Published in final edited form as:

J Health Psychol. 2014 October ; 19(10): 1271–1278. doi:10.1177/1359105313488977.

Age and sexual risk among black men who have sex with men in South Africa: The mediating role of attitudes towards condoms

Farnaz Kaighobadi^a, Justin Knox^b, Vasu Reddy^c, and Theo Sandfort^a

^aHIV Center for Clinical and Behavioral Studies, Department of Psychiatry, Columbia University and New York State Psychiatric Institute, New York, USA

^bDepartment of Epidemiology, Columbia University Mailman School of Public Health, New York, USA

^cHuman Sciences Research Council, Human and Social Development, and the University of KwaZulu-Natal, South Africa

Abstract

The results of research linking age and sexual risk among men who have sex with men (MSM) have been inconsistent. This study assessed the relationship between age and sexual risk among 193 black MSM in Pretoria. Older MSM reported engaging in more frequent unprotected insertive anal intercourse (UIAI). We examined whether components of Information-Motivation-Behavioral Skills model mediated this relationship. Results showed that (1) older age predicts less positive attitudes towards condoms, (2) less positive attitudes predict more frequent UIAI, and (3) attitudes mediate the relationship between age and frequency of UIAI. We consider two possible explanations for these findings: a developmental trajectory and a cohort effect.

Keywords

Age; sexual risk behavior; Information-Motivation-Behavioral Skills model; MSM; South Africa

Introduction

Men who have sex men (MSM) in low-income and middle-income countries are one of the most at-risk populations for HIV-infection. Black MSM specifically and disproportionately are affected by the epidemic. Recent epidemiological studies in Africa estimate that black MSM are 15 times more likely to be infected by HIV compared to the general population (Millett et al., 2012). Although black South African MSM remain to be one of the most at-risk populations for HIV infection, the number of empirical studies that have contributed to better understanding of this population and their risk behaviors remains limited (Lane et al., 2011; Sandfort et al., 2008). In order to be able to target HIV prevention efforts effectively, it is important to identify the sociopsychological predictors of sexual risk behaviors

including attitudes towards safer-sex, social norms for safer-sex and safer-sex self-efficacy and intentions among different subpopulations, such as younger vs. older MSM.

Thus far, research investigating the relationship between age and sexual-risk behaviors among MSM in Africa has produced inconsistent findings. For example, studies conducted among MSM in Egypt (El-Sayyed, Kabbash, & El-Gueniedy, 2008), Lesotho (Baral et al., 2011) and Uganda (Raymond et al., 2009) reported that unprotected anal intercourse (UAI) was more common among young men. In Egypt interviews were conducted with 73 MSM between 15 to 47 years old. Overall, about half of the sample reported never using condoms and about 19% reported always using them during sex (El-Sayyed et al., 2008). While 40% of men in the 25 and older age group reported always-use of condoms, only 13.8% of men in the younger than 25 age group reported always-use of condoms. In a larger sample of 252 MSM in Lesotho ranging between 18 and 56 in age, wearing condoms at last sex was associated with being older than 26 (Baral et al., 2011). Raymond and colleagues also found an inverse relationship between age and frequency of unprotected receptive anal intercourse within the past 6 months among a sample of 252 MSM aged 18 years and older in Uganda. A few other studies, on the other hand, have found a positive relationship between age and engaging in UAI. More than half of the sample of 142 MSM participating in a survey in Cameroon reported UAI with another man during the past 6 months. UAI was associated with older age at time of the study (median age = 26; Henry et al., 2010). In Senegal, among a large sample of 501 MSM, UAI at last sex was associated with belonging to the 24 and younger and 35 and older age groups (Larmarange et al., 2010). Finally, a study conducted among a sample of 199 MSM living in “township”¹ communities in South Africa did not find a link between UAI and belonging to the 18 to 24 or 25 and older age groups (Lane et al., 2008). This inconsistency in findings may be attributed to differences in research methodology or the age range or age categorization of participants. The primary objective of our study was to gain a better understanding of whether sexual-risk behaviors differ by age among black South African MSM. We hypothesized that there will be an association between age and UAI among black MSM. Because of the inconsistency of the findings in previous research, we did not hypothesize the direction of this relationship.

When considering whether sexual risk behavior varies by age, it is also important to identify potential mechanisms that could help explain any observed differences. Therefore, we were also interested in investigating the psychosocial mediators of the relationship between age and sexual risk among South African MSM. To explore this topic, the current study utilized the Information-Motivation-Behavioral Skills (IMB) model as a framework for a mediation analysis. The IMB model proposes that knowledgeable and motivated individuals will utilize behavioral skills to engage in HIV preventive behavior (Fisher and Fisher, 1992). Different empirical tests of the IMB model have included different measures of motivation ranging from single indicators to multiple indicators including attitudes toward preventive behaviors, intentions to engage in preventive behaviors, perceived social norms, and ambivalence (see Kalichman, Picciano, & Roffman, 2008 for review). The IMB model has been extensively validated in multiple settings among a variety of populations (Fisher,

¹“Township” communities are areas outside of urban South African centers and are often characterized by high population density and low-income levels. Under Apartheid, these communities were designated as legal residents for black South Africans.

Fisher, Bryan, & Misovich, 2002; Kalichman et al., 2008; Scott-Sheldon et al., 2010), and MSM in South Africa (Kalichman et al., 2006). For example, among a high-risk population in South Africa risk reduction intentions were positively linked with risk-reduction self-efficacy, and risk reduction self-efficacy was positively linked to reduction of risk behaviour measured three months later (Kalichman et al., 2006). In a sample of MSM at high risk for HIV, self-efficacy for engaging in safer sex behaviors, self-perceived motivation to change, and perceived HIV risk, predicted men's UAI with non-primary sex partners (Kalichman, et al., 2008). In a sample of STD clinic patients, motivation, as measured by attitudes towards condoms use and condom-use intentions, was directly associated with condom-use (Scott-Sheldon et al., 2010).

We hypothesized that the constructs of the IMB model including HIV knowledge, perceived social norms for safe sex, safe sex self-efficacy and safe sex intentions will explain the observed association between age and unprotected anal intercourse.

Methods

Participants

Men were eligible to participate in the study if they (1) lived in the greater Pretoria metropolitan area; (2) were between 18 and 40 years old; (3) were of black/African race; (4) reported having had oral, anal, or masturbatory sex with at least one man in the preceding year, regardless of involvement with women and including men who self-identify as gay; and (5) were conversant in English. The 18–40 age range was selected because HIV prevalence and incidence (regardless of transmission mode) are highest in South Africa among this age group (Shisana et al., 2005). Multiple recruitment strategies were deployed to accomplish heterogeneity. Black men living outside of townships were invited to attend social events at a Lesbian, Gay, Bisexual, Transgender (LGBT) community center where they were given the opportunity to participate in the study. For black men living in townships, social functions were held in locations throughout the township and attendees were invited to participate in the study. A total of 193 black men were surveyed for the project. Participant recruitment and data collection were conducted from October to December 2008. The research protocol was approved by the Institutional Review Boards at the New York State Psychiatric Institute and the South African Human Sciences Research Council.

Procedures

Informed consent was obtained verbally by the interviewers. Once confirmed, all participants were asked to fill out a survey on the spot. Privacy was maintained by having participants complete the survey in quiet, usually adjacent rooms. Interviews were administered using Computer-Assisted Self-Interviewing (CASI) in order to minimize social desirability bias. Four interviewers were trained to receive consent and to help participants begin the CASI. Participants were compensated equal to approximately 8 USD for their time.

Measures

The survey collected information on demographic characteristics, relationship status, behavioral determinants, HIV testing and sexual risk behaviors. We used a subset of those measures in the current study.

The IMB constructs were assessed using instruments that were previously validated (Cornman, Schmiede, Bryan, Benziger, & Fisher, 2007) including in South Africa (Simbayi et al., 2005). The constructs of the IMB included measuring knowledge, intentions, attitudes, perceived social norms, and self-efficacy regarding HIV preventive behaviors. All of the IMB constructs other than knowledge were measured on 5-point Likert scales. *HIV knowledge* was measured using fifteen items (Carey & Schroder, 2002). HIV knowledge questions included: “As long as both partners wash themselves after sex, it is not necessary to use condoms”; “Having a shower after sex prevents the spread and infection of HIV, therefore it is not necessary to use condoms”; “It is easy to get HIV by sharing a meal with someone who is HIV infected”; and “You can tell by looking at someone if they have HIV.” Response options were True, False or Don’t Know. *HIV knowledge* scores were calculated as the number of correct answers provided. The possible highest score was 15 (range: 0-15). *Safer sex intentions* were assessed using three items that asked how likely it would be for the respondent to use a condom during insertive anal intercourse, during receptive anal intercourse, or to always talk with sexual partners about safer sex (Cronbach’s $\alpha = .79$). Response options ranged from 1 = “Very unlikely” to 5 = “Very likely.” *Attitudes towards condom use* were measured using four items that asked how it would be to always use condoms during insertive or receptive anal intercourse with steady or non-steady partners ($\alpha = .88$). Response options ranged from 1 = “Very awful” to 5 = “Very nice.” *Social norms supporting condom use* were measured using four items that asked how true it would be that most people who are important to the person think that he should use a condom during insertive or receptive anal intercourse with a steady or non-steady partner ($\alpha = .86$). Response options ranged from 1 = “Very untrue” to 5 = “Very true.” *Perceived behavioral skills* were assessed by measuring respondents’ self-efficacy for implementing HIV preventive skills. The measure included six items that asked how easy it would be for the respondent to perform certain HIV preventive behaviors, such as talking about condom use with regular/steady partners, getting tested for HIV, and not having any insertive or receptive anal intercourse without a condom ($\alpha = .76$). Response options ranged from 1 = “Very difficult to do” to 5 = “Very easy to do.” For all IMB items, a high score indicates a stronger presence of the construct.

HIV sexual risk was assessed using the Sexual Practices Assessment Schedule, a previously validated tool with demonstrated re-test-reliability (Carballo-Diequez et al., 1999). The measure included questions about the number of occasions of different sexual acts (oral, anal; receptive, insertive), with or without protection. Measures of frequency of insertive anal intercourse ($M = 5.34$, $SD = 10.35$, $Skewness = 3.16$, $Kurtosis = 11.26$) and receptive anal intercourse ($M = 12.48$, $SD = 19.61$, $Skewness = 2.96$, $Kurtosis = 9.66$) in the past two months were also included in the analyses. Both variables were positively skewed, thus we used the logged values of both variables in the analyses. The primary outcomes of interest for the study were the reported frequency of Unprotected Insertive Anal Intercourse (UIAI)

and Unprotected Receptive Anal Intercourse (URAI) with male sex partners in the past two months. The frequency of UIAI ranged from 0 to 20 ($M = 1.08$, $SD = 3.55$, $Skewness = 4.26$, $Kurtosis = 18.48$). The frequency of URAI ranged from 0 to 100 ($M = 3.29$, $SD = 10.33$, $Skewness = 6.37$, $Kurtosis = 50.10$). Because the distributions of the outcome variables were positively skewed, we used the logged values of both UIAI ($Skewness = 2.61$, $Kurtosis = 6.10$) and URAI ($Skewness = 1.67$, $Kurtosis = 2.16$) in the analyses.

Data Analysis

Univariate analyses were conducted initially to examine variability and central tendency of the study variables. Next, bivariate correlation analyses were run to assess the relationship between men's age and UIAI and URAI. We tested the effects of the constructs from the IMB model on the relationship between age and UIAI and URAI using Ordinary Least Squares (OLS) regression models. We followed mediation analysis guidelines suggested by Baron and Kenny (1986), which include four steps: (1) Establishing a relationship between the predictor (age) and outcome variables (UIAI) using simple regression; (2) establishing a relationship between the predictor and mediating variables (components of the IMB model) using simple regression; (3) establishing a unique relationship between the mediator and the outcome variables using multiple regression and entering the predictor and mediator variable together; (4) testing the relationship between predictor and the outcome variable controlling for the variance accounted for by each mediator using hierarchical regression. We then tested the significance of the mediation using the Sobel test (Sobel, 1982). PASW Statistics 18.0 software was used to conduct all statistical analyses.

Results

Participants

Participants' age ranged from 18-40 years with a mean of 26.7 years ($SD = 5.9$). Most of the participants (79.1%) reported living in a township. About half of the participants (53.9%) reported having a grade 12 or less education; 63.2% reported being employed and 25.4% were students. Over half of the sample (63.2%) reported earning less than 4500 South African rands per month. A majority of the sample (81.3%) identified as gay.

Age and Sexual Risk Behaviors

The results showed a positive correlation between men's age and frequency of insertive anal intercourse ($r = .32$, $p < .001$) and between men's age and frequency of UIAI in the past two months ($r = .23$, $p = .002$), such that older men reported engaging in more frequent insertive anal intercourse and in more frequent UIAI. The correlations between men's age and frequency of receptive anal intercourse and between men's age and frequency of URAI in the past two months were not significant (See Table 1).

IMB Model Mediators

Of the five components of the IMB model, *attitudes towards condom use* significantly, but partially, mediated the relationship between men's age and frequency of UIAI following the mediation analysis guidelines. To summarize: (1) age predicted frequency of UIAI [$\beta = .23$, $F(1, 177) = 10.27$, $p < .01$], such that older men engaged in more frequent UIAI; (2) age

predicted *attitudes towards condom use* [$\beta = -.18$, $F(1, 179) = 6.14$, $p < .05$], such that older men had less positive attitudes towards condom use; (3) *attitudes towards condom use* uniquely predicted UIAI [$\beta = -.30$, $t = -4.17$, $p < .001$], such that less positive attitudes towards condom use was associated with engaging in more frequent UIAI; (4) after controlling for the variance accounted for by *attitudes towards condom use*, the relationship between age and UIAI significantly decreased [F -change(1, 173) = 6.03, R^2 -change = .03, $p < .05$]. The β coefficient in the initial regression between age and UIAI was reduced from .23 to .18 after controlling for *attitudes toward condom use*. Results from the Sobel test verified that attitudes towards condom use was a significant mediator of the relationship between men's age and frequency of engaging in UIAI ($z = 2.11$, $p < .05$). Figure 1 describes the results of the mediation analysis.

There was no association between age and the other four components of the IMB model: HIV knowledge, perceived norms for condom use, safer-sex self-efficacy, and safe-sex intentions. Because we could not establish the second criteria for mediation [9], we did not assess mediation using those variables. Correlations between age and the components of the IMB model and between components of the IMB model and frequency of engagement in unprotected anal intercourse are presented in Table I.

Discussion

Our study reports the following main findings: Older black South African men were likely to engage in more frequent UIAI. Older men had less positive attitudes towards condom-use and those men with less positive attitudes towards condom-use were more likely to engage in UIAI. Attitudes towards condom-use partially explained why older men were more likely to engage in sexual risk behaviors.

We consider two possible explanations for these findings. First, we speculate that there is a psychosocial developmental trajectory such that as men age, their attitudes towards condom-use become less positive and, as a result, they engage in risky sexual behavior more frequently. Myers et al. (2003) found that older African American men engage in high-risk sexual behaviors more frequently than younger men. The authors suggested that this might be because, over time, older men had established habits or preferences around risky sexual behaviors (Myers et al., 2003), including engaging in unprotected sex. These established habits or preferences might make older MSM more resistant to change in response to HIV prevention efforts compared to younger MSM.

Alternatively, other psychosocial factors and interpersonal contexts may help us understand why sexual risk behavior increases as men age. For example, a longitudinal study investigating attitudes towards condom-use among a large sample of adolescent American males found that their perceptions of HIV-risk declined as men got older. The authors observed less frequent condom-use as men aged and they attributed this to the decline in perception of risk (Pleck et al., 1993). Furthermore, the current study found that the frequency of receptive anal intercourse and unprotected receptive anal intercourse did not vary with age. A potential explanation for this is that as MSM get older they may have a shift in their sexual roles and in the context of their relationships. Thus, they engage in more

frequent insertive anal intercourse but not receptive anal intercourse. More frequent insertive anal intercourse, a practice already often perceived as lower risk than receptive anal intercourse (Parsons et al. 2005), coupled with already decreasing perceptions of HIV-risk in general may explain older MSM's more frequent engagement in unprotected insertive anal intercourse.

A second explanation for our findings is that there may be a unique relationship between age and HIV-risk behaviors in South Africa because of social and political shifts that took place over the past two decades. After the end of apartheid in 1994 and the transformation of the South African constitution in 1996 to include a prohibition of discrimination based on sexual orientation, the sociocultural environment of South Africa now allows its citizens more freedom to exercise and proclaim sexual identity and sexual orientation. In addition to these sociopolitical changes, HIV prevention efforts have increased in this region over the past decade, many of which target groups differently and have distinct levels of saturation among various segments of the population. These HIV prevention efforts in South Africa over the past decades may have influenced MSM differently in terms of perceptions of risk and attitudes towards safer-sex. These two events may, in turn, have created age cohorts among South African MSM because of differences in terms of perceptions of HIV risk and attitudes towards safer-sex, with younger MSM carrying more positive attitudes towards condoms and, as a result, engaging in risky sexual behavior less frequently.

There are several limitations to our study. First, the cross-sectional research design does not allow inference of causality. Second, our results were found among a convenience sample of black MSM in South Africa and are not intended to be generalized outside of this population. Lastly, the constructs measured were developed in Western settings, and although they have previously been demonstrated to be reliable and valid in South Africa, there may be additional culture-specific factors that have not been accounted for in the current study. Future studies may also use qualitative methods to gain a better understanding of MSM's perceptions of HIV-risk, attitudes towards condoms, and the effect of those perceptions and attitudes on sexual-risk behaviors.

Notwithstanding these limitations, the results of this study documents that older black MSM in South Africa engage in more frequent sexual-risk behaviors and that this is partially explained by older men having less positive attitudes towards condoms. The results of this research has important implications for HIV prevention programs targeting MSM in South Africa. Younger versus older MSM may have different attitudes towards safer sex practices either due to different socialization experiences or simply due to differences in motivation to change health behaviors. HIV prevention interventions aimed at changing sexual-risk behaviors should be aware of these differences between MSM of different age groups and should target the appropriate mechanisms accordingly.

Acknowledgments

The study was supported by a grant from amfAR (106973; Principal Investigator: Theo Sandfort, Ph.D.) with additional support from a grant from the National Institute of Mental Health to the HIV Center for Clinical and Behavioral Studies (P30-MH43520; Principal Investigator: Anke E. Ehrhardt, Ph.D.). This research was further supported by a training grant from the National Institute of Mental Health (T32 MH19139, Behavioral Sciences Research in HIV Infection; Principal Investigator: Theo Sandfort, Ph.D.). Special acknowledgement is due to Rudi

van der Walt, Marius Steenkamp and the OUT LGBT Well-Being staff for their assistance in conducting the survey.

References

- Baral S, Adams D, Lebona J, Kaibe B, Letsie P, Tshello R, Wirtz A, Beyrer C. A cross-sectional assessment of population demographics, HIV risks and Human rights contexts among men who have sex with men in Lesotho. *Journal of the International AIDS Society*. 2011; 14:36. [PubMed: 21726457]
- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*. 1986; 51:1173–1182. [PubMed: 3806354]
- Carballo-Diéguez A, Remien RH, Dolezal C, Wagner G. Reliability of sexual behavior self-reports in male couples of discordant HIV status. *Journal of Sex Research*. 1999; 36:152–158.
- Carey MP, Schroder KE. Development and psychometric evaluation of the brief HIV Knowledge Questionnaire. *AIDS Education and Prevention*. 2002; 14:172–82. [PubMed: 12000234]
- Cornman DH, Schmiede SJ, Bryan A, Benziger TJ, Fisher JD. An information motivation-behavioral skills (IMB) model-based HIV prevention intervention for truck drivers in India. *Social Science & Medicine*. 2007; 64:1572–84. [PubMed: 17257724]
- Fisher JD, Fisher WA. Changing AIDS-risk behavior. *Psychological Bulletin*. 1992; 111:455–474. [PubMed: 1594721]
- Fisher JD, Fisher WA, Bryan AD, Misovich SJ. Information-Motivation-Behavioral Skills model-based HIV risk behavior change intervention for inner-city high school youth. *Health Psychology*. 2002; 21:177–186. [PubMed: 11950108]
- Henry E, Marcellin F, Yomb Y, Fugon L, Nemande S, Guebogou C, Lamarange J, Spire B. Factors associated with unprotected anal intercourse among men who have sex with men in Douala, Cameroon. *Sexually Transmitted Infections*. 2010; 86:136–40. [PubMed: 19703845]
- Kalichman SC, Picciano JF, Roffman RA. Motivation to reduce HIV risk behaviors in the context of the information, motivation, and behavioral skills (IMB) model of HIV prevention. *Journal of Health Psychology*. 2008; 13:680–689. [PubMed: 18519441]
- Kalichman SC, Simbayi LC, Cain D, Jooste S, Skinner D, Cherry C. Generalizing a model of health behavior change and AIDS stigma for use with sexually transmitted infection clinic patients in Cape Town, South Africa. *AIDS Care*. 2006; 18:178–82. [PubMed: 16546776]
- Lane L, Raymond FH, Dladla S, Raseth J, Struthers H, McFarland W, McIntyre J. High HIV prevalence among men who have sex with men in Soweto, South Africa: Results from the Soweto men's study. *AIDS and Behavior*. 2011; 15:626–634. [PubMed: 19662523]
- Lane T, Shade SB, McIntyre J, Morin SF. Alcohol and sexual risk behavior among men who have sex with men in South African township communities. *AIDS and Behavior*. 2008; 12:S78–85. [PubMed: 18392672]
- Lamarange J, Wade AS, Diop AK, Diop O, Gueye K, Marra A, Desgree du Lou A, for ELIHoS Group. Men who have sex with men (MSM) and factors associated with not using a condom at last sexual intercourse with a man and with a woman in Senegal. *PLoS One*. 2010; 5:e13189.
- Millett GA, Jeffries WL 4th, Peterson JL, Malebranche DJ, Lane T, Flores SA, Fenton KA, Heilig CM. Common roots: a contextual review of HIV epidemics in black men who has sex with men across African diaspora. *The Lancet*. 2012; 380:411–423.
- Myers HF, Javanbakht M, Martinez M, Obediah S. Psychosocial predictors of risky sexual behaviors in African American men: implications for prevention. *AIDS Education and Prevention*. 2003; 15(1 Suppl A):66–79. [PubMed: 12630600]
- Parsons JT, Schrimshaw EW, Wolitski RJ. Sexual harm reduction practices of HIV-seropositive gay and bisexual men: serosorting, strategic positioning, and withdrawal before ejaculation. *AIDS*. 2005; 19:S13–S25. [PubMed: 15838191]
- Pleck JH, Sonenstein FL, Ku L. Changes in adolescent males' use of and attitudes toward condoms, 1988-1991. *Family Planning Perspectives*. 1993; 25:106–110. 117. [PubMed: 8354374]

- Raymond HF, Kajubi P, Kanya MR, Rutherford GW, Mandel JS, McFarland W. Correlates of unprotected receptive anal intercourse among gay and bisexual men: Kampala, Uganda. *AIDS and Behavior*. 2009; 13:677–81. [PubMed: 19495955]
- Sandfort TGM, Nel J, Rich E, Reddy V, Yi H. HIV testing and self-reported HIV status in South African MSM: Results from a community-based survey. *Sexually Transmitted Infections*. 2008; 84:425–429. [PubMed: 19028940]
- Scott-Sheldon LAJ, Carey MP, Vanable PA, Senn TE, Coury-Doniger P, Urban MA. Predicting condom use among STD clinic patients using the information-motivation-behavioral skills (IMB) model. *Journal of Health Psychology*. 2010; 15:1093–1102. [PubMed: 20453055]
- Shisana, O.; Rehle, T.; Simbayi, LC., et al. South African National HIV Prevalence, HIV incidence, Behaviour and Communication Survey. HSRC; Cape Town, South Africa: 2005.
- Simbayi LC, Kalichman SC, Jooste S, Cherry C, Mfecane S, Cain D. Risk factors for HIV-AIDS among youth in Cape Town, South Africa. *AIDS & Behavior*. 2005; 9:53–61. [PubMed: 15812613]
- Sobel, ME. Asymptotic confidence intervals for indirect effects in structural equation models. In: Leinhardt, S., editor. *Sociological Methodology*. American Sociological Association; Washington, DC: 1982.

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

Figure 1.

The relationship between MSM's age and frequency of unprotected anal intercourse is mediated by attitudes towards condoms use component of the IMB model.

Note. The numbers represent the standardized regression coefficients or β weights.

Table 1

Means, Standard Deviations, and Correlations among the main variables of the study

Variables	M (SD)	2	3	4	5	6	7	8	9	10
1. Age	26.69 (5.87)	-.10	-.18*	-.11	-.08	-.05	.23**	.09	.32***	.15
2. HIV knowledge	11.31 (2.61)	-	.29***	.28***	.34***	.19**	-.08	-.03	-.05	-.07
3. Positive attitudes	3.97 (1.18)		-	.48***	.29***	.49***	-.34***	-.14	-.26**	-.22*
4. Social norms	3.96 (1.14)			-	.23**	.20**	-.08	-.13	-.14	-.13
5. Self-efficacy	3.09 (1.03)				-	.26***	-.15*	-.01	-.18*	-.21*
6. Intentions	4.10 (1.08)					-	-.36***	-.37***	-.12	-.24**
7. UIAI	1.08 (3.55)						-	.46***	.52***	.22*
8. URAI	3.29 (10.33)							-	.18*	.43***
9. IAI	5.34 (10.35)								-	.34***
10. RAI	12.48 (19.61)									-

* $p < .05$,

** $p < .01$,

*** $p < .001$

Note. The reported means and standard deviations for UIAI (Unprotected Insertive Anal Intercourse), URAI (Unprotected Receptive Anal Intercourse), IAI (Insertive Anal Intercourse) and RAI (Receptive Anal Intercourse) are based on the raw data, the correlation coefficients are based on the logged variables.