Social and structural factors associated with vulnerability to HIV infection among young adults in South Africa

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Published online: 15 Jul 2014.

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There is increasing focus on social and structural factors following the marginal success of individual-level strategies for HIV prevention. While there is evidence of decreased HIV prevalence among young individuals in South Africa, there is still a need to monitor HIV incidence and prevalence in this vulnerable group as well as track and prevent high-risk sexual behavior(s). This study investigated the social and structural factors that shape the context of vulnerability to increased risk of exposure to HIV infection. A mixed-methods approach including qualitative and quantitative design components was employed. Young adults in the age group 18–24 were interviewed from four provinces in South Africa. The qualitative results produced strong support for the effectiveness of loveLife's HIV prevention programs. The household-based survey results showed that the strongest predictors of self-reported HIV infection (indicating a greater chance of being infected) using adjusted odds ratios (aOR) are: being diagnosed with an STI in a lifetime (aOR 13.68 95% Confidence Interval (CI) [4.61–40.56]; $p < .001$), inconsistent condom use (aOR 6.27 95% CI [2.08–18.84]; $p < .01$), and difficulty in accessing condoms (aOR 2.86 95% CI [1.04–7.88]; $p < .05$). The strongest predictors that indicated a decreased chance of being infected with the HI virus are: talking with partner about condom use in the past 12 months (aOR .08 95% CI [.02–.36]; $p < .001$) and having a grade 8 (aOR .04 95% CI [.01–.66]; $p < .05$) and higher educational level (aOR .04 95% CI [.01–.43]). These results show that social and structural factors serve as risk and protective factors for HIV prevention among young people. Intervention programs need to continue to focus on effective communication strategies and healthy relationships. Structural adjustments have to be made to encourage school attendance. Finally, social/health policies and health service delivery have to also be refined so that young people have access to youth friendly health services.

Keywords: social factors; structural factors; HIV infection; young adults; HIV prevention programs

Introduction

HIV prevention has been dominated by individual-level interventions that seek to influence knowledge, attitudes, and behaviors, such as promotion of condom use (Gupta, Parkhurst, Ogden, Aggleton, & Mahal, 2008). However, individual-level risks for HIV

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infection are impacted by socio-structural and population-level risks and protection for epidemic HIV infection spread or control (Bakeera-Kitaka, Nabukeera-Barungi, Nöstlinger, Addy, & Colebunders, 2008; Beyer, Taylor, Gersing, & Krishnan, 2007). These risks are further impacted by the presence or absence of appropriate prevention tools and services, the lack of a human rights culture, and social tolerance or stigma.

There is a growing body of research focusing on structural issues rather than on individual behavior as the key to understand the factors that shape the HIV/AIDS epidemic (Parker, Easton, & Klein, 2000). Socio- structural factors have been viewed as reflective of sociocultural norms, values, networks, structures, and institutions, which operate in concert with individual behaviors to influence HIV epidemics (Seeley et al., 2012). Moreover, the general conditions of poverty, migration, and mobility are also found to be linked to increased HIV incidence in a variety of contexts (Parker et al., 2000).

The causal pathway between social influences and HIV transmission is complex and non-linear (Auerbach, Parkhurst, & Càceres, 2011). "Gender inequality" and poverty, the major social drivers of HIV vulnerability among young women in sub-Saharan Africa (s-SA), are examples of this complexity. The fact that there are countries outside s-SA with greater poverty and gender inequalities with dissimilar gender differentials in HIV infection as compared to s-SA (Mishra et al., 2007; Obermeyer, 2006) adds to this complexity. There are specific pathways through which these social drivers operate in influencing vulnerability to HIV and these pathways include other contextual factors which can be targeted for intervention efforts (World Health Organization [WHO], 2007).

The HIV/AIDS pandemic affects males and females, although half of all HIV infected people, globally, are female (UNAIDS, 2009) with a growing proportion of new infections occurring among women in s-SA. Consequently, gender and sexuality should be conceptualized as structural factors rather than behavioral ones that impact HIV transmission (Parker et al., 2000). There are numerous studies that demonstrate the fact that women that are disempowered in a sexual relationship, are of lower socioeconomic status and have a history of abuse (Dunkle et al., 2004; Pulerwitz, Gortmaker, & DeJong, 2000; Weiss, Whelan, & Gupta, 2000) are at higher risk for HIV infection and low condom use.

The aim of this study was to investigate socio-structural factors as predictors of HIV infection among youth in SA. Social factors, namely, high levels of coercion, a sense of future, communication, and peer pressure; and structural factors, namely, pro-social activities, unemployment, parental occupation and educational levels, early school-leaving, and economic marginalization were examined. This study is part of a larger study that evaluated loveLife's HIV prevention programs for youth in SA (loveLife, 2012).

Methods

Study design

This study employed a mixed-methods design. In the formative phase, a qualitative design was used to inform the development of the survey questionnaire which was administered in four provinces in SA, namely, the Eastern Cape, KwaZulu-Natal, Gauteng, and Mpumalanga.

Participants and procedure

Participants between 18 and 24 years were recruited for the qualitative phase of the project. Sixty-one individuals, who were involved in a loveLife HIV prevention program in

the past 2–5 years were recruited to participate in a one-hour interview, a one-hour follow-up interview, and a series of six social network interviews (SNIs) (*n* = 239) (Hamilton Harding, 2010; Swartz & Bhana, 2009). The interviews were used to access interviewees' narratives of risk and opportunity.

The quantitative component of the study was a cross-sectional population-based household survey using a multi-stage stratified cluster sampling method. A total of 3123 eligible individuals were recruited and interviewed through systematic random sampling of 12 households per enumerator area (EA) across 583 EAs. The overall individual response rate was 96.4%.

A survey questionnaire was piloted with a sample of 100 individuals 18–24 years and ethical approval for the study was obtained from the HSRCs Research Ethics Committee. Participants were enrolled into the study after signing the "informed consent forms."

Data collection tools

Tools for the *qualitative component* comprised Individual Interviews and SNIs were conducted among the participants to ascertain their perception of the social and structural determinants of HIV infection.

Tools for the *quantitative component* included: (1) *Socio-Demographic Status*: structured questions were asked about the participant's age, race, home language, educational level, parent's educational level, marital status, main vocational activity, individual gross annual income, and whether they are recipients of a social grant. The poverty index (Cronbach α = .70) was assessed with items on the availability/non-availability of essential items such as shelter, electricity, clean water, medicines, food and cash income in the past week. Poverty was defined as higher scores on non-availability of essential items; (2) *Social and Structural Factors*: Poverty was conceptualized as a structural factor; *HIV communication* was assessed using a 10-item index (Cronbach α = .75); *Difficulty in accessing condoms* and *Relationship control* were assessed with items based on a Likert-style format (Cronbach α = .81) in which higher scores on lack of relationship power were defined as lack of relationship control; *Self-esteem* was assessed with the 10-item Rosenberg self-esteem scale (Cronbach α = .64) with a score of 14 or less indicating low self-esteem; *Sense of future* (Cronbach α = .63) was assessed with six items using categorical responses (Agree/Disagree); *Social network resources* were assessed with two items using a Likert-style format (Cronbach α = .45) producing scores that were categorized as low, medium, or high social network; *Peer pressure* was assessed with two items using a Likert-style format and also produced scores that were categorized as low, medium, or high peer pressure (Cronbach α = .61), and finally, one item captured a history of being engaged in *transactional sex* in one's lifetime with responses as 0 = never and 1 = ever having transactional sex.

Additional tools for female participants were:

Female role perception index was assessed with five items eliciting categorical responses (True/False) (Cronbach α = .50); *Communication about Sexual and Reproductive Health* was assessed with five items producing five communication sources (Cronbach α = .65); *Competency & demands of the female role index* was assessed with five items (Cronbach α of .73); and *Vulnerability & Lack of Opportunity index* was assessed with 11 items (Cronbach α of .78).

Analysis of the data

Qualitative analysis software (Atlas.ti) was used to conduct the thematic coding, with special emphasis on linking data from individual interviews with that from the SNIs. Codes were classified and reclassified until overarching themes and emerging recommendations were identified (Merriam, 1988). loveLife's risk-reduction model, the AIDS Risk Reduction Model (Catania, Kegeles, & Coates, 1990), Jessor's Interrelated Conceptual Domains of Risk Factors and Protective Factors (Jessor, 1998), and the Developmental Assets Framework (Scales, 1999) guided the analysis of the qualitative data.

The data that was generated from the survey were subjected to descriptive and inferential statistical analyses. Weighted data were analyzed using STATA software; and STATA software (svy command) was used to obtain the estimates of key indicators, significance levels (*p*-value ≤ .05), and confidence intervals (95% CIs). Logistic regression analysis was used to identify variables that are jointly significantly associated with HIV infection. Odds ratios were interpreted to quantify direction and magnitude of association. *p*-value and 95% CIs were reported. All variables that are jointly significantly associated with HIV in bivariate analyses were included in the multivariable models.

Results

Characteristics of the sample

Sixty-one participants (29 males and 32 females) with an average age of 21.4 years completed individual interviews and 239 participants with an average age of 27 years took part in the SNIs.

Table 1 contains the socio-demographic and structural profile of the participants. The sample included 3021 participants with a mean age of 20.5 years (SD = 2.0). The poverty index indicated that 8.1% (SD = 2.9) of the participants were "poor." At least two-fifth of the sample had a Grade 12 and "higher" educational level, 6.1% were diagnosed with an STI in their lifetime, and 7.4% reported that they were HIV positive with a higher number of females reporting HIV infection and STI in their lifetime. The diagnosis of HIV and STI was self-reported and not verified through bio-marker testing. The majority of participants lived with their next of kin.

Significant differences were found between male and female participants (*p*-value ≤ .05) for the following characteristics: more females reported inconsistent condom use, high levels of coercion, being students and having transactional sex; while more males reported living with their fathers.

Perception of risk and risk-taking behavior

Many young people spoke of risk-taking as a part of life, necessary for learning and essential for personal growth, as demonstrated by a 23-year-old male participant:

> Taking a risk, it's one of the important steps in life, but it depends how. Because life – according to my understanding – life it's risky. For example, a pilot … earns a lot of money, but that person knows very well that anytime the airplane can drop down. That's a risk. … If you don't want to experience risk you will be poor for the rest of your life. Even being poor you are under risk exactly. Risk is part of life.

Poverty was considered to be a determinant of risky behavior, such as engaging in illegal acts, by a quarter of the sample. Almost one-third linked the personal risks they took such as gaining access to the cash or clothing they needed to appear successful

Table 1. Sample characteristics.

	Male (*N* = 1612)	Female (*N* = 1409)	*p*-value
Individual			
Age (SD)	20.5 (2.1)	20.6 (2.0)	.21
Diagnosed with an STI in lifetime	128 (5.3)	113 (7.1)	.95
Diagnosed HIV positive	40 (5.8)	69 (8.5)	.19
Low self-esteem	91 (5.2)	71 (3.6)	.46
No sense of future	495 (24.9)	432 (32.8)	.86
Partner risk reduction self-efficacy (range 4–16)	14.0 (2.4)	14.2 (2.50)	.06
Social			
HIV communication index (range 0–10)	5.4 (2.6)	5.6 (2.2)	.03
Talked with partner about condoms in past 12 months	903 (91.9)	769 (90.7)	.23
Inconsistent condom use	169 (34.2)	136 (58.1)	<.001
Peer pressure			<.001
Low	558 (43.0)	679 (56.7)	
Medium	744 (44.4)	523 (35.8)	
High	247 (12.7)	153 (7.5)	
High levels of coercion	14 (1.1)	58 (7.3)	<.001
Social network resources			.19
Low	156 (8.1)	164 (15.9)	
Medium	840 (55.5)	707 (53.4)	
High	527 (36.4)	458 (30.8)	
Living arrangements			<.001
Stays alone	58 (2.7)	23 (1.3)	
Stays with family	1474 (93.2)	1261 (93.7)	
Stays with a partner/wife	8 (.8)	50 (1.7)	
Stays with friends/peers	42 (3.2)	38 (2.9)	
Stays on campus residence	2 (.1)	5 (.3)	
Mother alive	1383 (83.8)	1169 (79.5)	.16
Father alive	1131 (72.1)	957 (64.3)	.54
Stays with mother	1089 (82.7)	900 (76.7)	.11
Stays with father	756 (71.9)	576 (59.2)	<.001
Structural			
Poverty index (range 6–24)	8.3 (3.0)	7.9 (2.8)	.09
Education			.04
Low (≤Grade7)	59 (3.5)	39 (2.3)	
Medium (Grade 8–11)	643 (34.4)	513 (35.5)	
High (Grade 12 or more)	890 (62.1)	835 (61.6)	
Marginalization	243 (14.8)	190 (13.1)	.21
Student	772 (50.3)	614 (51.3)	<.001
Employed	237 (16.1)	134 (9.0)	
Unemployed	471 (33.5)	521 (39.8)	
Difficulty of getting condoms (range 1–4)	1.22 (.6)	1.18 (.6)	.60
Lack of relationship control (range 4–16)	8.4 (2.4)	8.0 (2.5)	.02
Ever transactional sex	82 (6.9)	44 (7.0)	<.001
Reported HIV Prevalence			
ALL	40 (5.8)	69 (8.5)	.19
Eastern Cape	8 (5.3)	19 (11.6)	.46
Gauteng	5 (3.4)	7 (5.2)	.90
KwaZulu-Natal	23 (8.9)	33 (15.9)	.15
Mpumalanga	4 (1.2)	9 (1.9)	.44

Table 1.   (*Continued*).

	Male ($N = 1612$)	Female ($N = 1409$)	*p*-value
Female respondents only			–
Female role perception Index (range 0–5)	1.20 (1.40)	1.04 (1.03)	–
Communication about SRH index (range 0–5)	3.6 (1.8)	3.5 (1.4)	–
Ever attended SRH clinic	9 (60.8)	695 (55.6)	–
Competency & demands of female role (range 2–30)	14 (4.3)	17.6 (5.3)	–
Vulnerability and lack of opportunity (range 0–33)	2.6 (4.6)	6.6 (6.4)	–

and "be respected" in the community. Participants that had exposure to loveLife reported that young men in their communities acquire money and recognition by their peers through theft or selling drugs, and young women acquire money or goods through casual transactional sex, having one or more "sugar daddies," or through prostitution.

About half of the participants that had exposure to the loveLife programs reported that this exposure helped them to reduce risky behaviors and increase self-control. An estimated one-third mentioned turning to safer sex practices including abstinence (reported by young women), using condoms, and having only one committed intimate partner as a result of the lessons learned in the loveLife programs. A 21-year-old female participant stated:

> When we are talking about HIV in loveLife … [it] actually touches you … you know that you don't have to like do that. And for next time you know that … if you are having sex with somebody, you have to use a condom … It clicks back in your head. That's all, you remember the last time when we were talking about that … Believe me it gives you a wake-up call when you about to do that thing.

Many participants explained how they learn to recognize and reduce risky behaviors as a result of their involvement in the loveLife programs. A 22-year-old male participant explained that when he first arrived at loveLife, he was regularly having sex with multiple partners but through exposure to loveLife he learned about how easily HIV spreads and the importance of having safe sex:

> I saw women just to have sex … Condom was a problem … You can't eat sweet with the wrapper … Once I came here I knew … I have so many partners … if I sleep with my partner then there is this partner which means I'm sleeping with all of them … which means if I'm positive … then they are positive … So I think, ok if I have many partners I have to practise safe sex 'cause at the end of the day I risk myself and others and it's not cool. And I have to now teach others about these condoms.

The layered and interlinked texture of young individual's physical and social environments, as well as the psychological implications for risk tolerance, are illustrated in the following quote of a 23-year-old male participant:

> Out there you want to get the sense of being alive … to feel the thrill and the excitement and all that … I don't know, I did it out of, I really liked him though, it was quite genuine. I thought "why should he be crucified for being HIV-positive?" I know enough about HIV to know that okay, I have myself to blame, but at that time it was a matter of "why not?" [Laughs] … it was for the exposure and also for the money because I wanted to move to a new place.

loveLife's impact on perceptions of risk and opportunity

Participants' responses indicated that they had experienced a change in their knowledge with regards to risk taking behavior and personal vulnerability. One of loveLife's programs, *Motivation*, was said to provide support, creating a safe space and supportive network where young people could discuss sensitive issues. Participants also suggested that the program helped them set personal goals and define how they see themselves. A female participant mentioned how the support she received helped her come to terms with her mother's HIV status and the realization that HIV was not a "life-threatening sentence."

Participants also described how loveLife motivated them to want "to look for opportunities" in their community and actively work towards a better future as demonstrated by a 22-year-old: *If you're not working, do something. There are so many voluntary things that you can do.*

Predictors of self-reported HIV infection

Univariate analysis (see Table 2) shows that the following factors were found to be significantly associated with self-reported HIV infection as derived from the odds ratios: having no sense of future, being diagnosed with an STI in a lifetime, inconsistent condom use, difficulty in accessing condoms, lack of relationship control, having had one or more transactional sex event, and female participants abiding by the expectations of a female role. In addition, the following factors were found to protect against HIV infection as can be seen from the outcome of the univariate analysis (odds ratios) conducted: talked with partner about condoms in the past 12 months, having a grade 8 or higher education, feeling competent about meeting the demands of the female role.

Multivariable analysis (see Table 2) highlights the following significant predictors of self-reported HIV infection (indicating a greater chance of being infected with the HI virus) using the adjusted odds ratios (aOR): being diagnosed with an STI in a lifetime, inconsistent condom use, and difficulty in accessing condoms. The following significant predictors indicated a decreased likelihood of being infected with the HI virus: talked with partner about condom use in the past 12 months and having a grade 8 and higher educational level.

Discussion

This study identified socio-structural factors that served a protective function and as risk indicators for self-reported HIV infection among youth in SA. The positive association found between having a history of STIs and HIV infection is well established in the medical literature (Steen, Wi, Kamali, & Ndowa, 2009) and, therefore, highlights the importance of educating young individuals about the dangers of not using a condom during penetrative sex and/or engaging in particular types of sexual acts, such as oral and anal sex. Sexual health messages need to be given clearly and concisely (Nutbeam, 2008).

Exposure to loveLife programs in this study served a socially protective function in the face of poverty. Living an "idle" existence is feared by young people, due to the pressures of poverty which bear upon them, increasing the likelihood of them engaging in high-risk behaviors. In this study, young people reported seeking ways to achieve emotional security and social status through relationships and/or finding a source of

Table 2.   Social and structural predictors of HIV infection for young men and women.

	HIV positive (vs. negative)	
	OR (95% CI)	aOR (95% CI)
Individual		
Female versus male	.66 (.28–1.56)	–
No sense of future	1.80 (1.00–3.25)*	.77 (.23–2.65)
Low self-esteem	1.83 (.57–5.85)	–
Partner risk-reduction self-efficacy	.88 (.77–1.01)	–
Diagnosed with an STI in lifetime	13.16 (6.06–28.57)***	13.68 (4.61–40.56)***
Social		
HIV communication index	1.04 (.81–1.34)	–
Talked with partner about condoms in past 12 m	.21 (.06–.80)*	.08 (.02–.36)***
Peer pressure		–
Low	1.00	
Medium	2.21 (.94–5.23)	
High	2.38 (.82–6.86)	
High levels of coercion	3.3 (.93–11.94)	–
Two or more sexual partners in past 12 m	1.79 (.89–3.58)	–
Inconsistent condom use	5.32 (1.50–18.84)**	6.27 (2.08–18.84)**
Social network resources		
Low	1.00	–
Medium	.77 (.25–2.40)	
High	.53 (.13–2.08)	
Peer pressure		
Low	1.00	–
Medium	2.21 (.94–5.23)	
High	2.38 (.82–6.86)	
Structural		
Poverty index	.96 (.85–1.09)	–
Education		
Low (≤Grade7)	1.00	1.00
Medium (Grade 8–11)	.10 (.03–.29)***	.04 (.01–.66)*
High (Grade 12 or more)	.07 (.02–.24)***	.04 (.01–.43)**
Marginalization	.58 (.24–1.41)	–
Difficulty in accessing to condoms	2.43 (1.46–4.06)***	2.86 (1.04–7.88)*
Lack of relationship control	1.16 (1.05–1.28)**	1.01 (.77–1.32)
Ever transactional sex	5.38 (2.13–13.58)***	1.61 (.30–8.62)
Student	1.00	–
Employed	1.23 (.43–3.56)	
Unemployed	1.98 (.72–5.43)	
Female respondents only		
Female role perception Index	1.39 (1.02–1.88)*	1.17 (.88–1.56)
Communication about SRH index	.98 (.88–1.22)	
Ever attended SRH clinic (1 = Y;0 = N)		
No	1.00	
Yes	.42 (.11–1.68)	
Competency & demands of female role	.90 (.84–.96)**	.94 (.86–1.02)
Vulnerability and lack of opportunity	.92 (.83–1.01)	

Notes: STI- sexually transmitted infection; OR- odd ratio; aOR- adjusted odds ratio; CI- confidence interval.
*$p < .05$; **$p < .01$; ***$p < .001$.

finance by selling alcohol, drugs, or carrying out theft of property (common among young men), and having sex for money and conceiving a child is common among young women and some young men (e.g. Bruce & Hallman, 2008; Harrison, 2010). loveLife interventions provided strategies to increase opportunities and decrease risk.

The finding that inconsistent condom use is a risk factor for HIV infection is an important consideration in HIV prevention programs for young individuals who have to understand that total adherence to male and female contraception is the most effective behavior that protects against HIV infection (Global HIV Prevention Working Group [GPG], 2008). Behavioral interventions, therefore, need to ensure that recipients are provided with specific information about condom use.

The result that difficulty in accessing condoms presents as a risk factor for HIV infection is a double-edged sword. On the one hand, this poses as a structural barrier because there are insufficient distribution points for condoms in SA and condoms are, therefore, not readily available (Han & Bennish, 2009). On the other hand, this finding poses as an individual level barrier because these youth were not pro-active and failed to equip themselves with contraception in the event that they were going to be sexually active. This lack of foresight may be constituted as sexual-risk behavior, which is a definite driver for HIV infection.

Factors found to protect against HIV infection in this study supports existing evidence. Couples communicating openly about the need for contraception were more protected from HIV infection in this study which is consistent with the fact that open and honest communication is known to be positively associated with healthy relationships (Harrison, Xaba, & Kunene, 2001; Sayles et al., 2006).

Having a high school education of at least a Grade 8 also served as a protective factor for HIV infection supporting the fact that social determinants play a vital role in health and well-being (Harrison, 2010; Marks, Fleimg, Long, & McMillan, 2000). HIV prevention programs for young people in SA should include modules that address the importance of school attendance and completion of schooling in order to create opportunities and reduce risk (Smith, 2011).

Conclusion

The results of the study revealed specific social and structural predictors for HIV infection and outline the factors that serve to protect young people from HIV infection. Since the results are aligned with loveLife's Risk Reduction Model for HIV infection, they will serve to guide the revision of existing programs targeting high-burden provinces.

Acknowledgment

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