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Transactional sex and the HIV epidemic among men who have sex with men (MSM): Results from a systematic review and meta-analysis

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Abstract

Engagement in transactional sex has been hypothesized to increase risk of HIV among MSM, however conflicting evidence exists. We conducted a systematic review and meta-analysis comparing HIV prevalence among MSM who engaged in transactional sex to those who did not (33 studies in 17 countries; n=78,112 MSM). Overall, transactional sex was associated with a significant elevation in HIV prevalence (OR=1.34, 95%CI=1.11-1.62). Latin America (OR=2.28, 95%CI=1.87-2.78) and Sub-Saharan Africa (OR=1.72, 95%CI=1.02-2.91) were the only regions where this elevation was noted. Further research is needed to understand factors associated with sex work and subsequent HIV risk in Latin America and Sub-Saharan Africa.

Keywords

men who have sex with men; HIV; transactional sex; meta-analysis

INTRODUCTION

Globally, men who have sex with men (MSM) bear a disproportionate burden of HIV infection as compared to men in the general population.[1] While an overall decline in HIV prevalence has been noted in many geographic regions, HIV prevalence among MSM continues to rise.[2] The HIV epidemic in MSM is driven by complex factors at multiple levels, and includes individual, social, and structural factors.[3] While individual-level factors such as a higher per-act probability of HIV transmission for anal sex as compared to vaginal sex[4], partner concurrency, and inconsistent condom use may explain some of the disproportionate burden of HIV borne by MSM [2], it is equally important to consider the

risk environment and how social and structural-level factors may influence HIV transmission risk for MSM. For example, stigma and discrimination at multiple levels, including healthcare-related stigma and criminalization of homosexuality, may drive the HIV epidemic underground making it more difficult for high-risk individuals to access prevention, care, and treatment services.[5,6]

Engagement in transactional sex by MSM likely affects HIV risk via a similar conceptual model. MSM who engage in transactional sex are a highly heterogeneous group, and a large proportion may identify as heterosexual or bisexual.[7] MSM who engage in transactional sex who identify as heterosexual may not be responsive to HIV prevention services that are specifically designed for gay-identified MSM. These men are affected by similar multi-level factors, such as stigma and discrimination at multiple levels, as well as likely also being exposed to factors that place them uniquely at risk due to the introduction of an economic transaction into a sexual relationship. MSM who engage in transactional sex may have differential power dynamics due to social or economic position, which could result in physical or sexual violence or abuse, inability to negotiate condom use, substance use and abuse, and/or psychological distress.[8] MSM who engage in transactional sex may also face additional dimensions of stigma (such as sex work stigma[9]) that can limit access to HIV prevention[10] and be internalized and lead to psychosocial distress.[11] In addition, there may be large differences in the definition of transactional sex, which may influence how transactional sex affects HIV risk. For example, individuals who self-identify as male sex workers and for whom sex work is a primary source of income may be substantially different than individuals who engage in transactional sex occasionally or informally.

To date, conflicting evidence exists on whether HIV prevalence is higher among MSM who engage in transactional sex (herein referred to as MSM-TS) compared to MSM who do not engage in transactional sex (MSM-NTS). While some studies have suggested that MSM-TS have an increased prevalence of HIV as compared to MSMNTS[12,13], other studies show no difference in these two subgroups.[14] To better understand how the HIV epidemic affects this vulnerable and stigmatized subpopulation of MSM, we conducted a secondary analysis using data collected as part of a systematic review and meta-analysis, and assessed the prevalence of HIV among MSM-TS as compared to MSM-NTS regionally and globally.

METHODS

Systematic Review

Complete methods for the systematic review have been reported previously.[15] In brief, 7 electronic databases were searched for studies published between January 1, 2004 and July 31, 2013, including PubMed, EMBASE, PsycINFO, Sociological Abstracts, POPLINE, CINAHL, and Web of Science. Two separate searches were performed, the first for “commercial sex”, “sex work*”, “male sex worker*”, “prostitution”, “exchange sex”, or “transactional sex” and the second for “men who have sex with men”. In addition, abstracts from the International AIDS Society (IAS), American Public Health Association (APHA), International Society for Sexually Transmitted Disease Research (ISSTD) and Conference on Retroviruses and Opportunistic Infections (CROI) annual meetings were searched.

Finally, integrated biological and behavioral surveillance (IBBS) and demographic and health surveys (DHS) were searched.

Studies were included in the present analysis if they contained primary, quantitative data reporting HIV prevalence in MSM who have a history of transactional sex (MSM-TS) and those who do not have a history of transactional sex (MSM-NTS). Studies were restricted to those reporting HIV prevalence among men, defined as individuals assigned a male sex at birth and presently identifying as a man/male. Studies were included if they were in English, Spanish, French, or Portuguese, or if enough study information was published in an English-language abstract. This analysis considered only studies in which HIV serostatus was confirmed with a biological assay.

Data were extracted independently by two separate reviewers, with >90% agreement. Adjudication for inconsistencies was done through discussion and, if necessary, a third reviewer served as the tiebreaker. Data extracted included the total number of participants in each group (MSM-TS and MSM-NTS), the total number who were tested for HIV, and the total number with a positive serostatus. Additional data collected included country and region, if the study reported an adjusted odds ratio (AOR) for the association between transactional sex and HIV, and if so, the AOR, its 95% confidence interval (95% CI), the factors which were included in the multivariable model, and the definition of transactional sex that was used in the study, categorized as “ever engaged in transactional sex”, “engaged in transactional sex in the previous 12 months”, and “identify as a male sex worker”.

Data Analysis

Pooled odds ratios were estimated by country and region of study origin for the association between transactional sex and HIV. Odds ratios were calculated using the Mantel-Haenszel method with a random-effects model and Cornfield 95% confidence intervals. A standard correction of 0.5 was added to any zero cells automatically by Stata so odds ratios could be estimated. Odds ratios were also further stratified by definition of transactional sex used in each study. In addition, a pooled estimate of HIV prevalence among MSM-TS and MSM-NTS and 95% CI was calculated using a DerSimonian-Laird random effects model.[16] All analyses were conducted in Stata 12.0 (StataCorp, College Station, TX).

RESULTS

Of the 88 studies selected for inclusion in the original review, 71 reported biological assay-confirmed HIV prevalence among men who had engaged in transactional sex. Of these, 35 studies reported HIV prevalence among MSM-TS and MSM-NTS. Among these, two studies reported HIV prevalence in both MSM-TS and MSM-NTS recruited through separate methods, possibly representing different cohorts; as such, these studies are not included in the present analysis.[17,18] Therefore, data from 33 studies[12-14,19-49] are included, representing 78,112 MSM (Supplementary Table 1), of whom 13,575 (17.4%) reported a history of transactional sex and 64,537 (82.3%) did not. These studies represent 17 countries in 7 major regions of the world, including Southeast Asia (Laos, Indonesia, Thailand, and Vietnam), South Asia (India and Nepal), East Asia (China), Latin America (Argentina, Ecuador, El Salvador, and Peru), Sub-Saharan Africa (Kenya, Senegal, South

Africa, and Uganda), North America (United States), and the Middle East (Israel). Twelve (36.4%) studies defined transactional sex as “ever” engaging in transactional sex, 8 (24.2%) defined transactional sex as engaging in transactional sex in the previous 12 months, and 13 (39.4%) defined transactional sex as individuals who self-identified as male sex workers.

Overall, MSM-TS had significantly elevated HIV prevalence (OR 1.30, 95% CI 1.08 to 1.57, $P=0.005$, Table 1) as compared to MSM-NTS. When stratified by geographic region, Latin America had significantly elevated HIV prevalence among MSM-TS (OR 2.28, 95% CI 1.87 to 2.78, $P<0.001$), and, when stratified by country, this elevation was noted in Ecuador, El Salvador, and Peru. Studies from Ecuador[13] and Peru[12] contained results from multivariable models assessing factors associated with HIV risk, and transactional sex was significantly associated with HIV infection in these studies. In Sub-Saharan Africa, HIV prevalence was significantly higher among MSMTS compared to MSM-NTS (OR 1.72, 95% CI 1.02 to 2.91, $P=0.04$), and this elevation was noted in Kenya (OR 2.56, 95% CI 1.64 to 4.00, $P<0.001$) and South Africa (OR 2.88, 95% CI 1.20 to 6.92, $P=0.02$). The association was not significant in a multivariable model in the study from South Africa.[25]

Table 2 presents pooled odds ratios for HIV prevalence among MSM-TS as compared to MSM-NTS stratified by country and region of study origin and by definition of transactional sex used in the study. Overall, there was significantly elevated HIV prevalence among men “ever” engaging in transactional sex compared to “never” (OR 1.49, 95% CI 1.12 to 1.99, $P=0.006$). In Latin America, there was a significant elevation among men who had ever engaged in transactional sex (OR 2.27, 95% CI 1.57 to 3.28, $P<0.001$, driven by results from Ecuador and El Salvador) and male sex workers (OR 2.20, 95% CI 1.54 to 3.13, $P<0.001$, driven by results from Peru) compared to MSMNTS. No studies in Latin America used “engaged in previous 12 months” as the definition of transactional sex. In Sub-Saharan Africa, there was a significant elevation in HIV prevalence among male sex workers compared to MSM-NTS (OR 2.56, 95% CI 1.64 to 4.00, $P<0.001$), driven by results from Kenya. In Southeast Asia, there was a significant elevation in HIV prevalence among men “ever” engaging in transactional sex (OR 1.56, 95% CI 1.19 to 2.05, $P=0.002$) and engaging in transactional sex (OR 2.20, 95% CI 1.38 to 1.52, $P=0.001$), both driven by results from Thailand. Among male sex workers in Thailand, there was a non-statistically significant decrease in HIV prevalence compared to MSM-NTS (OR 0.85, 95% CI 0.71 to 1.01, $P=0.07$). In East Asia (China), there was a significant decrease in HIV prevalence among male sex workers compared to MSM-NTS (OR 0.62, 95% CI 0.41 to 0.95, $P=0.03$).

DISCUSSION

These results suggest that HIV prevalence is elevated among MSM-TS as compared to MSM-NTS globally. Stratification by geographic region indicated that Latin America and Sub-Saharan Africa were the only regions with a significant elevation of HIV among MSM-TS. In Latin America, unadjusted results were consistent where data were available with multivariable models presented in individual studies, suggesting that transactional sex is independently associated with HIV-infection among MSM in Ecuador and Peru, and perhaps elsewhere in Latin America. The HIV epidemic in Latin America is highly concentrated in MSM, and Latin America has been reported to be one of the highest HIV

prevalence regions in the world for MSM.[2] The primary results of the meta-analysis indicated that MSM-TS in Latin America had 35 times the risk of HIV as compared to men in the general population, indicating a large burden of HIV in this population.[15] The results of the present analysis suggest the presence of a subepidemic within a concentrated epidemic in MSM in Latin America.[50] MSM-TS should be included in national surveillance and HIV prevention strategies, particularly in Latin America. Further work to identify effective HIV prevention interventions among this group is urgently needed.

There was also a significant difference in HIV prevalence between MSM-TS and MSM-NTS in Sub-Saharan Africa. Although Sub-Saharan Africa has a generalized HIV epidemic, recent work has suggested that concentrated epidemics exist within the generalized epidemic context.[50] For example, a recent review showed that incidence and prevalence of HIV among MSM tends to be higher than men who have sex only with women in countries such as Kenya and South Africa.[50] Although, to date, evidence related to the HIV epidemic among MSM in Sub-Saharan Africa is sparse, the current study suggests that MSM who engage in transactional sex may have vulnerability above and beyond that of MSM who do not engage in transactional sex. In the Sub-Saharan African context, it is possible that stigma and discrimination limit economic opportunities or drive sexual networks “underground”, which could increase reliance on transactional sex and reduce access to HIV prevention services.[6] The scarcity of evidence related to HIV risk in this group underscores the urgency of scaling up surveillance, research, and HIV prevention interventions for this population in Sub-Saharan Africa.

The results of this study demonstrated substantial heterogeneity in results by definition of transactional sex, which may explain some of the geographic differences seen in this study. Although there were a limited number of studies in each country, limiting the ability to compare results in some countries or regions by definition of sex work, these results revealed interesting associations in Thailand and China. In Thailand, there was a significant elevation in HIV prevalence among MSM who had “ever” engaged in transactional sex and those who had engaged in transaction sex in the previous 12 months, however among male sex workers there was a trend towards decreased HIV prevalence. Similarly in China, male sex workers had significantly decreased HIV prevalence compared to MSM-NTS, but there was no association between transactional sex and HIV prevalence using the definition of engagement in transactional sex in the previous 12 months. Previous studies have shown that male sex workers are more likely to use condoms than MSM-NTS in China[51], and they may have differential perception of their HIV risk, resulting in taking greater precaution against HIV.

The associations presented in this study do not represent a causal relationship between transactional sex and HIV prevalence. Studies included in this meta-analysis were cross-sectional in nature, thus it is not known if individuals engaged in transactional sex before or after their HIV diagnosis. Even if temporality could be assumed, a number of confounders, such as economic position, psychosocial factors such as sexual compulsivity, or structural-level factors such as country economics or legal environment, could influence the relationship between transactional sex and HIV, which could potentially result in a spurious relationship. However, some studies did report multivariable models in which transactional

sex was included as a covariate. In Latin America, multivariable models supported the unadjusted results, which suggests that transactional sex is independently associated with prevalent HIV infection among MSM in Latin America. Transactional sex was also significantly associated with increased odds of HIV infection in studies from Vietnam[19], China[24,33], and the United States[47], however the pooled results from these countries were non-significant, possibly due to heterogeneity of studies. Although we stratified analyses by definition of transactional sex to attempt to explore some of this heterogeneity by type of transactional sex, it is likely that there remained heterogeneity that could not be accounted for in a meta-analysis. For example, it has been demonstrated that male sex workers who meet clients in street-based venues have greater HIV vulnerability than those who meet clients via the Internet or other venues.[52] We were unable to account for these distinctions in this analysis, which may mask important associations. However, taken together, the results of the unadjusted and adjusted associations suggest that MSM-TS are a particularly vulnerable subgroup of MSM.

In the 34 studies included in this meta-analysis, nearly one in five MSM reported a history of transactional sex. Our results support existing literature suggesting that this subpopulation of MSM has different and increased risks associated with HIV vulnerability, and there are geographic differences in these associations globally. These global differences likely arise from differing cultural contexts, epidemiologic scenarios (including the degree to which the HIV epidemic is concentrated in MSM), and sexual networks. These differences underscore the need to better understand structural and individual-level factors that lead to engagement in sex work among MSM in different geographic contexts, and leading to differing HIV risk. Specifically including MSM who engage in transactional sex in national surveillance strategies will be an important first step in better addressing disparities in HIV prevalence globally. In addition, the development of HIV prevention interventions that address factors that may place MSMTS at differential risk compared to MSM-NTS, for example economic interventions and structural interventions that improve access to HIV prevention services, is necessary to curb the spread of HIV in this population. An understanding of the complex economic, social, political, and behavioral forces that potentiate engagement in sex work among MSM is needed to develop meaningful and cost-effective interventions for this population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

HIV prevalence among MSM with a history of transactional sex (MSM-TS; N=13,591) and MSM who have never engaged in transactional sex (MSM-NTS, N=64,537) among 34 studies in 17 countries

Region/Country	MSM-TS		MSM-NTS		P	AOR ^J (k)
	N (k)	Pooled HIV Prevalence	N (k)	Pooled HIV Prevalence		
<i>South East Asia</i>	3,591 (10)	14.0% (9.0 to 19.0%)	5,644 (10)	11.3% (6.0 to 16.5%)	0.12	
Laos	119 (1)	8.4% (3.4 to 13.4%)	421 (1)	4.8% (2.7 to 6.8%)	0.13	NS
Indonesia	250 (1)	3.6% (1.3 to 5.9%)	279 (1)	2.5% (0.7 to 4.3%)	0.47	NR
Thailand	2,606 (5)	19.0% (15.3 to 22.7%)	3,173 (5)	17.1% (12.2 to 22.0%)	0.40	NR(4), NS(1)
Vietnam	616 (3)	10.1% (0 to 22.8%)	1,771 (3)	7.1% (0 to 15.5%)	0.40	NR(2), S(1)
<i>South Asia</i>	2,442 (5)	10.1% (3.3 to 16.9%)	3,504 (5)	9.2% (4.6 to 12.2%)	0.23	
India	2,224 (3)	14.7% (6.8 to 22.5%)	2,964 (3)	13.0% (8.7 to 17.3%)	0.24	NR(1), NS(2)
Nepal	218 (2)	3.5% (1.0 to 5.9%)	540 (2)	3.5% (2.0 to 5.1%)	0.86	NR(2)
<i>East Asia (China)</i>	5,871 (6)	3.9% (2.5 to 5.3%)	50,001 (6)	6.5% (4.5 to 8.6%)	0.12	NR(2), NS(2),S(2)
<i>Latin America</i>	766 (5)	21.3% (15.3 to 27.3%)	3,975 (5)	11.2% (7.9 to 14.4%)	<0.001	
Argentina	56 (1)	10.7% (2.6 to 18.8%)	815 (1)	7.4% (5.6 to 9.2%)	0.36	NS
Ecuador	76 (1)	19.7% (10.8 to 28.7%)	338 (1)	9.2% (6.1 to 12.2%)	0.01	S
El Salvador	156 (1)	19.2% (13.0 to 25.4%)	505 (1)	8.7% (6.3 to 11.2%)	<0.001	NR
Peru	478 (2)	27.3% (20.2 to 34.4%)	2,317 (2)	16.0% (6.4 to 25.5%)	<0.001	NR(1),S(1)
<i>Sub-Saharan Africa</i>	519 (4)	25.1% (14.9 to 35.3%)	944 (4)	17.7% (12.7 to 22.7%)	0.04	
Kenya	273 (1)	26.0% (20.8 to 31.2%)	290 (1)	12.1% (8.3 to 15.8%)	<0.001	NR
Senegal	93 (1)	26.9% (17.9 to 35.9%)	345 (1)	20.3% (16.0 to 24.5%)	0.17	NS
South Africa	24 (1)	45.8% (25.9 to 65.8%)	176 (1)	22.7% (16.5 to 28.9%)	0.02	NS
Uganda	129 (1)	12.4% (6.7 to 18.1%)	133 (1)	16.5% (10.2 to 22.9%)	0.61	NR
<i>North America (USA)</i>	349 (2)	19.3% (8.0 to 30.6%)	234 (2)	21.4% (0 to 47.1%)	0.93	NR(1), S(1)
<i>Middle East (Israel)</i>	53 (1)	5.7% (0 to 11.9%)	235 (1)	4.7% (2.0 to 7.4%)	0.77	NR
OVERALL	13,591 (33)	13.3% (10.8 to 15.7%)	64,537 (33)	10.9% (9.3 to 12.5%)	0.005	--

Abbreviations: MSM-TS: men who have sex with men who have engaged in transactional sex; MSM-NTS: MSM who have never engaged in transactional sex; N=number of subjects; k=number of studies; AOR=adjusted odds ratio; NS=not significant; S=significant; NR=not reported; 95% CI = 95% confidence interval; bold = statistically significant at the $P<0.05$ level

^J If studies reported a multivariable model including transactional sex as a predictor of HIV infection, was transactional sex significant, not significant, or not reported

Table 2

Pooled odds ratios for the association between engagement in transactional sex and HIV, by definition of transactional sex

Region/Country	N (k)	Ever Engaged in Transactional Sex OR (95% CI)	P	Engaged In Transactional Sex in Last 12 Months OR (95% CI)	P	Identify as Male Sex Worker OR (95% CI)	P
<i>Southeast Asia</i>	3,591 (10)	1.56 (1.19 to 2.05)	0.002	2.20 (1.38 to 3.52)	0.001	0.97 (0.76 to 1.23)	0.80
Laos	119 (1)	NA	NA	1.84 (0.84 to 4.05)	0.13	NA	NA
Indonesia	250 (1)	NA	NA	NA	NA	1.45 (0.53 to 3.96)	0.47
Thailand	2,606 (5)	1.56 (1.19 to 2.05)	0.002	2.43 (1.36 to 4.35)	0.003	0.85 (0.71 to 1.01)	0.07
Vietnam	616 (3)	NA	NA	NA	NA	2.14 (0.36 to 12.5)	0.40
<i>South Asia</i>	2,442 (5)	1.53 (0.76 to 3.10)	0.24	NA	NA	1.08 (0.47 to 2.51)	0.86
India	2,224 (3)	1.53 (0.76 to 3.10)	0.24	NA	NA	NA	NA
Nepal	218 (2)	NA	NA	NA	NA	1.08 (0.47 to 2.51)	0.86
<i>East Asia (China)</i>	5,871 (6)	NA	NA	0.74 (0.44 to 1.24)	0.25	0.62 (0.41 to 0.95)	0.03
<i>Latin America</i>	766 (5)	2.27 (1.57 to 3.28)	<0.001	NA	NA	2.20 (1.54 to 3.13)	<0.001
Argentina	56 (1)	1.51 (0.62 to 3.67)	0.36	NA	NA	NA	NA
Ecuador	76 (1)	2.44 (1.24 to 4.78)	0.01	NA	NA	NA	NA
El Salvador	156 (1)	2.50 (1.51 to 4.13)	<0.001	NA	NA	NA	NA
Peru	478 (2)	NA	NA	NA	NA	NA	NA
<i>Sub-Saharan Africa</i>	519 (4)	1.50 (0.45 to 5.07)	0.51	1.44 (0.85 to 2.45)	0.17	2.20 (1.54 to 3.13)	<0.001
Kenya	273 (1)	NA	NA	NA	NA	2.56 (1.64 to 4.00)	<0.001
Senegal	93 (1)	NA	NA	1.44 (0.84 to 2.45)	0.17	2.56 (1.64 to 4.00)	<0.001
<i>South Africa</i>	24 (1)	2.88 (1.20 to 6.92)	0.02	NA	NA	NA	NA
Uganda	129 (1)	0.83 (0.41 to 1.68)	0.61	NA	NA	NA	NA
<i>North America (USA)</i>	349 (2)	0.96 (0.36 to 2.53)	0.93	NA	NA	NA	NA
<i>Middle East (Israel)</i>	53 (1)	NA	NA	NA	NA	1.22 (0.33 to 4.54)	0.77
OVERALL	13,591 (33)	1.49 (1.12 to 1.99)	0.006	1.08 (0.72 to 1.63)	0.71	1.29 (0.93 to 1.78)	0.13

Abbreviations: OR: odds ratio; CI: confidence interval; N=number of subjects; k=number of studies