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Sociodemographic and Behavioral Correlates of Anogenital Warts and Human Papilloma Virus-Related Knowledge Among Men who have Sex with Men and Trans Women in Lima, Peru

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Abstract

Background—Human papilloma virus (HPV) is the most common sexually transmitted infection (STI) globally, with a high burden of anogenital warts (AGW) among men who have sex with men (MSM) and transwomen (TW).

Methods—Six-hundred HIV negative MSM and TW (300 with AGW, 300 without) were recruited for a prospective cohort study to examine HPV outcomes and HPV vaccine knowledge. Participants completed a self-administered online questionnaire. Logistic regression was used to assess the association between sociodemographic and behavioral characteristics with HPV vaccine knowledge.

Results—The average participant age was 25.5 years. Most (67%) were single and 41.2% self-reported STI symptoms. The average age of first anal intercourse was 17 years, with self-reported sexual role as active (36%), passive (36%), and both (27%). Three quarters (77%) of participants reported engaging in condomless anal or oral sex up to six months prior to the study. Less than half (48%) of participants had heard of HPV. Participants with AGW were more likely to report that condoms helped prevent HPV ($p=0.01$) and that the absence of genital warts does not mean the absence of HPV ($p<0.01$).

Conclusion—Study participants had low levels of HPV knowledge but likely high HPV exposure due to condomless anal sex. The HPV knowledge gap may be explained in part by the stigma of sex work, underreporting of STIs, the high cost of the HPV vaccine in Peru, and misinformation about HPV vaccine. More work is needed to educate MSM and TW on HPV and the HPV vaccine.

Keywords

Human Papillomavirus; HPV vaccine; MSM; trans women; Peru; knowledge; warts

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Conflict of interest:

There is no conflict of interest for any of the contributing authors.

Introduction

Human papilloma virus is the most common sexually transmitted infection (STI) in the US and the prevalence of HPV in men who have sex with men (MSM) in the US at any anatomical site is higher than the general population [1,2]. Despite the large body of work on other STIs and HIV in South America, little equivalent data on HPV are available [3]. Anecdotal reports from Peruvian sexual health clinics suggest a high burden of the clinical manifestation of HPV (genital warts) in the anal, perianal, and penile regions of MSM. At *Epicentro*, a community sexual health clinic with tailored services for MSM and trans women (TW) in Lima, HPV-related disease accounts for over thirty-five percent of all medical consultations received [personal communication from medical director Gino Calvo].

The disease burden of HPV in MSM and TW in Peru is obscured by the lack of knowledge regarding the interactions between HPV and HIV infection and stigma faced by individuals with genital warts [4]. This is especially troubling given that anal warts are a significant risk factor for anal squamous intraepithelial neoplasia and subsequent anal cancer in HIV-infected men [5]. Studies have found that a recent history of receptive anal intercourse doubled the risk of HPV infection in MSM and the majority of new HIV infections in Latin America occur among MSM through anal sex [6,7]. In addition, the relationship between many other ulcerative genital STIs, such as *herpes simplex* virus type 2, syphilis, and chancroid are all known to enhance the transmission of HIV whereas the role of HPV and HPV-related disease is unknown [8, 9, 10].

This novel study measured the prevalence of anogenital warts (AGW) in MSM and TW presenting at a community clinic to determine their level of awareness of HPV and the HPV vaccine.

Materials and Methods

Participants

Six-hundred HIV-uninfected MSM and TW were recruited using venue-based sampling at *Epicentro*, a community-based men's sexual health clinic in Lima, Peru, and other locations (bars, clubs, discotheques, volley ball courts) that MSM and TW frequent. Additionally, recruitment banners were placed on gay websites directing participants to call or visit *Epicentro* for a screening appointment. Inclusion criteria were age 18–40 years, ability to provide informed consent for study participation, residency in Lima, being HIV-uninfected, and self-reporting receptive anal sex in the past 12 months. Participation was further limited to those who had not participated in a HIV or HPV vaccine clinical trial, did not have a diagnosis with an immunodeficiency disease that increased the risk of AGW, and had not taken HIV pre-exposure prophylaxis. Potential participants were first screened for HIV using the Determine HIV-1/2 Ag/Ab Combo rapid test. HIV-infected participants were provided accompaniment to free HIV care and treatment. HIV negative persons were invited to participate in the study. We aimed to recruit equal numbers of participants reporting current/prior AGW (arm A) and those who had no history of AGW (arm B) and continued

recruitment until both arms reached 300. Rapid syphilis testing was conducted using rapid plasma reagin (RPR) titers and *Treponema pallidum* Particle Agglutination (TPPA) test and treatment followed national guidelines. Institutional Review Boards at the University of California, Los Angeles and Asociación Civil Impacta Salud y Educación in Lima, Peru reviewed and approved the study protocol, recruitment materials and informed consent forms. Full details of the study protocol have been published [11].

Data Collection

Participants completed a self-administered questionnaire consisting of 84 questions on demographics, history of STIs, sexuality and sexual behavior, HPV knowledge, drug and alcohol use, acceptability of oral HIV testing, and rectal douching. Knowledge of HPV was measured by a standard survey validated in previous studies [12, 13]. Upon completion of the questionnaire, participants were offered a gift worth US\$2.00 as well as condoms and lubricant.

Data Analyses

Survey data was entered into SurveyMonkey Gold and checked for logic and range. Stata 12.0 (Statacorp LP, College Station, Texas) was used for quantitative data analyses. Mean, ranges, standard deviation (SD), and percentages were reported for demographic data and variables describing participants in our study. Pearson's chi-square and Fisher's exact tests were computed for differences in HPV knowledge by AGW status.

Results

Study Population

The average age of the participants was 25.5 years. Most (67%) participants were single, had completed a tertiary or university education (53%), and were current smokers (54%). Nearly one third (30%) reported having sex under the influence of alcohol in the month before they completed the survey; 8.5% reported the same for drugs. 41.2% of participants self-reported STI symptoms and diagnoses; symptoms and diagnoses explicitly assessed in the survey included anal and genital lesions, genital ulcers, and syphilis. The average age of participants' first anal intercourse was seventeen (SD = 4.58). 174 (29%) participants reported engaging in transactional sex, with an average age of first transactional sex at 18.5 years (SD = 4.32).

Three quarters (77%) of participants reported engaging in some form of unprotected anal or oral sex six months prior to their participation in the survey. This 63% percent who reported either insertive (32%) or receptive (37%) condomless anal sex three months prior to completing the survey and 71% percent who reported having condomless oral sex in the same time period. A majority (81%) of participants who received money or favors for sex, reported having only male sex partners. Participants self-reported their sexual role as active (36%), passive (36%), and both (27%).

Participants with AGW were significantly more likely to be educated than peers without a history of AGW (OR = 2.41, CI = 1.74, 3.36) and to assume an active or equally active and

passive role during sex (OR = 1.61, CI = 1.15, 2.27). They were significantly less likely to have ever smoked (OR = 0.57, CI = 0.38, 0.86) or to have exchanged favors for sex in the six months prior to their participation in the survey (OR = 0.36, CI = 0.24, 0.52). Finally, participants with AGW were less likely to have used condoms during their last sexual encounter than those without AGW (OR = 0.44, CI = 0.31, 0.61)

HPV and HPV Vaccine Knowledge

Less than half (48%) of participants had heard of HPV before their participation in the study, and only 19% of participants reported knowing of HPV vaccine. Results were similar with regards to a vaccine to prevent anal cancer; with 11% of participants knowing of a vaccine and 60% of participants reported they would utilize such a vaccine if it were made available. Participants with AGW were more likely to report that condoms help prevent HPV (OR = 2.12, 95% CI= 1.13–4.01) and that the absence of genital warts does not mean the absence of HPV (OR = 1.64 95% CI=1.27–2.13). Those with AGW were also less likely to report the availability of a vaccine to prevent genital warts (OR = 0.3, 95% CI=0.15–0.62).

Education level was a strong predictor of HPV and HPV vaccine knowledge. Participants with a tertiary education or beyond (including university) were more likely to correctly identify that condoms help prevent HPV (OR = 1.64, 95%CI = 1.-5, 2.59) and that the absence of genital warts does not mean the absence of HPV (OR = 9.52, 95% CI = 3.75–24.19). Paradoxically, those with a higher education were less likely to report HPV vaccine knowledge (OR=2.86, 95%CI=1.39–5.92). In addition, participants who were having condomless sex and those who did not identify as gay were significantly more likely to answer correctly with regards to the availability of a vaccine that prevents genital warts ($p = 0.04$ and $p = 0.01$, respectively). TW participants (34.8%) were four times as likely compared to other participants (7.7%) to respond that a lack of genital warts meant that HPV infection had also been resolved.

Discussion

Study participants had low levels of knowledge of HPV and HPV vaccines but likely high HPV exposure due to frequency of condomless anal sex and participation in the sex trade. Of note, participants with a higher education were more likely to have current or a history of AGW and less likely to be knowledgeable about HPV vaccines than those with a lower education. Paradoxically, these same participants were more likely to answer other questions about sexual health correctly, including whether condoms help prevent the spread of HPV. This knowledge gap may be explained in part by barriers cited in previous research, such as the stigma of sex work, underreporting of STIs, the high cost of the vaccine in Peru, and misinformation and fear about what the vaccine is and if it works [12].

HPV related knowledge was collected in a previous study of female sex workers (FSWs) in Lima. Compared to FSWs, participants in our study were less likely to report that condoms help prevent HPV transmission and less desirous of an HPV vaccine. Registered FSWs must visit a special clinic to obtain their health card, which serves as a license to conduct sex work [12]. Though this does not guarantee sexual health education, it provides an

opportunity to seek it, especially when compared to MSM and TW, who are often excluded from such services. More than half of participants in our study reported wanting to receive HPV vaccine. In a similar study in China, the majority of participants in the same age group as our study reported they were interested in being vaccinated [14]. This difference likely arises from many factors, including cultural norms and the barriers, differential access to sexual health knowledge, and acceptability of being vaccinated. Undoubtedly, important knowledge gaps remain with regards to HPV and HPV vaccine which must be addressed through culturally-competent education programs. This includes ensuring that local health professionals and laypersons in Lima become well-informed about HPV vaccine. At present we are not aware of national education campaigns about HPV vaccine in Peru for girls or boys.

There were several limitations in our study. The majority of our questions were closed-ended, and it is possible that open-ended questions with probes may have better gauged HPV knowledge. This limitation is compounded by the fact that our survey relied on participant recall, which may be subject to recall bias. In addition, our results may not be generalizable to MSM or TW outside Lima due to the convenience and clinic-based sampling method used. Finally, though TW face disproportionate STI burden throughout Latin America, even when compared to MSM [15], they represented only a fraction of respondents (11.5%). Special efforts must be made to be inclusive of TW in population-based STI research.

All men and women should have access to HPV vaccines and be targeted for education campaigns to gain HPV related knowledge and overcome the barriers they would face in vaccine campaigns. It also serves to call attention to the need for additional research among MSM and TW from Peru. These groups face a disproportionate disease risk and burden because of the social stigma they face, the difficulty in finding culturally-competent services, and the cost of relevant treatments. Additional studies are needed in MSM and TW to determine the potential cost-effectiveness of the vaccine in HPV-exposed populations.

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Table 1

Characteristics of 600 MSM and Trans Women in Lima, Peru by visible anogenital wart (AGW) status

Criteria:	ALL PARTICIPANTS N (%)	No Visible AGW (N=377) N (%)	Visible AGW (N=223) N (%)	P-value
AGE, years				
<20	124 (20.6)	65 (17.2)	59 (26.5)	0.05
20–25	227 (37.8)	144 (38.2)	83 (37.2)	
26–30	134 (22.3)	91 (24.1)	43 (19.3)	
31–35	69 (11.5)	49 (13.0)	20 (9.0)	
36–40	46 (7.7)	28(7.4)	18 (8.1)	
EDUCATION				
Primary	19 (3.2)	12 (3.2)	7 (3.1)	0.002
Secondary	264 (44.0)	188 (49.9)	76 (34.1)	
College (No Degree)	132 (22.0)	71 (18.8)	61 (27.4)	
College (Degree)	185 (30.8)	106 (28.1)	79 (35.4)	
EVER SMOKED				
No	118 (20.1)	60 (16.4)	58 (26.2)	0.004
Yes	470 (79.9)	307 (83.7)	163 (73.8)	
SEX ROLE				
Active/Mostly Active	212 (36.4)	129(35.3)	83 (38.1)	0.009
Equal	160 (27.4)	88 (24.1)	72 (33.0)	
Passive/Mostly Passive	211 (36.2)	148 (40.6)	63 (28.9)	
SEX PARTNERS				
Mostly/Only Women	56 (9.4)	39 (10.5)	17 (7.7)	0.42
Equal	40 (6.8)	27 (7.2)	13 (5.9)	
Mostly/Only Men	497 (83.8)	307 (82.3)	190 (86.4)	
CONDOMLESS SEX				
No	137 (23.1)	76 (20.5)	61 (27.5)	0.002
Anal OR Oral Sex	290 (48.9)	173 (46.6)	117 (52.7)	
Both	166 (28)	122 (32.9)	44 (19.8)	
AGE OF 1ST ANAL SEX				
< 14	110 (18.3)	82 (21.8)	28 (12.6)	0.007
14–19	356 (59.3)	221 (58.6)	135 (60.5)	
>19	134 (22.3)	74 (19.6)	60 (26.9)	
AGE OF 1ST ORAL SEX ON A MAN				
< 11	38 (7.8)	26 (8.6)	12 (6.5)	0.09
11–17	238 (48.7)	159 (52.3)	79 (42.7)	
18–25	186 (38)	104 (34.2)	82 (44.3)	
> 25	27 (5.5)	15 (4.9)	12 (6.5)	
AGE 1ST TRANSACTIONAL SEX				
< 14	11 (6.3)	6 (4.5)	5 (12.5)	0.15*
14–19	109 (62.6)	84 (62.7)	23 (62.5)	

Criteria:	ALL PARTICIPANTS N (%)	No Visible AGW (N=377) N (%)	Visible AGW (N=223) N (%)	P-value
> 19	54 (31.0)	44 (32.8)	10 (25.0)	
IDENTITY				
Gay	284 (47.9)	162(43.6)	122 (55.0)	0.003
Bi	156 (26.3)	98(26.4)	58 (26.1)	
Trans/Woman/Other	96 (16.2)	75 (20.2)	21 (9.5)	
Straight	57 (9.6)	36 (9.7)	21 (9.5)	
PAST 6 MONTHS: RECEIVED MONEY/ FAVORS FOR SEX?				
No	408 (70.1)	227 (62.9)	181 (81.9)	< 0.001
Yes	174 (29.9)	134 (37.1)	40 (18.1)	
CURRENT PARTNER WITH AGW**				
No	138 (72.6)	91 (90.10)	47 (78.3)	0.04
Yes	23 (12.1)	10 (9.9)	13 (21.7)	
WERE CONDOMS USED WITH LAST PARTNER?				
No	366 (61.0)	208 (55.2)	158 (70.9)	< 0.001
Yes	234 (39.0)	169 (44.8)	65 (29.2)	

* Fisher's Exact Test used

** This question was analyzed only among those who reported having a partner

Knowledge of HPV and HPV vaccine among 275 participants who heard of HPV prior to study enrollment based on history of AGW, current AGW status, and education

Table 2

Criteria:	Participants Correctly Answering Questions: N _i (%)					
	Yes, there is a vaccine to prevent HPV-related illness.	Yes, there is a vaccine to prevent genital warts.	If a vaccine could prevent anal cancer and warts, I would want it.	Yes, Condoms prevent HPV.	Yes, when genital warts are gone, HPV is gone.	HPV increases the risk of getting HIV.
History of AGW						
Yes AGW	42 (27.5)	24 (15.9)	102 (66.7)	112 (74.1)	13 (8.5)	103 (67.3)
No AGW	34 (28.3)	32 (26.7)	75 (61.5)	67 (57.3)	14 (11.5)	76 (62.3)
Chi ² p-value	p = 0.445	p = 0.002	p = 0.465*	p = 0.014	p = 0.001	p = 0.489*
AGW Status						
Present AGW	37 (33.0)	20 (17.9)	78 (69.6)	84 (76.4)	10 (8.9)	72(64.3)
No AGW Present	39 (23.9)	36 (22.1)	99 (60.7)	95 (60.1)	17 (10.4)	107 (65.6)
Chi ² p-value	p=0.18	p=0.20	P=0.47*	p=0.02	p=0.14*	p=0.67*
Education						
Secondary	30 (63.8)	29 (30.2)	57 (59.4)	58 (63)	20 (20.8)	63 (65.6)
Tertiary	46 (58.2)	27 (15)	120 (67)	121 (68.8)	7 (3.9)	116 (64.8)
Chi ² p-value	p = 0.534	p = 0.04	p = 0.612*	p = 0.046	p < 0.001*	p = 0.374*

* Fisher's Exact Test used