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HIV/AIDS RISK PERCEPTIONS AND FIRST SEXUAL INTERCOURSE AMONG YOUTH IN CAPE TOWN, SOUTH AFRICA

Kermyt G. Anderson
Ann M. Beutel
Brendan Maughan-Brown

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Kermyt G. Anderson is Assistant Professor of Anthropology as well as Project Director at the Center for Applied Social Science at the University of Oklahoma (U.S.A.).

Ann Beutel is Assistant Professor of Sociology at the University of Oklahoma (U.S.A.).

Brendan Maughan-Brown is a PhD student with the Aids and Society Research Unit (ASRU), a division of the Centre for Social Science Research at the University of Cape Town.

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HIV/AIDS Risk Perceptions and First Sexual Intercourse among Youth in Cape Town, South Africa

Abstract

HIV prevalence is high among South African youth. Health behavior models posit that perceived risk of HIV/AIDS is associated with HIV/AIDS risk behaviors, but research in sub-Saharan Africa that has considered the predictors of HIV/AIDS risk perceptions and behaviors or the relationship between them has been limited. Longitudinal data collected in 2002 and 2005 from 3,025 black, coloured, and white youth aged 14-22 (in 2002) in Cape Town, South Africa were analyzed using multivariate regression to examine correlates of perceived HIV/AIDS risk and one HIV/AIDS risk behavior, transition to first sex. Independent variables taken from the 2002 survey were used to predict dependent variables taken from the 2005 survey. Results indicate that most respondents viewed themselves at no risk or small risk of HIV infection. Perceived risk of HIV/AIDS was positively associated with having had sex and knowing somebody with HIV/AIDS. Among those who were virgins in 2002, perceived HIV/AIDS risk and knowing somebody with HIV/AIDS predicted entry into first sex by 2005 for females only. The effects of race on risk perceptions also varied by gender. In conclusion, HIV/AIDS education and prevention programs should consider more carefully how gender and race may intersect to influence risk perceptions and risk behaviors. The reciprocal relationship between risk perceptions and risk behaviors should also be considered in education and intervention programs.

Introduction

HIV/AIDS risk behavior and prevalence remain critical health concerns in South Africa, particularly among youth, whose HIV prevalence is 10.2% (Pettifor et al., 2004). A number of models used to explain health behavior posit that high perceived risk is associated with low risk-taking behavior (e.g., Ajzen & Fishbein, 1980; Bandura, 1994; Catania et al., 1990; Janz & Becker, 1984). Although some studies in sub-Saharan African countries have considered perceived risk as a predictor of such HIV/AIDS risk behaviors as inconsistent condom use or multiple sex partners (e.g., Adetunji & Meekers, 2001; Boer & Mashamba, 2005; Maharaj, 2006; Maswanya et al., 1999; Simbayi et al., 2005; Ukwuani et al., 2003), relatively few studies in sub-Saharan Africa have focused explicitly on the predictors of perceived HIV/AIDS risk. In addition, most studies of HIV/AIDS risk perceptions and risk behaviors have used cross-sectional data, making it difficult to disentangle the causal relationship between risk perceptions and risk behaviors.

This paper will examine the relationship between HIV/AIDS risk perceptions and an important HIV/AIDS risk behavior, first sexual intercourse, using two waves of data from the Cape Area Panel Study (CAPS), a representative survey of youth in Cape Town, South Africa. We use time-lagged variables to examine whether there is a reciprocal relationship between perceived HIV/AIDS risk and first sexual intercourse. We consider whether personal experience with HIV/AIDS (knowing somebody with or who died of the disease) influences either perceived HIV/AIDS risk or entry into first sex. We also examine whether the predictors of perceived HIV/AIDS risk and first sex vary by gender.

HIV/AIDS Risk Perception

Studies in South Africa and other sub-Saharan African countries show that young people often perceive their risk of HIV/AIDS to be low even if they engage in HIV/AIDS risk behaviors, live in areas with high HIV prevalence rates, or are knowledgeable about HIV/AIDS (Barden-O'Fallon et al., 2004; Macintyre et al., 2004; MacPhail & Campbell, 2001; Maswanya et al., 1999; Pettifor et al., 2004; Sarker et al., 2005; Tillotson and Maharaj, 2001). One explanation for low perceived HIV/AIDS risk is that youth may exhibit optimistic bias, tending to underestimate risks in general due to a feeling of invulnerability (Macintyre et al., 2004; Moore & Rosenthal, 1991). Additionally, HIV/AIDS is a highly stigmatized disease in South Africa (Kalichman et al., 2005; Maughan-Brown, 2006). Because acknowledging one's own risk means

putting oneself into a stigmatized group, youth may avoid this by downplaying their personal risk, leading to low risk perception (Macintyre et al., 2004).

Personal experience and familiarity with HIV/AIDS may be associated with more awareness of infection pathways, less stigma toward the disease, and higher perceived risk of infection. Eaton et al. (2003) note that individuals who deny the presence of HIV/AIDS in their community have reduced perceived vulnerability to the disease. Many South African youth know about HIV/AIDS firsthand: among South Africans aged 15 to 24, 26% personally know someone with HIV/AIDS, and 45% personally know someone who had died of AIDS (Pettifor et al., 2004). Evidence of a relationship between knowing someone with HIV/AIDS and greater perceived risk of HIV/AIDS for young people in Africa has, however, been mixed (Barden-O'Fallon et al., 2004; Macintyre et al., 2004; Smith & Morrison, 2006).

In South Africa, as in many other less developed countries, the primary method of HIV/AIDS transmission is heterosexual intercourse (UNAIDS, 2006), and most South African youth know that HIV/AIDS can be transmitted this way (Eaton & Flisher, 2000; Shisana et al., 2005). Individuals who have had sex should have higher perceived HIV/AIDS risk than virgins, and individuals who have high-risk sex (e.g., no or infrequent condom use or multiple partners) should have higher perceived risk than individuals who engage in low-risk sex. The evidence supporting the link between risk behaviors and perceived risk is mixed, however. Some studies in sub-Saharan Africa have found correlations between perceived HIV/AIDS and risk behaviors (Barden-O'Fallon et al., 2004; Maharaj, 2006; Maswanya et al., 1999; Sarker et al., 2005; Shobo, 2007; Ukwuani et al., 2003), while others have not (Adetunji & Meekers, 2001).

There are important gender differences in HIV/AIDS prevalence and HIV/AIDS risk behaviors in South Africa. Among those aged 15 to 24, 15.5% of females and 4.8% of males are seropositive (Pettifor et al., 2004). Males report more condom use and sexual partners than females (Pettifor et al., 2004; Simbayi et al., 2004). Evidence about the relationship between gender and perceived HIV/AIDS risk is mixed, with studies finding higher risk among males, or higher risk among females, or no gender differences among young people in South Africa and other African countries (Barden-O'Fallon et al., 2004; Boer & Mashamba, 2005; Macintyre et al., 2004; Maswanya et al., 1999; Pettifor et al., 2004; Smith & Morrison, 2006). Even if the absolute levels of risk are similar for males and females, research on African youth has found that some correlates of perceived HIV/AIDS risk, including HIV/AIDS knowledge and sexual risk behaviors, do vary by gender (Barden-O'Fallon et al., 2004; Macintyre et al., 2004; Shobo, 2007).

Relatively little attention has been paid to racial or ethnic differences in the level of perceived HIV/AIDS risk and the predictors of perceived HIV/AIDS risk among youth in South Africa or other African countries (for exceptions, see Macintyre et al., 2004; Sarker et al., 2005; Shobo, 2007). Race (commonly referred to in South Africa as population group) is particularly important in South Africa, in part because of the legacy of apartheid, the former policy of strict racial segregation. Under apartheid, coloureds (mixed race) and Indians (Asians) were moderately disadvantaged relative to whites (European descent), while blacks (Africans) were severely disadvantaged. Although apartheid ended in the early 1990s, racial inequality and de facto segregation continue in South Africa (e.g., Burgard & Treiman, 2006; Burger & Woolard, 2005; Charasse-Pouélé & Fournier, 2006). Nationally representative data for South African youth indicate some racial differences in sexual behavior, with blacks more likely to have ever had sex compared with other racial groups and less likely to report that they always used a condom with their most recent sex partner (Pettifor et al., 2004; Simbayi et al., 2004). HIV prevalence varies by race among South African youth, with 11.8% of blacks (Africans), 3.8% of coloureds (mixed race), 2.0% of whites (European ancestry), and 0.9% of Indians (Asians) being HIV positive (Pettifor et al., 2004).

Other background factors may be associated with perceived HIV/AIDS risk and will be controlled for in our analyses. A positive relationship between age and perceived risk has been found for young people in South Africa (Macintyre et al., 2004) but not in other African countries (Barden-O'Fallon et al., 2004; Sarker et al., 2005). Limited measures of socioeconomic background have been used in studies of perceived HIV/AIDS risk among youth in Africa, but there is some evidence that educational attainment may be positively associated with HIV/AIDS risk perceptions (Barden-O'Fallon et al., 2004).

First Sexual Intercourse

We also examine several predictors of first sexual intercourse, an important HIV/AIDS risk behavior. All else being equal, youth who delay sexual debut will spend fewer years of their lives at risk of HIV/AIDS infection, than youth who have sex at earlier ages. Most studies on sexual debut in South Africa and other African countries use cross-sectional datasets, and thus cannot examine the possible predictors of the transition from virgin status to sexually experienced. We use longitudinal data to consider whether the predictors of HIV/AIDS risk perceptions also predict first sex, as well as whether perceived HIV/AIDS risk predicts sexual debut. One may question whether virgins can logically have any HIV/AIDS risk. But virgins may legitimately have high perceived risk of HIV/AIDS if, for example, they doubt their ability to maintain consistent

condom use or to identify partners who are themselves at low risk of infection once they become sexually active (Macintyre et al. 2004). Along these lines, Macintyre et al. (2004) found that some of their sample of youth in KwaZulu-Natal (a province in South Africa with high HIV prevalence) had no risk behaviors but perceived some risk of getting the AIDS virus within the next 12 months. Virgins who view themselves at risk of HIV/AIDS infection at some point in the future may try to delay first sex. Supporting this, cross-sectional studies in sub-Saharan Africa indicate some individuals remain virgins out of concerns about HIV/AIDS infection (Gersovitz, 2005; Simbayi et al., 2004). We expect to find a reciprocal relationship between perceived HIV/AIDS risk and sexual activity among South African youth, with individuals who have had sex having higher perceived risk, and virgins with greater perceived risk being more likely to delay having sexual intercourse.

There is some evidence that knowing someone with HIV/AIDS may also be associated with risk-taking behaviors. Macintyre et al. (2001) found that knowing somebody with HIV/AIDS increased the odds that adult males in Tanzania and Uganda would use a condom, but Camlin and Chimbwete (2003) report that condom use among South African women is unrelated to knowing somebody who died of AIDS. Whether perceived HIV/AIDS risk or knowing somebody with HIV/AIDS predicts sexual debut among African youth has received little attention in the literature, but it seems likely that youth who know someone with or who died of HIV/AIDS will delay or avoid first sexual intercourse.

Our analysis will control for several background variables. We expect older youth to be more likely to have had sex than younger youth. Median age at first sex does not vary by gender in South Africa (Simbayi et al., 2004) but the predictors of first sex may vary by gender, as research in other sub-Saharan African countries has found (Gupta & Mahy, 2003). Age at sexual debut does vary by race in South Africa: the median age of first sex for blacks is 16.5 years versus 17.5 years for whites, coloureds, and Indians (Simbayi et al., 2004). Finally, education also may influence sexual debut (e.g., Gupta & Mahy, 2003).

Methods

We used data from the first (2002) and third (2005) waves of the Cape Area Panel Study (CAPS), a longitudinal study of youth and their families that is representative of metropolitan Cape Town (Lam, Seekings, and Sparks, 2006).[1] Roughly 26% of the residents of Cape Town are black, 50% are coloured, 22% are white, and 2% are Asian or other (Lam et al., 2006). CAPS is a joint project of the University of Cape Town and several universities in the United States that

is designed to follow the lives of a large and representative sample of young people in Cape Town as they undergo transitions from adolescence to adulthood. CAPS contains two main sources of data: a household questionnaire about the schooling, employment, and fertility of all household members, and a youth questionnaire about the schooling, employment, sexual behavior, and fertility of household members who were between the ages of 14 and 22 in 2002. All of the authors of this paper were involved in the design and implementation of the study.

Data Collection

CAPS used a two-stage probability sample of households. The first-stage sample of Census Enumeration Areas (EAs) was drawn using the 1996 Census as a sampling frame. Because EAs in South Africa are racially homogeneous, black and white EAs were oversampled with the goal of obtaining roughly equal numbers of black, coloured, and white youth. The second stage randomly sampled households within each selected EA. Upon recruitment into the survey, the household questionnaire was administered to an adult who was knowledgeable about the household, while full-length youth questionnaires were given separately to up to three young people in the household.

The first (2002) wave of CAPS includes data from 5,256 households (approximately 42% black, 44% coloured, and 14% white) and 4,752 youth (approximately 45% black, 40% coloured, and 16% white).[2] The response rates for households with youth were higher for blacks and coloureds (approximately 89% and 82%, respectively) than for whites (approximately 48%). The response rates for the youth questionnaire, conditional on household participation, were high for all groups (ranging from 93% for blacks to 86% for whites). The third (2005) wave of CAPS contains data from 3,536 youth and 2,412 households. The overall retention rate for youth in the third wave, relative to the first wave, was 75%. Retention rates for youth varied by racial group, with higher rates among blacks and coloureds (approximately 70% and 85%, respectively) than among whites (almost 60%). In 2005, household questionnaires were administered only to households containing youth who had completed the youth questionnaire administered that year. Virtually all of these households (92% for blacks, 95% for coloureds and 94% for whites) also completed the household questionnaire.

The lower response rates for white households and youth, although a limitation of the study, were not unexpected. Lower response rates for whites compared to non-whites are typical of survey research in South Africa (e.g., Pettifor et al., 2004; Shisana et al., 2005).[3] Whites may perceive higher opportunity costs to

participation in the survey, reducing their likelihood of involvement. For all racial groups, moving away from Cape Town was the primary reason for non-response in the 2005 wave of the study; the greater movement of white youth out of Cape Town compared to blacks and coloureds was the main reason for their lower retention rate (Lam et al., 2006). Our sample of whites may thus be biased in favor of those households and youth who perceived fewer opportunity costs to participating in the study, and those youth who did not move away from the study area.

Measures

To avoid endogeneity issues from using cross-sectional data, we utilize a lagged independent variables approach, in which independent variables measured in wave 1 (2002) are used to predict dependent variables measured in wave 3 (2005). In one set of analyses, the dependent variable is perceived HIV/AIDS risk in 2005, for all youth who completed the wave 1 and wave 3 interviews. In a second set of analyses, the dependent variable is whether or not the youth had sex by wave 3, for the sample who were virgins in wave 1. Details on the specific variables used in these analyses are provided below.

Perceived risk of HIV/AIDS was measured by the question, 'Do you think you have no risk, a small risk, a moderate risk or a great risk of getting the AIDS virus?', with respondents choosing one of these four different levels. This question was asked in both wave 1 and wave 3. Because our question about perceived risk is open-ended with respect to time frame, youth may consider both their short-term and long-term chances of HIV infection when reporting their perceived risk.

The wave 3 version of the question is the dependent variable in the first set of analyses, predicted by wave 1 variables. The wave 3 version is the independent variable in the second set of analyses predicting sexual debut by wave 3 for those respondents who were virgins at wave 1.

Personal experience with HIV/AIDS was measured in wave 1 by a dichotomous variable that collapsed two questions asking whether the respondent knew anybody with HIV/AIDS or who had died of HIV/AIDS. HIV/AIDS risk behavior was measured with a dichotomous variable indicating whether the respondent had ever had sexual intercourse (defined as 'full penetration'). The wave 1 version of this question is used as an independent variable to predict perceived HIV/AIDS risk measured at wave 3, while the wave 3 version of this question is used as a dependent variable to measure transition to first sex for the wave 1 virgin sample.

Several background variables were included. The respondent's age, measured at wave 1, was coded in years. Gender was captured by a dummy variable, coded as 1 for males and 0 for females. Race was coded using dummy variables for coloureds and whites, with blacks as the reference category. Education, coded as the highest grade the respondent had completed by wave 1, was also included.

Analysis

The sample was restricted to youth who had completed both the wave 1 and wave 3 interviews. Youth who had ever been married (206 respondents) were excluded from analysis, as married persons are likely to have different patterns of risk behaviors and different perceptions of HIV/AIDS risk than non-married persons (e.g., Zambuko & Mturi, 2005). We also excluded from the sample respondents with missing data or those who answered 'don't know' (these made up a small portion of all respondents). After these exclusions, the final sample for analysis was 3,025 for the full sample (i.e., those who were virgins and those who were sexually experienced at wave 1) and 1,783 for the wave 1 virgin sample.

Perceived HIV/AIDS risk in wave 3 is analyzed using ordinal logit regression. This technique is similar to logistic regression, except that it allows for multiple ordinal outcome levels rather than only two, and is necessary because the dependent variable has four outcome levels. We will analyze perceived HIV/AIDS risk as a function of previous engagement in risk behavior (having ever had sex), personal experience with HIV/AIDS (knowing somebody with or who died of the disease), gender, race, age, and education, all measured in wave 1. Whether or not the respondent is sexually experienced by wave 3 is estimated using logistic regression.[4] We will analyze first sex as a function of perceived HIV/AIDS risk, personal experience with HIV/AIDS (knowing somebody with or who died of the disease), gender, race, age, and education, all measured in wave 1. Results from all multivariate analyses are presented as odds ratios. For each dependent variable, two different sets of models were estimated, the first pooling together males and females and the second run separately by gender.

Analyses were performed in Stata/SE 9.1, using the 'svy' commands to adjust standard errors to account due to the complex survey design. When weighted for oversampling of blacks and whites and non-response of households and youth, the results are representative of metropolitan Cape Town.

Results

Summary statistics (means or proportions) for the variables used in the analysis are presented by gender in Table 1, with *p* values from F tests indicating whether significant gender differences exist for each variable or group of variables. The first column presents results from the full sample, which included respondents who had and had not had sex by the time of the wave 1 interview. Level of perceived HIV/AIDS risk reported in wave 3 was fairly low, given the high rate of HIV/AIDS prevalence in South Africa. Nearly half of both males and females perceived no risk of HIV infection, and only about 7% perceived their risk as high. Racial differences in perceptions were found in the pooled sample (results not shown in table, $p < 0.0001$). Coloureds were most likely to indicate no risk (50.4% versus 43.9% of blacks and 35.0% of whites), while blacks the most likely to perceive great risk (9.8% versus 6.5% of coloureds and 2.8% of whites).

On average, respondents in the full sample were 17.7 years old in wave 1. About half of the full sample was coloured, with over a quarter black and about one fifth white. Respondents averaged over nine years of completed education by wave 1. About 22% of males and 26% of females in the full sample knew somebody with or who had died of HIV/AIDS by wave 1, while less than 40% of respondents in the full sample had had sex by wave 1. For the sample who were virgins in wave 1, the summary statistics were similar with a few notable differences. Most of the virgin sample perceived no HIV/AIDS risk in wave 1 (about 58% of respondents). Yet, over 10% of both males and females perceived a moderate or high risk of HIV/AIDS infection. The wave 1 virgin respondents were about a year younger, on average, than the respondents in the full sample. The virgin sample had fewer blacks and more coloureds than the full sample. Wave 1 virgins had completed fewer grades and were less likely to know somebody with or who died from HIV/AIDS by wave 1 than respondents in the full sample, differences which might be related to the younger age of virgins at wave 1 relative to the full sample of respondents rather than to their virgin status per se. Lastly, about 46% of wave 1 virgins had had sex by wave 3.

Interestingly, the results in Table 1 revealed few gender differences. Perceived HIV/AIDS risk, for both the full sample and the virgin sample, did not differ for males and females, and most of the other variables did not vary by gender. Only two variables exhibited significant gender differences, and they did so for both samples: the highest grade completed (with females having completed nearly half a grade more than males), and knowing somebody with or who died of HIV/AIDS (with females more likely than males to have reported knowing someone in this category).

Table 1. Descriptive statistics (means and proportions) for analysis sample (Cape Area Panel Study)

	Full sample			**Virgins (wave 1)**		
	Male	Female	p	Male	Female	p
Perceived HIV/AIDS risk (wave 3)						
No risk	0.436	0.472		--	--	
Small risk	0.387	0.360		--	--	
Moderate risk	0.109	0.102		--	--	
Great risk	0.068	0.066	0.361	--	--	
Perceived HIV/AIDS risk (wave 1)						
No risk	--	--		0.577	0.600	
Small risk	--	--		0.309	0.286	
Moderate risk	--	--		0.065	0.064	
Great risk	--	--		0.049	0.050	0.805
Age (wave 1)	17.73	17.68		16.66	16.65	
	(0.070)	(0.077)	0.633	(0.095)	(0.082)	0.528
Race						
Black	0.279	0.288		0.189	0.212	
Coloured	0.531	0.505		0.573	0.579	
White	0.190	0.207	0.356	0.238	0.209	0.341
Highest grade completed (wave 1)	9.28	9.64		8.86	9.24	
	(0.078)	(0.074)	0.030	(0.095)	(0.080)	0.023
Know somebody with or who died of HIV/AIDS (wave 1)	0.219	0.264	0.011	0.165	0.232	0.002
Ever had sex (wave 1)	0.389	0.361	0.190	--	--	
Ever had sex (wave 3)	--	--		0.467	0.452	0.581
n	1,591	1,434		968	815	

Note: Standard errors in parentheses

Table 2 presents ordinal logistic regression models of perceived HIV/AIDS risk measured at wave 3, predicted by variables measured at wave 1 for the full sample (virgins and non-virgins). For the pooled sample of males and females, the respondent's age, gender and education were not significant. Race was significant: relative to black respondents, the perceived risk of coloured respondents was not significantly different while white respondents had higher perceived risk. (Supplementary analyses showed that both blacks and coloureds had significantly lower perceived risk than whites; results not shown.) Knowing somebody who has or who died of HIV/AIDS in wave 1 was associated with significantly greater perceived HIV/AIDS risk in wave 3. Engagement in HIV/AIDS risk behavior, as measured by whether or not the respondent was sexually experienced by wave 1, was also associated with significantly greater perceived risk in wave 3.

The results were similar when examined separately by gender, with a few exceptions. Age was not significant for males but was marginally significant and positive for females. The effects of race/ethnicity also varied somewhat by gender. For males, both coloured and white respondents had greater perceived HIV/AIDS risk in wave 3 than black respondents. (Additional analyses indicate that coloureds were not significantly different from whites; results not shown.) For females, however, whites were not significantly different from blacks in terms of perceived HIV/AIDS risk, while coloureds had lower perceived risk than blacks. (Coloureds also had significantly lower perceived risk than whites; results not shown.)

Table 2. Ordinal logistic regression models of wave 3 perceived HIV/AIDS risk (Cape Area Panel Study)

	Pooled sample			**By gender**					
				Male			*Female*		
	Odds ratio	*std. err.*	*p*	*Odds ratio*	*std. err.*	*p*	*Odds ratio*	*std. err.*	*p*
Age (wave 1)	1.034	0.026	0.189	1.025	0.038	0.519	1.061	0.037	0.091
Gender									
Female (ref)	1.000								
Male	1.140	0.096	0.121	--	--	--	--	--	--
Race									
Black (ref)	--	--	--	--	--	--	--	--	--
Coloured	0.917	0.088	0.366	1.557	0.208	0.001	0.546	0.074	0.000
White	1.359	0.170	0.015	1.853	0.329	0.001	1.026	0.171	0.879
Highest grade completed (wave 1)	0.995	0.026	0.838	1.000	0.036	0.995	0.976	0.037	0.534
Personal experience with HIV/AIDS (wave 1)									
Did not know anybody with/died of HIV/AIDS (ref)	1.000			1.000			1.000		
Knew somebody with/died of HIV/AIDS	1.325	0.121	0.002	1.340	0.180	0.030	1.298	0.164	0.040
Sexually experienced (wave 1)									
Never had sex (ref)	1.000			1.000			1.000		
Ever had sex	1.469	0.152	0.000	1.477	0.215	0.008	1.376	0.199	0.028
n	3,025			1,434			1,591		
F	8.27			5.48			9.99		
p	0.000			0.000			0.000		

Table 3. Logistic regression models of ever had sex by wave 3, for wave 1 virgins (Cape Area Panel Study)

	Pooled sample			**By gender**					
				Male			*Female*		
	Odds ratio	*std. err.*	*p*	*Odds ratio*	*std. err.*	*p*	*Odds ratio*	*std. err.*	*p*
Age (wave 1)	1.261	0.058	0.000	1.223	0.077	0.002	1.333	0.098	0.000
Gender									
Female (ref)	1.000								
Male	1.109	0.133	0.390	--	--	--	--	--	--
Race									
Black (ref)	1.000			--	--	--	--	--	--
Coloured	0.284	0.041	0.000	0.328	0.071	0.000	0.245	0.041	0.000
White	0.258	0.052	0.000	0.240	0.071	0.000	0.276	0.080	0.000
Highest grade completed (wave 1)	0.969	0.048	0.529	1.039	0.070	0.566	0.887	0.068	0.116
Personal experience with HIV/AIDS (wave 1)									
Did not know anybody with/died of HIV/AIDS (ref)	1.000			1.000			1.000		
Knew somebody with/died of HIV/AIDS	1.193	0.180	0.243	0.843	0.198	0.467	1.555	0.267	0.011
HIV/AIDS risk perception (wave 1)	0.878	0.069	0.097	0.958	0.100	0.683	0.785	0.082	0.021
n	1,783			815			968		
F	26.94			12.24			19.68		
p	0.000			0.000			0.000		

Table 3 presents logistic regression models of having had sex by wave 3 for respondents who were virgins in wave 1. For the sample that pools together males and females, respondents who were older in wave 1 were more likely to have had sex by wave 3. Gender was not related to sexual experience but race was. Coloureds and whites were both significantly less likely to have had sex by wave 3 than blacks. (There was no significant difference between whites and coloureds in terms of the odds of first sex; results not shown.) Highest grade completed and knowing somebody with or who died of HIV/AIDS in wave 1 did not predict sexual experience by wave 3. HIV/AIDS risk perception in wave 1 was marginally associated with not having had sex by wave 3.

Some of the results were different when examined separately by gender. For males, both knowing somebody with or who died from HIV/AIDS in wave 1 and HIV/AIDS risk perception in wave 1 were not significantly associated with having had sex by wave 3. For females, however, these variables were both significant predictors, but in opposite directions. Girls who reported knowing somebody with or who died of HIV/AIDS in wave 1 were more likely to have had sex by wave 3, while girls with higher wave 1 perceived HIV/AIDS risk were less likely to have had sex by wave 3.

Discussion

We examined HIV/AIDS risk perceptions and first sexual intercourse among youth in Cape Town, South Africa, using lagged independent variables measured in 2002 to predict dependent variables measured in 2005. Consistent with previous research we found that a majority of respondents perceive themselves at some risk of HIV/AIDS infection, though few perceived their risk level as high. A key risk behavior, entry into sexual intercourse, was a positive and significant predictor of perceived risk. We also examined other types of risk behavior, applicable only to those who had had sex, such as condom use and number of partners (results not shown). These other risk behaviors generally showed no significant relationship to perceived risk (see also Macintyre et al., 2004). Thus, our findings suggest that the main risk behavior influencing risk perception for youth in Cape Town is sexual debut; further high-risk sexual behavior among sexually active youth might not increase their perceived risk, even though such behavior is likely to increase their actual risk.

We found evidence of a reciprocal relationship between risk perception and first sex for females only. For females who were virgins in 2002, higher perceived HIV/AIDS risk predicted lower probability of having had sex by 2005, while females who had had sex by 2002 had higher perceived HIV/AIDS risk in 2005. For males, although first sex predicted HIV/AIDS risk perceptions, the reverse

was not true: perceived HIV/AIDS risk did not predict whether males had first sex between the interviews. Gender-based beliefs, pressures, roles, and power may influence the ability of males and females to behave in ways that correspond to their risk perceptions. Females may be more aware than males that once they become sexually active, they may have less control over negotiating condom use and other safe sex behaviors than males (e.g., Campbell & MacPhail, 2002; Eaton et al., 2003). Thus, female youth who are more concerned about their risk of HIV/AIDS may try to delay entry into first sex. Girls may also receive more support from parents and others that allows them to keep their sexual behaviors in line with their risk perceptions than males (Macintyre et al., 2004). Among boys, in contrast, widespread belief in a male need for sex or strong peer pressure to engage in sex (e.g., MacPhail & Campbell; 2001; Tillotson & Maharaj, 2001) may be more important influences on sexual behavior than self-perceived HIV/AIDS risk.

Another key result of this study is that knowing somebody with or who died of HIV/AIDS is associated with higher levels of perceived HIV/AIDS risk for males and females, suggesting that personal experience with HIV/AIDS makes risk of the disease seem more real. Knowing somebody with or who died of HIV/AIDS was not a significant predictor of first sex for males, while for females, and contrary to our prediction, it was actually a significantly positive predictor of first sex: girls who knew somebody with or who died of HIV/AIDS in 2002 were more likely to have had sex by 2005. This unexpected finding for females may perhaps reflect an unobserved correlation between this predictor variable and the youth's social reference group. It is possible that young people who knew somebody with HIV/AIDS in wave 1 were also more likely to know people who were already sexually active, and were thus more likely to engage in sex at an earlier age. Alternatively, youth who knew somebody with or who died of HIV/AIDS may perhaps have a more fatalistic outlook on the disease, viewing it as widespread and inevitable (e.g., Campbell et al., 2005; Tillotson & Maharaj, 2001). Neither of these hypotheses explain, however, why the positive relationship between personal experience with HIV/AIDS and first sex was observed only for girls. Perhaps different aspects of the social environment influence sexual behaviors differently by gender; knowing someone with or who died of HIV/AIDS may influence girls' behaviors but not boys', while other environmental factors, such as peer pressure, may exert influence over boys' behaviors but not girls'.

We also found important variation in perceived risk and first sex by race, and different effects of race when analyzed separately by gender. For the pooled sample, whites have higher perceived HIV/AIDS risk than both blacks and coloureds, who do not differ from each other. When examined separately by gender, however, coloureds and whites both have greater perceived risk than

blacks for males, while coloureds have lower perceived risk than whites and blacks for females. This suggests a race-gender interaction, with coloured females having the lowest perceived HIV/AIDS risk. In an analysis of the pooled sample using combined race-gender dummies (not shown), every race-gender group had higher perceived risk than coloured females except for black males, who were not significantly different from coloured females. There were no differences by gender or by race-gender groups for entry into first sex, and the relationship between race and first sex is similar for all samples: blacks are more likely to become sexually active than whites or coloureds, who are not significantly different from each other.

These results underscore the importance of race/ethnicity to the HIV/AIDS-related attitudes, perceptions and risk behaviors of youth in South Africa. Race is a complex issue, and may function as a proxy for a host of social and cultural factors including discrimination, sources of knowledge and information, beliefs about the origins of HIV/AIDS, HIV/AIDS-related stigma, and the meaning of sexuality. The lack of attention to social and cultural factors in models used to explain perceptions and behavior related to HIV/AIDS in South Africa has been noted elsewhere (e.g., Hartell, 2005; MacPhail & Campbell, 2001; Tillotson & Maharaj, 2001). Our results suggest that different aspects of race and gender may intersect to influence risk perceptions and risk behaviors. Although many HIV/AIDS education and prevention programs in South Africa attempt to reach a wide range of individuals (males and females, virgins and the sexually experienced, and individuals from different population groups), our results suggest that education and prevention programs should pay even more attention to developing culturally sensitive ways to reach youth. In particular, prevention programs may need to align perceptions among certain groups with the reality these groups face, acknowledging that perceived risk varies for groups defined by race and gender. We recognize the potential difficulties in terms of cost and effort to implementing such a strategy, but a one-size-fits-all policy may be ineffective at changing perceptions and behaviors.

In addition to the findings for race, there are other findings from this study that may have implications for education and intervention programs, particularly ones targeted at female youth. First, the reciprocal relationship between perceived HIV/AIDS and engagement in first sex for females suggests that education programs targeted at virgin girls that increase perceived HIV/AIDS risk may result in their delayed engagement in first sex. Second, this reciprocal relationship suggests than programs that delay first sex may also result in increased perceived HIV/AIDS risk, at least for girls, which may subsequently influence their engagement in other HIV/AIDS risk behaviors. Lastly, our finding that knowing somebody with or who died from HIV/AIDS influences both perceived risk and sexual debut suggests that programs and interventions

that create a more open, less stigmatized environment in which youth are able to openly disclose their seropositive status to their friends, or in which youth are introduced to openly seropositive individuals, may result in delayed age at sexual debut for girls and increased perceived HIV/AIDS risk for both boys and girls.

There were a number of limitations to our study. Attrition in our longitudinal dataset may result in a biased sample, especially with respect to the most highly mobile youth and the youth with the highest opportunity costs to participation in survey research (such as those with jobs or in school). Our waves of data were collected three years apart; somewhat shorter time intervals may be better suited for studying relationships that may be highly variable over time. The few studies of youth in South Africa and other African countries that used longitudinal data had less time between data collection waves than our study did, but these studies were usually evaluations of intervention programs using non-representative samples of youth (Gallant & Maticka-Tyndale, 2004; Speizer et al., 2003). More longitudinal studies of HIV/AIDS risk perceptions and risk behaviors using representative samples of youth are needed.

In conclusion, our results suggest that the relationships among perceived HIV/AIDS risk, personal experience with HIV/AIDS, and HIV/AIDS risk behaviors are complex and dynamic. HIV/AIDS education and prevention programs in South Africa should take into account how the experiences and specific social locations of youth may influence their attitudes, perceptions, and behaviors as they pertain to HIV/AIDS.

Footnotes

[1] The second wave (2003-2004) of the study re-interviewed only a subset of the original sample and did not ask comparable questions about perceived risk.

[2] Only 27 respondents, less than 0.6% of the entire sample, belonged to another racial group and were dropped from the analysis.

[3] In Pettifor et al.'s (2004) national survey of 15 to 24 year-old South Africans, the percentage of interviews completed with youth selected for the study was 82.7% for blacks and 71.2% for coloureds but only 37.7% for whites.

[4] Entry into first sexual intercourse could be analyzed using event history analysis, treating each year between wave 1 and wave 3 as a separate unit of analysis for risk of first sex. However, we had few appropriate time varying independent variables to use for this analysis. In particular, our main independent variables of interest, perceived HIV/AIDS risk and knowing somebody with or who died of HIV/AIDS, were not time varying, having been measured only at wave 1. We thus felt that logistic regression was a more appropriate analytical approach for this outcome.

References

Adetunji, J., & Meekers, D. (2001). Consistency in condom use in the context of HIV/AIDS in Zimbabwe. *Journal of Biosocial Science, 33,* 121-138.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1994). Social cognitive theory and exercise of control over HIV infection. In R. J. DiClemente and J. L. Peterson (Eds.), *Preventing AIDS: Theories and methods of behavioral interventions* (pp. 25-59). New York: Plenum Press.

Barden-O'Fallon, J. L., de Graft-Johnson, J., Bisika, T., Sulzbach, S., Benson, A., & Tsui, A. O. (2004). Factors associated with HIV/AIDS knowledge and risk perception in rural Malawi. *AIDS and Behavior, 8,* 131-140.

Boer, H., & Mashamba, M. T. (2005). Psychosocial correlates of HIV protection motivation among black adolescents in Venda, South Africa. *AIDS Education and Prevention, 17,* 590-602.

Burgard, S. A., & Treiman, D. J. (2006). Trends and racial differences in infant mortality in South Africa. *Social Science and Medicine, 62,* 1126-1137.

Burger, R., & Woolard, I. (2005). The state of the labour market in South Africa after the first decade of democracy. Centre for Social Science Research Working Paper No. 133, University of Cape Town.

Camlin, C. S., & Chimbwete, C. E. (2003). Does knowing someone with AIDS affect condom use? An analysis from South Africa. *AIDS Education and Prevention, 15,* 231-244.

Campbell, C., Foulis, C. A., Maimane, S., & Sibiya, Z. (2005). The impact of social environments on the effectiveness of youth HIV prevention: A South African case study. *AIDS Care 17,* 471-478.

Campbell, C., & MacPhail, C. (2002). Peer education, gender and the development of critical consciousness: Participatory HIV prevention by South African youth. *Social Science and Medicine, 55,* 331-345.

Catania, J., Kegeles, S., & Coates, T. (1990). Toward an understanding of risk behavior: An AIDS risk reduction model (ARRM). *Health Education Quarterly, 17,* 53-72.

Charasse-Pouélé, C., & Fournier, M. (2006). Health disparities between racial groups in South Africa: A decomposition analysis. *Social Science and Medicine, 62,* 2897-2914.

Eaton, L., Flisher, A. J., & Aarø, L. E. (2003). Unsafe sexual behavior in South African youth. *Social Science and Medicine, 56,* 149-165.

Eaton, L., & Flisher, A. J. (2000). HIV/AIDS knowledge among South African youth. *Southern African Journal of Child and Adolescent Mental Health, 12,* 97-124.

Gallant, M., & Maticka-Tyndale, E. (2004). School-based HIV prevention programmes for African youth. *Social Science and Medicine, 58,* 1337-1351.

Gersovitz, M.(2005). The HIV epidemic in four African countries seen through the Demographic and Health Surveys. *Journal of African Economies, 14,* 191-246.

Gupta, N., & Mahy, M. (2003). Sexual initiation among adolescent girls and boys: Trends and differentials in sub-Saharan Africa. *Archives of Sexual Behavior, 32,* 41-53.

Hartell, C. G. (2005). HIV/AIDS in South Africa: A review of sexual behavior among adolescents. *Adolescence, 40,* 171-181.

Janz, N., & Becker, M. (1984). The health belief model: A decade later. *Health Education Quarterly, 11,* 1-47.

Kalichman, S. C., Simbayi, L. C., Jooste, S., Toefy, Y., Cain, D., Cherry, C., & Kagee, A. (2005). Development of a brief scale to measure AIDS-related stigma in South Africa. *AIDS and Behavior, 9,* 135-143.

Lam, D., Seekings, J., & Sparks, M. (2006). *The Cape Area Panel Study (CAPS): Overview and Technical Documentation for Waves 1-2-3*. Cape Town: Centre for Social Research, University of Cape Town.

Macintyre K, Brown L, & Sosler S. (2001). It is not what you know, but who you knew: Examining the relationship between behavior change and AIDS mortality in Africa. *AIDS Prevention and Education, 13,*160-174.

Macintyre, K., Rutenberg, N., Brown, L., & Karim, A. (2004). Understanding perceptions of HIV risk among adolescents in KwaZulu-Natal. *AIDS and Behavior, 8,* 237-50.

MacPhail, C., & Campbell, C. (2001). 'I think condoms are good but, aai, I hate those things': Condom use among adolescents and young people in a Southern African township. *Social Science and Medicine, 52,* 1613-1627.

Maharaj, P. (2006). Reasons for condom use among young people in KwaZulu-Natal: Prevention of HIV, pregnancy or both? *International Family Planning Perspectives, 32,* 28–34.

Maughan-Brown, B. G. (2006). Attitudes towards people with HIV/AIDS: Stigma and its determinants among young adults in Cape Town, South Africa. *South African Review of Sociology, 37,* 165-188.

Maswanya, E. S., Moji, K., Horiguchi, I., Nagata K., Aoyagi, K., Honda, S., & Takemoto, T. (1999). Knowledge, risk perception of AIDS and reported sexual behavior among students in secondary schools and colleges in Tanzania. *Health Education Research, 14,* 185-196.

Moore, S., & Rosenthal, D. (1991). Adolescent invulnerability and perceptions of AIDS risk. *Journal of Adolescent Research, 6,* 164-180.

Pettifor, A. E., Rees, H. V., Steffenson, A., Hlongwa-Madikizela, L., MacPhail, C., Vermaak, K., & Kleinschmidt, I. (2004). *HIV and sexual behaviour among young South Africans: A national survey of 15-24 year olds*. Johannesburg: Reproductive Health Research Unit, University of Witwatersrand.

Sarker, M., Milkowski, A., Slanger, T., Gondos, A., Sanou, A., Kouyate, B., & Snow, R. (2005). The role of HIV-related knowledge and ethnicity in determining HIV risk perception and willingness to undergo HIV testing among rural women in Burkina Faso. *AIDS and Behavior, 9,* 243-249.

Shisana, O., Rehle, T., Simbayi, L. C., Parker, W., Zuma, K., Bhana, A., Connolly, C., Jooste, S., & Pillay, V. (2005). *South African National HIV Prevalence HIV Incidence, Behaviour and Communication Survey, 2005*. Cape Town: HSRC Press.

Shobo, Y. (2007). Youth's perceptions of HIV infection risk: A sex-specific test of two risk models. *African Journal of AIDS Research, 6,* 1-8.

Simbayi, L. C., Chauveau, J., & Shisana, O. (2004). Behavioural responses of South African youth to the HIV/AIDS epidemic: A nationwide survey. *AIDS Care, 16,* 605-618.

Simbayi, L. C., Kalichman, S. C., Jooste, S., Cherry, C., Mfecane, S., & Cain, D. (2005). Risk factors for HIV-AIDS among youth in Cape Town, South Africa. *AIDS and Behavior, 9,* 53-61.

Smith, R. A., & Morrison, D. (2006). The impact of stigma, experience, and group referent on HIV risk assessments and HIV testing intentions in Namibia. *Social Science and Medicine, 63,* 2649-2660.

Speizer, I. S., Magnani, R. J., & Colvin, C. E. (2003). The effectiveness of adolescent reproductive interventions in developing countries: A review of the evidence. *Journal of Adolescent Health, 33,* 324-348.

Tillotson, J., & Maharaj, P. (2001). Barriers to HIV/AIDS protective behavior among African adolescent males in township secondary schools in Durban, South Africa. *Society in Transition*, 32, 83-100.

Ukwuani, F. A., Tsui, A. O., & Suchindran, C. M. (2003). Condom use for preventing HIV infections/AIDS in sub-Saharan Africa: A comparative multilevel analysis of Uganda and Tanzania. *Journal of Acquired Immune Deficiency Syndromes, 34,* 203-213.

UNAIDS. (2006). *2006 Report on the Global AIDS Epidemic*. New York: United Nations Publications.

Zambuko, O., & A. J. Mturi. (2005). Sexual risk behaviour among the youth in the era of HIV/AIDS in South Africa. *Journal of Biosocial Science, 37,* 569-584.