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Anal Sex Role Segregation and Versatility among Men Who Have Sex with Men: EXPLORE Study

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Abstract

Anal sex role patterns and correlates during unprotected anal sex were examined longitudinally among HIV-negative men who have sex with men (MSM). 9.6% were exclusively receptive, 16.7% exclusively insertive, and 63.0% versatile. Versatility was more likely with primary and HIV-negative/unknown status partners and among younger men and substance users, but less likely among Blacks and with higher number of partners. Exclusively receptive role was more likely with HIV-negative/unknown status partners and among younger men and substance users, but less likely with higher number of partners. Examining anal sex role patterns helps understand the factors that drive the epidemic among MSM.

Keywords

Role Segregation; Versatility; Anal Sex Role; men who have sex with men; HIV

Introduction

The U.S. HIV epidemic has had a devastating impact on men who have sex with men (MSM), with half of new HIV infections occurring in this risk group.[1,2] Among MSM, unprotected anal sex (UAS) is common and poses high acquisition risk, especially to the receptive partner.[3-11]

Anal sex role preference is an important component of sexual identity among MSM, differs across cultures,[12-16] and mostly corresponds to sexual positioning.[14] The prevalence of

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versatile sexual position in UAS, with men assuming both insertive and receptive roles, varies considerably across sociocultural contexts, may affect HIV transmission dynamics,[17,18] and may have implications for male circumcision for HIV prevention among MSM. Analysis of anal sex role patterns among MSM in the U.S., particularly longitudinal descriptions, has been limited. In this report, we used longitudinal data from HIV-negative MSM in the EXPLORE Study to classify UAS episodes during 6-month periods as exclusively receptive, exclusively insertive, or versatile, and identified correlates of these behavioral patterns.

Methods

The EXPLORE Study recruited MSM in 6 cities between 1999-2001.[19,20] Men were eligible if they were HIV-negative, 16 years or older, and reported having anal sex with ≥1 men in the past year. The participants underwent behavioral risk assessment using audio-computer assisted self-interviewing (ACASI) technology every 6 months, along with HIV antibody testing. A total of 4,295 HIV-negative men were enrolled, with average follow-up of 3.25 years. Follow-up for men who seroconverted ended at the seroconversion study visit. The study did not detect a significant difference in HIV seroincidence between the behavioral intervention and control groups, but found lower rates of UAS in the intervention group during follow-up compared to control group.[19]

Data from the baseline and semi-annual visits over 30 months were used for this analysis. At every visit, participants self-reported, using ACASI, number of sex acts in the previous 6 months by partner HIV status, anal sex role (insertive vs. receptive), both with and without a condom. The analysis focused on UAS acts, rather than protected anal sex, since we were interested in HIV acquisition and transmission risk conferred by UAS. We first classified the UAS acts reported by each participant across all study visits as exclusively receptive, exclusively insertive, or versatile.

Next, in the primary analysis, we applied this classification to all UAS acts reported at each visit by partner HIV serostatus. Thus each participant contributed up to 3 outcomes at each included participant-visit (i.e., UAS role with HIV-positive, negative, and unknown status partners). Multinomial logistic regression was used to estimate the independent associations of covariates with these repeated measures, contrasting exclusively receptive and versatile with exclusively insertive, the least risky behavioral pattern. Robust standard errors were used to account for within-subject correlation of the repeated outcomes. Participant-visits with missing covariate information were excluded. We assessed the effects of baseline as well as time-dependent covariates for the prior 6 months. The multinomial models were implemented in Stata.

Results

Baseline Sociodemographic and Risk Behavior Characteristics

Baseline characteristics of the men in EXPLORE have been described previously.[19] Mean age was 34 years (SD 9.4). A majority (73%) were White, 15% Hispanic, and 7% Black, and 64% had at least a college degree. While 40% had an annual household income of <$30,000, 76% were fully employed. Eleven percent reported heavy alcohol use in the 6 months before baseline. Non-injection drug use was reported by 65%. The median number of male sex partners was 7 (IQR 3-18), with 42% reporting ≥10. UAS was reported by 69%, receptive UAS by 48%, and insertive UAS by 55%. Receptive UAS with an HIV-positive or unknown status partner was reported by 28%.

Unprotected Anal Sex Roles

A majority of the men (63.0%) reported versatile positioning during UAS across all visits, with a median of 7.5 UAS acts per 6-month interval. Among the 17% of participants who were exclusively insertive during UAS, there was a median of 1.0 UAS act per interval; among the 9.6% who were exclusively receptive during UAS, there was a median of 0.8 UAS act per interval. Nearly 11% of the men reported no UAS acts across all visits.

Nearly 70% of the visits (13,552 of 19,416 visits) reported UAS and were included in the analysis. Table 1 shows the distribution of participant-visits contributing to the multivariate analysis of role preferences in UAS. Far fewer visits reported UAS with HIV-positive (1,980) and unknown status (5,924) than with HIV-negative partners (9,001). For visits with UAS, 19.9% of visits were classified as exclusively receptive, 31.2% exclusively insertive, and 48.9% versatile. With HIV-positive partners, 53.5% of included participant-visits were classified as exclusively insertive in UAS. In contrast, with HIV-negative partners, 53.2% were classified as versatile. With unknown status partners, the most prevalent role was exclusively insertive (45.8%).

Correlates of Anal Sex Role

In multivariate multinomial models (Table 2), partner HIV status was strongly associated with exclusively receptive compared to exclusively insertive periods: 51% more likely with unknown status and 2.3 times more likely with HIV-negative vs HIV-positive partners. Being exclusively receptive compared to exclusively insertive during UAS was more likely amongst those reporting amyl nitrate use, and less likely amongst older men, men reporting >10 partners, and men reporting Chlamydia infection. Versatility compared to exclusively insertive was also strongly associated with partner HIV status: 34% more likely to report versatility with unknown status and 3.5 times more likely with HIV-negative vs. HIV-positive partners. Men were less likely to be versatile compared to exclusively insertive if they were older, Black, and had multiple partners, but more likely to be versatile if they reported having a primary partner and used amyl nitrates, amphetamines, or hallucinogens.

Discussion

In one of the few prospective studies to follow a large cohort of MSM over a long period, almost two-thirds of men reported both insertive and receptive positions during UAS over 30 months, with only a small proportion remaining exclusively insertive or exclusively receptive. Of participant-visits where UAS was reported, half were classified as versatile.

The prevalence of versatility may have implications for the future of the HIV epidemic. In a cross-sectional study of MSM in San Francisco, 14% were exclusively receptive in the prior 6 months, 30% exclusively insertive, and 55% versatile, very close to our classification of participant-visits during UAS.[14] However, when all anal sex acts (both unprotected and protected) were taken into account, we found a very high proportion (83.6%) had versatility of role (data not shown). Similarly, among MSM in Australia, 83% reported versatility over the previous 12 months, whereas 9% were exclusively insertive and 8% exclusively receptive.[21] Several modeling studies proposed that greater role versatility could promote HIV transmission,[22-25] since versatile men at high infection risk via receptive UAS are likely to transmit HIV via insertive UAS.[17,21] A modeling study based in Peru suggested that HIV prevalence in a context in which all men were versatile would stabilize at a level approximately 20 percentage points higher than if only 30% were versatile.[17]

UAS role patterns may have implications for male circumcision among MSM. While circumcision has been shown to reduce HIV acquisition among heterosexual men,[26-28] data on its effect among MSM are conflicting. A meta-analysis of observational studies failed to

show any significant difference in HIV infection between circumcised and uncircumcised MSM.[29] Similarly, a Cochrane review did not show any significant effect of male circumcision on HIV acquisition among MSM. However, in the same review, circumcision was found to significantly reduce HIV acquisition by 73% among circumcised MSM who reported exclusively or predominantly insertive anal sex roles.[30] Given that male circumcision is likely to be effective in preventing HIV infection only among MSM who are mainly insertive,[30,31] our finding that merely 16.7% were exclusively insertive during UAS over 30 months suggests that promoting male circumcision may be of limited value as an HIV prevention strategy for MSM in the U.S.

We found that partner HIV status was important in anal sex role, as has been reported by others, with higher risk receptive and versatile roles reported with unknown status and HIV-negative partners.[32-35] Versatility was the most common pattern with HIV-negative partners, while exclusively insertive behavior during UAS predominated with HIV-positive partners.

Higher prevalence of versatility, relative to exclusively insertive sex, among MSM with primary partners likely reflects better knowledge of partner HIV serostatus. Higher risk role patterns were consistently common with HIV-negative or unknown status partners than HIV-infected, suggesting a practice of seropositioning, a type of seroadaptive behavior[36-38] already reported as associated with decreased risk of HIV in EXPLORE.[39,40] This demonstrated behavioral adaptation to lower risk behaviors based on knowledge of partners' HIV status highlights the importance of accurate knowledge of HIV status from regular HIV testing in MSM in the U.S.

Versatile compared to exclusively insertive roles during UAS were less common among Blacks than Whites. This finding may reflect the influence of sociocultural constructs of masculinity, sexual identity, and gender role.[41,42] In a qualitative study of young Black MSM, respondents perceived themselves, and the insertive sex role, as masculine, and most expressed a preference for masculine partners to retain their own sense of masculinity and/or maintain their heterosexual identity.[42] Similarly, in a cross-sectional sample of MSM, 63% of 24 Black respondents preferred being insertive, as compared to 39% of Whites; in recent anal intercourse episodes, 54% of Black MSM were exclusively insertive.[14] These findings are consistent with the conclusion reached by Millett and colleagues[43,44] that risk behaviors, in particular UAS, do not explain Black/White disparities in HIV incidence.

We found that exclusively receptive and versatile men tended to be younger. A plausible explanation is that in partnerships between men of different ages, the older partner is likely to have higher socioeconomic status and more sexual experience, and the younger to feel disempowered – differences which are then sometimes expressed in traditional sex roles.[42] Our finding that exclusively receptive men during UAS tended to be younger might be contributing to the rising HIV incidence in young MSM in the U.S.[2]

Substance use has been clearly found to be associated with unprotected anal intercourse among MSM using global and event-level data.[45-50] In our analysis, global use of amyl nitrates during the prior 6 months was associated with higher probability of both exclusively receptive and versatile roles during UAS, while global use of amphetamines, and hallucinogens during the prior 6 months was associated with versatile roles. However, such an association was not found when examining situational drug and alcohol use in conjunction with UAS. While substance use may be contributing to UAS risk, these data do not support that substance use in conjunction with UAS has a role in anal sex role decisions.

There are limitations to our study. The differential change in sexual behaviors between intervention and control arms and intensity of risk reduction counseling may limit the generalizability of our results to the general MSM population. Sexual risk behaviors were

self-reported, thus subject to recall and social desirability bias, although the latter should have been limited by ACASI. Because we focused on UAS episodes only and condom use might not have been accurately reported, misclassification bias might have occurred. Our classification of behaviors as exclusively insertive, exclusively receptive, or versatile may obscure differences between "typical" versatility and behavioral patterns that are predominantly, but not exclusively, insertive or receptive. Lastly, EXPLORE followed men between 1999-2004, and behavioral patterns and their correlates may have changed in the ensuing 10 years.

Conclusion

The high rate of versatility during UAS may have implications on the future of the HIV epidemic among MSM in the U.S., as several modeling studies have suggested the high impact that versatile behaviors have on HIV transmission dynamics. Only a minority of EXPLORE participants were exclusively insertive during UAS, suggesting that promoting male circumcision may have a limited role as an HIV prevention strategy for MSM in the U.S. This study provides insight into the prevalence of role segregration and versatility during UAS among MSM in the U.S. and correlates of these behavioral patterns over time, and emphasizes the significance of examining anal sex role patterns in understanding factors driving the HIV epidemic among MSM.

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Table 1

Unprotected Anal Sex Role Stratified by HIV Status of Male Sex Partner

	Positive N* (%)	Negative N* (%)	Unknown N* (%)	Overall N* (%)
Exclusively receptive	319 (16.1)	1,874 (20.8)	1,311 (22.1)	2,684 (19.9)
Exclusively insertive	1,059 (53.5)	2,339 (26.0)	2,714 (45.8)	4,212 (31.2)
Versatile	602 (30.4)	4,788 (53.2)	1,899 (32.1)	6,593 (48.9)
Total	1,980(100.0)	9,001 (100.0)	5924 (100.0)	13,489 (100.0)

* unit of analysis is participant-visits where UAS contacts, by partner serostatus, or overall, are reported

Table 2

Correlates of Sexual Role Preference in Unprotected Anal Sex, Multivariate Multinomial Models

	Exclusively Receptive vs. Exclusively Insertive UAS			Versatile vs. Exclusive Insertive UAS		
Variable	**aRRR**	**95% CI**	**p-value**	**aRRR**	**95% CI**	**p-value**
Age (years)			<0.0001			<0.0001
≤ 25	Ref	NA	NA	Ref	NA	NA
26-30	0.83	0.66 – 1.06	0.14	0.81	0.67 – 0.98	0.031
31-35	0.59	0.46 – 0.74	<0.0001	0.66	0.55 – 0.80	<0.0001
≥ 36	0.43	0.34 – 0.54	<0.0001	0.47	0.40 – 0.57	<0.0001
Race/ethnicity			0.26			0.009
White	Ref	NA	NA	Ref	NA	NA
Black	0.85	0.62 – 1.14	0.28	0.65	0.50 – 0.86	0.002
Hispanic	1.08	0.87 – 1.34	0.50	1.10	0.92 – 1.31	0.29
Other	1.26	0.92 – 1.72	0.15	1.01	0.78 – 1.29	0.96
General alcohol use in last 6 months			0.10			0.86
None	Ref	NA	NA	Ref	NA	NA
Light[1]	0.77	0.61 – 0.98	0.03	0.95	0.78 – 1.17	0.66
Moderate[1]	0.79	0.61 – 1.02	0.08	1.00	0.80 – 1.25	1.00
Heavy[1]	0.93	0.68 – 1.27	0.64	1.00	0.76 – 1.31	1.00
Use of alcohol or drugs before or after sex						
Never or occasionally	Ref	NA	NA	Ref	NA	NA
Often or all the time	1.08	0.92 – 1.25	0.35	1.10	0.97 – 1.24	0.14
Non-injection drug use in last 6 months						
Amyl nitrates	1.21	1.05 – 1.41	0.01	1.23	1.09 – 1.38	0.001
Cocaine	0.95	0.79 – 1.13	0.55	0.96	0.83 – 1.11	0.59
Amphetamines	1.09	0.89 – 1.32	0.40	1.28	1.09 – 1.51	0.003
Hallucinogens	0.98	0.83 – 1.16	0.85	1.28	1.11 – 1.47	0.001
Primary partner[2]	1.06	0.93 – 1.21	0.37	1.92	1.73 – 2.14	<0.0001
Number of sex partners in last 6 months			<0.0001			<0.0001
1	Ref	NA	NA	NA	NA	NA
2-3	1.12	0.90 – 1.39	0.30	0.71	0.60 – 0.85	<0.0001
4-9	1.04	0.84 – 1.30	0.71	0.67	0.56 – 0.80	<0.0001
≥ 10	0.71	0.56 – 0.90	0.004	0.80	0.67 – 0.96	0.014
Self-reported STIs[3] in last 6 months						
Chlamydia	0.62	0.43 – 0.89	0.01	0.87	0.66 – 1.15	0.33
Gonorrhea	0.76	0.50 – 1.17	0.22	1.03	0.78 – 1.36	0.85

	Exclusively Receptive vs. Exclusively Insertive UAS			Versatile vs. Exclusive Insertive UAS		
Variable	**aRRR**	**95% CI**	**p-value**	**aRRR**	**95% CI**	**p-value**
Partner HIV status			<0.0001			<0.0001
HIV positive	Ref	NA	NA	Ref	NA	NA
HIV unknown	1.51	1.29 – 1.77	<0.0001	1.34	1.16 – 1.54	<0.0001
HIV negative	2.34	1.98 – 2.75	<0.0001	3.47	3.00 – 4.01	<0.0001

[1]Light alcohol use: three or less drinks/day on no more than 1–2 days/week. Moderate alcohol use: four or five drinks/day on no more than 1–2 days/week, or one to five drinks/day on 3–6 days/week, or one to three drinks/day on a daily basis. Heavy alcohol use: four or more drinks every day or six or more drinks on a typical day when drinking

[2]A participant was determined to have a primary partner if he reported that he was in a primary relationship with a male sex partner in the last 6 months.

[3]STI: Sexually transmitted infections

UAS: unprotected anal sex

NA: not applicable

aRRR: adjusted relative risk ratio

The multivariate models controlled for study arm (intervention vs. control arm), employment status, and site.