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ORIGINAL PAPER

HIV, Sexually Transmitted Infections, and Sexual Risk Behavior Among Transgenders in Indonesia

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Abstract Behavioral surveillance was undertaken among 1,150 male-to-female transgenders (waria) in Java, Indonesia, 2007; samples were collected for HIV and STI testing ($n = 748$). Almost all waria had ever sold sex (median duration 10 years). Prevalence of HIV was 24.4%, syphilis 26.8% and rectal gonorrhea and/or chlamydia 47.0%. Syphilis and rectal STIs were associated with HIV infection. Consistent condom use during receptive anal sex with clients was reported by 35.9% waria and was higher among those who visited an STI clinic and who knew their HIV status. Efforts should continue to strengthen behavior change and STI care in future HIV prevention programs.

Keywords HIV · STI · Sexual risk behavior · Transgenders · Indonesia

Introduction

Male-to-female transgender persons are considered to be at high risk for HIV infection [1], mainly because they often engage in unprotected receptive anal sex. Discrimination and stigmatization are common, often resulting in the economic necessity of trading sex for money [1, 2]. Many transgender persons also experience low self esteem and sexual violence, which may lead to psychosocial vulnerability and reduced negotiation of condom use [2].

Male-to-female transgenders in Indonesia (waria) might face discrimination similar to male-to-female transgenders in other countries in South-East Asia, such as hijra's in India/Nepal and kathoeys in Thailand. Although not prohibited by law, most communities in Indonesia discriminate against waria making it harder for them to finish school, find a job, housing, and access to public health services, which altogether increased their risk for STIs and HIV.

Indonesia has a concentrated HIV epidemic among populations with high-risk behavior, including injecting drug users, female sex workers and their clients, men who have sex with men, and waria in Indonesia. The HIV prevalence among waria in Jakarta increased from 7.9% in 1995 to 22.0% in 2002 [3]. In addition, syphilis prevalence among waria in Jakarta was similarly high in 2002 at 19.3% [3]. Unprotected anal sex among waria was common [3], thereby increasing the risk of HIV and sexually transmitted infection (STI) transmission. These findings prompted the Indonesian Ministry of Health and its implementing partners to strengthen HIV prevention services for the estimated 21,000 waria in Indonesia [4], most of whom live in major cities in Java. These services started in 2002 and included outreach and behavior change interventions to encourage waria to adopt safe sexual behaviors, and to visit clinics for STI screening and treatment and voluntary HIV counseling and testing (VCT).

The 2007 Integrated Biological-Behavioral Surveillance (IBBS) survey gathered data among most-at-risk groups in Indonesia. We report the results from the 2007 IBBS among waria in Indonesia, including the prevalence of

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HIV, STIs and unprotected commercial sex and factors associated with these outcomes. These data will provide the Ministry of Health with updated information on the epidemic situation among waria with which to assess current program efforts and make changes as appropriate.

Methods

Sampling

Behavioral survey data were collected between August and November 2007 from independent samples of 1,150 waria in five Indonesian cities; Jakarta, Bandung (West Java), Semarang (Central Java), and Surabaya and Malang (East Java). Waria interviewed in Jakarta, Bandung, and Surabaya were asked to provide biological samples and were tested for HIV ($n = 748$), rectal and urethral gonorrhea and chlamydia ($n = 734$), syphilis ($n = 720$), and syphilis titer ($n = 462$).

Waria are biological males and meet the definition of waria if they cross-dress, adopt the behavior and societal roles of females, identify themselves as waria, and socialize regularly with fellow warias in definable communities.[1] Local health authorities and local non-governmental organizations providing services to waria obtained city and group-specific sampling frames after mapping commercial sex hotspots. Participants were selected through two-stage, time-location sampling. Primary sampling units (PSU) consisted of ringleaders or mami's[2] and streets where waria gathered. PSUs were selected via simple random sampling with probability proportional to estimated waria population size. Mapping identified PSUs and estimated the number of waria at each site. PSUs were selected through simple random sampling until completion of the desired sample size. At the second stage, all waria assembled by their mami or present at sampled street locations at the time of data collection agreed to participate and were included in the survey. Missing PSU identification numbers and missing measures of size for some PSUs precluded the possibility of computing sampling weights.

Survey field teams were drawn from staff of provincial offices of the Central Statistics Bureau and Provincial Health Offices. Following receipt of witnessed verbal consent, interviewers gathered behavioral information using a structured pre-coded questionnaire. In selected cities, following the completion of the behavioral survey, a nurse collected blood through venipuncture and participants provided self-collected rectal swabs and first-void urine. The behavioral survey and biological data were anonymous, linked via a unique identifier for each participant. Per Indonesian Ministry of Health surveillance guidelines, all participants received a coupon for free HIV counseling and testing at a nearby Community Health Center.

Laboratory Analysis

Whole blood was centrifuged and aliquoted. Serum specimens were stored at 4–6°C and tested within 3 days of collection at the nearest local laboratory. HIV testing was done with two parallel rapid tests: SD Bioline HIV 1/2 3.0® (Standard Diagnostic Inc, Suwon City, South Korea) and Determine® HIV-1 (Inverness Medical, Matsudo, Japan). Discrepant results were re-tested at the National Research Laboratory using two ELISA assays: Murex® (Murex Biotech, Dartford, United Kingdom) and Vironostika® (Biomérieux, Marcy l'Etoile, France).

Presence of antibodies against *Treponema pallidum* was tested using the Rapid Plasma Reagin (RPR) test (Shield Diagnostics, Bridpot, Dorset, UK) as a screening test and the *Treponema pallidum* Rapid Test (Determine TP Syphilis, Inverness Medical, Bedford, United Kingdom) as a confirmatory test. Specimens with both positive RPR and TPHA results were titered until 1/128 dilution. Those with RPR titer $\geq$1:8 and TPHA-positive were classified as active syphilis.

Rectal swabs and urine specimens were tested for the presence of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* by polymerase chain reaction analysis (Cobas Roche Amplicor Diagnostic System, Basel, Switzerland). Persons were invited to visit an STI clinic to receive their STI test results by showing their unique identity number; treatment was provided free of charge according to the national STI treatment guidelines.

Statistical Analysis

Behavioral data were double-entered using Census and Survey Processing System (CSPro) 2.6.007 (U.S. Census Bureau). Laboratory data were entered using Microsoft Excel. Analysis was performed using Stata 9.0 (Stata Corporation, College Station, TX, USA). Variables of interest were described in terms of frequency, median, and range. Prevalence of HIV, active syphilis (RPR $\geq$1:8), urethral and rectal gonorrhea and chlamydia were assessed with 95% exact binomial confidence intervals (CIs). Associations between categorical variables were assessed using the Wald test and *P*-values less than 0.05 were considered as significant.

[1] Most waria have breast implants, use hormones such as oral contraception and some might have undergone surgery.

[2] Waria often live in small groups, coordinated by a ring leader or 'mami'. A mami usually is a senior waria who provides support for the 5–15 waria in her group, including violence protection and promotion of condom use, VCT and regular routine STI check-ups.

Factors potentially associated with HIV infection, rectal gonorrhea or chlamydia infection and consistent condom use during receptive anal sex with clients in the last week were analysed in bivariable and multivariable models. Logistic regression was used to calculate odds ratios (OR) with 95% CIs; continuous variables were dichotomized. Multivariable modeling included factors with $P < 0.2$ level of significance in the bivariable analysis. Following backward elimination; significant risk factors with $P < 0.05$ were retained in the model. The purpose of this modeling exercise was to explore associations present in the study population with the intention of generating hypotheses, and with no intention of making causal inferences that are generalizable beyond this study population.

Analyses were performed on the multi-site pooled data assuming stratified cluster sampling, with the recruiting mami in Jakarta and street locations in other cities being considered as clusters.

The study protocol was approved by both the Ethics Committee of the Indonesian Center for Biomedical and Pharmaceutical Research and the Family Health International Protection of Human Subjects Committee.

Results

General Characteristics

The median age among waria was 30 years (range 15–83). More than half of waria (58.3%) had only primary education or less, and most reported to have been discriminated against in the last year (64.7%), including physical harassment and/or being insulted at work or in daily life because of being waria (Table 1). Approximately half (46.9%) reported having a steady sexual partner, most of them being male partners. A quarter of waria reported having been forced into sex in the last year.

Behavioral Characteristics

Injecting drug use among waria was rare (0.3%), but 10% reported to have used recreational drugs in the last 3 months. Condom breakage and the use of more than one condom (one on top of the other) were reported by 14.7 and 11.5% waria, respectively. Almost all (97.0%) reported having ever sold sex. The median age waria started selling sex was 19 years, with a median duration of 10 years. The median number of clients for anal sex in the last week was 2.0 with a median fee for last sex of 20,000 Indonesian Rupiah (roughly equivalent to 2 USD). The proportion of waria who reported consistent condom use during receptive anal sex with clients in the last month was 35.9%, although condom use with the last client was reported by 79.5% of waria (85.1% of waria in Jakarta). Twenty percent reported buying anal sex in the last month, and half reported non-paying sex (with casual or steady partners) in the last year.

Three quarters had visited an STI clinic for a routine check-up in the last 3 months. Around a quarter of waria reported STI symptoms in the last year, most of them visited the STI clinic for treatment. More than half of waria had an HIV test in the last year (58% of waria in Jakarta).

HIV-Related Knowledge

Overall levels of HIV-related knowledge among waria were moderate (data not shown). Nearly one-half (45.9%) of waria provided correct answers to Abstinence, Being faithful and Condom use (ABC) knowledge; 65.5% said reducing number of partners reduces HIV risk, 72.7% said that being faithful reduced HIV infection risk, and 83.0% knew HIV could be prevented by condom use. However, misconceptions about HIV acquisition persist; such as getting HIV from mosquito bites (22.2%) or by sharing food utensils with an HIV-infected person (21.2%).

HIV and STI Prevalence

The overall HIV prevalence among waria was 24.4%, and was highest in Jakarta (34.0%) (Table 2). Overall syphilis prevalence was 26.8% and was similar among waria in all three cities; active syphilis (RPR $\geq$1:8) was assessed among waria in Jakarta (15.0%) and Surabaya (14.9%). The prevalence of rectal gonorrhea was 29.0%, chlamydia 30.4% and gonorrhea and/or chlamydia 47.0%. The highest rectal gonorrhea and/or chlamydia prevalence was found among waria in Bandung (54.6%). The prevalence of urethral gonorrhea and/or chlamydia was much lower at 1.1%, and was similar across cities. Overall, more than half (59.1%) of waria had one or more STI.

Factors Associated with HIV, STIs and Condom Use

Several factors were associated with HIV infection in bivariable analysis. Multivariable analysis showed that not having a steady sex partner, longer duration of sex work (>4 years), syphilis and rectal STIs were independently associated with HIV infection (Table 3).

The proportion of waria with reactive syphilis serology was similar among those who had visited an STI clinic for a check-up at least once in last 3 months compared to those who had not (28.8% vs. 21.7%; $P = 0.3$). Older age, lower education, more clients and HIV positive test result were independently associated with syphilis (Table 4).

The proportion of waria with rectal gonorrhea/chlamydia was also similar among those who did and who did not visit an STI clinic (47.8% vs. 43.6%; $P = 0.3$). Most

Table 1 General, behavioral, and sexual-health related characteristics among transgenders (waria) in five cities who participated in the Behavioral Survey and among transgenders in three cities who participated in the Behavioral and Biomarker Survey, 2007

Characteristic	Jakarta, Bandung, Semarang, Surabaya, Malang (Behavioral Survey)		Jakarta, Bandung, Surabaya (Behavioral and Biomarker Survey)	
	n/N	%	*n/N*	%
General				
Age <40 years	878/1,150	76.3	596/750	79.5
Completed primary education or less	671/1,150	58.3	438/750	58.4
Discriminated against[a] last year	744/1,150	64.7	465/750	62.0
Current steady sexual partner	539/1,150	46.9	360/750	48.0
Gender of steady sexual partners				
Men	521/537	97.0	350/359	97.5
Women	15/537	2.8	9/359	2.5
Waria	1/537	0.2	0/359	0.0
Forced to have sex last year	278/1,150	24.2	171/750	22.8
Behavioral				
Injecting drug use last year	4/1,150	0.3	3/750	0.4
Recreational drug use[b] before sex last 3 months	121/1,150	10.5	82/750	10.9
Alcohol use before sex last 3 months	619/1,150	53.8	438/750	58.4
Have condom at time of interview	694/1,150	60.3	476/750	63.5
Condom breakage last 3 months	169/1,150	14.7	120/750	16.0
Use of more than 1 condom on top of each other last 3 months	132/1,150	11.5	99/750	13.2
Consistent use of water-based lubricant and condoms during anal sex last month	330/1,150	28.7	215/750	28.7
Selling sex				
Proportion of waria who ever sold sex	1,019/1,051	97.0	680/750	90.7
Duration of sex work >4 years	799/1,050	76.1	493/685	72.0
>4 clients for anal sex last week	211/905	23.3	131/591	22.2
Fee for last anal sex <20,000 Indonesian Rupiah[c]	437/982	44.5	308/652	47.2
Condom use last client	754/949	79.5	541/638	84.8
Proportion of waria who sold anal sex last month	982/1,150	85.4	661/750	88.1
Consistent condom use during receptive anal sex last month	351/978	35.9	239/656	36.4
Consistent condom use during insertive anal sex last month	273/812	33.6	229/605	37.9

Table 1 continued

Characteristic	Jakarta, Bandung, Semarang, Surabaya, Malang (Behavioral Survey)		Jakarta, Bandung, Surabaya (Behavioral and Biomarker Survey)	
	n/N	%	*n/N*	%
Buying sex				
Proportion waria who bought anal sex last month	231/1,150	20.1	170/750	22.7
Consistent condom use during receptive anal sex last month	95/225	42.2	84/167	50.3
Consistent condom use during insertive anal sex last month	96/208	46.2	85/162	52.5
Non-paying sex[d]				
Proportion waria who had anal sex without payment last month	585/1,150	50.9	394/750	52.5
Consistent condom use during receptive anal sex last month	185/577	32.1	133/388	34.3
Consistent condom use during insertive anal sex last month	161/471	34.2	131/354	37.0
>1 non-paying partner for anal sex last month	221/572	38.6	138/382	36.1
Sexual-health related				
Visited STI clinic for routine check-up last 3 months	834/1,136	73.4	559/743	75.2
Reported sexually transmitted infection (STI) symptoms last year	302/1,149	26.3	170/750	22.7
Attended clinic for last STI episode	189/302	62.6	100/170	58.8
Received HIV test results last year	621/1,150	54.0	395/750	52.7
Disclosed HIV test result to others last year	344/621	55.4	262/395	66.3

[a] Discrimination included ever experienced either of the following in the last year because of being waria: pushed, slapped, beaten, or having things thrown at them; insulted at work or in daily life

[b] Recreational drugs included marijuana, ecstasy, and metamphetamines

[c] 20,000 Indonesian Rupiah is equivalent to 2 USD (depending on exchange rates)

[d] Non-paying sex includes sex with casual and steady partners

Numbers may vary due to missing data

Table 2 Prevalence of HIV, syphilis, gonorrhea and chlamydial infection and consistent condom use among transgenders (waria) in three cities in Indonesia, 2007

Factor	Prevalence (95% CI)		
	Jakarta	Bandung	Surabaya
HIV ($N = 748$)	34.0% (28.1–39.9)	14.1% (9.2–18.4)	25.3% (19.9–30.7)
Syphilis (RPR+ and TPHA+) ($N = 720$)	25.2% (19.5–31.0)	25.2% (19.8–30.6)	29.8% (24.1–35.5)
Active syphilis (RPR ≥1:8) ($N = 462$)	15.0% (10.2–19.8)	NA	14.9% (10.4–19.3)
Rectal gonorrhea (PCR) ($N = 734$)	29.7% (24.0–35.5)	37.4% (31.3–43.4)	19.7% (14.7–24.8)
Rectal chlamydia (PCR) ($N = 734$)	22.7% (17.4–28.0)	34.5% (28.6–40.5)	33.7% (27.8–39.7)
Rectal gonorrhea and/or chlamydia (PCR) ($N = 734$)	42.1% (35.9–48.4)	54.6% (48.4–60.8)	44.0% (37.8–50.3)
Urethral gonorrhea and/or chlamydia (PCR) ($N = 734$)	2.0% (0.3–3.8)	1.2% (−0.2–2.6)	0.0
Any STI ($N = 734$)	52.4% (46.2–58.6)	63.6% (57.6–69.6)	61.2% (55.1–67.3)
Consistent condom use receptive anal sex with clients last month ($N = 978$)	15.3% (10.6–20.5)	51.5% (45.1–57.9)	40.1% (33.5–46.6)

CI Confidence interval

Comparisons of frequencies between cities using the chi-square test resulted in the following statistically significant differences

Prevalence of HIV was higher in Jakarta than Bandung ($P < 0.01$) and Surabaya ($P = 0.03$) and was higher in Surabaya than Bandung ($P < 0.01$)

Prevalence of syphilis and active syphilis was similar across cities; no statistically significant differences were found

Prevalence of rectal gonorrhea/chlamydia was higher in Bandung than Jakarta ($P < 0.01$); gonorrhea was lowest in Surabaya ($P = 0.01$)

Reported consistent condom use was higher in Bandung than Jakarta ($P < 0.01$) and higher in Surabaya than Jakarta ($P = 0.02$)

(82.3%) underwent an anal exam during the STI clinic visit; the gonorrhea/chlamydia prevalence was similar among those who did and who did not undergo an anal exam (49.0% vs. 44.0%; $P = 0.3$). Multivariable analysis of factors associated with rectal gonorrhea/chlamydia showed experience of discrimination in the last year and HIV positive test results to be independently associated with rectal gonorrhea/chlamydia (Table 5).

Waria who received VCT and their test result last year were more likely to use condoms consistently during receptive anal sex with clients in the last month compared to waria who did not know their status. Other factors independently associated with consistent condom use were better HIV knowledge, higher than median fee for selling anal sex and currently carrying a condom; having STI symptoms was associated with less condom use (Table 6).

Discussion

The 2007 IBBS survey among waria revealed high HIV and STI prevalence, along with low consistent condom use. Apparently, HIV and STIs continue to spread among waria and their male clients. The finding that HIV prevalence in Jakarta increased from 22% in 2002 [3] to 34% in the current 2007 survey is alarming. However, the proportion of waria in Jakarta who received an HIV test in the last year increased from less than 3% in 2002 [3] to 58%, likely the result of prevention efforts. Although current HIV prevention services seem insufficient to curb the HIV epidemic, efforts to increase access to VCT have been successful and more waria have become aware of their HIV status. Linkages to HIV care and treatment have been established, but information about HIV test results and receipt of antiretroviral treatment (ART) was not included in this study. Clearly, access to ART will need to be assessed in future surveys and interventions implemented as needed to ensure adequate utilization of care and support services (Table 6).

The overall HIV prevalence among waria was 24.4%, which was higher than the prevalence found among female sex workers (FSW) (7.9%) [5] and men who have sex with men (MSM) (5.2%) [6], in surveys conducted in the same year. This observation is in accordance with a meta-analysis from studies in fourteen countries showing higher HIV prevalence among transgenders compared to FSWs and MSM [7]. Sex work, low education levels, discrimination and coercion into sex were common among waria in our survey contributing to higher vulnerability for STIs and HIV [1]. Among waria in our study, we found that having experienced discrimination in the last year was associated with a higher prevalence of rectal STIs. The explanation for this is not clear as discrimination was not associated with lower condom use; probably because different time frames were used. Perhaps those experiencing discrimination had a lower self esteem placing them somehow at risk for acquiring rectal STIs; for example, they may not be particular in partner selection. Discrimination,

Table 3 Factors associated with HIV prevalence among 748 transgenders (waria) in three cities in Indonesia, 2007

Characteristic	Prevalence (%)	OR (95% CI)	Adjusted OR (95% CI)
Age			
<40 years	24.9	1	
≥40 years	22.7	0.89 (0.58–1.35)	
Highest education completed			
Primary or less	25.6	1	
Secondary or more	22.9	0.86 (0.61–1.22)	
Discriminated as waria[a] last year			
No	21.5	1	
Yes	26.3	1.3 (0.92–1.85)*	
Forced to have sex last year			
No	25.5	1	
Yes	20.6	0.76 (0.50–1.15)*	
Have current steady sex partner			
No	27.9	1	
Yes	20.6	0.67 (0.48–0.94)*	0.61 (0.41–0.89)
Duration of sex work			
No sex work	7.14	1	
≤4 years	19.0	3.05 (0.69–13.55)*	2.39 (0.53–10.86)
>4 years	29.3	5.38 (1.26–22.96)*	4.44 (1.02–19.28)
Numbers of clients for anal sex last week			
≤4	24.4	1	
>4	35.9	1.72 (1.14–2.62)*	
Consistent condom use during anal sex with clients last month			
Yes or no clients	22.3	1	
No	28.4	1.38 (0.95–2.00)*	
Recreational drug use[b] before sex last 3 months			
No	23.9	1	
Yes	29.3	1.32 (0.79–2.19)	
Visited STI clinic last 3 month			
No	18.6	1	
Yes	26.5	1.58 (1.04–2.40)*	
Syphilis serology			
Negative	18.9	1	
Positive	37.8	2.62 (1.82–3.77)*	2.28 (1.54–3.37)
Rectal gonorrhea/chlamydia			
Negative	21.1	1	
Positive	28.0	1.45 (1.04–2.04)*	1.56 (1.07–2.27)

OR odds ratio, *CI* confidence interval

* Indicates variables with *P*-values <0.2 and included in the initial multivariable model

[a] Discrimination included ever experienced any of the following in the last year because of being waria: pushed, slapped, beaten, or having things thrown at them; insulted at work or in daily life

[b] Recreational drugs included marijuana, ecstasy, and metamphetamines

stigmatization and marginalization among waria need to be addressed and may include facilitating access to the formal employment sector.

The syphilis seroprevalence was 26.8% for waria in Indonesia. We found an increase in syphilis prevalence among waria in Jakarta from 19.3% in 2002 to 25.2% in 2007 [3]. Syphilis control needs to be emphasized as syphilis fuels the HIV epidemic by increasing susceptibility for HIV and by increasing HIV infectiousness among those already infected with HIV [8]. In addition, untreated syphilis results in short-term (e.g., genital lesions, lymphadenopathy, and alopecia) and long-term (cardiovascular complications such as aortic aneurysm and neurological complications such as meningitis) morbidity [9]. Although three quarters of waria reported to have visited an STI clinic in the last 3 months for routine check-ups, those visiting STI clinics did not have lower syphilis rates. This could result from inadequate syphilis screening and treatment at the clinics or from high re-infection rates.

This study highlights for the first time high prevalence of rectal gonorrhea and chlamydial infection among waria across the three cities. The 2007 IBBS showed similar high

Table 4 Factors associated with reactive syphilis serology among 720 transgenders (waria) in three cities in Indonesia, 2007

Characteristic	Prevalence (%)	OR (95% CI)	Adjusted OR (95% CI)
Age			
<40 years	23.2	1	
≥40 years	41.6	2.35 (1.60–3.46)*	2.50 (1.54–4.06)
Highest education completed			
Secondary or more	20.6	1	
Primary or less	31.4	1.75 (1.25–2.50)*	1.75 (1.15–2.63)
Discriminated as waria[a] last year			
No	25.1	1	
Yes	27.8	1.15 (0.82–1.62)	
Forced to have sex last year			
No	27.4	1	
Yes	25.1	0.89 (0.60–1.33)	
Have current steady sex partner			
No	26.4	1	
Yes	27.1	1.04 (0.74–1.44)	
Sold anal sex last month			
No	25.9	1	
Yes	26.9	1.05 (0.63–1.77)	
Numbers of clients for anal sex last week			
≤4	23.5	1	
>4	42.3	2.38 (1.56–3.62)*	1.91 (1.22–2.99)
Consistent condom use during receptive anal sex with clients last month			
Yes or no receptive sex with clients	29.6	1	
No	25.7	0.82 (0.58–1.17)	
Visited STI clinic last 3 month			
Yes	28.8	1	
No	21.7	1.46 (0.97–2.19)*	
Genital ulcer last year (self-report)			
No	34.0	1	
Yes	26.3	1.44 (0.77–2.71)	
HIV test			
Negative	22.0	1	
Positive	42.4	2.62 (1.82–3.77)*	2.89 (1.91–4.39)

OR odds ratio, *CI* confidence interval

[a] Discrimination included ever experienced any of the following in the last year because of being waria: pushed, slapped, beaten, or having things thrown at them; insulted at work or in daily life

* Indicates variables with *P*-values <0.2 and included in the initial multivariable model

rectal STIs among MSM as shown in a separate report [6]. Waria in Surabaya had significantly lower rectal gonorrhea prevalence compared to waria in the other cities, most likely resulting from receipt of PPT one-two month prior to the survey (as part of a Family Health International and World Health Organization project for FSWs in four cities and waria in Surabaya). Surprisingly, the rectal STI prevalence was not lower among waria who had visited STI clinics. This may result from re-infection or from inadequate treatment of these STIs. Many clinics still provide ciprofloxacin for gonorrhea treatment (personal communication, Robert Magnani, country director FHI Indonesia) although resistance has been reported since 2006 [10] and cefixime replaced ciprofloxacin as the treatment of choice in the 2006 STI treatment guidelines. Emphasis is now being placed on providing correct treatment for rectal STIs at the STI clinics. This would also reduce HIV acquisition as a recent cohort study showed men with anal gonorrhea to be seven times more likely to acquire HIV compared to those without anal gonorrhea [11].

Syphilis and rectal STIs were associated with HIV infection in our study. As previous studies have indicated that these infections may result in increased risk of HIV transmission [8], it seems appropriate to focus on controlling STIs among waria in order to decrease HIV transmission. We have shown previously that periodic presumptive treatment for gonorrhea and chlamydia among female sex workers in Indonesia resulted in a rapid decline in prevalence of gonorrhea and Chlamydia [12]. A similar project has been developed by the Indonesian Ministry of

Table 5 Factors associated with rectal gonorrhea and/or chlamydial infection among 734 transgenders (waria) in three cities in Indonesia, 2007

Characteristic	Prevalence (%)	OR (95% CI)	Adjusted OR (95% CI)
Age			
<40 years	47.9	1	
≥40 years	43.3	0.83 (0.58–1.19)	
Highest education completed			
Secondary or more	46.6	1	
Primary or less	47.3	1.03 (0.77–1.39)	
Discriminated as waria[a] last year			
No	40.9	1	
Yes	50.8	1.49 (1.10–2.02)*	1.48 (1.09–1.99)
Forced to have sex last year			
No	45.1	1	
Yes	53.6	1.40 (0.99–1.99)*	
Have current steady sex partner			
No	46.4	1	
Yes	47.1	1.03 (0.77–1.38)	
Sold anal sex last month			
No	29.8	1	
Yes	49.2	2.29 (1.40–3.74)*	
Numbers of clients for anal sex last week			
≤4	49.3	1	
>4	55.8	1.30 (0.87–1.92)*	
Consistent condom use during receptive anal sex with clients last month			
Yes or no receptive sex with clients	51.7	1	
No	47.5	0.84 (0.62–1.15)	
Visited STI clinic last 3 month			
Yes	47.8	1	
No	43.6	0.85 (0.59–1.19)	
HIV test			
Negative	44.6	1	
Positive	53.9	1.45 (1.04–2.04)*	1.42 (1.01–2.00)

OR odds ratio, *CI* confidence interval

[a] Discrimination included ever experienced any of the following in the last year because of being waria: pushed, slapped, beaten, or having things thrown at them; insulted at work or in daily life

* Indicates variables with *P*-values <0.2 and included in the initial multivariable model

Health for waria and the first round of presumptive treatment for gonorrhea and chlamydia has been provided for 250 waria in Surabaya in December 2009.

Consistent condom use in the past month with different partners and during different roles was low across cities, despite HIV prevention program implementation since 2002. The finding that a low proportion of waria reported consistent condom use is in accordance with the high HIV and STI prevalence found among waria in this survey. However, the proportion of waria in Jakarta who used condoms with their last client doubled since 2002 (85% vs. 43% in 2002) [3], although social desirability bias might have prompted waria to report condom use. Waria with good knowledge about prevention of HIV transmission were more likely to use condoms consistently with clients. Having a condom at the time of the interview was associated with more condom use, which could reflect willingness to use a condom or availability of condoms.

Waria who had received HIV test results in the last year were more likely to use condoms with their clients. This association has also been observed by others [13] in a cross-sectional assessment. Persons may adopt safer behavior after knowing their HIV status or safer behavior may be a result from counseling on condom use during VCT. Perhaps, persons who are more likely to use condoms may also be the ones who decide to receive VCT and the observed association between condom use and VCT might not be causally related. The relationship between receipt of VCT and subsequent reported behavior was assessed in a recent population-based cohort study in Zimbabwe [14], which showed a reduction in the number of new partners for women but no increase in condom use. No behavioral risk reduction was observed after VCT among men. A prospective cohort study among waria could clarify the temporal relationship between condom use and VCT in our setting. In addition, we did not collect information about

Table 6 Factors associated with consistent condom use during receptive anal sex with clients in the last month among 978 transgenders (waria) in five cities in Indonesia, 2007

Characteristic	Prevalence (%)	OR (95% CI)	Adjusted OR (95% CI)
Age			
<40 years	37.6	1	
≥40 years	29.3	0.68 (0.49–0.96)*	
Highest education completed			
Secondary or more	41.1	1	
Primary or less	32.2	0.68 (0.52–0.88)*	
Discriminated as waria[a] last year			
No	40.3	1	
Yes	33.7	0.75 (0.57–0.99)*	
Forced to have sex last year			
No	35.3	1	
Yes	37.9	1.12 (0.83–1.51)	
Know HIV can be avoided by ABC: abstinence, partner reduction, condoms			
No	29.8	1	
Yes	43.0	1.78 (1.36–2.31)*	1.62 (1.23–2.14)
Have current steady sex partner			
No	33.3	1	
Yes	39.3	1.29 (1.00–1.68)*	
Duration of sex work			
≤4 years	41.1	1	
>4 years	34.0	0.74 (0.54–1.00)*	
Numbers of clients for anal sex last week			
≤4	40.0	1	
>4	36.0	1.00 (0.72–1.38)	
Fee last receptive anal sex			
≤20,000 Rp (2 USD)[c]	32.4	1	
>20,000 Rp	41.8	1.50 (1.15–1.96)*	1.39 (1.06–1.84)
Have condom (according to interviewer)			
No	29.4	1	
Yes	39.7	1.58 (1.20–2.09)*	1.56 (1.16–2.09)
Recreational drug use[b] before sex last 3 months			
No	36.6	1	
Yes	30.6	0.77 (0.50–1.17)	
Alcohol use before sex last 3 month			
No	31.3	1	
Yes	39.5	1.43 (1.10–1.87)*	
Reported STI symptoms			
No	38.6	1	
Yes	28.7	0.64 (0.47–0.87)*	0.67 (0.49–0.92)
Visited STI clinic last 3 month			
No	26.4	1	
Yes	39.6	1.83 (1.32–2.53)*	
Received HIV test result last year			
No	26.0	1	
Yes	43.1	2.15 (1.63–2.84)*	2.06 (1.55–2.75)
Disclosed HIV status			
No or don't know HIV status	31.7	1	
Yes	45.5	1.80 (1.37–2.38)*	

OR odds ratio, *CI* confidence interval

[a] Discrimination included ever experienced any of the following in the last year because of being waria: pushed, slapped, beaten, or having things thrown at them; insulted at work or in daily life

[b] Recreational drugs included marijuana, ecstasy, and metamphetamines

[c] 10,000 Indonesian Rupiah is equivalent to 1 USD (depending on exchange rates)

* Indicates variables with *P*-values <0.2 and included in the initial multivariable model

HIV test results and a future study could also assess associations between self-reported HIV status and condom use.

A possible limitation of the time-location sampling design is that waria in highest demand for sex work, representing those with most clients and at highest risk for HIV transmission, may not have been present during the time of sampling for this survey. Alternatively, waria not selling sex are likely not present at commercial hotspots and might be under represented in this survey. Another limitation is a possible selection bias as mami's invited waria to participate in this survey. Therefore, estimates need to be interpreted with some caution, particularly when comparing them with estimates from an earlier survey in Jakarta. Another limitation of this assessment is that we cannot show a temporal association between behaviors and the outcomes, due to the cross-sectional design as mentioned above. Although associations may differ per city we did not undertake risk analysis for cities separately due to limited sample size.

Our analyses indicate the need for further expansion of HIV program coverage, integrating behavior change communication, STI care, VCT and HIV care in a comprehensive approach to leverage the contributions in each area to maximize the final impact on HIV transmission. In addition, efforts should continue to educate waria on HIV prevention and create an enabling environment for behavioral change by addressing discrimination through community mobilization and other "structural" interventions. Interventions should address motives for unprotected sex and psychological, social and cultural factors that determine sexual risk behavior among waria.

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