

HIV incidence among men who have sex with men (MSM) in Metro Manila, the Philippines

A prospective cohort study 2014–2018

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Abstract

The human immunodeficiency virus (HIV) epidemic in the Philippines has been driven by sexual transmission among men who have sex with men (MSM) over the past 2 decades. As the incidence of HIV infection among MSM has not been extensively evaluated, this study aimed to determine the incidence of HIV infections and the associated risk factors among MSM in Metro Manila, Philippines.

This prospective cohort study was conducted in 2 community centers in Metro Manila, the Philippines, between March 2014 and December 2018. MSM who had anal or oral sex in the past 12 months, aged ≥ 18 years, and confirmed HIV-negative status were enrolled. Participants were followed up every 3 months with repeat HIV testing and assessment of HIV-related practices.

Of the 708 MSM included in this study, a total of 59 HIV seroconversions occurred during the follow-up, resulting in an incidence of 2.7 (95% confidence interval: 2.1–3.5) per 100 patient-years. Multivariate risk regression analysis indicated that age ($P = .002$) and anal sex with a consensual male partner in the past 3 months ($P = .039$) were significantly associated with HIV infection.

Our study has shown high rates of incident HIV infection among Filipino MSM. This demonstrates the need for effective HIV prevention, surveillance, treatment, and intervention strategies targeting this population.

Abbreviations: AIDS = acquired immunodeficiency syndrome, DOH = Department of Health, HIV = human immunodeficiency virus, MSM = men who have sex with men, OFWs = Overseas Filipino Workers, RITM = Research Institute for Tropical Medicine, UN = United Nations, WHO = World Health Organization.

Keywords: HIV, incidence, men who have sex with men (MSM), Philippines, prospective cohort study

1. Introduction

For more than a decade, there has been a rapid increase in the number of new human immunodeficiency virus (HIV) diagnosis in the Philippines driven by men who have sex with men (MSM).^[1] The United Nations Global report in 2018 showed the Philippines was among the few countries in the world with a 50% or more increase in new HIV infections from 2010 to 2017.^[2,3] Recent data indicate that MSM transmission infection cases accounted for 85% of the approximately 56,105 diagnosed cases from 2015 to 2020.^[1] Whereas overseas Filipino workers (OFWs), who presumably acquire the infection outside the country, used to comprise >30% of newly diagnosed cases from 2000 to 2006, there has been a steady increase in the number of non-OFW, newly diagnosed with HIV infection.^[4] As of July 2020, there were 7699 OFWs diagnosed with HIV infection, comprising 9% of cases reported only.^[1] This trend highlights a shift in the acquisition of

the HIV infection from being largely exogenous to one that is now primarily acquired from transmission within the country.^[1]

Complete understanding of the epidemiology of HIV infection in the population that drives the epidemic is crucial for both biomedical and sociobehavioral interventions. The National HIV/AIDS Registry, a passive surveillance system established in 1987, continuously logged confirmed HIV cases reported by hospitals, laboratories, blood banks, and clinics. The Philippine Integrated HIV Behavioral and Serologic Surveillance established in 1993 consistently monitored the key populations, which included female sex workers, MSM, and injecting drug users.^[5] However, both systems were not able to provide rates of incident infection. Published data from the Philippines on HIV incidence estimates in general population or among different population groups are limited. Evaluating HIV incidence can better inform in real time the burden of disease and efficacy of ongoing interventions. To objectively evaluate the

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The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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incidence of HIV among MSM and define the risk factors associated with incident infections, a prospective cohort study was conducted among MSM in Metro Manila, Philippines.

2. Methods

2.1. Study design and participants enrollment

This prospective cohort study was conducted in 2 HIV satellite clinic/community centers in Metro Manila, which is supported by the Research Institute for Tropical Medicine (RITM) of the Philippine Department of Health. Between March 2014 and December 2018, MSM who visited these 2 clinics were recruited to attend a prospective follow-up with a frequency of 3 months per visit. The eligible criteria for participation were: MSM who had anal or oral sex in the past 12 months, aged ≥ 18 years, HIV-negative status, willing and able to complete study procedures, and provide informed consent. For this study, our sample size calculation determined the requirements of 670 participants. The calculations assumed an incidence of 4% of HIV among MSM in Metro Manila, 95% confidence level, 0.02 margin of error, and 30% attrition rate.

2.2. Study procedures

At baseline and at every 3-month follow-up, face-to-face questionnaire interviews by trained staff were administered with the study participants. Data collected include patient demographics, knowledge, attitude, and practices on HIV and AIDS at baseline. Recall of prior 3-month sexual behavior and substance use (i.e., alcohol and narcotic drug use) were also collected at baseline and follow-up points. Blood samples were collected with each participant and tested for HIV, syphilis, and hepatitis B. Urine samples were also collected for chlamydia and gonorrhea polymerase chain reaction (PCR) test.

HIV-negative status at baseline was defined as negative HIV antibody test (HAT) and PCR test or 2 negative HAT 3 months apart. Study participants without HIV infection confirmed at baseline were followed up every 3 months with repeat HAT.

Pretest and posttest counseling was provided to the study participants along with health education and free condoms at each follow-up visit. Those who were positive for HIV were referred to the RITM HIV clinic for management. The patients received standard management following local guidelines.

The study protocol was submitted to and approved by the Institutional Review Board of the RITM (Approval number: 2011-029). Written informed consent was obtained from all the study participants to participate in the study.

2.3. Statistical analysis

The questionnaire and laboratory testing results were entered using a customized Microsoft Access database developed. Data were analyzed using Stata software version 15 (StataCorp. 2015. Stata Statistical Software: Release 15; College Station, TX: StataCorp LP).

The primary endpoint for this study was the occurrence of HIV infection or HIV seroconversion. For the demographic characteristics, educational level was divided into 2 categories: vocational, high school, or lower vs college level or higher. Participants' knowledge of HIV and AIDS transmission and prevention were captured at the baseline and assessed through the following questions: whether HIV can be prevented; whether having sex with only one and faithful partner reduces the risk of HIV transmission; whether using condom during vaginal sex prevents HIV transmission; whether mosquito and other insects bites will transmit HIV; whether sharing needles when injecting drugs will increase the risk of HIV infection; whether HIV infection can be avoided by not having sex at all; and whether using

condom during anal intercourse prevents HIV transmission. Study participants were considered knowledgeable about HIV if 5 or more questions for each area were answered correctly. HIV risk awareness was defined as the perception of the likelihood of being infected with HIV and was divided into 2 categories: feel at risk of HIV infection vs do not feel at risk of HIV infection. Data on sexual behavior and substance use in the past 3 months were obtained in the last follow-up visit questionnaire.

Study participants were considered hepatitis B, syphilis, gonorrhea, and chlamydia co-infected at baseline if they had any record of a positive hepatitis B surface antigen test, positive rapid plasma reagin results, and positive urine PCR chlamydia test result at baseline, respectively.

To identify the predictors of time to HIV seroconversion, competing risk regression analysis was employed. Censored observations were considered as those individuals who did not experience or develop the outcome of interest within the study duration. Loss to follow-up (LTFU) was defined as those study participants not seen at the community centers ≥ 9 months from the last follow-up visit date. LTFU was considered as competing risks. Participants were censored at the last study visit. Follow-up time was computed from the study recruitment (initial visit) until the occurrence of HIV infection, LTFU, or censoring. Follow-up time was left censored. Variables with a P value of $\leq .15$ in univariate analyses were then entered simultaneously into a multivariate risk regression model. Predictors were retained in the multivariate model if one or more categories showed a P value of $\leq .05$. Patients with missing data were included in the analyses, but HRs for missing categories are not reported. Statistical significance was defined as a P value of $\leq .05$.

3. Results

3.1. Study participants and high-risk behaviors

One thousand forty (1040) MSM consented to participate in the study and screened for eligibility. Of these, 105 were HIV positive and 6 were unevaluable (HAT positive after 90 days but within 180 days); uncertain if they were at window period

Table 1
Baseline characteristics of 708 MSM in Manila, Philippines, 2014–2018.

Variable	No.	%
Age at study enrollment (yr)		
18–24	289	40.8
≥ 25	419	59.2
Age at first sexual act (yr)		
≤ 18	494	69.8
> 18	214	30.2
Civil status		
Single	707	99.8
Married	1	0.2
Education		
Vocational, high school or below	46	6.5
College or higher	662	93.5
HVB status (n = 695 tested)		
Negative (% tested)	679	97.7
Positive (% tested)	16	2.3
Missing	13	1.8
Syphilis status (n = 668 tested)		
Negative (% tested)	668	96.4
Positive (% tested)	25	3.6
Missing	15	2.1
Chlamydia status (n = 300 tested)		
Negative (% tested)	247	96.1
Positive (% tested)	10	3.9
Missing	451	63.7

HVB = hepatitis B virus, MSM = men who have sex with men.

(prevalence at baseline or incidence cases), and 214 with incomplete screening assessments (with baseline HAT but no 2 repeat HAT test 3 months apart or a PCR test), thus a total of 715 eligible MSM (with HAT negative at baseline and 2 HAT negative tests 3 months apart and/or a PCR negative test at baseline) were eventually enrolled in the cohort study during March 2014 and December 2018. Of the 715 negative MSM who were enrolled in the prospective study, 7 (0.97%) did not return for any follow-up and were excluded from the analysis thus a total of 708 participants (with at least one follow-up visit) were eligible for inclusion in this analysis.

Baseline characteristics of the 708 HIV-negative MSM who participated in the prospective cohort are presented in Table 1. The majority of the study participants were single (99%); aged ≥ 25 years (59.2%; median age; [IQR]: 26; [22–29]) at entry point; most (69.8%) reported first sexual contact at age ≤ 18 years and about 93.5% attended college education or higher. Hepatitis B, syphilis, and chlamydia status was positive in 2.3%, 3.6%, and 3.9% of participants tested, respectively. Majority of the study participants have good knowledge about HIV (95.1%) and about 66.7% felt at risk of having HIV.

High-risk behaviors of study participants are shown in Table 2. Majority reported having ≤ 2 sexual partners (70.1%), and 63.4% reported having anal sex with consensual male partner in the past 3 months. Of those who reported having anal sex

with consensual male partner in the past 3 months, only 33.6% reported using condom. The most frequently reported position during anal sex was versatile (26.1%). About 30% reported having sex with a male partner that had met over the internet, while only 3.1% of the study participants reported having sex with a woman in the past 12 months. Moreover, 16% reported having sex when drunk and only 1.3% reported having engaged with sex partners that are injected drug users.

3.2. HIV seroconversion and associated risk factors

The total follow-up time was 2065 years. HIV infection occurred in 56 patients at an incidence rate of 2.7 (95% confidence interval [CI]: 2.1–3.5) per 100 patient-years. The rate of LTFU was 2.4 per 100 patient-years. Risk factors associated with HIV seroconversion are presented in Table 3. In the univariable analysis, age, number of male sexual partner in the past 3 months, anal sex with a consensual male partner in the past 3 months, position during anal sex, and sex with an injected drug user partner in the past 3 months were associated with increased risk of HIV infection. In the final multivariate model, older age group (≥ 25) was associated with a lower risk of having HIV infection than younger age group (18–24 year old; hazard ratio [HR]: 0.4, 95% CI: 0.2–0.7, $P = .002$), whereas anal sex with a consensual male partner in the past 3 months was strongly associated with an increased risk of the HIV infection (HR: 2.1, 95% CI: 1.0–4.3, $P = .039$).

Table 2
HIV and AIDS knowledge and high-risk behaviors among MSM, Manila, Philippines, 2014–2018.

Variable	No.	%
HIV/AIDS knowledge		
Good knowledge	673	95.1
Poor knowledge	35	4.9
HIV risk awareness		
Don't feel at risk for HIV infection	236	33.3
Feel at risk for HIV infection	472	66.7
Number of male sexual partner in the P3M		
≤ 2	496	70.1
> 2	212	29.9
Had anal sex with consensual male partner in the P3M		
Yes	449	63.4
No	259	36.6
Use of condom during anal sex with consensual male partner in the P3M		
Yes	293	41.4
No	151	21.3
Missing/NA	264	37.3
Position during anal sex with a man in P12M		
Top	158	22.3
Bottom	102	14.4
Versatile	185	26.1
Missing/NA	263	37.1
Ever had sex with a male partner that had met over the internet		
No	163	23.0
Yes	211	29.8
Missing	334	47.2
Had sex with a woman in the P12M		
No	686	96.9
Yes	22	3.1
Ever had sex when drunk		
No	595	84.0
Yes	113	16.0
Had any sex partners that are injected drug user		
No	563	79.5
Yes	9	1.3
Missing	136	19.2

AIDS = acquired immunodeficiency syndrome, HIV = human immunodeficiency virus, MSM = men who have sex with men, NA = not available.

4. Discussion

This study was the first prospective cohort study in the Philippines on HIV incidence among MSM. We reported an overall incidence rate of 2.7 infection per 100 person-years, which is close to the World Health Organization threshold (incidence > 3 per 100 person-years) defining a population as “substantial risk of HIV infection.” The observed incidence in this study, however, is lower in comparison to studies conducted in other Asian countries such as Thailand^[6,7] and China,^[8] with incidence rates approximately ranging from 3.5 to 7.4 per 100 person-years. The rate of new infections observed in this study, however, may have been underestimated since the study participants were offered HIV prevention components including HIV testing, health education, and access to condom throughout the follow-up. Data of seroconversion rates among repeat MSM testers in a community center for HIV counseling and testing in the country's capital Manila showed increasing HIV incidence, from 2.1 to 6.3 per 100 person-years between 2012 and 2017.^[9]

It is notable that this study found high incidence rates among participants aged 18 to 24 years old (4.1 per 100 person-years). This confirms recent estimates that showed 65% of new infections were occurring among MSM aged 15 to 24 years, the subgroup of MSM where the lowest rate condom use was reported in the country.^[10] Other studies involving MSM in China,^[11] Thailand,^[7] and Benin^[12] also showed similar results. This demonstrates the sexually active nature of young MSM and their significant contribution in driving HIV epidemic, thus, emphasizing the need for this group to be considered a priority for HIV prevention interventions.

We also found that anal sex with consensual male partner 3 months prior to follow-up visit was significantly correlated with HIV incidence. This once again showed that MSM at risk for HIV were highly sexually active. In addition, similar to previous studies,^[12,13] our results have shown that HIV incidence was higher among MSM who reported no condom use in the past 3 months. The resurgence of HIV through male to male transmission is a global phenomenon. After a decline in 1998 to early 2000, rate of infection steadily rose in low- and middle-income countries among MSM. The lack of access to preventive services among young MSM may explain the increasing trend in this population.^[14]

Table 3
Risk factors associated with HIV incidence among 708 MSM, Manila, Philippines.

Variable	No.	%	Follow-up years	No. of HIV cases	Rate	95% CI	HR	Univariate		Multivariate		
								95% CI	P value	HR	95% CI	P value
Total			2064.8	56	2.7	2.1–3.5						
Age at study enrollment (yr)												
18–24	289	40.8	820.6	34	4.1	2.9–5.8	1.0	–	–	1.0	–	–
≥25	419	59.2	1244.2	22	1.8	1.2–2.7	0.4	0.2–0.7	.002	0.4	0.2–0.7	.002
Age at first sexual act (yr)												
≤18	494	69.8	1426.5	41	2.9	2.1–3.9	1.0	–	–			
>18	214	30.2	638.3	15	2.3	1.4–3.8	0.8	0.5–1.5	.503			
Education												
Vocational, high school or below	46	6.5	129.3	4	3.1	1.2–8.2	1.0	–	–			
College or higher	662	93.5	1935.5	52	2.7	2.0–3.5	0.9	0.3–2.5	.835			
HVB status (n = 745 tested)												
Negative (% tested)	679	97.7	1989.6	55	2.8	2.1–3.6	1.0	–	–			
Positive (% tested)	16	2.3	47.4	1	2.1	0.3–14.9	0.8	0.1–5.6	.798			
Missing	13	1.8	27.7	0	–	–						
Syphilis status (n = 668 tested)												
Negative (% tested)	668	96.4	1955.5	54	2.8	2.1–3.6	1.0	–	–			
Positive (% tested)	25	3.6	72.0	2	2.8	0.7–11.1	1.0	0.3–4.2	.960			
Missing	15	2.1	37.3	0	–	–						
Chlamydia status (n = 300 tested)												
Negative (% tested)	247	96.1	833.7	18	2.2	1.4–3.4	1.0	–	–			
Positive (% tested)	10	3.9	26.5	2	7.5	1.9–30.2	2.8	0.7–2.5	.146			
Missing	451	63.7	1204.6	36	3.0	2.2–4.1	–	–	–			
AIDS knowledge												
Good knowledge	673	95.1	1952.8	53	2.7	2.1–3.6	1.0	–	–			
Poor knowledge	35	4.9	111.9	3	2.6	0.9–8.3	0.9	0.3–2.9	.969			
HIV risk awareness												
Don't feel at risk for HIV infection	236	33.3	679.5	18	2.6	1.7–4.2	1.0	–	–			
Feel at risk for HIV infection	472	66.7	1385.3	38	2.7	1.9–3.8	1.1	0.6–1.8	.863			
No. of male sexual partner in the P3M												
≤2	496	70.1	1437.897	30	2.1	1.5–2.9	1.0	–	–	1.0	–	–
>2	212	29.9	626.9021	26	4.1	2.8–6.1	2.0	1.2–3.4	.008	1.6	0.9–2.7	.102
Had anal sex with consensual male partner in the P3M												
No	259	36.6	753.1	10	1.3	0.7–2.5	1.0	–	–	1.0	–	–
Yes	449	63.4	1311.7	46	3.6	2.6–4.7	2.8	1.4–5.4	.003	2.1	1.0–4.3	.039
Use of condom during anal sex with consensual male partner in the P3M												
Yes	293	41.4	856.8	28	3.3	2.3–4.7	1.0	–	–			
No	151	21.3	450.5	19	4.2	2.6–6.6	1.3	0.7–2.4	.358			
Not applicable	264	37.3	757.5	9	1.2	0.6–2.3	–	–	–			
Position during anal sex with a man in P12M												
Top	158	22.3	474.6	10	2.1	1.1–3.9	1.0	–	–	1.0	–	–
Bottom	102	14.4	295.2	11	3.7	2.1–6.7	1.7	0.7–4.0	.229	1.6	0.7–3.9	.232
Versatile	185	26.1	540.1	26	4.8	3.3–7.1	2.3	1.1–4.9	.024	1.8	0.9–3.8	.094
Not application	263	37.1	754.9	9	1.2	0.6–2.3	–	–	–			
Ever had sex with a male partner that had met over the internet												
No	163	23.0	447.5	24	5.4	3.6–8.0	1.0	–	–			
Yes	211	29.8	600.2	21	3.5	2.3–5.4	0.6	0.4–1.1	.129			
Missing	334	47.2	1017.0	11	1.1	0.6–1.9	–	–	–			
Had sex with a woman in the P12M												
No	686	96.9	2007.5	55	2.7	2.1–3.6	1.0	–	–			
Yes	22	3.1	57.3	1	1.7	0.2–12.4	0.6	0.1–3.9	.567			
Ever had sex when drunk												
No	595	84.0	1731.5	46	2.7	1.9–3.5	1.0	–	–			
Yes	113	16.0	333.3	10	3.0	1.6–5.6	1.1	0.6–2.2	.730			
Had any sex partners that are injected drug user												
No	563	79.5	1699.4	37	2.2	1.6–3.0	1.0	–	–	1.0	–	–
Yes	9	1.3	22.9	2	8.7	2.2–34.8	4.2	0.91–19.6	.065	3.6	0.7–17.5	.110
Missing	136	19.2	343.4	17	4.9	3.0–7.9	–	–	–	–	–	–

Patients with missing data or NA were included but HRs for missing/NA categories are not reported.

AIDS = acquired immunodeficiency syndrome, CI = confidence interval, HIV = human immunodeficiency virus, HR = hazard ratio, MSM = men who have sex with men, NA = not applicable.

Although the study participants were provided with risk reduction education, condoms, and lubricants for each follow-up visit, yet a significant incident rate of HIV was still observed. Provision of education and commodities for HIV and STI prevention for young people remains a challenge in the country. As of this writing, sex education curriculum as mandated in the recently passed Reproductive Health Law has yet to be rolled out. Although the revised national AIDS Law lowered the age for HIV test consent to below 18 years of age, it remained silent on the capacity of minors to access reproductive health services, including condom and antiretroviral therapy, without parental consent.^[15] Preexposure prophylaxis (PrEP) for the prevention of HIV infection was introduced in the Philippines only in 2017 through a government-sponsored demonstration research on a community-led driven peer PrEP delivery that provided PrEP to 250 MSM for 1 year with an option to continue PrEP after the end of project.^[16] The government recently released the national guideline that provides details on the delivery of PrEP services for people at substantial risk for HIV infection.^[17] Thus, accelerated efforts such as access to targeted HIV prevention programs, better understanding of sexual behavior, reinforcing condom use, and increasing awareness and access to PrEP could help reduce the HIV epidemic among MSM in the Philippines.

5. Conclusion

Our study demonstrated that the overall HIV incidence within the MSM population is high, particularly among the younger age groups, suggesting the need for initiating rapidly and extensively comprehensive interventions efforts to reduce their likelihood in engaging in risky behavior and acquiring new infections.

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Author contributions

RD conceived, designed the study and wrote the first draft of the manuscript. MLM contributed to the statistical design of the study and performed the data analysis. Both contributed to the interpretation of the results and editing of the manuscript.

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