BMC Public Health

RESEARCH

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Unveiling the dynamics of HIV transmission among young homosexual and bisexual men in Korea

Minsoo Jung[1*]

Abstract

Background Despite the relatively low prevalence of HIV/AIDS in Korea, the incidence of HIV is steadily increasing, centering on same-sex sexual contact among men in their 20s and 30s. However, in Korean society, where acceptance of homosexuality is low, LGBTQ + research is lacking and there is little empirical data on HIV transmission. This study explored the context in which anal intercourse occurs among male sexual minorities in Korea.

Methods Data were collected by conducting a web survey targeting paid members of Korea's largest homosexuality portal site ($n = 941$). The dependent variable was whether anal intercourse was preferred, and the major independent variables were health behavior, health status, and sexual behavioral characteristics.

Results Those who reported that their gender identity was homosexual tended to prefer anal sex more than those who reported that they were bisexual (Chi-square = 5.165, $p < .05$). For homosexuals that had more unprotected sex (OR = 1.538, 95% CI = 1.281–1.847), had a primary sex partner (OR = 1.943, 95% CI = 1.345–2.809), and had been diagnosed with an STD (OR = 2.978, 95% CI = 1.592–5.568), there was a high possibility of preferring anal intercourse. Bisexuals were more likely to prefer anal intercourse if they had unprotected sex (OR = 1.715, 95% CI = 1.322–2.225) or had a primary sex partner (OR = 1.927, 95% CI = 1.141–3.257).

Conclusions This study found that young non-heterosexual men in South Korea are more likely to engage in condomless anal sex while living with HIV/STDs. As a result, primary partners are at higher risk of infection, and bisexual individuals are more likely to transmit HIV/STDs due to similar sexual contexts.

Keywords HIV, Anal intercourse, Homosexual men, Bisexual men, Korea

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Background

HIV/AIDS continues to be a major global public health issue, even amidst the ongoing challenges posed by the COVID-19 pandemic. As of 2019, approximately 38 million people worldwide were living with HIV, according to the Joint United Nations Program on HIV/AIDS (UNAIDS) [1]. In that same year, an estimated 690,000 individuals died from HIV-related causes, and around 1.7 million new infections were recorded [2]. The spread of HIV is further complicated by socioeconomic factors such as poverty, inequality, and stigma, which hinder effective testing, disclosure of HIV status, and adherence to antiretroviral therapy (ART). Addressing these challenges requires a comprehensive strategy that integrates socioeconomic, human rights, and biomedical approaches [3]. However, the development of tailored HIV prevention interventions remains challenging due to diverse socio-cultural conditions across countries.

HIV/AIDS impacts diverse populations globally, affecting individuals across all ages, genders, sexual orientations, races, and socioeconomic statuses. However, specific "key groups" such as men who have sex with men (MSM), people who inject drugs, sex workers, and transgender individuals face higher risks due to certain behavioral and social factors [2, 4]. In South Korea, despite a relatively low prevalence of HIV/AIDS compared to other countries, there has been a noticeable increase in infections. Data from the Korea Disease Control and Prevention Agency (KDCA) shows that in 2019, about 89.5% of new HIV diagnoses were among males, primarily in their 30s (32.7%) and 20s (29.4%). Furthermore, 98.2% of these cases were transmitted via sexual contact, predominantly heterosexual (85.5%) [5]. Although the Korean government offers free antiretroviral therapy (ART), only 75.6% of diagnosed individuals are receiving treatment [6]. Challenges in targeting public health interventions include the difficulty in identifying the hidden population due to social stigma and discrimination. A significant portion of the HIV-positive population in Korea is characterized by homosexual behaviors and anal sex. For instance, a 2003 survey indicated low rates of anal sex among the general population compared to Europe, yet it remains a significant aspect of sexual identity among Korean MSM. Cho reported that 60.1% of MSM surveyed engaged in anal sex [7–9]. This behavior is particularly noted among Korean male homosexuals and is associated with HIV risks, as highlighted in studies by Cho and Jung [7, 10]. However, utilizing anal intercourse as a criterion for public health interventions is problematic due to privacy concerns and potential stigmatization of homosexuals. Consequently, research focusing on the health of LGBTQ + individuals, including MSM, remains limited in Korea.

In Western contexts, anal intercourse is recognized as a sexual behavior that transcends sexual orientation. In the United States, approximately 40% of men and 35% of women have engaged in heterosexual anal sex, with variations influenced by factors such as education, income, and race [11]. In the UK, about 20% of men and 17% of women have participated in anal sex, with correlations to the number of sexual partners and oral sex experiences [12]. Similarly, in Australia, around 36% of men and 33% of women have reported engaging in heterosexual anal sex, influenced by factors like age and a history of sexually transmitted infections (STIs) [13]. Although anal intercourse is more common among sexual minorities, it is a diverse behavior. For example, transgender women are often receptive partners more frequently than cisgender individuals [14], and this pattern is also prevalent among gay and bisexual men [15]. Several factors influence anal intercourse among men who have sex with men (MSM), including individual characteristics like age, gender identity, and attitudes toward masculinity [16, 17]. Relationally, the roles during anal intercourse—whether penetrative or receptive—are shaped by partner characteristics and relationship dynamics, such as trust and commitment, which also affect condom use and perceived HIV risk [18, 19]. At a socio-cultural level, attitudes toward homosexuality and societal norms surrounding anal intercourse impact MSM's sexual behaviors [20]. Additionally, structural factors like access to sexual health services and HIV prevention resources play a significant role. In South Korea, where Confucian cultural norms stigmatize homosexuality, there is a significant lack of studies exploring anal intercourse among male sexual minorities, underscoring a major gap in public health research and intervention strategies.

Unprotected anal intercourse (UAI) poses a high risk for HIV and sexually transmitted infections (STIs) due to the delicate nature of the anal lining, which can be easily damaged during intercourse [21]. According to the CDC, men who have sex with men (MSM) are 44 times more likely to contract HIV than heterosexual men [22]. This study explores the contexts in which anal intercourse occurs among male sexual minorities in Korea, given the elevated risks associated with this behavior. In Korean society, shaped by Confucian values and conservative Christian influences, LGBTQ + individuals often face significant barriers in expressing their sexual orientations and identities [7, 23, 24]. This social climate complicates public health efforts to address HIV within these communities. Despite the availability of anonymous, free HIV testing at public health centers, detailed empirical data on HIV transmission routes and demographics are scarce. Current interventions are limited to distributing free condoms, primarily in areas frequented by homosexuals. This research seeks to enhance public health

strategies by examining the specific contexts and behaviors that contribute to HIV transmission among sexual minorities in Korea. By identifying key areas for intervention, this study aims to help establish a more systematic and inclusive framework for HIV prevention.

Methods

Datasets

The participants of this study were drawn from Ivan City (https://ivancity.com/bbs/login.php), Korea's lar gest online portal for the gay community, managed by LGBT KOREA since 1999. "Ivan" in Korean is slang used by homosexuals to distinguish themselves from "ilvan" (heterosexuals), and approximately 95% of its members are men who have sex with men (MSM). The primary motivation for joining the site is to seek dating and sexual partners. Based on the domestic prevalence rates of sexually transmitted diseases (STDs) like syphilis, gonorrhea, and chlamydia among MSM, we hypothesized a maximum HIV prevalence rate of 30% to determine the sample size. Using a prevalence rate of 0.5 and a 95% confidence interval, the G*Power program indicated a required sample size of 1,063 participants; hence, we set our study size at 1,000 participants. Through collaboration with the Ivan City management team, 10,000 IDs, about 5% of active accounts, were randomly selected. A web survey was conducted by Hankook Research Co. Ltd., which was responsible for data collection and de-identification to ensure anonymity. The survey, open from July 22, 2022, to July 29, 2022, excluded respondents who were female, under 19 or over 60 years old, or had no experience of sexual contact (Appendix 1). The web survey incorporated a double-confirmation process to exclude ineligible respondents—those who identified as female, were under 19 or over 60 years old, or lacked same-sex sexual contact experience. This process was implemented in collaboration with Hankook Research and Ivan City. Initially, the sampling frame was established, and the eligibility of respondents was verified before distributing the survey link. A second verification was conducted during the survey administration to ensure that only eligible participants completed the survey. Additionally, as the study targeted an adult population, minors and elderly individuals were excluded. This is because minors under the age of 19 require a separate research ethics review, and a preliminary investigation revealed that there are no members over the age of 60 in Ivan City. Approximately 10% ($n = 1,005$) of those approached participated, filling out a 20-minute questionnaire. Participants were incentivized with coupons worth 5,000 won (approximately 3.8 USD) redeemable on Ivan City, ensuring anonymity while maintaining the reliability and validity of the data. The analysis focused on respondents who identified as "homosexual" (1) or "bisexual" (2), comprising 941 of the responses. Those who identified as "other," "don't know," or had "never thought about it" in terms of gender identity accounted for 6.4% of the total responses. The data collected in this study underwent rigorous procedures to ensure both reliability and validity. During the web survey, Hankook Research Co. Ltd. employed attention checks to promote careful participation, identifying respondents who provided contradictory answers or completed the survey in an unusually short time. After data collection, we carried out thorough data cleaning and validation processes, including an assessment of internal consistency (response rate = 93.6%).

Analytical framework

The analytical framework for this study employs a three-tiered model derived from the UNAIDS and Family Health International (FHI) MSM behavioral indices, focusing on sexual type, anal intercourse, and condom use [25]. Given the crucial role of unprotected anal intercourse (UAI) in HIV/STI transmission, this study specifically examines predictive factors associated with this behavior. Model I investigates the relationship between individual socioeconomic characteristics and sexual behavior, particularly anal intercourse, based on evidence suggesting that socioeconomic status can influence sexual behaviors [11, 13]. Model II explores the link between conventional health risk behaviors—such as smoking and drinking—and sexual behaviors, acknowledging that these behaviors can hinder protective actions like safe sex. This model also considers the impact of being HIV-positive or having chronic conditions, such as mental illness, on engaging in sexual behaviors, including UAI [26–30]. Model III focuses on the relationship between condom use and other sexual behaviors, while considering the nature of the sexual partnership—whether the partner is primary or not—and how this influences anal intercourse practices [19, 31, 32]. This framework also examines the role of sexual identity in anal intercourse, analyzing data separately for homosexual and bisexual men [15, 16].

Measures

Dependent variables

The dependent variable in this study was whether or not the respondents preferred anal intercourse. Responses were divided into "prefer" (1) and "don't prefer" (0).

Independent variables

The study categorizes its independent variables into two primary groups: health behaviors and health status, and characteristics of sexual behaviors. These variables are assessed through structured survey questions designed

to capture specific aspects of each participant's lifestyle and sexual practices.

Health risk behaviors and health status

Smoking: Participants were asked whether they currently smoke, with responses categorized as "smoke" (1) and "do not smoke" (0).

Alcohol Consumption: Frequency of alcohol consumption was gauged with options ranging from "I never drink" (0) to "more than 4 times a week" (4).

HIV Infection Status: Participants were directly questioned about their HIV status, with responses of "yes" (1) or "no" (0).

Underlying Diseases: This variable checked for the presence of non-HIV/AIDS diseases such as diabetes, cardiovascular and respiratory diseases, cancer, chronic hepatitis or cirrhosis, autoimmune diseases, tuberculosis, mental illnesses like depression, and others. Responses were categorized as "I suffer from one or more of the listed underlying diseases" (1) or "I do not have an underlying disease" (0).

Characteristics of sexual behaviors

Condom Use: The frequency of condom use during sexual intercourse was queried, with responses ranging from "every time (used 100%)" (1) to "mostly not used (used less than 10%)" (4).

Type of Sexual Partnership: This variable identified whether the respondent was in a primary same-sex relationship, with options of "yes" (1) or "no" (0).

Sexually Transmitted Infections (STIs): Participants were asked if they had been diagnosed with or treated for an STI in the past year, with responses of "yes" (1) or "no" (0).

These variables are integral to understanding the nuanced behaviors and health statuses that influence HIV transmission and sexual health risks among the study's participants. The structured data collection facilitates a comprehensive analysis of the factors that contribute to the sexual health dynamics within the MSM community in Korea.

Covariates

Each respondent's age, educational attainment, and income as potential confounding variables were controlled in the model.

Statistical analyses

First, descriptive statistical analyses of the social and sexual characteristics of the MSM were conducted. At this time, using cross tabulation, bivariate analyses were also conducted according to the characteristics of anal intercourse preference and the sexual identity of the respondents. Second, a chi-square test was used to examine the association between anal intercourse preference and the sexual identity of the sample. Third, through hierarchical multiple logistic regression analyses, predictors affecting anal intercourse in MSM were identified according to their sexual identity. All statistical analyses were conducted using STATA v. 14.0 (STATA, College Station, TX, USA).

Results

Characteristics related to the respondents' preference for anal intercourse

The results of the bivariate analyses revealed that age and socioeconomic status were not significantly associated with a preference for anal intercourse ($p > .05$) (Table 1). However, health risk behaviors and certain sexual behavioral characteristics displayed significant relationships. Smokers were more likely to prefer anal sex than non-smokers (Chi-square = 4.961, $p < .05$). HIV-positive individuals also showed a greater preference for anal sex compared to those who are HIV-negative (Chi-square = 9.451, $p < .01$). Notably, low condom use was strongly linked to a preference for anal intercourse (Chi-square = 82.847, $p < .001$), as were having a primary sex partner (Chi-square = 35.588, $p < .001$) and a recent STI diagnosis (Chi-square = 31.311, $p < .001$). These findings underscore the importance of targeted interventions to address these factors among MSM to reduce sexual health risks.

Characteristics related to the gender identity of the respondents

The bivariate analyses of the sample characteristics and gender identity indicated no significant associations with age, educational attainment, income, smoking, drinking alcohol, HIV status, or underlying disease ($p > .05$) (Table 2). There was, however, a marginal correlation between income, smoking, drinking alcohol, and gender identity ($0.05 < p < .1$). Notably, sexual behavior characteristics showed significant associations: a preference for unprotected sex was strongly linked to homosexuality (Chi-square = 81.142, $p < .001$), and both having a primary sex partner (Chi-square = 9.056, $p < .05$) and a history of STIs (Chi-square = 4.211, $p < .05$) were statistically associated with homosexuality. These results highlight the need for focused public health interventions addressing sexual health risks within the homosexual community.

The association between gender identity and anal intercourse

Table 3 reveals that individuals identifying as homosexual are more likely to prefer anal sex compared to those identifying as bisexual, with a statistically significant difference (Chi-square = 5.165, $p < .05$).

Table 1 Characteristics related to the respondents' preference for anal intercourse (*n*, %) (*n* = 941)

Categories			Anal intercourse		Total
			Yes	No	
Socioeconomic characteristics	Age	19 ~ 29	140(37.9)	229(62.1)	369(100.0)
		30 ~ 39	116(40.8)	168(59.2)	284(100.0)
		40 ~ 49	87(45.8)	103(54.2)	190(100.0)
		50 ~ 59	39(39.8)	59(60.2)	98(100.0)
		$\chi^2 = 3.237$			
	Educational attainment	Middle school or less	2(25.0)	6(75.0)	8(100.0)
		High school	102(37.0)	174(63.0)	276(100.0)
		College	215(40.8)	312(59.2)	527(100.0)
		Post-graduate	63(48.5)	67(51.5)	130(100.0)
		$\chi^2 = 5.667$			
	Annual income (USD)	< 7000	67(39.9)	101(60.1)	168(100.0)
		7001 ~ 14,000	13(28.9)	32(71.1)	45(100.0)
		14,001 ~ 21,000	68(34.9)	127(65.1)	195(100.0)
		21,001 ~ 28,000	86(44.1)	109(55.9)	195(100.0)
		28,001 ~ 35,000	46(40.4)	68(59.6)	114(100.0)
		35,001 ~ 42,000	34(45.9)	40(54.1)	74(100.0)
		42,001 ~ 48,000	16(45.7)	19(54.3)	35(100.0)
		48,001 ~ 56,000	21(50.0)	21(50.0)	42(100.0)
		56,001 ~ 63,000	8(38.1)	12(61.9)	21(100.0)
		63,001 ~ 70,000	10(50.0)	10(50.0)	20(100.0)
		≥ 70,001	13(40.6)	19(59.4)	32(100.0)
		$\chi^2 = 9.826$			
Health risk behavior and HIV-related status	Smoking	No	245(43.5)	318(56.5)	563(100.0)
		Yes	137(36.2)	241(63.8)	378(100.0)
		$\chi^2 = 4.961$*			
	Drinking alcohol	I never drink	92(45.8)	109(54.2)	201(100.0)
		Less than once a month	120(42.3)	164(57.7)	284(100.0)
		About 2–4 times a month	105(38.5)	168(61.5)	273(100.0)
		About 2–3 times a week	44(35.5)	80(64.5)	124(100.0)
		More than 4 times a week	21(35.6)	38(64.4)	59(100.0)
		$\chi^2 = 5.028$			
	HIV infection	Negative	368(41.9)	510(58.1)	878(100.0)
		Positive	14(22.2)	49(77.8)	63(100.0)
		$\chi^2 = 9.451$**			
	Underlying diseases	No	343(40.4)	507(59.6)	850(100.0)
		Yes	39(42.9)	52(57.1)	91(100.0)
		$\chi^2 = 0.241$			
Sex behavioral characteristics	Condom use (unprotected sex)	Every time (used 100%)	163(61.0)	104(39.0)	267(100.0)
		Frequently used (used between 50% and 90%)	99(31.5)	215(68.5)	314(100.0)
		Occasionally used (used between 10% and 50%)	47(25.7)	136(74.3)	183(100.0)
		Mostly not used (less than 10% used)	39(28.1)	100(71.9)	139(100.0)
		$\chi^2 = 82.847$***			
	Primary sex partner	Have not	266(48.7)	280(51.3)	546(100.0)
		Have	116(29.4)	279(70.6)	395(100.0)
		$\chi^2 = 35.588$***			
	STD infection	Never	358(44.2)	452(55.8)	810(100.0)
		Ever	24(18.3)	107(81.7)	131(100.0)
		$\chi^2 = 31.311$***			

*$p < .05$, ** $p < .01$, ***$p < .001$

Table 2 Characteristics related to the gender identity of the respondents (n, %) ($n = 941$)

Categories			Gender identity		Total
Socioeconomic characteristics	Age	19 ~ 29	237(64.2)	132(35.8)	369(100.0)
		30 ~ 39	198(69.7)	86(30.3)	284(100.0)
		40 ~ 49	136(71.6)	54(28.4)	190(100.0)
		50 ~ 59	67(68.4)	31(31.6)	98(100.0)
		$\chi^2 = 3.893$			
	Educational attainment	7(87.5)	1(12.5)	8(100.0)	7(87.5)
		183(66.3)	93(33.7)	276(100.0)	183(66.3)
		366(69.4)	161(30.6)	527(100.0)	366(69.4)
		82(63.1)	48(36.9)	130(100.0)	82(63.1)
		$\chi^2 = 3.690$			
	Annual income (USD)	< 7,000	117(69.6)	51(30.4)	168(100.0)
		7,001 ~ 14,000	38(84.4)	7(15.6)	45(100.0)
		14,001 ~ 21,000	129(66.2)	66(33.8)	195(100.0)
		21,001 ~ 28,000	126(64.6)	69(35.4)	195(100.0)
		28,001 ~ 35,000	77(67.5)	37(32.5)	114(100.0)
		35,001 ~ 42,000	53(71.6)	21(28.4)	74(100.0)
		42,001 ~ 48,000	29(82.9)	6(17.1)	35(100.0)
		48,001 ~ 56,000	26(61.9)	16(38.1)	42(100.0)
		56,001 ~ 63,000	12(57.1)	9(42.9)	21(100.0)
		63,001 ~ 70,000	9(45.0)	11(55.0)	20(100.0)
		≥ 70,001	22(68.8)	10(31.3)	32(100.0)
		$\chi^2 = 17.789$†			
Health risk behavior and HIV-related status	Smoking	No	395(70.2)	168(29.8)	563(100.0)
		Yes	243(64.3)	135(35.7)	378(100.0)
		$\chi^2 = 3.575$†			
	Drinking alcohol	I never drink	132(65.7)	69(34.3)	201(100.0)
		Less than once a month	192(67.6)	92(32.4)	284(100.0)
		About 2–4 times a month	200(73.3)	73(26.7)	273(100.0)
		About 2–3 times a week	77(62.1)	47(37.9)	124(100.0)
		More than 4 times a week	37(62.7)	22(37.3)	59(100.0)
		$\chi^2 = 6.697$†			
	HIV infection	Negative	589(67.1)	289(32.9)	878(100.0)
		Positive	49(77.8)	14(22.2)	63(100.0)
		$\chi^2 = 3.079$			
	Underlying diseases	No	570(67.1)	280(32.9)	850(100.0)
		Yes	68(74.7)	23(25.3)	91(100.0)
		$\chi^2 = 2.213$			
Sex behavioral characteristics	Condom use (unprotected sex)	Every time (used 100%)	161(60.3)	106(39.7)	267(100.0)
		Frequently used (used between 50% and 90%)	220(70.1)	94(29.9)	314(100.0)
		Occasionally used (used between 10% and 50%)	126(68.9)	57(31.1)	183(100.0)
		Mostly not used (less than 10% used)	101(72.7)	38(27.3)	139(100.0)
		$\chi^2 = 81.142$***			
	Primary sex partner	Have not	360(65.9)	186(34.1)	546(100.0)
		Have	278(70.4)	117(29.6)	395(100.0)
		$\chi^2 = 9.056$*			
	STD infection	Never	539(66.5)	271(33.5)	810(100.0)
		Ever	99(75.6)	32(24.4)	131(100.0)
		$\chi^2 = 4.211$*			

*$p < .05$, ** $p < .01$, ***$p < .001$

†: $0.1 > p > .05$

Table 3 The association between gender identity and anal intercourse

		Anal intercourse			
		No	Yes	Total	χ^2
Gender identity	Homosexual	243 (38.1%)	395 (61.9%)	638 (100.0%)	5.165*
	Bisexual	139 (45.9%)	164 (54.1%)	303 (100.0%)	
Sum		382 (40.6)	559 (59.4%)	941 (100.0%)	

*$p < .05$

Hierarchical regression analyses of predictors of anal intercourse in homosexuals

The analysis of factors influencing the preference for anal intercourse among Korean male homosexuals, as presented in Table 4, provides multifaceted insights across various regression models. In Model I, age showed a negative association with preference for anal intercourse, though it lacked strong statistical significance. Model II, which adjusted for socioeconomic factors, indicated a significantly higher likelihood of preferring anal sex among HIV-positive respondents (OR = 2.481, 95% CI = 1.198–5.189). Model III, which incorporated socioeconomic characteristics, health behaviors, and health status, revealed that a preference for anal intercourse was strongly associated with unprotected sex (OR = 1.538, 95% CI = 1.281–1.847), having a primary sexual partner (OR = 1.943, 95% CI = 1.345–2.809), and a history of sexually transmitted infections (OR = 2.978, 95% CI = 1.592–5.568). These findings underscore the complex relationships between health status, sexual behavior, and partnership dynamics in shaping sexual preferences within this group.

Hierarchical regression analyses of predictors of anal intercourse in bisexuals

The analysis of predictors for preferring anal intercourse among Korean male homosexuals, as presented in Table 5, highlights findings across three models. In Model I, higher education levels were associated with a slight reduction in the likelihood of preferring anal intercourse, though this relationship demonstrated limited statistical

Table 4 Hierarchical regression analyses of predictors of anal intercourse in homosexuals

		Model I		Model II		Model III	
		OR	95% CI	OR	95% CI	OR	95% CI
Socioeconomic characteristics	Age	0.853†	0.723–1.007	0.856†	0.723–1.013	0.927	0.771–1.116
	Education	0.886	0.689–1.141	0.966	0.743–1.256	0.939	0.703–1.255
	Income	0.987	0.922–1.056	0.986	0.920–1.056	0.987	0.907–1.055
Health risk behavior and the HIV-related status	Smoking (Ref.: No)			1.156	0.814–1.643	1.154	0.787–1.692
	Drinking alcohol			1.116	0.960–1.298	1.153	0.978–1.359
	HIV infection (Ref.: Negative)			2.481*	1.198–5.189	1.450	0.644–3.267
	Underlying diseases (Ref.: None)			0.731	0.423–1.265	0.670	0.369–1.220
Sex behavioral characteristics	Unprotected sex					1.538***	1.281–1.847
	Primary sex partner (Ref.: None)					1.943***	1.345–2.809
	STD infection (ref.: Never)					2.978***	1.592–5.568
Nagelkereke R^2		0.012		0.035		0.157	

*$p < .05$, ** $p < .01$, ***$p < .001$

†: $0.1 > p > .05$

Table 5 Hierarchical regression analyses of predictors of anal intercourse in bisexuals

		Model I		Model II		Model III	
		OR	95% CI	OR	95% CI	OR	95% CI
Socioeconomic characteristics	Age	1.135	0.892–1.444	1.155	0.901–1.480	1.181	0.901–1.549
	Education	0.714†	0.499–1.022	0.785	0.543–1.137	0.813	0.543–1.215
	Income	0.964	0.875–1.062	0.939	0.849–1.039	0.927	0.831–1.033
Health risk behavior and the HIV-related status	Smoking (Ref.: No)			1.507	0.933–2.435	1.472	0.879–2.467
	Drinking alcohol			1.073	0.881–1.307	1.090	0.878–1.352
	HIV infection (Ref.: Negative)			3.515	0.912–13.556	4.648†	0.811–26.621
	Underlying diseases (Ref.: None)			0.884	0.351–2.225	0.574	0.208–1.584
Sex behavioral characteristics	Unprotected sex					1.715***	1.322–2.225
	Primary sex partner (Ref.: None)					1.927*	1.141–3.257
	STD infection (ref.: Never)					2.154†	0.864–5.370
Nagelkereke R^2		0.026		0.059		0.197	

*$p < .05$, ** $p < .01$, ***$p < .001$

†: $0.1 > p > .05$

significance. Model II, which adjusted for socioeconomic characteristics, did not identify any statistically significant predictors. In Model III, which further accounted for socioeconomic factors, health behavior, and health status, a significant association was found between unprotected sex and a higher preference for anal intercourse (OR = 1.715, 95% CI = 1.322–2.225). Additionally, having a primary sex partner was strongly correlated with a greater likelihood of preferring anal intercourse (OR = 1.927, 95% CI = 1.141–3.257). While the relationship between a history of sexually transmitted infections (STIs) and a preference for anal intercourse showed limited significance (OR = 2.154, 95% CI = 0.864–5.370), being HIV-positive was also linked to a higher preference for anal sex, though this finding had limited statistical significance (OR = 4.648, 95% CI = 0.811–26.621). These results emphasize the intricate relationship between individual health status, sexual behavior, and relational factors in shaping sexual preferences among this population.

Discussion

Since its emergence in 1981, AIDS has become one of the most severe infectious diseases, claiming an estimated 40.1 million lives globally. Effective control, prevention, and treatment remain critical public health priorities [33]. As of 2021, approximately 38.4 million people worldwide are living with HIV [34]. In South Korea, around 16,000 individuals are HIV-positive, with a low but rising incidence rate, particularly among men in their 20s, at 2.36 per 100,000 population [35]. Despite the urgency, interventions and studies addressing HIV transmission are limited. Stigma and discrimination against homosexuality contribute to lower rates of HIV screening and treatment adherence among sexual minorities, heightening the risk of silent transmission. This study examined anal intercourse behaviors among Korean male sexual minorities (MSM and bisexual men) to identify high-risk groups and inform targeted interventions. The findings underscored the need for specific public health strategies to address these challenges.

In Korea, male sexual minorities, particularly gay men, often associate anal intercourse with enhanced sexual pleasure and identity affirmation. This preference is regarded as a key predictor of high-risk sexual behaviors among homosexual males, with the context of anal intercourse largely driven by the pursuit of pleasure. Analysis reveals that individuals with a primary sex partner and a tendency toward unprotected sex are more likely to engage in anal intercourse. For many gay men, this behavior not only contributes to physical and emotional satisfaction but also plays a central role in affirming their sexual identity, providing a sense of belonging and self-expression [36, 37]. Unlike female sex workers (FSW) in Korea, who are often influenced by alcohol and face elevated risks of HIV [28], alcohol does not appear to play a similar role in anal intercourse among MSM. Furthermore, many gay men express a preference for condomless anal intercourse, even with primary partners, thereby increasing their risk of contracting HIV or other sexually transmitted infections. These behaviors are consistent with findings from Western studies, highlighting that the motivations for and implications of anal intercourse among Korean gay men align with broader international patterns.

In South Korea, the characteristics of anal intercourse among homosexual and bisexual men show notable similarities, challenging patterns observed in other countries. This study found that a history of sexually transmitted diseases (STDs) is a significant predictor of a preference for anal intercourse among Korean male sexual minorities. For men who have sex with men (MSM), this correlation was statistically significant, while for bisexual men, it held limited but notable significance. Furthermore, individuals who are HIV-positive are more likely to prefer anal intercourse, indicating a potentially complex relationship between past infections and current sexual behavior, which may suggest a form of reverse causality unique to this demographic. The practice of anal intercourse carries significant stigma in Korean society, often associated with fear of HIV [7]. This stigma likely contributes to inadequate safe sex practices among homosexuals, potentially reducing self-efficacy for condom use and limiting the adoption of preventive measures like pre-exposure prophylaxis (PrEP) [38]. The unstable and transient partnering patterns among young Korean MSM, as noted by Jung [10], may facilitate the spread of STDs and HIV through concurrent sexual relationships [27]. Additionally, societal pressures and fear of rejection during the coming-out process may drive many Korean gay men to marry women and identify as bisexual, thereby blurring the distinctions between homosexual and bisexual identities [7]. This study found that homosexual men displayed a slightly higher preference for anal intercourse compared to bisexual men, although the difference was not statistically significant. The HIV prevalence rates among homosexuals (7.7%) and bisexuals (4.6%) were similar, suggesting that many bisexual men may suppress their sexual identities due to societal norms and Confucian cultural influences. This undifferentiated identity complicates sexual partnerships and increases the risk of transmitting STDs and HIV, as demonstrated by the findings of this study.

This study presents several limitations that merit consideration. First, potential confounders not measured in this analysis, such as group sexual encounters (GSE) and the use of drugs and stimulants—known factors in HIV/STI transmission among MSM—could not be included. In Korea, where such behaviors are either illegal or highly

sensitive, the IRB restrictions precluded these measures from the survey. However, cultural differences suggest that the impact of GSE on unprotected anal intercourse (UAI) may be less significant in Korea than in the United States [16], as indicated by a qualitative study [10]. Second, the study might suffer from reverse causality between the independent and dependent variables. Despite measuring "past" factors such as condom use and HIV/STI status against the "current" preference for anal sex, inconsistencies in responses could indicate that pleasure-driven behaviors precede rational decision-making. This necessitates a cautious interpretation of the findings, acknowledging the potential for reverse causation. Third, the results of this study may have been influenced by various biases during the data collection process (e.g., reporting bias, recall bias, and/or the Hawthorne effect). However, we adhered to statistically validated procedures to ensure a representative sample. Additionally, we made every effort to enhance the reliability of the responses by implementing several measures throughout the web survey process. Fourth, we did not include the use of various drugs during sexual intercourse in our model, as most of these substances are illegal in Korea, and the IRB recommended excluding these items from the questionnaire.

Korean society perpetuates a cultural and institutional aversion to homosexuality, often fueled by the erroneous belief that homosexuality is linked to HIV as a "deadly disease," leading to significant stigma and discrimination against homosexuals [39]. Despite advances in genetic research debunking the existence of so-called "gay genes" and indicating that sexual orientation results from complex interactions between biological and socio-environmental factors [40], this stigma persists. This misconception not only contributes to social exclusion but can also lead to severe consequences such as suicide among homosexuals, despite HIV being manageable as a chronic condition today [41]. This study examined predictive factors for anal intercourse among Korean homosexuals and bisexuals, revealing that young non-heterosexual men are more likely to engage in unprotected anal sex while potentially living with HIV/STDs. Such behaviors increase the susceptibility to infections among primary same-sex partners, and bisexuals also face a higher risk of transmitting HIV/STDs due to similar sexual behaviors. Currently, the Korean government's approach to HIV prevention primarily involves distributing free condoms to venues frequented by MSM. However, this strategy does not fully leverage the insights gained about the sexual partnership dynamics among Korean male sexual minorities. There is an opportunity to refine public health interventions targeting young men by utilizing these insights to better address the HIV transmission risk. However, while improving HIV prevention strategies, care must be taken to avoid reinforcing the stigma against sexual minorities by overly focusing on their sexual orientation during screening processes. Instead, it is advisable to integrate health education into the existing anonymous HIV testing services offered at public health centers. This integration should include information on establishing one's gender identity and practicing safe sex, thereby fostering a more inclusive and effective public health response.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-21751-2.

Supplementary Material 1

Supplementary Material 2

Acknowledgements

I extend my gratitude to Jang Bo-hyun, Senior Research Manager at Hankook Research, and the Ivan City management team for their valuable assistance with data collection.

Author contributions

Prof. Dr. Minsoo Jung (MJ) conceived the study idea, performed the statistical analysis and drafted the manuscript. MJ advised on methodological issues and provided statistical expertise. MJ participated in interpreting results, reviewing drafts of the manuscript and approved the final version of the manuscript submitted for publication.

Funding

This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2022R1F1A1062998; PI: Prof. Dr. Minsoo Jung). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Data availability

Data cannot be shared publicly because of the policy of the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2022R1F1A1062998). Data are available from the Institutional Review Board of Dongduk Women's University (DDWU2206-02) for researchers who meet the criteria for access to confidential data. The person in charge of Dongduk Women's University's IRB is Researcher Seol Chae-yeon. The phone number is +82-2-940-4236 and the email address is tjfcodus@dongduk.ac.kr. Upon your request, she will provide you with data from this study after approval by NRF.

Declarations

Ethics approval and consent to participate

Sampling and recruitment procedures complied with the research ethics guidelines of the National Research Foundation of Korea and were approved by the institutional review board of Dongduk Women's University (DDWU2206-02). In order to protect vulnerable research participants, we obtained informed consent from the participants before conducting the survey. Hankook Research Co. Ltd., which was responsible for data collection for this study, received responses to the survey after obtaining written informed consent from each of all respondents. The entire process of data collection was reviewed and approved by Dongduk Women's University IRB.

Competing interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Received: 22 May 2024 / Accepted: 3 February 2025
Published online: 19 February 2025

References

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). 2023. Global HIV & AIDS statistics: Fact sheet. Retrieved June 4, 2023, from https://www.unaids.org/en/resources/fact-sheet
2. World Health Organization (WHO). 2023. HIV/AIDS. Retrieved June 8, 2023, from https://www.who.int/health-topics/hiv-aids#tab=tab_1
3. Centers for Disease Control and Prevention (CDC). 2023. About HIV/AIDS. Retrieved June 4, 2023, from https://www.cdc.gov/hiv/basics/whatishiv.html
4. Centers for Disease Control and Prevention (CDC). 2023. HIV/AIDS Basic Statistics. Retrieved June 4, 2023, from https://www.cdc.gov/hiv/basics/statistics.html
5. Korea Disease Control and Prevention Agency (KDCA). 2019. HIV/AIDS notifications in Korea, 2019. Retrieved June 24, 2023, from https://www.kdca.go.kr/filepath/boardDownload.es?bid=0031&list_no=368236&seq=1
6. Joint United Nations Programme on HIV/AIDS (UNAIDS). 2023. South Korea country data. Retrieved June 14, 2023, from https://www.unaids.org/en/regionscountries/countries/republicofkorea
7. Cho BH, Sexuality. Risk, & HIV/AIDS. Seoul: Nanam, 2008.
8. Hubert M, Bajos N, Sanfort T, editors. Sexual behavior and HIV/AIDS in Europe. London: UCL; 1998.
9. Sohn A, Cho B. Knowledge, attitudes, and sexual behaviors in HIV/AIDS and predictors affecting condom use among men who have sex with men in South Korea. Osong Public Health Res Perspect. 2012;3(3):156–64.
10. Jung M. Partnering patterns and sexual behavior among Korean men who have sex with men. Open AIDS J. 2016;10:104–12.
11. Herbenick D, Reece M, Schick V, Sanders SA, Dodge B, Fortenberry JD. Sexual behavior in the United States: results from a national probability sample of men and women ages 14–94. J Sex Med. 2010;7(Suppl 5):255–65.
12. Mercer CH, Tanton C, Prah P, Erens B, Sonnenberg P, Clifton S, Macdowall W, Lewis R, Field N, Datta J, Copas AJ, Phelps A, Wellings K, Johnson AM. Changes in sexual attitudes and lifestyles in Britain through the life course and over time: findings from the national surveys of sexual attitudes and lifestyles (Natsal). Lancet. 2013;382(9907):1781–94.
13. Smith AM, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: reflections and recommendations for future research. Aust N Z J Public Health. 2003;27(2):251–6.
14. Operario D, Soma T, Underhill K. Sex work and HIV status among transgender women: systematic review and meta-analysis. J Acquir Immune Defic Syndr. 2008;48(1):97–103.
15. Holt M, Lea T, Mao L, Kolstee J, Zablotska I, Duck T, Allan B, West M, Lee E, Hull P, Grulich A, De Wit J, Prestage G. Community-level changes in condom use and uptake of HIV pre-exposure prophylaxis by gay and bisexual men in Melbourne and Sydney, Australia: results of repeated behavioural surveillance in 2013-17. Lancet HIV. 2018;5(8):e448–56.
16. Grov C, Rendina HJ, Ventuneac A, Parsons JT. HIV risk in group sexual encounters: an event-level analysis from a national online survey of MSM in the U.S. J Sex Med. 2013;10:2285–94.
17. Hoppe T. Circuits of power, circuits of pleasure: sexual scripting in gay men's bottom narratives. Sexualities. 2011;14(2):193–217.
18. Moskowitz DA, Roloff ME. The existence of a bug chasing subculture. Cult Health Sex. 2007;9(4):347–57.
19. Mitchell JW. HIV-negative and HIV-discordant gay male couples' use of HIV risk-reduction strategies: differences by partner type and couples' HIV-status. AIDS Beh. 2013;17(4):1557–69.
20. Parker RG, Herdt GH, Carballo M. Sexual culture, HIV transmission, and AIDS research. J Sex Res. 1991;28:77–98.
21. Kalichman SC, Simbayi LC, Cain D, Jooste S. Heterosexual anal intercourse among community and clinical settings in Cape Town, South Africa. Sex Transm Infect. 2009;85(6):411–5.
22. Centers for Disease Control and Prevention (CDC). 2020. HIV and Gay and Bisexual Men. Retrieved June 14, 2023, from https://www.cdc.gov/hiv/group/msm/index.html
23. Kim YG, Hahn SJ. Homosexuality in ancient and modern Korea. Cult Health Sex. 2006;8(1):59–65.
24. Jung M. Framing, agenda setting, and disease phobia of AIDS-related coverage in the South Korean mass media. Health Care Manag (Frederick). 2013;32(1):52–7.
25. Family Health International (FHI). Behavioral surveillance surveys: guidelines for repeated behavioral surveys in populations at risk of HIV. Arlington, VA: FHI; 2000.
26. Scott-Sheldon LA, Carey KB, Cunningham K, Johnson BT, Carey MP, MASH Research Team. Alcohol use predicts sexual decision-making: a systematic review and meta-analysis of the experimental literature. AIDS Behav. 2016;20(Suppl 1):S19–39.
27. Jung M, Choi MK. The sociodemographic characteristics of concurrent sexual partnerships and their risky sexual behaviors: results of a nationally representative sample of South Korean adults. Sex Disabil. 2009;27:127–38.
28. Jung M. Risk factors of sexually transmitted infections among female sex workers in Republic of Korea. Infect Dis Poverty. 2019;8(1):6.
29. Kwon RH, Jung M. Associations between conventional healthy behaviors and social distancing during the COVID-19 pandemic: evidence from the 2020 community health survey in Korea. J Prev Med Public Health. 2022;55(6):568–77.
30. Mustanski B, Garofalo R, Herrick A, Donenberg G. Psychosocial health problems increase risk for HIV among urban young men who have sex with men: preliminary evidence of a syndemic in need of attention. Ann Behav Med. 2007;34(1):37–45.
31. Mustanski BS, Newcomb ME, Du Bois SN, Garcia SC, Grov C. HIV in young men who have sex with men: a review of epidemiology, risk and protective factors, and interventions. J Sex Res. 2011; 48(2–3): 218–53.
32. Rosenberger JG, Reece M, Schick V, Herbenick D, Novak DS, Van Der Pol B, Fortenberry JD. Condom use during most recent anal intercourse event among a U.S. sample of men who have sex with men. J Sex Med. 2012;9(4):1037–47.
33. World Health Organization (WHO). 2021. HIV/AIDS. Retrieved June 20, 2023, from https://www.who.int/health-topics/hiv-aids#tab=tab_1
34. Joint United Nations Programme on HIV/AIDS (UNAIDS). 2020. Global HIV & AIDS statistics — 2020 fact sheet. Retrieved June 14, 2023, from https://www.unaids.org/en/resources/fact-sheet
35. Korea Disease Control and Prevention Agency (KDCA). 2022. 2021 HIV/AIDS Reporting Status. Retrieved June 17, 2023, from https://www.kdca.go.kr/filepath/boardDownload.es?bid=0034&list_no=720480&seq=1
36. Jeffries WL 4. A comparative analysis of homosexual behaviors, sex role preferences, and anal sex proclivities in latino and non-latino men. Arch Sex Behav. 2009;38(5):765–78.
37. Adam BD. Constructing the neoliberal sexual actor: responsibility and care of the self in the discourse of barebackers. Cult Health Sex. 2005;7(4):333–46.
38. Sullivan PS, Carballo-Diéguez A, Coates T, Goodreau SM, McGowan I, Sanders EJ, Smith A, Goswami P, Sanchez J. Successes and challenges of HIV prevention in men who have sex with men. Lancet. 2012;380(9839):388–99.
39. Cho BH, Sohn AR. Why are Korean protestant churches hostile to homosexuality and AIDS? Health Social Sci. 2018;48:5–28.
40. Ganna A, Verweij KJH, Nivard MG, Maier R, Wedow R, Busch AS, Abdellaoui A, Guo S, Sathirapongsasuti JF, 23andMe Research Team, Lichtenstein P, Lundström S, Långström N, Auton A, Harris KM, Beecham GW, Martin ER, Sanders AR, Perry JRB, Neale BM, Zietsch BP. Large-scale GWAS reveals insights into the genetic architecture of same-sex sexual behavior. Science. 2019;365(6456):eaat7693.
41. Hatzenbuehler ML. The social environment and suicide attempts in lesbian, gay, and bisexual youth. Pediatrics. 2011;127(5):896–903.

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