

The Correlation of Contraception with Sexually Transmitted Infection and HIV Infections on Female Sex Workers in Surakarta

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Keywords: Sexually Transmitted Infections, HIV Infections, contraception

Abstract: The control and prevention of Sexually Transmitted Infections (STIs) and Human Immunodeficiency Virus (HIV) infections still a major challenge especially in developing countries. One of the high risk groups that can spread STIs and HIV infection are female sex workers (FSWs). Condom as one of contraception can be used as a way in preventing transmission of STIs and HIV infection. However the other method, especially hormonal contraception such as Oral contraception pills (OCPs) and Injection can increase the risk of STIs and HIV infection. The purpose of this study was to determine the correlation between the use of contraception with the occurrence of STIs and HIV infection in FSWs in Surakarta. A cross sectional study was conducted FSWs in several areas in Surakarta. A total 75 female sex workers completed a questionnaire and provided blood samples for HIV and syphilis testing, endocervical and vaginal swab were performed for STIs examination. Chi Square Test was used for the statistical analysis. There was a significant correlation between the use of hormonal contraceptive especially in implant with HIV incident.

1 INTRODUCTION

Sexually Transmitted Infections (STIs) are still a major public health problem for developed and developing countries, despite the availability of therapies and effective preventive measures. More than 1 millions STIs are occurred everyday worldwide. Each year, it is estimated 357 millions new infections have 1 of 4 STIs such as chlamydia (131 milion), gonorrhoeae (78 million), syphilis (5.5 million) and trichomoniasis (143 million) (WHO, 2016). The association between STIs and Human Immunodeficiency Virus (HIV) infection has been widely reported whereas STIs can increase the risk of HIV transmission. Untreated STIs can increase the risk of transmitting HIV infection up to 3 times higher than people without STIs (Gyawale and Pokhrel, 2014).

The global HIV prevalence in the world is increasing especially in the female population. By 2012 in the world 35.3 million people infected with HIV and 1.6 million people died from *acquired immunodeficiency syndrome* (AIDS) (Mabey, 2014). The regions with the highest mortality rates are Sub Saharan Africa, the Caribbean, and South and Southeast Asia in Asia, Indonesia ranks in the top five

highest in the number of people living with HIV whereas in 2012 there were 370 thousands new cases of HIV infection and HIV epidemic in the region has been concentrated in key populations at higher risk of HIV exposure, including commercial sex worker (Dokubo et al., 2013). In Central Java, particularly in Surakarta, based on the data from the Surakarta AIDS Commission (KPA) in 2015 in the FSWs group there were 263 new STIs cases and 77 new HIV infections (Komisi Penanggulangan AIDS, 2016).

Contraception can be used as a way of preventing transmission of STIs and HIV infection in sex workers. Using contraception has several benefits i.e prevention of unplanned pregnancies and protection against STIs, reduction in the risk of Pelvic Inflammatory Diseases (PID) and also protection from HIV infection especially in high risk group like FSWs.

There are many methods of contraception such as the barrier method of male and female condoms, hormonal methods of contraception, including oral contraception pills (OCPs), combination of estrogen and progestin injectable, progestin-only injectable such as depo-medroxyprogesterone acetate (DMPA), and hormone containing technologies i.e implants, intrauterine devices (IUD), patches, and rings (Morrison and Cates, 2008; Baeten and Heffron, 2015).

There have been many literatures reviewing the effect of different contraception on the risk of STIs and HIV. In general, they all come to the same conclusion that male condoms used correctly and consistently provide good protection against most STIs, both bacterial and viral (Steiner et al., 2008). Several studies have suggested a possible link between hormonal contraception use and enhanced HIV-1 susceptibility, although other studies have found no such link. Study by Grabowski et al. suggested that hormonal contraception especially DMPA might increase HIV risk. They reported that DMPA injection could increase genital inflammation and increase cervical DNA shedding (expressed either as detectability or quantity) (Baeten and Heffron, 2015).

It is still debatable whether contraception use is related to STIs and HIV. Therefore we conducted this cross sectional study to investigate the correlation of contraception with STIs and HIV among FSWs in Surakarta.

2 METHODS

Cross sectional study was conducted in FSWs in Surakarta. Female sex workers (FSWs) who were still actively working willing to be interviewed and fill in questionnaires, undergo endocervical and vaginal swab examinations were performed at the sites. Laboratory examinations were performed at dr. Moewardi Hospital using Gram examination for Non-Specific Genital Infection (NSGI), Neisseria gonorrhoea and Bacterial Vaginosis (BV), NaCl for Trichomonas Vaginalis (TV), KOH for Vulvovaginalis Candidiasis (VVC), Acetowhite test for Condiloma Acuminata (CA) and Rapid Test for Syphilis and HIV. All data were analyzed with SPSS version 17, Chi Square Test was used for the statistical analysis, $p < 0.05$ was considered significant.

3 RESULT

The total subjects were 75 FSWs. Most of FSWs aged between 26-49, with the longest time being FSWs was <5 years. Most of these FSWs had more than twice sexual intercourse in a week (71%). Contraception with 3 month injection was the most preferable contraception used by FSWs. The incidence of STIs in this study was 53.33%. STIs were found in 40 WPS, consisting of Bacterial Vaginosis 18.67%, Syphilis 14.67%, Vulvo vaginalis

Candidiosis 9.3%, Trichomoniasis 5.3%, Non-Specific Genital Infection (2.6%), Cervicitis Gonorrhoeae (1.33%) and Condyloma Acuminata (1.33%).

Based on table 2, there were no significant correlation between contraceptive use with STIs and HIV. However implant contraception had a significant correlation with HIV infection (P value < 0.002, Contingency Coefficient (CC) 44.7%).

4 DISCUSSION

The use of contraception is closely related to prevention efforts of STIs and HIV. Given the different cultures and contraceptive practices, several methods of providing protection from unintended pregnancy, STIs and HIV infection should ideally be available.

Globally more than 100 million women use hormonal contraception in which it is associated with potential effects of HIV infection. The association of the effects of hormonal contraception with the risk of HIV infection remains a matter of debate. Hormonal contraception could act through a number of biological mechanisms. There are multiple mechanisms by which the use of hormonal contraception might increase a woman's susceptibility to HIV infection. The possible mechanisms include the ability of oral contraception to increase cervical ectopy which then increases the susceptibility to STIs including HIV, increased cervical chlamydial infection, a hypoestrogenic effect associated with DMPA injection use resulting in thinning of the vaginal epithelium, reduction in hydrogen peroxide producing lactobacilli (and thereby decreased vaginal acidity) and irregular uterine bleeding, suppression of the local (cell-mediated) immune response and increased recruitment of inflammatory and other target cells to the genital tract or through a direct effect on the infecting virus inoculum by upregulating HIV gene expression and associated viral replication (Morrison and Cates, 2008; Baeten and Heffron, 2015).

A prospective study revealed an increased incidence of STIs in women using hormonal contraception. Study by Borgdorff H in Rwandan female sex workers reported that oral contraception (OCPs) use was associated with increased Chlamydia trachomatis incidence and injectable use significantly associated with candidiasis incidence (H Borgdorff et al., 2015). A systematic review and meta analysis by LAVodstrel reported that hormonal contraception use was associated with a significant reduced risk of Bacterial Vaginosis (Vodstrel et al., 2013). However,

in our study the oral contraception group had high rate of BV infection (2.67%) followed by Cervicitis

gonorrhoeae infection (1.33%) while in the contraceptive injection group

Table 1. Demographic characteristics of Female Sex Workers in Surakarta.

Characteristic		Frequency (n=75)	Percent (%)
Current Age	<25 years of age	2	2.6
	26-49years of age	69	92
	>50 years of age	4	5.3
Length of work	<5 years	39	52
	5-10 years	20	26.67
	>10 years	16	21.33
Sex Frequency>2x/week	Yes	71	94.6
	No	4	5.3
Condom use	Always	42	56
	Occasionally	33	44
Contraceptive Method	No	25	33.33
	Injectionof 3 months	22	2.3
	Injectionof 1 month	10	13.3
	Pill	11	14.6
	Implant	5	6.67
	IUD	2	2.67
HIV	Yes	3	4
	No	72	96
STIs	No	35	46.67
	Bacterial Vaginosis	14	18.67
	Syphilis	11	14.67
	Vulvovaginalis Candidiasis	7	9.3
	Trichomoniasis	4	5.3
	Non Specific Genital Infection	2	2.6
	Cervicitis Gonorrhoeae	1	1.33
	CondilomaAcuminata	1	1.33

the incidence of STIs including BV (6.67%), NSGI (1.33%) and Trichomoniasis (2.67%). There was no significant correlation between the length contraception use with the incidence of STIs or HIV infection.

Some cross sectional studies reported that hormonal contraception was use significantly associated with increased amount of HIV-1 DNA in genital tract. The only prospective study by Wang measured HIV-1DNA levels before and after initiation of hormonal contraception confirmed the findings that 2 months after the initiation of hormonal contraception, endocervical HIV-1 DNA increased (Blish and Baeten, 2011).Study by CB Polis et all assessed genital viral shedding comparing the

levonorgestrel implant reported no change in cervical or vaginal tract (CB Polis et al., 2013).In our study revealed a significant correlation between the use of hormonal contraception (the implant group) and the incidence of HIV infection (P value < 0.002, Contingency Coefficient (CC) 44.7%).

Mechanical barriers contraception, such as condom, may provide some protection against bacterial STIs, their impact on HIV prevention is currently under study. One analysis by AN Turner et all compared findings from case crossover design with a traditional cohort analysis found that condoms were significantly protective against STIs especially chlamydial and gonococcal infection

Table 2. The correlation between contraception, STIs and HIV.

		STIs		P Value	HIV		P Value	
		No	Yes		No	Yes		
Contraceptive	Yes	30 (40%)	20(26.7%)	0.509	48 (64%)	2 (2.7%)	1.000	
	No	13(17.3%)	12 (16%)		24 (32%)	1 (1.3%)		
	Total	33(57.3%)	32(42.7%)		72 (96%)	3 (4%)		
Condom	Always	24(32%)	18(24%)	0.970	40(53.3%)	2(2.7%)	0.704	
	Occasionally	19(25.3%)	14(18.7%)		32(42.7%)	11.3%		
	Total	43(57.3)	32(42.6%)		72(96%)	3(4%)		
Contraceptive Types	Injection 3 month	13(17.3%)	9 (12%)	0.875	22(29,3%)	0 (0%)		
	Injection 1 month	7 (9.3%)	3 (4%)		10(13.3%)	0 (0%)		
	Pill	7 (9.3%)	4 (5.3%)		11(14.6%)	0 (0%)		
	Implant*	2 (2.7%)	3 (4%)		3 (4%)	2 (2,7%)		0.002*
	IUD	1 (1.3%)	1 (1.3%)		2 (2.7%)	0 (0%)		
	Total	30(39.9%)	20(26.6%)		48(63.9%)	2(2,7%)		
Contraceptive Use	< 1 year	4 (18.2%)	2 (9.1%)	0.469	6 (27.3%)	0 (0%)	0.592	
	2-5 years	2 (9.1%)	3 (13.1%)		5 (22.7%)	0 (0%)		
	>5 years	4 (18.2%)	7 (31.8%)		10(45.5%)	1 (4.5%)		
	Total	10(45.5%)	12(54,5%)		21(95.5%)	1(4.5%)		

*Significant statistically

(Turner et al., 2011). The study in Surakarta revealed a significant relation between condom use and the incidence of STIs and HIV among FSWs in surakarta (Yulianto et al., 2017). our study revealed that the use of either condom and iud contraception had no correlation with stis and hiv infection

5 CONCLUSION

The use of implant contraception is significantly correlated with HIV infection. However the use of contraception including condom and the length of contraception use have no significant correlation with STIs and HIV infection among FSWs. Further study with larger sample size is needed in order to generalize these findings.

REFERENCES

Baeten, JM., Heffron, R., 2015. Contraception and sexually transmitted infections : risks and benefits, hypotheses and evidence. *The Lancet Global Health*, Lancetgh, 3, 430-431.
 Blish, CA., Baeten, JM., 2011. Hormonal contraception and HIV-1 transmission. *American Journal of Reproductive Immunology*, Mar 65 (3), 302-7.
 Borgdorff, H., Verwijs, M. C., Wit, F. W., Tsvitivadze, E.,

Ndayisaba, G. F., Verhelst, R., Schuren, F. H. & Van De Wijgert, J. H., 2015. The Impact of Hormonal Contraception and Pregnancy on Sexually Transmitted Infections and on Cervicovaginal Microbiota in African Sex Workers. *Sexually transmitted diseases* Pubmed. March, 42 (3), 143-152.
 Dokubo, EK., Kim, AA., Le, LV., Nadol, PJ., Prybylski, D., Wolve, MI., 2013. HIV Incidence in Asia : A Review of Available Data and Assessment of the Epidemic. *AIDS Rev*, 15, 67-76.
 Gyawalee, M., Pokhrel, D., 2014. Pattern of Sexually Transmitted Infections and Sexual Behavior in Patients with Genital Symptomps. *Nepal Journal of Dermatology, Venereology & Leprology*, 12(1), 20-27.
 Komisi Penanggulangan AIDS. 2016. Target dan Capaian KPA Kota Surakarta, Surakarta.
 Mabey, D., 2014. Epidemiology of Sexually Transmitted Infections. *Medicine Journal*, 1-4.
 Morrison, CS., Cates, W Jr., 2008. *Contraception, Contraceptive Technology and STDs*. In : Holmes KK, Sparling PF, Stamm WE, Piot P, Wasserheit JN, Corey L, et all. Sexually Transmitted Diseases. New York: McGraw Hill, 1493–1506.
 Polis, CB., Phillips, SJ., Curtis, KM., 2013. Hormonal Contraceptive Use and Female to male HIV Transmission : a systematic review of the epidemiologic evidence. *Aids Pubmed*, 27, 493-505.
 Steiner, Markus J., Warner, Lee., Stone, Katherine M., Cates, W Jr., 2008. *Condoms and Other Barrier Methods for Prevention of STD/HIV Infection and Pregnancy*. In : Holmes KK, Sparling PF, Stamm WE, Piot P, Wasserheit JN, Corey L, et all. Sexually Transmitted Diseases. New York: McGraw Hill, 1821–18266.

- Turner, AN., Feldblum, P., Hoke, TH., 2011. Condom use and Sexually Transmitted Infections among Malagasy Sex Workers. *International Journal of STDs and AIDS*, 22(10), 552-557.
- Vodstrcil, LA., Hocking, JS., Law, M., Walker, S., Tabrizi, SN., Fairley, CK., et al., 2013. Hormonal Contraception Is Associated with a Reduced Risk of Bacterial Vaginosis: A Systematic Review and Meta-Analysis. *Plos One*, 8 (9), 1-16.
- World Health Organisation., 2016. Sexually Transmitted Infections (STIs). www.who.int/mediacentre/factsheets/fs110/en/.
- Yulianto, D., Ellistasari, EY., Hastuti, R., Dewi, W., Hartaty, AT., 2017. *Hubungan Frekuensi Pemakaian Kondom dengan Infeksi Menular Seksual dan Human Immunodeficiency Virus pada Wanita Pekerja Seks di Surakarta*. In : Proceeding Book Konas XV Perdoski.

