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Youth, sexual risk taking behavior, and mental health: a study of university students in Uganda

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Abstract:

Background: Little focus has been paid to the role of mental health among young people with regard to risky sexual behavior and HIV prevention in sub-Saharan Africa. **The aim** of this study was to investigate the relationship between poor mental health and risky sexual behavior (HIV/AIDS) among a population of university students in Uganda.

Methods: In 2005, 980 Ugandan university students completed a self-administered questionnaire (response rate 80%) assessing socio-demographic and religious background factors, mental health, alcohol use and sexual behavior. Mental health was assessed using items from the Hopkins Symptoms Checklist-25 (HSCL-25) and the Symptom Checklist-90 (SCL-90).

Results: High scores on depression and high numbers of sexual partners among both males (OR 2.0, 95% CI: 1.2–3.3) and females (OR 3.3, 95% CI: 1.3–8.6) were significantly associated. Elevated anxiety scores among men were associated with high numbers of sexual partners (OR 1.9, 95% CI: 1.1–3.3) and inconsistent condom use (OR 1.9, 95% CI: 1.1–3.6). Psychoticism was also significantly associated with high numbers of sexual partners among men. The associations remained statistically significant after controlling for socio-demographic factors and level of alcohol consumption.

Conclusion: These findings indicate that previous conclusions on the association between sexual behavior and mental health from high- and middle-income countries also are valid in a low-income setting, such as in Uganda. This knowledge has implications for policy formation and HIV/AIDS preventive strategies. Coordinated youth-friendly

mental health and sexual and reproductive health services to meet the needs of young people would be desirable.

Introduction

Little attention has been given to the role of mental health with regard to risky sexual behavior and HIV prevention in sub-Saharan Africa. However, previous research conducted in high- and middle-income countries has indicated that mental health may play an important role in association with risky sexual behavior and HIV/AIDS (1-3).

In most countries mental disorders contribute greatly to the disease burden in young people (4). In 2004, a cross-sectional study was carried out in 14 districts of Uganda that included 4660 respondents 15 years of age and older. The findings showed that 29.3% of all respondents suffered from "probable major depressive disorder" (5). Another study from the Masaka and Rakai districts of Uganda reported that 24.4% of 587 respondents were diagnosed with depression on the basis of three of the five DSM-IV criteria (6)

Mental health is included in the Uganda Health Sector Strategic Plan II, 2005 (7). It is suggested that "child and adolescent mental health" should be a focus of the new national mental health policy in Uganda (8). However, mental health services in Uganda are still very limited, especially outside the capital of Kampala, where these do not exist for young people.

The onset of mental health problems and risky sexual behavior both reach a peak in young adulthood. Poor mental health has strong associations with other health concerns in this age group, substance abuse, and violence (4). Young adulthood is a challenging

time with regard to psychosocial development. The struggle to find and test one's own identity, to "fit in", and to build self-esteem often takes place through experimentation in different areas of behavior, including sexual relations (9).

Results from a longitudinal national survey in the US reported an association between depressive symptoms and failure to use condoms on latest occasion of sexual intercourse among high school boys (10). The same study also showed an association among girls between depressive symptoms and having contracted a sexually transmitted disease (STD). Another study of high school students in the US showed a similar association between depression and failure to use condoms on latest occasion of sexual intercourse, but also indicated an association between depression and having had three or more partners in the last 12 months (11). In contrast, the results from a community-based cross-sectional study in South Africa on poor mental health and sexual behavior found a strong association between depression and consistent condom use (12). However, there is limited evidence and little research available on mental health and its relation to sexual behavior ~~from~~in low-income countries. Studies are particularly lacking among youth from such settings (12-14).

Contextual and individual factors that influence sexual behavior among young people may differ if one compares low- with high-income countries. To the best of our knowledge, there has been no previous research on the potential association between poor mental health and risky sexual behavior (HIV/AIDS) among youth in a low-income

country in sub-Saharan Africa. It is, therefore, of interest to investigate this in a country with a high HIV prevalence such as Uganda.

The aim of this study was to investigate the relationship between poor mental health and risky sexual behavior (HIV/AIDS) among a population of university students in Uganda.

Methods

Population and setting

The study was performed at Mbarara University of Science and Technology (MUST), a public university in the city of Mbarara in southwestern Uganda. Our target population consisted of undergraduate students from the university's three faculties: medicine, science, and development studies. The sample comprised 1220 students, the entire undergraduate class of MUST in 2005.

Data collection

Data was collected by means of an 11-page self-administered questionnaire. It consisted of 132 questions and was distributed in lecture halls to all undergraduate students at MUST. The questionnaire was administered to the respondents by the first author (AA). Students were orally informed beforehand about the purpose of the questionnaire and given instructions for filling it out. A consent form signed by each student also explained the project. Contact details for the principal investigator and a research assistant were provided, in case questions or personal concerns arose while answering the questions. A total of 980 students, representing 80% of the undergraduate students at the university, completed the questionnaires.

The questions posed assessed lifestyle factors, including alcohol consumption, drug use, and smoking habits; relationships, love, and sexuality; social relations, participation, and social capital; self-rated health and mental health; and social and demographic factors,

such as area of origin, socio-economic status (SES), religious affiliation, and the role of religion in one's family.

The research project was approved by the Institutional Ethical Review Committee at MUST.

Definition of variables

Background variables

Area of origin was based on the response to the question "Where did you grow up? (most of the time=most of your life years). Responses were then categorized as "rural", "urban", or "peri-urban or small town" and dichotomized into "rural" and "urban/peri-urban or small town".

Educational level of head of household during childhood was dichotomized so that "did not finish primary school" and "completed primary school" were coded as "low" and any education above that was classified as "high".

Age was divided into two groups: "younger" = ≤ 23 years old and "older" = > 23 years.

Sex was classified as male or female.

Mental health was assessed by means of the Hopkins Symptom Check List (HSCL-25). This self-reporting instrument consists of 15 items assessing symptoms of depression, and 10 items assessing symptoms of anxiety during the week prior to its administration (15). In addition, 10 items from the Symptom Checklist-90 (SCL-90) were included for the assessment of symptoms of psychoticism during the previous week (16). Each item on the HSCL-25 is graded on a four-point scale ranging from (1) "not at all" to (4) "extremely". The SCL-90 is also a self-reporting instrument whose five-point scale was developed to assessment psychiatric symptoms. To attain a homogeneous classification, we rated the 10 psychoticism items in the same way as anxiety and depression, i.e., on a scale of 1 to 4. The HSCL has been widely used in a variety of clinical and non-clinical settings, and its high degree of reliability and validity is well documented (15, 16). Moreoverr, both HSCL-25 and SCL-90 have been employed and validated in different cultural contexts in Africa, including Uganda (16-19).

The HSCL has been widely used in a variety of clinical and non-clinical settings, and its reliability and validity is regarded as high. More over, both HSCL-25 and SCL-90 had been employed and validated in different cultural contexts in Africa (16-19).

Mean total mental health scores, as well as mean scores for depression, anxiety, and psychoticism, were calculated on the basis of a student's total score for each of the measures, and then divided by the number of items for which responses were received. We then dichotomized the scores into "high" and "low", based on a calculation of a median-split between the total scores for each measure. We also calculated the

prevalence of probable depression using a total score cut- off point of 31, as indicated by Bolton and Kinyanda (5, 20).

Lifestyle factors

Alcohol use: Frequent heavy episodic drinking (HEP) was measured by the question "How often do you drink six 'glasses' or more on the same occasion?" Responses were categorized based on the responses "daily, or almost daily", "every week", "every month"— all of which were coded as "yes"—and "less than once a month" and "never", which were coded as "no".

Dependent variables

Sexual behavior variables

Previously had sex was coded as "yes" or "no" based on the response to the question: "Have you ever had sexual intercourse?" *Number of sexual partners* was ascertained by the response to "How many sexual partners have you had during the last twelve months?" and was dichotomized so that ≥ 2 was coded as "high" and 1 as "low". *Condom use on latest occasion of sexual intercourse* was determined by asking "Did you use any method of avoiding sexually transmitted diseases on your latest occasion of sexual intercourse?" The response alternatives were "yes, condom", "no", or "yes, other". They were dichotomized by classifying the first alternative as "consistent condom use" and the latter alternatives as "inconsistent condom use".

Data analysis

Sample size was given, since we assessed all the students at the University, but a formal check revealed that in most analyses a 75% increase of risk could be ascertained at 80% probability. This could not exclude the risk of not being able to detect some true effects of moderate size.

The statistical analyses were done with SPSS Version 16.0. Chi-square tests were used to analyze between-group differences (males versus females) in category variables, and independent t-tests were used for between-group differences (males versus females) in continuous measures. Logistic regressions were performed to calculate the crude odds ratios (OR) with 95% confidence intervals (CI) for the effect of background and mental health on “previously had sex”, “number of sexual partners in last 12 months”, and “condom use on latest occasion of sexual intercourse”.

Multivariate logistic regression (OR with 95% CI) was used to investigate the association between mental health and sexual behavior, adjusted stepwise for age, rural origin, and frequent heavy episodic drinking. All analyses were performed separately for males and females. Significance level was accepted at $p < 0.05$, two-tailed.

Results

Table 1 shows the distribution of socio-demographic and background variables, as well as heavy episodic drinking and the sexual behavioral outcome variables, i.e., having previously had sex, number of sexual partners during the last twelve months, and condom use on latest occasion of sexual intercourse. About one-third of the students were females and were younger than the males. Thirty-one percent of the female students came from rural areas; this percentage was higher for male students (50.6%). A large majority of the female students (84.8%) grew up in families where the head of household had completed secondary school, college, or had attended a university, i.e., their formal educational level was categorized as “high”.

A larger proportion of males (62.9%) than females (51.3%) reported having previously had sex. More men (40.5%) than women (25.0%) reported having had two or more sexual partners in the preceding twelve months. A higher proportion of females than males reported that a condom was not used on their latest occasion of having sexual intercourse (23.4% and 14.8%, respectively).

Table 2 shows the mean scores (with standard deviation) of female and male students for the mental health items in the questionnaire, as well as total mental health score, and scores for depression, anxiety, and psychoticism. There were no significant gender differences for any of the measures assessed. The prevalence of probable depression was 15% among males and 16% among females (data not shown).

Table 3 shows the results for the univariate analyses (crude OR, 95% CI) for the associations between socio-demographic factors, mental health measures, frequent heavy episodic drinking, and sexual behavior.

Previous sexual experience

Being older had a significant association with having previously had sex among both females (OR 2.2, 95% CI: 1.3–3.8) and males (OR 1.9, 95% CI: 1.3–2.7). The educational level of head of household did not seem to influence the outcome of having previously had sex for men or women. Frequent heavy episodic drinking was associated with having had previously had sex among both females and males. Elevated total mental health scores (i.e., poor mental health) were associated with having previously had sex among males (OR 1.5, 95% CI: 1.04–2.1), but not among females.

High number of sexual partners in the last twelve months

None of the socio-demographic factors, i.e. age, area of origin, and educational level of head of household, were associated with a high number of sexual partners. However, frequent heavy episodic drinking was significantly related to a great number of sexual partners among both females and males. Elevated mental health scores were significantly associated with a great number of sexual partners among males (OR 2.4, 95% CI: 1.5–3.9), but not among females 2.2 (0.96-4.9). However, high scores on the depression subscale was significantly associated with having had a great number of sexual partners among both males (OR 2.4, 95% CI: 1.5–3.8) and females (OR 3.0, 95% CI: 1.3–7.1). Furthermore, there were also significant associations between high scores on anxiety and

psychoticism among males and having had a great number of sexual partners (OR 1.9, 95% CI: 1.2–3.0 and OR 2.1, 95% CI: 1.3–3.4, respectively). Psychoticism and anxiety scores were not associated with a great number of sexual partners among females. Frequent heavy episodic drinking was associated with high number of sexual partners among both females and males (OR 3.5, 95% CI: 1.3–9.5 and OR 2.4, 95% CI: 1.4–4.1).

Inconsistent condom use

Inconsistent condom use was significantly associated with anxiety alone, and solely among males (OR 3.0, 95% CI: 1.1–3.6).

Based on these findings, we included mental health, depression, anxiety, and psychoticism as variables determinative of sexual behaviors in a multi-variate logistic analysis in which we adjusted for the potential confounding factors of age, rural origin, and frequent heavy episodic drinking (Table 4).

Table 4 presents the adjusted OR with 95% CI for associations between mental health, depression, anxiety, and psychoticism, and the dependant sexual behavior variables (adjusted for the confounding factors of age, rural origin and frequent heavy episodic drinking). In the fully-adjusted model, a statistically significant association persisted among males between all mental health factors and a high number of sexual partners. The significant association between high number of sexual partners and depression among females and condom use and anxiety among males persisted. No relationships were found between inconsistent condom use and mental health factors among females.

Discussion

The results of our study show a statistically significant relationship between poor mental health and risky sexual behavior among university students in southwestern Uganda. High scores on mental health were significantly associated with the variable previously had sexual intercourse among males, but not females. Elevated total scores on mental health, depression, anxiety, and psychoticism were significantly associated with a high number of sexual partners in the last 12 months among males. The risk for females with elevated scores on depression was three times greater for having high numbers of sexual partners.

A high score on anxiety was associated with inconsistent condom use on latest occasion of sexual intercourse in males, but not in females.

It should be noted, however, that 37% of the male and 49% of the female students in our survey had not previously had sex. Of those male and female students with prior sexual experience, 40,5% of the males and 25% of the females had had two or more sexual partners in last 12 months, and 14.8% of the males and 23.4% of the females did not use a condom on latest occasion. These results indicate a generally low level of risky sexual behavior among the majority of students. This might be accounted for by the fact that the study sample consisted of university students only. Perhaps different results would have been obtained if non-university students of the same age had been included.

Several studies from high-income countries show a strong correlation between poor

mental health and risky sexual behavior (1, 2, 4, 21). As far as we can determine, there has been no previous research regarding the potential association between poor mental health and risky sexual behavior (HIV/AIDS) among young people in a low-income country in sub-Saharan Africa. Very few studies in sub-Saharan Africa and particularly in Uganda have examined mental disorders among young people and their possible correlates.

In our study, 15% of the males and 16% of the females scored high on probable depression. This result was lower than that found by a recent cross-sectional study carried out in 14 districts in Uganda, which reported that 29.3% of all respondents fulfilled the criteria for depression (5). However, the aforementioned study differed from ours, since its target group was the general population ages 15 and up. Moreover, that study was partly carried out in north-eastern Uganda where there has been a prolonged internal conflict, and one would expect higher rates of depression due to violence, rape, etc. In another study from the Masaka and Rakai districts in Uganda, the prevalence of depression was measured at 24.4%, based on three of the five DSM-IV criteria (6). The difference in sampling university students versus the general population might partly explain the difference between our findings and previous research.

In the present study, elevated depression scores were associated with having had a high number of sexual partners among both males and females. This result corresponds with the findings from a birth cohort conducted in New Zealand among 21-year-old females and males, where depression and other mental health factors were associated with a

greater likelihood of taking part in risky sexual intercourse, i.e., high number of sexual partners (2). This was also demonstrated in another study targeting high school students in the US, where depression was associated with having had three or more partners and inconsistent condom use among males (11). The variable previously had sex is linked to abstinence, one of the components in the ABC strategy that has been at the center of campaigning by religious groups to curb the spread of HIV/AIDS in Uganda by denouncing premarital sex. Therefore, we regarded it of interest to assess the impact of a factor like mental health status and its bearing on abstinence in a Ugandan university setting. Our findings showed that poor mental health was ~~negatively~~ related to ~~never~~ever having had ~~had sex.~~sexual intercourse. This association was statistically significant before adjusting for potential confounders, which marginally weakened the association so that it no longer was significant. However, it is very likely that adjusting for e.g. alcohol consumption represent over-adjustment, since this factor plausibly also could be regarded as a coping factor for ill mental health and thus be a part of a common causal chain. An underlying assumption is that a considerable number of students make their sexual debut during their time at the university, which is supported by our data showing that about half of the female students and one-third of the male ones had not ~~had~~ debuted sexually.

An increased probability of risky sexual behavior in relation to poor mental health including depression among young people might be explained by different individual and contextual factors. This has been pointed out by Bennett and Bauman, who suggest that "risky sex on one hand may be an expression of anger", and might also be used to "exert some control over one's life", and on the other hand it may also function to relieve

tension, or function as affection seeking, and does represents self-administered treatment for depression (22). This is corroborated by the results of our study both among males and females. In addition, men with high anxiety and psychoticism scores also had a significantly greater number of sexual partners during the last 12 months. This may correspond with the view cited above that sexual activities might be related to anger, a stronger element among men with depression. The finding that high levels of anxiety in males are linked to greater number of sexual partners could reflect an overlap of this symptom with depression or, alternatively, sexual activity could serve as a means of relieving tension among those with isolated anxiety syndrome (23, 24). The higher risk of not using condoms on latest occasions of sexual intercourse among those with high anxiety scores might represent a lower level of negotiation or communication skills in the sexual encounter situation.

A number of theoretical models, such as Health Behavior Model, including Social Cognitive Theory, the Theory of Planned Behavior (25, 26) provide possible mechanisms whereby mental distress and low self-esteem may affect sexual risk behavior/HIV risk. For example, the self-efficacy model of health behavior might predict that people who are depressed have less capacity to take control over their lives, including areas pertaining to sexual behavior. However, it is important to keep in mind that this is a cross-sectional study and the direction of causality is thus uncertain.

A somewhat surprising finding was the strong effect of frequent heavy episodic drinking when controlling for mental health concerning previously had sex and great number of

sexual partners. It was particularly notable that the effect of this type of alcohol consumption was even more strongly related to previously having had sex in the multivariate model. Whether this represents a confounding or a mediating mechanism is impossible to conclude from our analyses.

The findings of higher scores of depression among female students are well in line with the gender gap in depression between males and females shown in most epidemiological studies of mental health (27, 28).

In summary, mental health factors seem to play an important role in relation to risky sexual behavior among a student population in Uganda. Since a substantial proportion of that population appears to be afflicted by such health problems, this should not be neglected in the broader perspective of promoting sexual health. The findings of our study, therefore, indicate that improving mental health for young people might lead to less risky sexual behavior.

Although young people are especially mentioned in the draft mental health policy of Uganda (8), there is a surprising lack of initiative with regard to investing in mental health services for young people. There is a need of coordinated youth-friendly mental health and sexual and reproductive health services. Increased awareness of the association between poor mental health and risky sexual behavior among health workers is also of great importance. More research is required to determine the relationship

between mental health and risky sexual behavior among young people.

Study limitations

Our study design was cross-sectional, thus leaving the ~~causal~~ direction of causality open~~, although~~. Thus, it ~~appears more plausible that~~cannot be ascertained whether mental health ~~would affect~~affected sexual behavior ~~than~~or vice versa.

According to our calculations of statistical power, the sample size was adequate for the main analyses, although somewhat small for assessing effect modification without risking a type two error, that is, erroneously accepting the null hypothesis when it should be rejected.

More than 80% of all students at MUST completed the questionnaire. Most of the remaining 20% could not be contacted by the research team because they were not on campus. The "true" rate of non-responders was, therefore, less than 20% (in all probability below 5%). Although we did not have access to information on how many students were off-campus, we know that 66% of the student body were males and 34% were females. The distribution of males and females among the remaining 20% (n = 240 students) was 72% (n = 172) for males, and 28% (n = 68) for females. Under these circumstances, it seems unlikely that systematic factors should have caused selection bias of any importance for the results. Internal missing data was on the order of 5% to 10% regarding questions concerning sexual behavior. This might lead one to infer a moderate

selection bias in an unknown direction, although the likelihood that this would have dramatically biased the results is regarded as minimal.

We believe that selection bias was a minor problem in our study because of the relatively high response rate (80%). Regarding the issue of misclassification, it might be argued that there was a risk for dependent misclassification, since individuals who scored low on mental health might have systematically assessed their behavior differently than those scoring high in this regard. If so, it would be very difficult to predict the direction such a dependent misclassification may have been introduced (i.e., it could have led to an under- or over-estimation of risky sexual behavior.) However, since our findings generally agree with those of previous research, we do not think misclassification played a role in our results, although we cannot exclude confounding from sources unrepresented in this study.

The questions regarding alcohol use were necessarily limited since alcohol use was not the main focus of the study. Although a number of items concerning consumption of alcoholic beverages were included in the questionnaire, the question that was deemed to be most informative in this setting was the item concerning heavy episodic drinking.

Conclusion

High scores in assessing poor mental health are associated with risky sexual behavior among students in Uganda. These findings indicate that previous conclusions on the association between risky sexual behavior and poor mental health from high- and middle-income countries also are valid in a low-income setting, such as in Uganda. This knowledge has implications for policies and HIV/AIDS preventive strategies. Coordinated youth-friendly mental health and sexual and reproductive health services to meet the needs of young people would be desirable.

Competing interests: The authors declare that they have no competing interests.

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Table 1. Prevalence of socio-demographic factors, frequent heavy episodic drinking, and sexual behavior (ABC) among university students in Uganda

	All		Female		Male		x^2
	n	%	n	%	n	%	*p*
Sex							
Male	633	64.6					
Female	347	35.4					
Age							
Younger ≤ 23	628	65.6	250	75.1	378	60.6	0.000
Older > 23	329	34.4	83	24.9	246	39.4	
Missing	(23)		(14)		(9)		
Area of origin							
Rural	424	43.7	106	31.0	318	50.6	0.000
Urban/ peri–urban	546	56.3	236	69.0	310	49.4	
Missing	(10)		(5)		(5)		
Educational level of head of household							
≤ Primary	235	25.5	49	15.2	186	31.0	0.000
>Primary school	688	74.5	274	84.8	414	69.0	
Missing	(57)		(24)		(33)		
Frequent Heavy Episodic Drinking[1]							
Yes	144	16.6	32	32.7	112	41.3	0.001
No	225	83.4	66	67.3	159	58.7	
Missing	(34)		(10)		(24)		
Previously had							
Yes	532	59.0	156	51.3	376	62.9	0.001
No	370	41.0	148	48.7	222	37.1	
Missing	(78)		(43)		(35)		
Number of sexual partners in last 12 months[2]							
1 = low	284	64.4	105	75.0	179	59.5	0.009
≥ 2 = high	157	35.6	35	25.0	122	40.5	
Missing	(71)		(16)		(66)		
Condom use on latest occasion[2]							
Consistent	424	82.7	118	76.6	306	85.2	0.002
Inconsistent	89	17.3	36	23.4	53	14.8	
Missing	(19)		(2)			(17)	

[1]Only analyzed among individuals who drank alcohol

[2]Only analyzed among individuals who had had sexual intercourse

Table 2. Mean score (with standard deviation) of mental health assessment measures among university students in Uganda

Mental health factors	All			Male			Female		
	N	Mean	SD	n	Mean	SD	n	Mean	SD
Total Mental health score	941	1.68	0.57	606	1.66	0.63	335	1.73	0.53
Missing	(39)								
Depression	936	1.73	0.58	603	1.69	0.53	333	1.80	0.65
Missing	(44)								
Anxiety	914	1.58	0.58	589	1.57	0.56	325	1.61	0.62
Missing	(66)								
Psychoticism	922	1.67	0.58	593	1.66	0.57	329	1.68	0.64
Missing	(58)								

Table 3. Association (OR, 95% CI) between socio-demographic factors, frequent heavy episodic drinking, mental health factors and *sexual behavior* among university students in Uganda

	Previously had sex		High number of sexual partners		Inconsistent condom use	
	Female	Male	Female	Male	Female	Male
Age						
Younger	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Older	2.2 (1.3–3.8)	1.9 (1.3–2.7)	1.2 (0.5–2.9)	1.0 (0.6–1.5)	1.1 (0.7–1.7)	1.0 (0.5–2.0)
Area of origin						
Urban/peri-urban	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Rural	1.1 (0.7–1.9)	1.5 (1.1–2.1)	1.0 (0.5–2.4)	1.1 (0.7–1.7)	1.1 (0.7–1.7)	1.1 (0.6–2.3)
Educational level of head of household						
High	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Low	0.9 (0.5–1.7)	1.1 (0.8–1.6)	1.3 (0.4–5.1)	1.1 (0.7–1.8)	0.6 (0.2–1.5)	0.9 (0.6–1.5)
Frequent heavy episodic drinking						
No	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
Yes	4.2 (1.5–11.6)	3.2 (1.9–5.3)	3.5 (1.3–9.5)	2.4 (1.4–4.1)	1.0 (0.4-2.8)	0.7 (0.3–1.3)
Mental health						
Low	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
High	1.4 (0.9–2.2)	1.5 (1.04–2.1)	2.2 (0.96–4.9)	2.4 (1.5–3.9)	1.3 (0.6–2.7)	1.1 (0.6–1.9)
Depression						
Low	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
High	1.4 (0.9–2.2)	1.3 (0.94–1.9)	3.0 (1.3-7.1)	2.4 (1.5–3.8)	1.2 (0.6–2.4)	1.4 (0.8–2.5)
Anxiety						
Low	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
High	1.2 (0.7–1.9)	1.1 (0.8–1.6)	1.1 (0.5–2.4)	1.9 (1.2–3.0)	2.0 (0.9–4.1)	3.0 (1.1–3.6)
Psychoticism						
Low	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
High	1.4 (0.9–2.2)	1.3 (0.9–1.8)	1.6 (0.7–3.5)	2.1 (1.3–3.4)	1.4 (0.7–2.8)	0.9 (0.5–1.6)

Table 4. Association (OR 95 % CI) between mental health and sexual behavior in a sample of Uganda university students. (All covariates are adjusted for each other.)

Sexual behavior factor	Previously had sex		High number of sexual partners		Inconsistent condom use	
	Female	Male	Female	Male	Female	Male
Poor mental health	1.6 (0.9–2.6)	1.4 (0.98–2.1)	2.4 (0.96–5.8)	2.3 (1.3–3.8)	1.3 (0.6−2.8)	1.2 (0.7−2.2)
Old	2.2 (1.2–4.0)	1.9 (1.3–2.8)	1.0 (0.4–2.6)	1.2 (0.7–2.0)	2.3 (1.01−5.0)	1.4 (0.7−2.5)
Rural	1.1 (0.6–2.0)	1.5 (1.1–2.2)	0.6 (0.2–1.8)	1.0 (0.6–1.7)	0.9 (0.4−2.2)	0.9 (0.5−1.7)
Frequent heavy episodic drinking	3.5 (1.2–10.0)	2.9 (1.7–4.9)	4.7 (1.5–15.2)	2.2 (1.2–3.8)	1.1 (0.4−3.1)	0.6 (0.3−1.2)
Depression	1.4 (0.9-2.4)	1.3 (0.9-1.9)	3.3 (1.3-8.6)	2.0 (1.2-3.3)	1.1 (0.5−2.5)	1.6 (0.9−3.0)
Old	2.2 (1.2-3.9)	1.9 (1.3-2.8)	1.0 (0.4-2.7)	1.1 (0.6-1.8)	2.3(1.03−5.1)	1.4 (0.7−2.5)
Rural	1.1 (0.6-1.9)	1.5 (1.1-2.2)	0.6 (0.2-1.8)	1.1 (0.6-1.8)	0.9 (0.4−2.2)	0.9 (0.5−1.7)
Frequent heavy episodic drinking	3.4 (1.2-9.7)	2.9 (1.7-5.0)	3.4 (1.1-10.9)	2.1 (1.2-3.7)	1.2 (0.4−3.4)	0.5 (0.3−1.1)
Anxiety	1.2 (0.7–2.0)	1.1 (0.8–1.6)	1.1 (0.4–2.7)	1.9 (1.1–3.3)	2.1 (0.9−4.7)	1.9 (1.1−3.6)
Old	2.2 (1.2–4.0)	1.8 (1.2–2.7)	0.7 (0.2–1.9)	1.2 (0.7–2.1)	2.7 (1.2−6.2)	1.4 (0.8−2.6)
Rural	1.0 (0.6–1.9)	1.6 (1.1–2.3)	0.4 (0.1–1.3)	1.0 (0.6–1.7)	1.0 (0.4−2.4)	0.9 (0.5−1.6)
Frequent heavy episodic drinking	3.6 (1.3–10.3)	3.0 (1.7–5.1)	5.5 (1.7–18.3)	2.2 (1.2–3.9)	1.1 (0.4−3.2)	0.6 (0.3−1.2)
Psychoticism	1.4 (0.8–2.4)	1.2 (0.9–1.8)	1.3 (0.5–3.2)	1.8 (1.1–3.0)	1.4 (0.6−3.2)	1.0 (0.5−1.8)
Old	2.3 (1.2–4.1)	1.8 (1.2–2.7)	0.8 (0.3–2.3)	1.1 (0.7–1.9)	2.6 (1.1−5.9)	1.3 (0.7−2.5)
Rural	1.1 (0.6–1.9)	1.6 (1.1–2.3)	0.4 (0.1–1.3)	1.1 (0.6–1.8)	0.9 (0.4−2.3)	0.9 (0.5−1.7)
Frequent heavy episodic drinking	3.5 (1.2–9.8)	2.9 (1.7–5.0)	5.2 (1.6–17.0)	2.2 (1.2–3.9)	1.1 (0.4−3.1)	0.6 (0.3−1.2)