test, syphilis cases been successful in therapy will show positive serology results. However, this diagnostic tool was considered the most specific and sensitive checks in the high risk group [5].

FSWs are a source of infection and a population that connect the transmission of HIV and syphilis in heterosexuals, so that the data obtained in this study have an important impact in controlling STIs [6]. According to David L. Heymann, a sluggish clinical manifestation of syphilis needs an early detection, effective therapy with patients and theirs' contacts; thus, reducing transmission, preventing latent syphilis and preventing re-infection [7].

The prevalence of syphilis in this study among FSWs in 7 cities in Indonesia in 2007 was 12.2%. This prevalence is a quite high considering most of the early phase of syphilis can be asymptomatic so it can be a source of transmission. Several studies in other countries indicate that the prevalence of syphilis varies, such as a study among rural populations in Africa in the period 1991-1994, the prevalence of syphilis in men and women respectively was 7.5% and 9.1%. In Asia, the increase in the prevalence of syphilis has been reported. Research in China in 2006 showed that there was an increase in primary and secondary syphilis cases to 7.63 cases per 100.000 populations. In addition there was also an increasing number of congenital syphilis to 71.9% higher compared with the case of the previous year [1].

Based on Integrated Biological and Behavioral Survey (IBBS) conducted by the Directorate General of Disease Control and Environmental Health in 2011 in 11 provinces in Indonesia showed that the prevalence of syphilis among direct FSWs was 10%, while indirect FSWs was 3%. The highest prevalence found in other risk groups, transgender was 25%. This pattern was similar to IBBS in 2007, the prevalence of syphilis among direct and indirect FSWs were 14.6% and 6%, respectively. In this study the prevalence of syphilis in direct FSWs was lower (9.7%) than indirect FSWs (19.2%). This may occur because of differences in time and location between this study and IBBS [8, 9].

This study found that the prevalence of syphilis among FSWs in Makassar was very high reaching to 55.2%. In 2007, STI clinics in the city of Makassar were not even serving examination and treatment of syphilis yet. The absence of symptoms and signs perceived by FSWs might also the reason why they did not looking for a treatment for this disease. Both of these factors may lead to the high prevalence of syphilis in the city.

This study revealed that educational factors affect the incidence of syphilis among female sex workers. FSWs never had formal education have 2.84 times risk for syphilis infection compared to FSWs with high school/College/University education [Adjusted Relative Risk (RRa) = 2.84; CI = 1.46 to 5.52; p = 0.002]. The influence of education was also seen in several studies conducted in other countries. Based on research conducted by Hua Zhou et al in pregnant women in Shenzhen, China found that the incidence of syphilis was affected by marital status, low education, multiple sex partners, history of previous abortions, and history of suffered STIs. Compared to FSWs with a college education, FSWs with junior high school or lower and high school

education have a higher risk, (OR = 8.61, 95% CI = 2.18-34.04) and (OR = 4.89, 95% CI = 1.28 - 18.69), respectively.

Another study conducted in 8 cities of China, suggested the possibility of greater risk. When compared with FSWs who received higher education, the FSWs graduated elementary school or lower had 6.45 times risk of suffered syphilis (95% CI = 5,10-8-15, p <0.001), whilst the FSWs had ever junior high school education had the possibility of syphilis 2.54 times compared to highly educated FSWs. (95% CI = 2.06 to 3.13, p <0.001) [1].

FSWs who had ever formal education will be easier to understand the dangers of STIs and more easily understand the information given by the health workers. The understanding about reproductive health if implemented would certainly be able to reduce the chances of getting an infection of syphilis and other STIs.

Cambodian studies among sex workers in rural Cambodia in 2000, conducted by Sopheab H et al, showed that the risk of syphillis found on direct FSWs was 1.62 times higher compared to indirect FSWs (95% CI = 074 - 3:54), but the results were less significant. These results were different from those found in this study. After multivariate analysis, the type of FSWs group also had significant effects on the incidence of syphilis. Indirect FSWs proved to have a risk of 2.22 times higher than the direct FSWs (RRa = 2.22, 95% CI = 1.67 to 2.96, p = 0.000). This is probably due to difficulties of STI control program in reaching indirect FSWs. Veiled Profession of the indirect FSWs group caused the difficulty to identify them even by outreach [10].

Based on this study, education and the type of FSWs had a significant influence on the incidence of syphilis. Hence, it is important to disseminate the information and the education to the female sex workers about the dangers of syphilis, the prevention methods, and the facilities to treat it. The main purpose is to change risky sexual behaviors with an approach that is easier to understand. Given level of education has a great influence associated with the understanding of FSWs. Dissemination and the outreach programs for STI control is seemed only to reach direct FSWs, This can be understood because the program did not reach indirect FSWs. Therefore, it needs special strategies to be able to approach and to disseminate the information and to educate among indirect FSWs, such as cooperation with the tourism department and the private parties managing or employing them. In general, the control of syphilis infection needs comprehensive steps including using a condom prevention, early detection with screening, treatment and the follow-up of patients with syphilis which standardized, personal hygiene, and the performance evaluation of the STI clinic.

5. CONCLUSIONS

The prevalence of syphilis which is high enough among FSWs group requires special attentions. Controlling of syphilis in this group requires a comprehensive approach including education, early detection, treatment, follow-up treatment and the behavior change interventions, in order to break the chain of transmission. The level of education is one important factor in changing risk behaviors; the study showed that FSWs who did not have formal education had a

higher risk for the disease of syphilis 2.84 times compared to those with high school/College/university graduates.

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