

Perceptions of risk to HIV Infection among Adolescents in Uganda: Are they Related to Sexual Behaviour?

*Richard Kibombo, *Stella Neema and **Fatima H. Ahmed

ABSTRACT

Uganda has been hailed as a success story in the fight against HIV that has seen a reversal in prevalence from a peak of 15% in 1991 to about 6.5% currently. Since 1992, the largest and most consistent declines in HIV have occurred among the 15-19-year-olds. While many studies have examined how key behavior changes (Abstinence, Be faithful and Condom use) have contributed to the decline in HIV prevalence, few have studied the relationship between sexual behaviors and risk perception. Using data from the 2004 National Survey of Adolescents, multivariate logistic regression models were fitted to examine the strength of the association between risky sexual behavior and perceived risk among 12-19-year-old adolescents in Uganda. After controlling for other correlates of sexual behavior such as age, education, residence, region and marital status, the findings indicate highly significant positive association between perceived risk and risky sexual behavior among males but not females. The findings reveal that, regardless of their current sexual behavior, most female adolescents in Uganda feel at great risk of HIV infection. The findings also show that adolescents with broken marriages are much more vulnerable to high risk sexual behaviors than other categories of adolescents. These results further emphasize the need for a holistic approach in addressing the social, economic and contextual factors that continue to put many adolescents at risk of HIV infection. (*Afr J Reprod Health* 2007; 11[3]:168-181)

RÉSUMÉ

Perceptions du risque d'être séropositif chez les adolescents en Ouganda: sont-elles liées au comportement sexuel? On a acclamé l'Ouganda comme un pays qui a eu beaucoup de succès par rapport à la lutte contre le VIH qui a connu un renversement dans sa prévalence d'un sommet de 15% en 1991 à environ 6,5% à l'heure actuelle. Depuis 1992, les déclin les plus nombreux et les plus consistants se sont produits chez les gens âgés de 15-19 ans. Alors que plusieurs études ont interrogé comment les modifications de comportement clé (Abstinence, Soyez Fidèle et l'usage de préservatif) ont contribué au déclin de la prévalence du VIH, il y a très peu d'études qui ont porté sur les rapports entre les comportements sexuels et la perception de risque. À l'aide des données recueillies de l'Enquête nationale sur les Adolescents en 2004, des modèles de la régression logistique multifactorielles ont été fixés afin d'examiner l'intensité des rapports entre le comportement sexuel risqué et le risque aperçu chez les adolescents âgés de 12-19 ans en Ouganda. Ayant contrôlé pour déterminer les autres corrélats du comportement sexuel tels l'âge, l'instruction, la résidence, la région et l'état civil, les résultats ont montré un rapport positif important entre le risque perçu et le comportement risqué chez les mâles, mais pas chez les femelles. Les résultats montrent que malgré leur comportement sexuel à l'heure actuelle, la plupart des adolescents en Ouganda ressentent un grand risque de l'infection du VIH. Les résultats montrent que les adolescents qui ont vécu les mariages rompus sont beaucoup plus vulnérables aux comportements sexuels à haut risque que les autres catégories d'adolescents. Les résultats soulignent davantage la nécessité d'adopter une approche holistique pour aborder les facteurs sociaux, économiques et contextuels qui ne cessent d'exposer beaucoup d'adolescents au risque de l'infection du VIH. (*Rev Afr Santé Reprod* 2007; 11[3]:168-181).

KEY WORDS: *adolescents, HIV infection, sexual behaviour*

Makerere Institute of Social Research, Kampala, Guttmacher Institute, New York

Introduction

In many regions of the world, new HIV infections are heavily concentrated among young people (15-24 years of age). Among adults 15 years and older, young people accounted for 40% of new HIV infections in 2006.¹ In Uganda, HIV/AIDS is recognized as a grave public health and social development concern. Fuelled by poverty, gender inequality and lack of information and prevention services, adolescents, in particular, are exposed to the risks of HIV infection and eventually AIDS.² HIV prevalence was, until the end of 2000, highest among adolescents (aged 15-19 years), with females three to six times more likely to be infected than males.³ For example, HIV prevalence in young pregnant women (15-24 years) in Kampala showed a declining trend from 8.5% in 2000 to 5.2% in 2005.¹ On the other hand, in 2005, HIV prevalence among young men 15-24 years in Kampala was only 2.3% as compared to 5.2% among young women of the same age range.¹

Current studies show that the highest infection rate is now amongst married females 15-49 years old (at 5.9%); the rate among females who have never been in union or any form of marital union is 2.7%.⁴ The same study shows that overall, 6.4% of Ugandan adults (15-49 years) are infected with HIV, with higher prevalence among women (7.5%) as compared to men (5.0%). Among young people 15-19 years, the prevalence rate among women is 2.6% as compared to only 0.3% among men.⁴

Although young people in Uganda are now starting sexual activity at a later age than in the past, the age at sexual initiation is still early. Fourteen percent of both men and women aged 15-24 reported they had had sex before age 15, and 63% of women and 47% of young men had had sex before the age of 18.⁴ Even if young people 15-19 were the most likely age group to have used a condom at last sex (27% of women and 47% of men), this percentage is still low. Their increased vulnerability to HIV infection is still

compounded by the fact that most sexual encounters are without the benefit of consistent and correct condom use.⁴ Further more, among women who had sex in the last 12 months, 7.6% (15-19) and 3.8% (20-24) years had 2 or more sexual partners.⁴

Prata et al⁵ highlights the relationship between young people's assessments of their HIV risk with assessments based on current and past sexual behavior, where more male than female who considered themselves to have no risk or a small risk of contracting HIV were actually at moderate or high risk in relation to unprotected sex. Correct assessment was positively associated with condom use. Other studies have also suggested that the perception of actual threat of personal vulnerability to contracting HIV leads to adopting protective behaviors (Lagarde et al⁶; and Ekanem et al⁷). However, Hulton et al⁸ and Kiirya et al⁹ suggest that knowledge of safe-sex behavior and reported behavior have little in common and that the fundamental barriers to behavioral change lie within the economic and socio-cultural context that shapes the sexual politics of youth. Maswanya et al (1999)¹⁰ and Stanton et al¹¹ also noted that while young people were aware of their risk in having unprotected sexual intercourse, they failed to take up risk reduction behavior.

Gender differentials on perceived HIV risk and sexual behaviour have been studied with some studies indicating males to be at more risk while others show females were more at risk (Smith & Morrison¹²; Boer & Mashamba¹³; Pettifor et al¹⁴; Simbayi et al¹⁵). It has also been alluded to that being personally affected by HIV and AIDS especially having seen a close person die of AIDS may be associated with higher perceived risk of HIV infection (Kermyt et al¹⁶; Macintyre et al¹⁷; and Eaton et al¹⁸).

Many behavioral intervention programs which aim to get adolescents to recognize their own vulnerability to infection rely on adolescent's accurate perceptions of risk.¹⁹ Given the vulnerability of young people to HIV, it is of program and

policy relevance to better understand the relationship between actual behavioral risk and perceptions of risk among adolescents in order to help young people protect themselves from negative outcomes. The ability to accurately judge one's own risk to HIV is an essential element in developing successful strategies for prevention such as seeking VCT services. Uganda, being one of the countries that had HIV prevalence rates as high as 30% in some urban centers³ but has now managed to reverse and contain the pandemic, may offer important lessons towards understanding the intricate relationship between perceived risk and actual sexual behavior. This paper will provide an understanding of how Ugandan youth judge their risk to HIV. The findings will be helpful to policymakers, program developers, providers of health services, health educators, parents and those who provide support and guidance to adolescents to enable young people to live healthy sexual and reproductive lives.

Methods

Data on Behavior Risk and Risk Perception

The data used in this paper was collected in 2004 in a nationally representative survey of adolescents aged 12-19 years old. The Uganda survey was part of a larger multi-country study of adolescent sexual and reproductive health issues under the Guttmacher Institute's project called Protecting the Next Generation (PNG): Understanding HIV Risk among Youth, which is supported by Bill and Melinda Gates Foundation. Other countries that were covered by study include Burkina Faso, Ghana and Malawi. The primary objective of the PNG Project was to establish a knowledge base of policy-relevant evidence that will provide new depths of understanding into adolescent sexual and reproductive health behavior and practice. In Uganda, the survey was conducted by Uganda Bureau of Statistics in collaboration with ORC

Macro, Makerere Institute of Social Research and Guttmacher Institute.

The sample for the Uganda Survey covered the population residing in private households. The self-weighting national sample was selected in two stages with the 2002 Uganda National population Census serving as the sampling frame. At the first stage, 202 enumeration areas (EAs) were selected using systematic random sampling with probability proportional to size. At the second stage, 38 households per EA were selected – again using systematic random sampling.

All 12-19-year-old de facto residents in a household were eligible for the survey and yielded a total of 5112 respondents (2513 males and 2599 females). All districts of Uganda were covered except four in Northern Uganda which were deemed too insecure due to the rebellion that was raging in that part of the country at the time.

Analysis Methods

Behavior change is a very complex process involving the interaction of a wide array of factors both personal and environmental. Personal factors which play a major role in behavior change may include but not limited to age, education, gender, wealth, personal experiences, personal beliefs/attitudes and self-efficacy while environmental factors may include social norms and practices, institutional/national policies, infrastructure to support the desired behavior as well as information and influence from peers and the media. These factors interact leading to differences in individual behavior.

In this paper, we compare behavioral risk with a respondent's self-perceived risk to HIV. Risky sexual behavior is based on responses to questions about the respondent's sexual activity in the past 12 months, their use of condoms, their union status and the number of sexual partners in the past 12 months. Those who exhibit **high risk** behavior are those who had two or more partners in the last 12 months and who did

not use a condom at last sex with one or both of their partners. Because the prevalence of HIV is not low in Uganda, high risk takers are also those who had one partner in the last 12 months, were not married or in a union and did not use a condom at last sex. **Low risk** takers are those who have never had sex or have had sex but not in the year prior to the survey; and those who were married; those who had one partner during the past 12 months and used a condom at last sex; and those who had two or more partners in the past 12 months and used a condom at last sex with both their partners. A score of "0" was given to the low risk takers while "1" was assigned to the high risk takers, thus making risky behavior a dichotomous (binary) variable.

On the other hand, perception of risk has been measured by the question "*Do you think your chances of getting HIV/AIDS are great, moderate, small, or you have no chance at all?*". This question was addressed to all adolescents who were aware of HIV/AIDS regardless of whether they had ever had sexual intercourse or not.

In trying to understand the relationship between risky sexual behavior and risk perception, we have followed the approach of Akwara et al (2003)²⁰ whereby risky sexual behavior is treated as the dependent variable while perception of risk is treated as an explanatory variable although the relationship can actually go in either direction.

Logistic regression has been used to examine the relationship between risky sexual behavior and perception of HIV risk while controlling for other factors that are likely to influence sexual behavior. This has been done by starting with a model that includes perception of risk as the only explanatory variable (Model A) and then blocks of variables are added in a stepwise approach and their effect is ascertained. Separate models for males and females have been fitted to account for gender differences risk behaviors.

Model B= Model A + background socio-demographic factors (region, area of residence-rural/urban, age, religion).

Model C = Model B + other socio-demographic factors (education, wealth quintile).

Model D= Model C + psychosocial factors (Recent exposure to HIV messages, personal ties with person with HIV or died of AIDS, comprehensive knowledge of AIDS).

Adolescents who have comprehensive knowledge of AIDS have been defined here as those who correctly identified two major ways of preventing the sexual transmission of HIV, correctly rejected the two most common local misconceptions about AIDS transmission or prevention and also correctly responded that a person who looks healthy can have HIV.

Study Limitations

This analysis is primarily based on cross-sectional data; hence it is not possible to make any causal connections between risky sexual behavior and perceptions of risk to HIV or know the direction in their relationship. Furthermore, the measure of risky sexual behavior used is based only on an individual's behavior in the 12 months preceding the study yet actual risk of exposure to HIV is a combination of several factors such as the type and number of lifetime sexual partners; consistent and correct use of condoms by the individual and/or the partner currently and in the past; and the partner's past and current sexual behavior. Similarly, risk perception is often context specific. People might perceive themselves as at high risk when they are in a new relationship but this is likely to change with time as the relationship becomes more stable. Others may perceive themselves as highly at risk simply because of the high prevalence of HIV in the population or because of the perceived risky behavior of their partners. Despite these limitations, this analysis is important in that it is able to determine whether or not there is any significant relationship between current risky behavior and perception of risk and this has considerable programmatic implications.

Results

Descriptive Results

Characteristics of respondents: About half of young women 12-19 in Uganda are between the ages of 15-19 and half are between 12 and 14 (Table 1). Most are rural residents. Roughly three in four are currently in school, although the proportion drops to half among those 15-19. Most young women 12-19 have attended school at some point in their life, with less than 5% having never attended. Among women 15-19, one in four has had some secondary or higher level education. Slightly more 12-14 year old female adolescents live in households that are in the lowest wealth quintile compared with 15-19 year-olds, however overall, female adolescents are similarly distributed across the five wealth quintiles. The characteristics of young men are similar to those of their female counterparts. For instance, nine in ten live in rural areas. However, higher proportions of adolescent males compared to females are currently in school.

Union status and sexual experience: Becoming sexually active and entering into a union are important transitions in the lives of adolescents. For one, these occasions affect their exposure to the risk of pregnancy and STIs, including HIV. Most adolescents in Uganda are not in a union although, among women aged 15-19, this proportion is not so low, with one in five reporting to be in a union (Table 2). With regards to sexual activity, 28% of adolescent women have ever had intercourse and among those aged 15-19, nearly half have had sex. Sexual activity is slightly higher among young men, with 32% having had intercourse. While a similar distribution of males aged 15-19 have had intercourse compared to their female counterparts, a larger proportion of younger males aged 12-14 have ever had sex compared to females of same age group. In the last 12 months before the survey, approximately one out of five young women and men reported having had intercourse. In terms of current sexual activity, defined as having intercourse within the last 3 months, the proportion

TABLE 1. Percentage distribution of adolescents by basic socio-demographic characteristics by sex and age, Uganda, National Survey of Adolescents, 2004

Characteristic	Female			Male		
	12-14 (N=1281)	15-19 (N=1311)	Total (N=2592)	12-14 (N=1202)	15-19 (N=1301)	Total (N=2503)
Urban-rural residence						
Urban	9.0	14.5	11.8	8.1	11.1	9.6
Rural	91.0	85.5	88.2	91.9	88.9	90.4
Currently attending school						
No	6.9	49.4	28.4	4.3	32.8	19.1
Yes	93.1	50.6	71.6	95.7	67.2	80.9
Highest level of school attended						
None	2.1	6.4	4.3	1.5	2.9	2.2
Primary	93.9	67.0	80.3	94.5	68.5	81.0
Secondary or higher	4.0	26.6	15.4	4.0	28.6	16.8
Household wealth quintile						
Lowest	22.4	17.0	19.7	23.3	18.1	20.6
Second	20.9	18.1	19.5	20.8	21.6	21.3
Third	18.3	18.5	18.4	19.5	20.9	20.2
Fourth	19.9	21.5	20.7	20.4	19.5	19.9
Highest	18.4	24.9	21.7	15.9	19.9	18.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

† "Types of media" include radio, television and newspaper. Notes: Ns are weighted.

of sexually active dropped to approximately 15% among young women and 13% among young men.

Risky sexual behavior: About 10% and 7% of the 12-19-year-old men and women respectively who have heard of AIDS had engaged in risky sexual behavior in the past 12 months prior to the study. The proportions are higher among older adolescents and show significant gender differences ($p = 0.001$) with one in seven males aged 15-19 years compared with one in ten females of the same age group having engaged in high risk sexual behavior.

HIV Testing: In countries where HIV is highly prevalent, access to Voluntary HIV Counseling and Testing is of paramount importance primarily because it equips one with information and knowledge on actions that need to be taken to reduce vulnerability to the disease. The majority (68%) of adolescents— both males and females expressed desire to get tested. Significantly higher proportions (77%) of adolescents who had engaged in risky sexual behavior in the past 12 months indicated that they wanted to get tested compared to those (67%) who had not engaged in risky sexual behavior ($p = 0.001$).

TABLE 2. Percentage distribution of adolescents by sexual behavior patterns by sex and age, Uganda, National Survey of Adolescents, 2004

Characteristic	Female			Male		
	12-14 (N=1281)	15-19 (N=1311)	Total (N=2592)	12-14 (N=1202)	15-19 (N=1301)	Total (N=2503)
Current union status						
Not in union	100.0	81.2	90.5	100.0	98.4	99.2
In union	0.0	18.8	9.5	0.0	1.6	0.8
Ever had sexual intercourse						
No	92.4	51.7	71.9	85.1	51.4	67.7
Yes	7.6	48.3	28.1	14.9	48.6	32.3
Had sex in the last 12 months						
No	96.4	62.4	79.2	92.4	68.5	80.0
Yes	3.6	37.6	20.8	7.6	31.5	20.0
Had sex in the last 3 months						
No	98.0	73.3	85.5	95.0	79.1	86.8
Yes	2.0	26.7	14.5	5.0	20.9	13.2
Among those who have heard of AIDS:	(N=1256)	(N=1300)	(N=2556)	(N=1192)	(N=1293)	(N=2485)
Never had sex or have had sex but not in the last 12 months	96.3	62.5	79.1	92.3	68.5	79.9
1 partner in last 12 months, married	0.0	17.8	9.1	0.0	1.0	0.5
1 partner in last 12 months, not married or in a union, used condom	0.8	7.2	4.0	0.7	13.1	7.1
1 partner in last 12 months, not married or in a union, no condom (risky sexual behavior)	2.7	10.3	6.6	5.6	12.1	9.0
2+ partners in last 12 months, used condom	0.1	1.8	0.9	0.3	3.3	1.9
2+ partners in last 12 months, did not use condom (risky sexual behavior)	0.2	0.5	0.3	1.1	2.0	1.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Notes: Ns are weighted.

TABLE 3. Distribution of Independent Variables by sex and risky behavior status, among those who have ever heard of AIDS, Uganda, National Survey of Adolescents, 2004

Variables	Not engaged in risky behavior			Engaged in risky behavior		
	Female (N=2376)	Male (N=2220)	Total (N=4596)	Female (N=177)	Male (N=262)	Total (N=439)
Worried about getting HIV/AIDS						
Very worried	68.8	51.0	60.2	77.1	56.9	65.0
Somewhat worried	7.4	11.4	9.3	8.0	15.6	12.6
Not worried	23.6	36.3	29.7	14.9	27.1	22.2
Don't know	0.3	1.2	0.7	0.0	0.4	0.2
Perceived at risk						
Great	49.7	42.5	46.2	52.5	54.2	53.5
Moderate	12.1	12.8	12.4	15.8	13.7	14.6
Small	13.7	17.8	15.7	14.1	17.2	15.9
No chance at all	19.6	19.4	19.5	12.4	11.1	11.6
Has HIV	0.1	0.0	0.0	0.0	0.0	0.0
Don't know	4.8	7.6	6.1	5.1	3.8	4.3
Want to be tested for AIDS virus †						
Yes	64.7	70.1	67.3	76.5	77.8	77.3
No	35.0	29.5	32.3	23.5	21.8	22.4
Don't Know	0.3	0.4	0.3	0.0	0.4	0.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

† Limited to those who have never been tested and who knows that a person can be tested. Sample sizes are: Not engaged in risky behavior, female (N=1994); Not engaged in risky behavior, male (N=1877); Engaged in risky behavior, female (N=136); Engaged in risky behavior, male (N=243). Notes: Ns are weighted.

Self-Perceived Risk to HIV: Worries about contracting HIV and self-perceived risk can serve as a motivation for adolescents to change behaviors that place them at risk to HIV. In Uganda, the majority of adolescents - especially the females - across all age groups are very worried about the possibility of getting infected with HIV. On average, among the 15-19-year-olds, about 72% of the females compared to 55% of the males expressed this opinion and among the 12-14-year-olds, the corresponding percentages were 65% compared to 47% respectively (Table 3). The gender differences across all age categories were statistically significant ($p=0.001$).

Chart 1 shows the percentage distribution of adolescents' perceptions of their own risk to HIV by age and sex. Overall, at least 40% of adolescents perceived themselves to be at great risk of contracting HIV. The proportion is higher among females than males across both age groups:

among 12-14 year olds (46% versus 39%) and among 15-19 year olds (54% versus 48%). About one in five adolescents believed they were at no risk at all to HIV, however, this proportion varied across the two age groups. Among young women, 25% of those aged 12-14 reported being at no risk to HIV infection compared to 14% of their older counterparts. Similar differences in distributions across age groups existed among males. This difference in the proportion of adolescents reporting being at no risk to HIV across age is understandable considering fewer 12-14 year-olds are sexually experienced compared to 15-19 year-olds.

Multivariate Logistic Regression results

Results for the separate female and male multivariate logistic regression models on **Sexual Behavior** and **HIV Risk perception** are summarized in Tables 4 and 5.

Females: Model A shows that females who perceived themselves as having a moderate to high risk of getting infected with HIV were significantly more likely to report that they had engaged in a risky sexual behavior in the past 12 months prior to the study than those who perceived themselves to be at no risk. However, when variables on background socio-demographic characteristics (age, residence, region and religion) are added to the model, this association became non-existent. In Contrast, Model B shows

that there is a strong association between increasing age and the likelihood of females to report that they engaged in risky sexual behavior. In addition, unlike other regions, females from Eastern Uganda were also more likely to report that they had engaged in risky sexual behavior compared to those from the Central Region.

Introduction of additional (intermediate) socio-demographic factors (education, household wealth level and marital status and later psycho-

Chart 1. Self-perceived risk of HIV among adolescents by sex and age, Uganda, National Survey of Adolescents, 2004

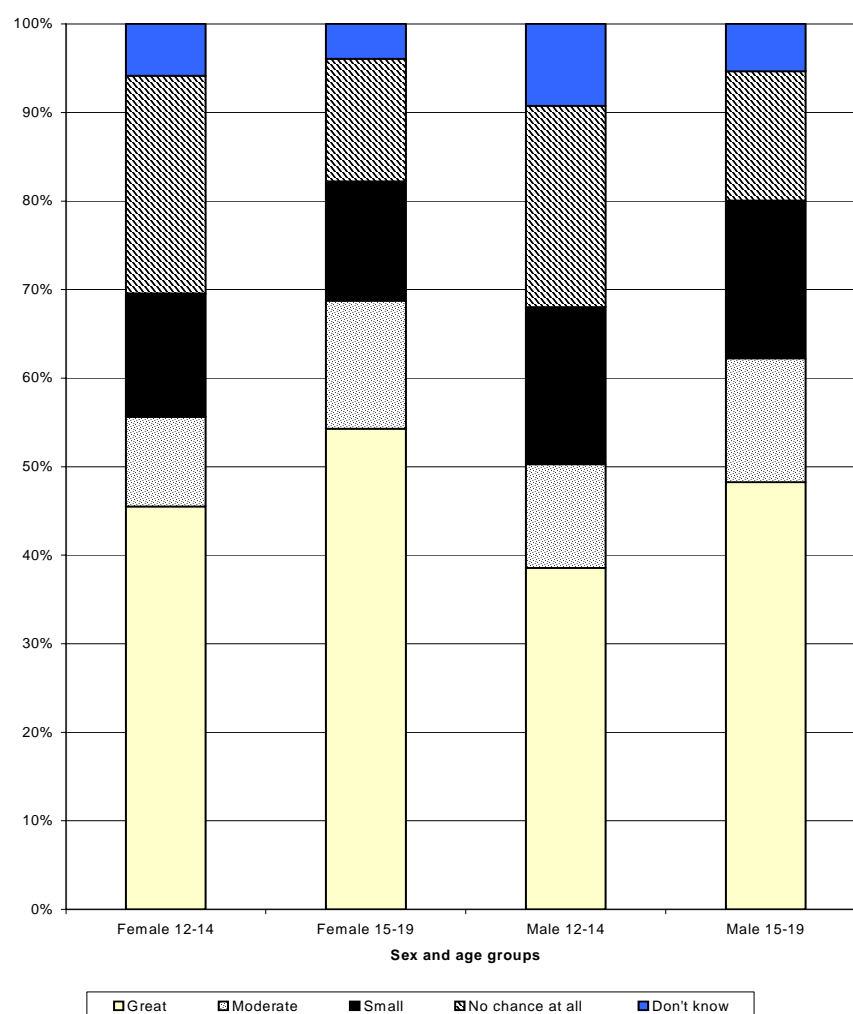


Table 4: Odds ratios for reporting of risky sexual behavior in the last 12 months among females who are aware of HIV/AIDS

Explanatory Variables	Model A	Model B	Model C	Model D
Perception of Risk				
None	1.0000	1.0000	1.0000	1.0000
Small	1.6055	1.3124	1.3265	1.3248
Moderate	2.0507*	1.5234	1.9425*	1.9143*
High	1.6875*	1.4991	1.5865	1.5457
Age				
12-14		1.0000	1.0000	1.0000
15-17		3.7451***	4.3536***	4.1722***
18-19		4.6523***	8.2425***	7.8958***
Residence				
Rural		1.0000	1.0000	1.0000
Urban		0.5568	0.5567	0.5298
Region				
Central		1.0000	1.0000	1.0000
Eastern		1.6227*	1.8298**	1.7428*
Northern		1.0311	1.0579	1.3019
Western		0.6305	0.5676*	0.5970
Religion				
Catholic		1.0000	1.0000	1.0000
Protestant		0.8596	.9413	0.9399
Charismatic/Born-again		1.2665	1.2464	1.2606
Muslim		0.7657	0.8237	0.8543
Other Christian		0.8043	0.8451	0.7995
Other Religion		3.0740	3.0318	3.2131
Highest Education Level Attained				
None			1.0000	1.0000
Primary			1.4017	1.1985
Secondary or higher			0.5573	.4498
Wealth Quintile				
Lowest			1.0000	1.0000
Second			1.1452	1.0776
Third			0.8228	.7410
Fourth			1.0696	.9887
Highest			1.2663	1.1171
Marital Status				
Never married			1.0000	1.0000
Ever married but currently not married			8.4423***	8.5383***
Currently married/cohabiting			0.0350***	0.0332***
Recent exposure to HIV messages				
None				1.0000
1				1.4896
2				2.3211*
3+				1.6861
Knowledge of someone with HIV or died of HIV				
Yes				1.0000
No				1.6748
Comprehensive knowledge of HIV transmission/ prevention				
Yes				1.0000
No				1.2281

* significant at p= 0.05, ** significant at p= 0.01, *** significant at p = 0.001

Table 5: Odds ratios for reporting of risky sexual behavior in the last 12 months among males who are aware of HIV/AIDS

Explanatory Variables	Model A	Model B	Model C	Model D
Perception of Risk				
None	1.0000	1.0000	1.0000	1.0000
Small	1.6996*	2.2147*	2.1955**	2.2364**
Moderate	1.9018*	3.3278***	3.2523***	3.1925***
High	2.2480***	4.1666***	4.0400***	3.8941***
Age				
12-14		1.0000	1.0000	1.0000
15-17		1.8317***	1.9294***	1.8995***
18-19		2.5105***	2.8106***	2.7955***
Residence				
Rural		1.0000	1.0000	1.0000
Urban		0.7322	1.0589	1.0688
Region				
Central		1.0000	1.0000	1.0000
Eastern		1.2202	1.0593	1.1132
Northern		4.6047***	3.8570***	4.1392***
Western		2.0335***	1.8540**	1.8113**
Religion				
Catholic		1.0000	1.0000	1.0000
Protestant		0.9070	0.9438	0.9300
Charismatic/Born-again		0.8314	0.8084	0.8044
Muslim		0.6293	0.6145	0.6073
Other Christian		2.0787*	2.3228*	2.3846*
Other Religion		1.6524	1.5433	1.7399
Highest Education Level Attained				
None			1.0000	1.0000
Primary			1.0152	0.8213
Secondary or higher			0.5260	0.4323
Wealth Quintile				
Lowest			1.0000	1.0000
Second			1.0195	0.9987
Third			0.9827	0.9620
Fourth			0.8112	0.7891
Highest			0.7944	0.7694
Marital Status				
Never married			1.0000	1.0000
Ever married but currently not married			5.8720***	5.5245***
Currently married/cohabiting			0.8644	0.8468
Recent exposure to HIV messages				
None				1.0000
1				2.0841**
2				1.9353*
3+				1.8366*
Knowledge of someone with HIV or died of HIV				
Yes				1.0000
No				0.9894
Comprehensive knowledge of HIV transmission/ prevention				
Yes				1.0000
No				0.9295

* significant at p= 0.05, ** significant at p= 0.01, *** significant at p = 0.001

social factors (exposure to HIV messages, knowing someone who has HIV or died of HIV and comprehensive knowledge of HIV transmission/prevention) further indicate there is no strong association between perception of risk and reporting of risky sexual behavior among Uganda's female adolescents. In fact, only females who perceived themselves as having a moderate risk of HIV infection were significantly more likely (than those who perceived no HIV risk at all) to report risky sexual behavior. Those who perceived themselves as at high risk of HIV infection were not significantly more likely than those who perceived no risk at all to report that they had engaged in risky sexual behavior. However, the models reveal that, apart from age, there also exists a strong association between risky sexual behavior and marital status whereby females who have separated or divorced were highly likely to report that they had engaged in risky sexual behaviors (compared to the never married) while those in marriage were significantly less likely to report engaging in such risky sexual behaviors. It should also be noted that the models did not reveal strong association between the psychosocial factors and engagement in risky sexual behaviors (Model D). Place of residence, religion, education, household wealth level, knowledge of someone who has HIV or died of HIV/AIDS and comprehensive knowledge of HIV transmission/prevention did not show significant association with engaging in risky sexual behavior. Nevertheless, it is worth noting that females who are more educated (secondary education or higher) and those who reside in urban areas were half as likely to report that they had engaged in risky sexual behaviors.

Males: Among males, the results of all the four models consistently show a strong association between HIV risk perception and sexual behavior with males who perceived themselves to be at high risk also were significantly more likely to report that they had engaged in risky sexual behaviors in the past 12 months prior to the

study. Unlike among the females, introduction of additional variables in the model did not weaken this relationship.

Similar to the females, Models B, C and D also show that older male adolescents and those who are divorced or separated were significantly more likely to report that they had engaged in a risky sexual behavior. These models further reveal a strong association between region and sexual behavior whereby male adolescents in the Western and Northern regions of the country were two to four times more likely to report that they had engaged in risky sexual behaviors. Contrary to what is often expected, Model D shows that male adolescents who had recently been exposed to HIV/AIDS messages were twice as more likely to report that they had engaged in risky sexual behavior than those who had had no recent exposure to such messages.

It is also worth noting that like among the females, place of residence; education level; household wealth; knowledge of someone who has HIV or died of HIV/AIDS; and comprehensive knowledge of HIV transmission/prevention showed no significant association with engagement in risky sexual behavior. Also, similar to the females, males with secondary or higher education or higher were also half as likely to report that they had engaged in risky sexual behaviors.

Discussion

The primary objective of this paper was to examine the relationship between risky sexual behavior and perception of risk to HIV infection among Uganda's adolescents aged 12-19 years. This is important because for adolescents to take appropriate measures to protect themselves against HIV/AIDS, they need to have a correct perception of their risk. Although the results show fairly low proportions of adolescents engaged in risky sexual behavior, significantly higher proportions of male adolescents are engaged in high risk sexual behavior compared

to females. Given that risky sexual behavior among males or vice-versa translates into risk for the opposite sex, it is perhaps not surprising that significantly higher proportions of females perceived themselves to be at great HIV risk compared to the males – yet higher proportions of males are involved in risky behavior. This situation is however not unique to Uganda as many studies conducted particularly in countries where HIV is prevalent have shown that higher proportions of women than men perceive themselves as being at a high HIV risk (Sheppard et al²², Wood et al²³, Stein and Nyamathi²⁴).

Results from the multiple logistic Regression Models also seem to confirm this. The Models show that while HIV risk perceptions among males is strongly associated to sexual behavior, the linkage was not strong among the females. It is apparent that most female adolescents, regardless of their sexual behavior, feel at great risk of HIV infection. Although both sexes gave this perception, it was much more pronounced among the females – particularly those 15-19 years. These gender differences in perceived HIV risk are perhaps due to women's lack of or limited sexual power and economic vulnerability.^{14, 26, 27} The Models further reveal that age, marital status and region (particularly among males) are strongly associated with engaging in risky sexual behavior. A higher proportion of older adolescents' engaging in risky sexual behavior is not surprising given that the 12-14-year-olds are mostly not sexually active. With regard to marital status, adolescents who are divorced or separated are apparently more likely to engage in risky sexual behavior than other adolescents. Although, not much appears to have been written about this aspect, available data from previous studies show, for example, limited use of condoms by persons who have divorced/separated compared to those who have never been married,^{4,25} hence confirming the above finding. There are perhaps a number of factors that may help explain this. First, having been in a marital union, this group of adolescents

is used to having regular and unprotected sex. Adjusting to life without regular sex or using a condom whenever they have sex most likely poses a big challenge to them. Secondly, it is not uncommon for couples who have separated to have sex together whenever an opportunity presents itself. Thirdly, female adolescents who have divorced/separated are usually very vulnerable to risky sexual behaviors mainly for economic reasons^{21,26} because they often have to financially fend for themselves (and perhaps for their children as well) having been deprived of their former livelihoods. With limited or no formal education, no job skills and lack of access to capital resources, particularly land, coupled with stigmatization, especially from family members, such female adolescents make easy prey for men. Regarding the differences in risky sexual behavior across the different regions of Uganda compared to the Central, there are perhaps a number of factors responsible, among which are inequitable access to SRH information and services, poverty and negative cultural attitudes/practices. The central region generally has better SRH services than other regions of Uganda and the population is relatively richer. Although the variable on wealth quintile was not statistically significant (perhaps because – in a country like Uganda where sexual relationships among unmarried adolescents are kept extremely secretive - being a member of a rich household does not necessarily guarantee access to financial resources that an adolescent often needs to access SRH services), poverty is widely known to increase vulnerability to risky behavior. Regarding culture, Asiimwe et al (2003)²¹ showed that there are many traditional practices spread across Uganda that increase risky sexual behavior among adolescents. In Eastern Uganda – for example, there are ethnic groups which circumcise and during such occasions, casual sex among adolescents is common and is traditionally encouraged. In many parts of Northern Uganda, male adolescents 15 years and above are generally considered to be adults and

live in their own huts hence receive less parental monitoring which increases their vulnerability. Furthermore, this part of the country has a variety of traditional functions which tend to promote casual sex among adolescents. In Western Uganda, some sections of the population have been reluctant to adopt condom use allegedly because it is incompatible with their sexual styles.

Conclusions

There is a strong association between risky sexual behavior and perception of risk to HIV among Uganda's male adolescents but not among the females. Although most adolescents perceive themselves to be at great risk of getting infected with HIV, this perception is much stronger among females regardless of their current sexual behavior. In other words, the majority of Uganda's adolescents—particularly females, believe contracting HIV/AIDS is more or less an inescapable reality. The fact that higher proportions of male adolescents reported engaging in risky behavior while females perceived themselves more at risk and also have higher HIV prevalence points to the need for a more holistic approach in dealing with adolescents' sexual and reproductive health (SRH) needs. For example, many HIV and other SRH programs in Uganda tend to focus on the girl child because she is considered more vulnerable and pay little attention to one of the key sources of that vulnerability—their male counterparts. There is also sufficient evidence to show that at household level, female adolescents are much more monitored and counseled on SRH issues by their parents compared to the males.² All these gender disparities in targeting of information and services need to be re-examined from household to program level and appropriate interventions be instituted.

The logistic Regression Models revealed that both male and female adolescents with broken marriages are much more likely to engage in risky sexual behaviors than other adolescents. This increased vulnerability needs to be recognized at

family, community and program levels so that such adolescents are provided with appropriate support—in terms of information and services. Some cultural practices and rituals exhibited in parts of the country also continue to put adolescents at risk through promoting risky sexual behaviors. There is need to design specific interventions and intensify efforts targeting such negative cultural practices in order to make them safer. For example, cultural functions that have traditionally provided the environment for adolescents to engage in risky sexual behaviors can instead be turned into platforms to provide HIV/AIDS prevention information.

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