

Knowledge and Practices Related to HIV/AIDS Infection among Youths in Mining Areas of Central Tanzania: A Case of Londoni and Winza Mining Areas

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Abstract: Sexually Transmitted Infections (STIs) including HIV/AIDS are among the major Sexual and Reproductive Health problems facing Sub-Saharan Africa countries. Most of the new HIV/AIDS infections are concentrated among youths. Mining areas are among the risky area with regard to the infection. This study was carried out in 2 mining areas of Central Tanzania viz. Londoni in Manyoni District and Winza in Mpwapwa District to assess knowledge and practices related to HIV/AIDS among youths with the aim of providing information that could help in curbing the problem among youths in a study population. Specific objectives of the study were to determine proportion of youths with comprehensive knowledge on HIV/AIDS; determining prevalence of high risk sexual behaviors among youths, as well as identification of correlates of high risk sexual behaviors among youths in a study population. This was a cross-sectional study that involved a random sample 202 youths aged between 15-24 years with equal number of respondents from each mining area. Data were analyzed for descriptive statistics using Statistical Package for Social Sciences (SPSS) version 16. The software was also used for running Binary Multiple Logistic Regression Analysis for identification of factors associated with high risk sexual behaviors among youths in a study population. Results of this study indicated that although majority of youths were aware of HIV/AIDS, however, a considerable proportion of them (41%) lacked a comprehensive knowledge on the infection. Results of the present study also indicate risky sexual behaviors among youths in a study population existed at substantial rate. On overall, based on sexual experience (If ever had sex), number of sexual partner and condom use in last 12 months before survey, as well as marital/ union status, nearly one-third of total respondents (32%), a considerable proportion, were engaged in high risk sexual behaviours and hence vulnerable to HIV infection. Chances (Odds) for engaging in high risk sexual behaviors by youths increased significantly with lack of comprehensive knowledge on HIV/AIDS (OR = 1.95; 95% CI, 1.24-3.07) and being male (OR = 3.79, 95% CI, 3.42-4.06) decreased significantly with having secondary education and above (OR = 0.74, 95% CI, 0.67-0.82); increased significantly with being from distant areas/villages (OR = 1.43, 95% CI, 1.18-1.75) and being from Mpwapwa mining area (OR = 1.86, 95% CI, 1.39-2.48). The Likelihood also increased significantly with main activity in mining area being mining (OR = 3.21; 95% CI, 1.93-5.37), bar/hotel maid (OR = 4.18; 95% CI, 3.07-5.70) and just roaming (no occupation) (OR = 2.30; 95% CI, 1.43-3.67); increased significantly with having close friends that are sexually active (OR = 1.71, 95% CI, 1.31-2.25), if use alcohol (OR = 2.80; 95% CI, 1.50-5.26) and if ever received money or material gift in exchange for sex in last 12 prior to survey (i.e., engagement in transactional sex) (OR = 4.67; 95% CI, 3.29-6.62). Based on these findings recommendations to control the spread of the infection among youths in the study population have been indicated.

Keywords: HIV/AIDS, risky sexual behaviors, youths

INTRODUCTION

HIV/AIDS is one of the major health challenges in the world. This pandemic has claimed lives of many people in the world including those in working-age group (economically active population) and hence threatening economic development of countries which are severely affected by the disease (Biddlecom *et al.*, 2007). Due to its potential negative impact on economic development, prevention of new infections and further spread of the pandemic is one of the ten Millennium development goals i.e., Goal No. 6 (Wilson *et al.*, 2004). Sub-Saharan Africa is the most affected region

in the world, accounting for over 2 thirds (67%) of all people living with HIV and for nearly 3 quarters (72%) of AIDS-related deaths in 2008. Furthermore, studies in Sub-Saharan Africa including Tanzania has indicated youths are the hardest hit group by the infection. New HIV infections are heavily concentrated among young people aged between 15-24 years i.e., Youths. Youths account for 60% of people living with HIV/AIDS and 40% of new infections in Africa (Joint United Nations programme on HIV/AIDS, 2006; Okonta, 2007; Bankole *et al.*, 2007). Lack of close bond between children and parents is among the factors for increased vulnerability of youths to HIV/AIDS (Madu, 2002;

Erulkar *et al.*, 2005; Babalola *et al.*, 2005; Okonta, 2007). Lack of parental responsibility is due to various reasons such as poverty, declining values, marital separation and domestic violence. These circumstances have driven adolescents/youths out of their homes to seek for better life in areas such as mining zones, places which are considered to be high risk areas as far as HIV/AIDS infection is concerned (Soldan *et al.*, 2007; Zwang and Garenne, 2008). In recent years there has been an explosion (growing number) of new mining areas in many parts of Tanzania including central parts of the country (i.e., Winza and Londoni in Mpwapwa and Manyoni districts, respectively) which attract substantial proportion of youths. In order to devise effective interventions for protecting youths from HIV/AIDS infection in these areas, understanding their level of knowledge on the infection and their sexual behaviours are important. Little is known on these aspects in the study areas. Therefore, the aim of this study was to assess knowledge and practices related to HIV/AIDS infection among youths in the study areas. Specific objectives of the study were to determine proportion of youths with comprehensive knowledge of HIV/AIDS; determining prevalence of high risk sexual behaviours among youths, as well as identification of correlates of high risk sexual behaviours among youths in a study population.

METHODOLOGY

Study area: This study was conducted in Winza mining area in Mpwapwa district and Londoni mining area in Manyoni district, in Dodoma and Singida regions, respectively, located in central part of Tanzania. Mining activity (Ruby mining) in Winza started on 2007, while in Londoni, Manyoni (Gold mining) started on 2006.

Study design: The study involved a cross-sectional survey in the 2 mining areas carried out between June to July, 2010. A total of 205 youths aged between 15-24 years chosen at random using a snowball technique, with nearly equal number of youths from each area were involved in this study. Sample size was estimated using the following formula (Amin, 2002):

$$n = \frac{(Z_{\alpha/2})^2 P(1-P)}{\lambda^2}$$

where,

n : Sample size

P : Percentage of youths in the area that are involved in high risk sexual behaviors

λ : Maximum error

since P was not known for the study population, its value was assumed to be 50% as it ensures maximum sample size (Nwankwo and Nwoke 2009). By assuming

confidence interval of 95% for the estimated population proportion, maximum error of 10% and design effect of 2 (Kisizza *et al.*, 2008) that is nx2 and non response rate of 5%, a final sample was calculated to be 205 individuals. Data for this study was collected using a pre-tested semi-structured questionnaire. During data collection, informed verbal consent was directly asked from the respondent before interview.

Analytical framework: In this study it was conceptualized that high risk sexual behaviour and hence vulnerability to HIV/AIDS by a youth are due to direct influence of cognitive/psychosocial and behavioural factors; and indirect influence of cognitive/psychosocial, socio-economic and demographic factors through their influence on attitude and perception towards the pandemic. Cognitive/psychosocial factors included comprehensive knowledge on HIV/AIDS and perceived level of risk for contracting HIV/AIDS; socio-economic and demographic variables included age, sex, education level, religious affiliation, village of origin, mining area and main activity/occupation in mining area; behavioural factors included alcohol consumption, engagement in transactional sex (individual behaviour) and sexual activity by close friend (sexual behaviour by a close friends i.e., peer pressure). According to Kibombo *et al.* (2007), in this study level of risk sexual behaviour by a youth was considered to be low when she/he never had sex or had sex but not in last 12 months prior to survey; had 1 partner in last 12 months, married/in a union; had 1 partner in last 12 months, not married/ not in a union but used condom; had 2 or more sexual partner in last 12 months but used condom. Level of risk sexual behaviours by a youth was considered to be high when she/he had 1 partner in last 12 months prior to survey, not married/not in a union, no condom; 2 or more sexual partners in last 12 months prior to survey, did not used condom. Furthermore, based on previous works (Kibombo *et al.*, 2007; Lawoyin, 2008; Bankole *et al.*, 2007; Molla *et al.*, 2009), a youth was considered to have a comprehensive knowledge on HIV/AIDS when she/he know all 3 ABC methods for preventing the spread of the infection (i.e., Abstinence, Be faithful, Use condom), agreed that health looking person can be HIV positive and correctly rejected all the other 2 common misconceptions about the infection (Transmission through sharing utensils and shaking hands).

Statistical analysis: Data were analyzed for Descriptive Statistics such as Frequencies and Percentages using Statistical Package for Social Sciences (SPSS) version 16. Furthermore, SPSS program was also used to run a Binary Multiple Logistic Regression Analysis to identify factors that are significantly associated with high risk sexual behaviors among youths in a study population using the following

statistical model (Hosmer and Lemeshow, 2000; Agresti, 2002):

$$\ln\left(\frac{p}{1-p}\right) = \alpha + \sum_{i=1}^n \beta_i X_i$$

where,

p : A probability of engaging in high risk sexual behaviors

α & β : Estimated regression coefficients

X_i : Various explanatory variables

Odds Ratio (OR) for determining the effect of various categories of explanatory variables on likelihood of engaging in high risk sexual behaviors were estimated by computing Exp(β) for each variable (Hosmer and Lemeshow, 2000). Variables used in this analysis were “If engaged in high risk sexual behaviours” (binary) (1 = Yes, 0 = No), a dependent variable.

Independent (explanatory variables) included; Comprehensive knowledge on HIV/AIDS with 2 categories (1 = High, 2 = Low); Perceived risk for contracting HIV infection with 2 categories (1 = Low, 2 = High); Age of respondent in years with 3 categories (1 = 15-17, 2 = 18-20, 3 ≥ 21); Sex of respondent with 2 categories (1 = Female, 2 = Male); Education level of respondent with 2 categories (1 = None or Primary, 2 = Secondary and above); Religion affiliation with 3 categories (1 = Catholic, 2 = Protestant, 3 = Moslem); Where coming from with 2 categories (1 = From nearby areas (villages), 2 = From distant area (villages); District/Mining area with 2 categories (1 = Manyoni-Londoni, 2 = Mpwapwa-Winza); If close friends are sexually active with 2 categories (1 = No, 2 = Yes); If use alcohol with 2 categories (1 = No, 2 = Yes); If ever received money or material gift in exchange for sex in last 12 months prior to survey with 2 categories (1 = No, 2 = Yes).

During analysis, first category for each explanatory variable was used as a reference category. Based on literature, in this study it was hypothesized that likelihood of engaging in high risk sexual behaviors by youths decreases by having comprehensive knowledge on HIV/AIDS and higher education level; and increases with perception on risk for contracting the infection being low; increase in age; sex of respondent being female; religion affiliation being Catholic or Muslim; area/village of origin being at distant place; Mining area being Mpwapwa; If use alcohol; having close friends that are sexually active; if engage in transactional sex (i.e., ever received money or material gift in exchange for sex in past 12 months prior to survey; if main occupation in mining area is mining, waiter in bar/hotel or no occupation/just roaming. Effect of other occupation on likelihood of engaging on high risk sexual behaviors can be on either direction.

RESULTS AND DISCUSSION

Socio demographic characteristics of respondents:

Results from Table 1 indicate most of respondents were males accounting for 2 third of total respondents. This could be attributed to a tendency of most young males to migrate to economically active areas such as mining areas and big cities in seek for employment and money to support their families leaving behind females and old people to take care of children (Soldan *et al.*, 2007; Zwang and Garenne, 2008). About 77% of respondents aged between 18-24 years indicating majority of youths were already mature enough (Seifu *et al.*, 2006; Bankole *et al.*, 2007) and hence more likely to engage in sexual activity. Results from Table 1 also reveal a substantial proportion of youths (25%) were coming from distant areas and hence more likely to live in rented rooms (*Ghettos*) instead at home with their parents. Studies have shown that living in *Ghettos* increases chances of youths to engage in sexual activity as parental control in *Ghettos* is usually minimal (Abu and Akerele, 2006; Zakayo and Lwelamira, 2011). About 2% of respondents had no formal education, 71% had primary education while the rest (nearly one-third) had at least secondary education (Table 1), reflecting high literacy level by youths in the study area and hence more likely to poses good ability to process information such as HIV/AIDS prevention packages as

Table 1: Distribution of respondents by socio-demographic characteristics (n = 205)

Variable	Frequency	(%)
Sex		
Male	137	66.8
Female	68	33.2
Age		
15-17	47	22.9
18-20	93	45.4
21-24	65	31.7
Where coming from		
Nearby areas/villages	153	74.6
Distant areas/villages	52	25.4
Schooling status		
None	3	1.5
Primary school	145	70.7
Secondary school	53	25.8
College	4	2.0
Marital status		
Married/cohabiting/living Together	33	16.1
Single	172	83.9
Religion affiliation		
Catholic	65	31.7
Protestant	98	47.8
Moslem	42	20.5
Main activity in mining area		
Hawking	51	24.9
Food vending	25	12.2
Mining activities	21	10.2
Kiosk	18	8.8
None (roaming)	42	20.5
Waiter in hotel/bar	35	17.1
Others	13	6.3

Table 2: Distribution of respondents by knowledge on HIV/AIDS

Variable	Frequency	(%)
Ever heard of HIV/AIDS (n = 205)		
Yes	203	99.0
No	2	1.0
Source of information on HIV/AIDS^a (n = 203)		
Parents/older member of the family	42	20.7
Siblings	67	33.0
Peers/friends	95	46.8
Teachers	48	23.7
Radio	28	13.8
TV	17	8.4
Printed media	70	34.5
Hospital/dispensary	11	5.4
Seminars/meetings	76	37.4
Knowledge on ABC (Abstinence, Be faithful and use Condom) as methods for preventing HIV/AIDS transmission (n = 203)		
Don't know any method	3	1.5
Know one method	21	10.3
Know two methods	32	15.8
Know all three methods	147	72.4
Specific ABC method known (n = 200)^a		
Abstinence	155	77.5
Be faithful	135	67.5
Use condom	184	92.0
Health looking person can be HIV positive (n = 203)		
Agree	177	87.2
Disagree	26	12.8
HIV can be transmitted by sharing eating utensils with infected person (n = 203)		
Agree	21	10.3
Disagree	182	89.7
HIV can be transmitted by shaking hands with infected person (n = 203)		
Agree	12	5.4
Disagree	190	93.6
Having comprehensive knowledge on HIV/AIDS^b		
Yes	120	58.6
No	85	41.4

^a: Variable allowed respondent to have multiple responses; ^b: Individual was considered to have comprehensive knowledge on HIV/AIDS when he/she know all three ABC methods, agreed that health looking person can be HIV positive and correctly rejected all the other two misconceptions (Transmission through sharing utensils and shaking hands)

well as other extension materials (Mgabo *et al.*, 2010). Religious affiliations sometimes influence youths' decisions on issues related to sexual and reproductive health and hence important socio-demographic factors in studies on youths' sexuality (Odimegwu, 2005; Mairiga *et al.*, 2007; Madise *et al.*, 2007). Results from Table 1 indicate each of study participants had at least affiliated to a particular religion. Nearly half (47.8%) of the respondents were Protestants and the rest were Catholic (31.7%) and Moslem (20.5%). Respondents were also asked to indicate their main activities in mining area. Results from Table 1 show majority (80%) of respondents were engaged in variety of income generating activities including waiter in bars/hotels, indicating some of the youths were engaged in high risk occupations in relation to HIV/AIDS (Akarro, 2011).

Knowledge on HIV/AIDS among youths: Knowledge on the disease by an individual is an important tool for preventing transmission of Sexually Transmitted diseases (STIs) such as HIV/AIDS as it has the power to influence change in attitude and practice (Wagbatsoma and Okojie, 2006; Molla *et al.*, 2009). Results from Table 2 indicate nearly all respondents (99%) were aware of HIV/AIDS. Similar results has

been reported among youths in other parts of Tanzania (Lema *et al.*, 2008; Zakayo and Lwelamira, 2011) as well as other African countries (Molla *et al.*, 2009; Seifu *et al.*, 2006; Tolulope and Oludare, 2009). Main source of information on HIV/AIDS by study participants were peers/friends, siblings, printed media and seminars/meeting mentioned by at least one third of total respondents. Despite of awareness of the disease by nearly all of the youths in the study population, however, in-depth knowledge of the disease by substantial proportion of youths was lacking. Findings from Table 2 reveal that 28% of total respondents (a sizeable percent) were not knowledgeable of all 3 ABC methods for preventing sexual transmission of HIV/AIDS, that is Abstinence, Be faithful and use Condom as described by Zakayo and Lwelamira (2011). Furthermore, one in every ten youths had some misconceptions on HIV/AIDS. Thirteen percent of total respondents disagreed with the statement that health looking person can be HIV positive (i.e., believed that people living with HIV/AIDS always look sick and thin) and further that 10% of them agreed with the statement that HIV/AIDS can be transmitted by sharing eating utensils with an infected person (Table 2). Misconceptions on HIV transmission by a noticeable

Table 3: Distribution of respondents by practices/conditions related to risk of HIV/AIDS infection

Variable	Frequency	(%)
Ever had sex in last 12 months prior to survey (n = 205)		
Yes	140	68.3
No	65	31.7
Number of sexual partners in last 12 months prior to survey (n = 140)		
one	83	59.3
two	32	22.8
Three and more	25	17.9
If condom was used in all sexual encounters in past 12 months prior to survey (n = 140)		
Yes	57	40.7
No	83	59.3
If given money/ material in exchange for sex in last 12 months prior to survey (n = 140)		
Yes	51	36.4
No	89	63.6
If close friends are sexually active (engage in sexual activity frequently) (n = 205)		
Yes	77	37.6
No	128	62.4
If use alcohol (n = 205)		
Yes	74	36.1
No	131	63.9
Perceived risk of contracting HIV/AIDS (n = 203)		
High	159	78.3
Low	44	21.7
Level of risky sexual behaviours (n = 205)*		
Low	139	67.8
High	66	32.2

*Low = Never had sex or had sex but not in last 12 months; 1 partner in last 12 months, married/in a union; 1 partner in last 12 months, not married/ not in a union, used condom; 2+ partner in last 12 months, used condom. High = 1 partner in last 12 months, not married/not in a union, no condom; 2+ partners in last 12 months, did not use condom

proportion of youths were also reported in studies by Tolulope and Oludare (2009), Odu and Ankale (2008) and Wagbatsoma and Okojie (2006) in Nigeria in which it was observed that at least 25% of sampled respondents believed that HIV infection can be transmitted by shaking hands with an infected person, sharing meal with an infected person and talking to an infected person. On overall, based on ABC knowledge as well as presence of misconceptions on HIV infection (Kibombo *et al.*, 2007; Lawoyin, 2008; Bankole *et al.*, 2007; Molla *et al.*, 2009), a considerable proportion of youths lacked comprehensive knowledge on HIV/AIDS. About 41%, that is 4 in every ten youths in a study population lacked comprehensive knowledge on HIV/AIDS (Table 2), a situation that might fuel the spread of the infection and stigma on the disease among youths in the study population.

Prevalence of risky sexual practices and some other risky behaviours/conditions in relation to HIV/AIDS infection among youths:

This study also sought to explore prevalence of sexual practices and some other behaviours or conditions that could predispose youths to the risk of contracting HIV infection in the study population. Results from Table 3 indicate majority of respondents were sexually active in the last 12 months prior to survey. Two-Third (68%) of interviewed youths had ever had sex in that period, a situation reflecting high sexual activity among youths in the study population and hence high risk of contracting HIV infection. This observation is in line with findings in other part of Tanzania (Lema *et al.*, 2008; Zakayo and Lwelamira, 2011) and other Sub-Saharan African countries (Ndyababangi *et al.*, 2004; Wagbatsoma and

Okojie, 2006; Seifu *et al.*, 2006; Kibombo *et al.*, 2007). Furthermore, when those who had ever experienced sex in the last 12 months before the survey asked on the number of sexual partners in that period and if condom was used in all sexual encounters (consistency of condom use), a considerable proportion of respondents reported to have at least 2 sexual partners and condom was not used in all sexual encounters. Results from Table 3 show that about 41% of respondents (4 in every ten youths) and 59% of respondents (nearly 6 in every ten youths) had multiple sexual partners and didn't use condom in all sexual encounters in last 12 months prior to survey, respectively. Prevalence of transactional sex among study participants (specifically girls) was also noted to be at substantially high level, possibly due to poverty (Moore *et al.*, 2007; Atuyambe, 2008). About 36% of interviewed respondents reported to have ever received money or material gift in exchange for sex in last 12 months prior to survey (Table 3), meaning that sex with non-regular/casual partners among youths was also common in the study population despite low level of condom use. These observations reflect high prevalence of risky sexual behaviours among youths in a study population and hence prone to HIV infection. Consistent with results of present study, most of previous surveys among youths in Sub-Saharan Africa including Tanzania for both in-school and out of school youths also revealed similar trend. Studies by Bankole *et al.* (2007) and Madise *et al.* (2007) in 4 Sub-Saharan countries (Burkina Faso, Ghana, Malawi and Uganda) indicate proportion of youths reported consistent condom use to ranged from 20 to 47%, while use of condom in last sexual encounter within 12 months

before survey was reported by 43% of respondents. Similarly, studies by Lema *et al.* (2008) in Tanzania and Adu-Mireku *et al.* (2003) in Ethiopia revealed proportion of youths that used Condom in last sexual intercourse to be 32 and 45%, respectively. Alcohol consumption is sometimes considered as risk behaviour as it can negatively influence decisions of abuser on sexual matters i.e., on whether to engage in sexual activity or not, or practicing safe sex or not (Setshed and de la Monte, 2011; Tegang *et al.*, 2011). Furthermore, studies have also indicated sexual behaviours of close friends/peers can have a great influence on sexual behaviour of an adolescent (Seifu

et al., 2006; Morhason-Bello *et al.*, 2008; Zakayo and Lwelamira, 2011). Results from Table 3 indicate a sizeable proportion of respondents (nearly 4 in every ten youths) were consuming alcohol (36%) and also reported to have close friends/peers who are sexually active (38%) and hence stands a high chance of engaging in sexual activity. Likewise, thinking of having a great chance of contracting an infection “fear of the disease” has been pointed by several authors to be a strong driver for an individual to take preventive measures such as practising ABC in case of HIV (Lagarde *et al.*, 1999; Haque and Soonthornhdada, 2009; Molla *et al.*, 2009). Interestingly, despite

Table 4: Results for multiple logistic regression analysis to indicate Odds Ratios (OR) for reporting high risky sexual behaviors among youths against various predictor variables

Predictor	β	S.E.	Odds ratio (OR)	95% Confidence interval (CI) for OR
Comprehensive knowledge on HIV/AIDS				
High (ref.)			1	1
Low	0.67	0.23	1.95	(1.24 – 3.07)*
Perceived risk for contracting HIV infection				
Low (ref.)			1	
High	-0.08	0.06	0.92	(0.81- 1.04)
Age (years)				
15-17 (ref.)			1	1
18-20	0.14	0.08	1.15	(0.98 – 1.35)
21 and above	0.17	0.12	1.19	(0.93 – 1.50)
Sex				
Female (ref.)			1	1
Male	1.31	0.04	3.71	(3.42 – 4.06)*
Highest education level				
None or primary (Ref.)			1	1
Secondary and above	-0.30	0.05	0.74	(0.67 – 0.82)*
Religion affiliation				
Catholic (ref.)			1	1
Protestant	0.11	0.07	1.12	(0.97 – 1.28)
Moslem	0.14	0.09	1.15	(0.96 – 1.38)
Where coming from				
Nearby areas (ref.)			1	1
Distant areas	0.36	0.10	1.43	(1.18 – 1.75)*
District/mining area				
Manyoni (ref.)			1	1
Mpwapwa	0.62	0.15	1.86	(1.39 – 2.48)*
Main activity (occupation)				
Hawking (ref.)			1	1
Mining	1.17	0.26	3.21	(1.93 – 5.37)*
Food vending	0.13	0.08	1.14	(0.97 – 1.34)
Kiosk (<i>Genge</i>)	-0.03	0.05	0.97	(0.88 – 1.07)
Waiter in bar/hotel	1.43	0.16	4.18	(3.07 – 5.70)*
Roaming/no occupation	0.83	0.24	2.30	(1.43 - 3.67)*
Others	0.08	0.06	1.08	(0.96 - 1.22)
If close friends are sexually active				
No (ref.)			1	1
Yes	0.54	0.14	1.71	(1.31 - 2.25)*
If use alcohol				
No (ref.)			1	1
Yes	1.03	0.32	2.80	(1.50 - 5.26)*
If ever received money or material gift in exchange for sex in last 12 months prior to survey				
No (ref.)			1	1
Yes	1.54	0.18	4.67	(3.29 - 6.62)*

Cox and Snell R^2 : 0.58; ref.: reference category; *: significant at $p < 0.05$

of mining areas being considered to be among high risk areas for HIV infection (Soldan *et al.*, 2007), however, a substantial proportion of respondents, 21% (around 2 in every ten), considered their risk for contracting the infection to be low (Table 3). This could further fuel risky sexual behaviour and hence spread of the infection among youths in the study area. On overall, based on sexual experience (If ever had sex), number of sexual partner and condom use in last 12 months before survey, as well as marital/union status (Kibombo *et al.*, 2007), nearly one-third of total respondents (32%), a considerable proportion, were engaged in high risk sexual behaviours (Table 3) and hence vulnerable to HIV infection. This is an alarming situation which requires concrete interventions. To develop such interventions, knowledge of factors that lead to high risk sexual behaviours among youths in the study population is indispensable.

Correlates for high risky sexual behaviors among youths in the study population: Binary Multiple Logistic Regression Analysis was carried out to identify factors associated with high risk sexual behaviors among study participants. Results are presented in Table 4. Results indicate low comprehensive knowledge on HIV/AIDS was significantly associated with increased likelihood of engaging in high risk sexual behaviours (OR = 1.95; 95% CI, 1.24-3.07). Mixed results were obtained in previous studies. Some studies also indicated high knowledge on HIV/AIDS to be protective against risky sexual behaviors (Wagbatsoma and Okojie, 2006; Molla *et al.*, 2009; Nguyen *et al.*, 2010) while some others reported lack of association between knowledge and sexual behaviors (Maswanya *et al.*, 1999; Meekers and Klein, 2002; Akwara *et al.*, 2003; Zellner, 2003). Our result underscores importance of knowledge as valuable cognitive factor and power to bring behavioral change in the study population and hence target for intervention programmes. Perception of being at risk of contracting HIV often lead to protective behaviors (Lagarde *et al.*, 1999; Meekers and Klein, 2002; Ekanem *et al.*, 2005; Haque and Soonthornhada, 2009). In contrast, although in expected direction, results from present study reveal non significant association between risk perception and sexual behaviors. Increase in age has been indicated in number of studies to be associated with increased likelihood of engaging in risky sexual behaviors, meaning that younger adolescents were less likely to engage in risky sexual behaviors than older adolescents (Adu-Mireku, 2003; Seifu *et al.*, 2006; Seme and Wirtu, 2008; Maria, 2007). However, result of present study indicated no association between age and high risk sexual behaviors, indicating all age groups were equally engaged in risk sexual behaviors and hence interventions to control the infection among

youths in the study population should target all age groups. Results from Table 4 also indicate being a male was associated with increased odds for engaging in high risk sexual behaviors (OR = 3.71; 95% CI, 3.42-4.06), while having secondary education and above was associated with decreased odds for engaging in high risk sexual behaviours (OR = 0.74; 95% CI, 0.67-0.82). Effect of sex observed in the present study contradicts findings by Maria (2007) in which females were found to be 2 times more likely to report risk sexual behaviours than males (i.e., having multiple sexual partner) and Lema *et al.* (2008) in which no differences between sex was found, but in agreement with several other studies (Bankole *et al.*, 2007; Kibombo *et al.*, 2007; Seme and Wirtu, 2008; Aomreore and Alikor, 2008; Morhason-Bello *et al.*, 2008) in Sub-Saharan African countries. Likewise, as with results of current study, protective effect of education on risky sexual behaviors among youths was also reported elsewhere (Maria, 2007; Guiella and Madise, 2007; Baker *et al.*, 2011; Siziya *et al.*, 2008; Utulu and Lawoyin, 2007). For example, a study by Guiella and Madise (2007) in Nigeria indicated that adolescents who achieved a secondary education and higher were 3 times more likely to use condoms compared to those with low or no formal education.

Baker *et al.* (2011) asserted that formal education brings about better informed choices and strongly affect health reasoning ability. Protective effect of education call for a need to put emphasis on formal education, especially for girls, as one of the strategies for achieving positive sexual and reproductive health outcomes. Findings from Table 4 also indicate youths coming from distant villages/areas were 43% times more likely to engage in high risk sexual behaviors than those coming from nearby areas (OR = 1.43; 95% CI, 1.18-1.75) and those in Mpwapwa mining area were 2 times more likely to engage in high risk sexual behaviours compared to those from Manyoni mining area (OR = 1.86; 95% CI, 1.39-2.48). Effect of religion was non-significant. Effect of area/village of origin could be explained by the fact that youths coming from distant areas are more likely to live in *Ghettos* compared to those coming from nearby areas in which are more likely to live in their homes with parents/older relatives. Parental control and monitoring in *Ghettos* are usually minimal, a situation which gives youths chances to engage in sexual activity (Abu and Akerele, 2006; Kumi-Kyereme *et al.*, 2007; Kabiru and Ezech, 2007; Zakayo and Lwelamira, 2011). One of plausible explanation for the effect of mining area observed in this study could be due the fact that Mpwapwa mining area is somehow more urbanized than Manyoni mining area. Studies have shown sexual activity and prevalence of multiple sexual partners among youths to be high in urban areas compared to rural areas although condom

use prevalence among youths in rural areas could sometimes be low (Seifu *et al.*, 2006; Moore *et al.*, 2007). Youths living in urban areas are usually exposed to diverse life-style and subject to weaker social control than those in rural areas. It can also be seen from Table 4 that involving in mining, working in bar/hotel as a waiter and non-involvement in any income generating activity (just roaming) was significantly associated with high risky sexual behaviors among youths. Youths working in mining were 3 times more likely to engage in high risk sexual behaviors compared to those do hawking (OR = 3.21; 95% CI, 1.93-5.37). Similarly, youths working in bar/hotel as waiters were 4 times more likely to engage in high risk sexual behaviors compared to those involved in hawking (OR = 4.18; 95% CI, 3.07-5.70), while non-involvement in any income generating activity increased odd for engaging in high risk sexual behaviors 2 times relative to hawking (OR = 2.30; 95% CI, 1.43-3.67). In line with results of current study, a study by Akarro (2011) in some urban areas of Tanzania also reported high risk sexual behaviors among individuals working as bar maid.

Furthermore, youths working in mining as a risk group as far as risky sexual behaviors is concerned have also been reported elsewhere. To get rid of boredom, studies in Southern African countries have indicated mine-workers especially those working as semi-skilled or unskilled workers (with most of them being youths) tend to spend their leisure time in luxury life such as alcohol consumption (Soldan *et al.*, 2007; Govender *et al.*, 2011). Consistent with results of present study in Table 4, several studies have indicated alcohol consumption increases likelihood of an individual to engage in risky sexual behaviors (Setshed and de la Monte, 2011; Tegang *et al.*, 2011). For example, in our study we found that youths that are taking alcohol were 3 times more likely to report high risk sexual behaviours compared to those not taking alcohol (OR = 2.80; 95% CI, 1.50-5.26) (Table 4).

Results from Table 4 also indicate that youths with close friends that are sexually active were 2 times more likely to engage in high risk sexual behaviors compared to their counterpart (OR = 1.71; 95% CI, 1.31-2.25), implying association between peer pressure and risky sexual behaviors among adolescents in the study population.

This finding is in agreement with most of other studies conducted in some African countries including Tanzania, in which it was found peer pressure to have a great influence on adolescents' sexual behaviors (Seifu *et al.*, 2006; Morhason-Bello *et al.*, 2008; Zakayo and Lwelamira, 2011). For example in a study by Seifu *et al.* (2006) it was noted that youths with sexually active

friends are usually forced to engage in sexual activity to get acceptance of their friends.

High poverty levels in developing countries such as Sub-Saharan African countries have forced several female youths to engage in transactional sex including having multiple sexual partners (Moore *et al.*, 2007; Atuyambe, 2008). Findings from Table 4 indicate that youths that had ever received money or material gift in exchange for sex in last twelve months before survey were 5 times more likely to report high risk sexual behaviors compared to their counterpart (OR = 4.67; 95% CI, 3.29-6.62). Amuyunzu-Nyamongo *et al.* (2005) argued that it is harder for females to negotiate safe sex such as use of condom if they have received money or material gift.

CONCLUSION

Overwhelming majority of youths in a study population are aware of HIV/AIDS, however, comprehensive knowledge on the infection among them is lacking. A considerable proportion of youths in study population were engaged in high risk sexual behaviors and hence prone to HIV/AIDS infections. Chances (Odds) for engaging in high risk sexual behaviors by youths decreased significantly with increased knowledge on HIV/AIDS and education level; increased significantly with being from distant areas/villages and being from Mpwapwa mining area. The Likelihood also increased significantly with being male; main activity in mining area being mining, bar/hotel maid and just roaming (no occupation); increased significantly with having close friends that are sexually active, if use alcohol and if ever received money or material gift in exchange for sex in last 12 prior to survey (i.e., engagement in transactional sex). Perceived risk for contracting the infection, age and religion affiliation had no significant influence on odds for engaging in high risk sexual behaviors among youths in a study population.

RECOMMENDATIONS

Based on findings of this study, it is recommended that HIV/AIDS education among vulnerable groups of youths such as mine workers, bar/hotel and maids those living in *Ghettos* should be emphasized in study areas. This could be through the use of peer educators. Efforts to encourage formal education among youths should be intensified as this would bring about informed decisions with regard to their health including HIV/AIDS infections. Furthermore, campaigns to discourage alcohol abuse and engagement in transactional sex among youths should be launched in study areas.

Encouraging youths' income generating groups in a study population and extending micro-credit services to these groups can serve several youths from idleness and risk of engaging in sexual activity including transactional sex.

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