

Delaying sexual debut as a strategy for reducing HIV epidemic in Kenya: Findings from the Kenya Demographic Health Survey, 2003

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Abstract:

The objectives of this study were to determine the association between HIV sero-status and age at sexual debut, and factors associated with a positive HIV diagnosis among individuals age at sexual debut. Retrospective cross-sectional data from the Kenya Demographic and Health Survey-2003 were used. The female, male and HIV datasets were merged together with a sub-data of those who accepted a HIV test (n=6,190) retained for all analysis. The sample included women aged 15-49 (n=3,273 [53%]) and men aged 15-54 (n=2,917 [47%]). Data were weighted for stratum and primary sampling units. Univariate and Multivariate logistic regression analyses were performed using Stata version 10.1, $p < 0.05$. Nine percent of women and 5% of men tested positive for HIV. Among these, 45% and 41% were men and women aged 8-15, $p < 0.001$, and 49% and 46% aged 16-21, $p < 0.001$ respectively. After adjusting for confounding, women and men who had sexual debut aged 8-15 were 5.88 (95% CI: 2.54-13.64), $p < 0.001$ and 3.19 (95% CI: 1.06-9.59), $p < 0.05$ times more likely to have tested positive for HIV compared to those who never had sex respectively. Among women and men aged 16-21, they were 2.31 (95% CI: 1.52-3.51), $p < 0.001$ and 1.83, $p < 0.05$ times more likely to have tested positive for HIV compared to those who never had sex respectively. Early sexual debut continues to be a major risk factor for acquiring HIV infection later in life for both women and men, suggesting earlier interventions in life could have a notable impact in the fight against HIV pandemic on Kenya. There is a need for continued support and enhancement for programs geared towards informing and preventing the youth from engaging in earlier sexual debut through informed educational policies.

Keywords: HIV/AIDS, HIV sero-status, risk factors, methods, education, Kenya

Introduction

In Kenya, HIV/AIDS is still a serious health challenge. In 2006, there were 55,000 new infections with a majority of the infections being recorded among those aged 15-24 years (National Aids Control Council [NACC], 2006). Research documents that infection with HIV and other sexually transmitted infections (STIs) is on the rise among adolescents with girls being more vulnerable relative to boys (Buvé, Caraël, Hayes et al., 2001; Central Bureau of Statistics [CBS], 2004; Glynn, Caraël, Auvert, et al., 2001; Njue, Nzioka, Ahlberg et al., 2009). As a way to combat HIV/AIDS, the Ministry of Education (MOE) introduced an HIV/AIDS curriculum to be taught in schools at the primary and secondary levels (Maticka-Tyndale, 2010). The learning goals outlined in the HIV/AIDS curriculum focus on prevention and control of HIV and related STIs. These goals stress on: 1) acquisition of knowledge about HIV/AIDS and STIs by learners; 2) decision making relating to both social and personal behaviour that lowers the risk of infection; 3) being compassionate to those infected; and 4) active involvement in activities both in school and out of school (Maticka-Tyndale, 2010; MOE, 2003; Mwebi, 2008). However, early sexual debut in Kenya continues to be a major hindrance towards the control of HIV and STIs.

Sexual debut

Kenya is one of the countries in Sub-Saharan Africa where the HIV/AIDS pandemic still poses huge challenges to the social and economic development activities. According to the Kenya AIDS Indicator Survey (KAIS, 2007), at the end of 2007, the national HIV prevalence was 7.1% among adults aged 15-64 (or 1.42 million people were infected with HIV). Among those aged 15-24, the HIV prevalence stood at 3.8%, while more women compared to men, particularly those aged 15-24 were infected with HIV (5.6% and 1.4%, respectively) (KAIS, 2007). These

findings show that the youth and especially young women are more vulnerable to HIV infection. Some of the factors cited as driving the spread of the disease include early sexual debut, inconsistent condom use, lack of knowledge about HIV/AIDS, multiple sexual partners, transactional sex (KAIS, 2007; Kenya Demographic and Health Survey [KDHS], 2004; World Health Organization [WHO], 2006).

Existing research has shown that early sexual debut is significantly associated with the risk of acquiring HIV infection. Studies exploring the risk factors for HIV infection among the youth found that the likelihood of having HIV increased significantly among men and women who had experienced early sexual debut (Bakilana, 2005; Konde-Lule, Wawer, Sewankambo et al., 1997; Pettifor, Rees, Kleinschmidt et al., 2005; Pettifor, van der Straten, Dunbar et al., 2004). According to the KAIS (2007), by age 15, 20% of young women and 22.4% of men reported having had sex at least once in their lifetime, while 95.2% of women and 92.8% of men reported having sex at least once by age 24. The vulnerability of the youth is compounded by a number of factors including social and economic pressures, which significantly increase the propensity of engaging in sex at an early age. Multiple studies have reported that the youth, particularly young women are more likely to face pressure to engage in sex from older partners, peers, and in some cases from their parents or other family members (Konde-Lule, Wawer, Sewankambo et al., 1997; Maticka-Tyndale, Gallant, Brouillard-Coyle et al., 2005; Tenkorang & Maticka-Tyndale, 2008).

Engaging in sex with older partners has also been associated with increased risk of acquiring STIs, including HIV. For example, findings from a study by Konde-Lule, Wawer, Sewankambo et al. (1997) indicated that, adolescent girls with older partners had higher HIV prevalence compared to their peers who did not have such partners. On the other hand, due to

economic constraints, young women are forced to engage in transactional sex in exchange for money and/or gifts, while for young men, pressure from their peers to have sex with as many women as possible is associated with early sexual initiation (Maticka-Tyndale, Gallant, Brouillard-Coyle et al., 2005; Tenkorang & Maticka-Tyndale, 2008). In cases involving transactional sex, most of the young women preferred older partners to peers because they are stable and better providers.

Early sexual debut is also associated with increased likelihood of engaging in risky sexual practices. Studies have shown that early sexual debut is correlated with risky sexual practices, such as inconsistent condom and multiple sexual partners (KAIS, 2007; Pettifor, Rees, Kleinschmidt et al., 2005; Pettifor, van der Straten, Dunbar et al., 2004; Tenkorang & Maticka-Tyndale, 2008; White, Cleland, & Carael, 2000; WHO, 2006). According to the KAIS (2007), condom use at first sexual encounter was significantly low among young women (26.3%) and men (28.5%) aged 15-24. Lack of knowledge about HIV/AIDS and imbalance in gender-power relations are some of the factors that have been attributed to risk taking behaviours among the youth. The WHO (2006) reports that many young men and women lack basic knowledge about how HIV is transmitted and how to protect themselves against getting infected.

Imbalance in gender-power relations is a consequence of socio-cultural norms and practices, which force women into subservient status to men. Research indicates that in many parts of Africa, the domination of women by men undermines their ability to make not only decisions concerning the household, but also decisions about their sexual and reproductive needs (Lugalla, Emmelin, Mutembei et al., 1999; NACC, 2002; WHO, 2006). This means that many women are unable to negotiate for safer sex even in cases where the partners are engaged in risky sexual behaviour. The problem is further compounded in cases involving young women and

older partners due to the inexperience of the former in sexual issues, which increases their vulnerability to STIs and HIV infection. According to the WHO (2006), young men and women are more likely to be associated with risky sexual behaviour, including inconsistent condom use and multiple sexual partners. This is because many of the young people lack the skills and education that are critical for reducing their vulnerability to STIs, including HIV. This paper seeks to determine the association between HIV infection and age at sexual debut. We further seek to determine the factors that are associated with a positive HIV diagnosis and an individual age at sexual debut.

Research design and methodology

Data source

Data for this study were from retrospective cross-sectional Kenya Demographic and Health Survey (KDHS-2003) conducted between April 18, 2003-September 15, 2003 (CBS, 2004).

Unlike the previous surveys, the KDHS-2003 was the first to collect data on respondents HIV sero-status in addition to the survey data.

Data analysis plan

Variables and measures

The main outcome measure for this study was HIV sero-status. This variable primarily sought to find out if one tested positive or negative for HIV after taking a voluntary test for HIV. HIV sero-status variable was coded “0” if one tested negative for HIV and “1” if one tested positive for HIV. The main predictor was age at sexual debut, which was coded “0” if the respondent reported to have never had any sexual contact, “1” if the respondent age at sexual debut was 8-15 years, “2” 16-21 years, “3” 22-40 years, and “4” after marriage.

Confounding effect was controlled for using several variables, which were selected through a multivariate stepwise forward method and manual selection. Circumcision was coded “0” if one was circumcised, and “1” if one was uncircumcised; wealth was coded “0” if one was poorest, “1” poor, “2” moderate, “3” rich and “4” richest. Exposure to STIs was coded as “0” if respondent tested negative or did not show any signs of STIs, and “1” if respondent tested for or indicated signs of an STIs. Area of residence was coded “0” if one resided in an urban area and “1” in rural area. Perceived risk of acquiring HIV was coded “0” if respondents had considered themselves to have no risk, “1” if they considered themselves to have small risk, “2” if they considered themselves to have moderate risk, and “3” if they considered themselves to have high risk for acquiring HIV. Religion was coded “0” if one was affiliated or identified themselves as Protestants, “1” Roman Catholic, “2” Muslim, and “3” other religions. Province was coded “0” if an individual came from Nairobi province, “1” from Central province, “2” from Coast province, “3” from Eastern province, “4” from Nyanza province, “5” from Rift Valley province, “6” from Western province, and “7” from North Eastern province. Occupation was coded “0” if one worked in agriculture or was self employed, “1” worked as a teacher or as a manager, “2” worked in sales, “3” other occupations, and “4” not working. Education was coded “0” if one had less than a primary education, “1” if one had a primary education, “2” if one had a post primary, vocational, or secondary education, and “3” if one had a college or university education. Lastly, having multiple sexual partners was coded “0” if one did not have multiple sexual partners, and “1” if one had multiple sexual partners.

Analysis strategy

For this analysis, three datasets were merged together (the male dataset, female dataset, and the HIV dataset). Only those individuals who were randomly selected for an HIV test (n=8,800) and

accepted (n=6,360) to be tested (CBS, 2004) were included in the analysis. The final sample retained for analysis was 6,190 (n=3,273 women [53%] and n=2,917 men [47%]). The data were weighted and adjusted for sampling design in order to attain linearized standard errors “robustness.”

Data analysis utilized a statistical software (Stata version, 10.1), which is regarded to be highly appropriate due to its unique features for making adjustments to the standard errors, especially when analyzing data collected through stratification, clustering and involving multiple weights procedures (Lumley, 2004; StataCorp, 2007; Wears, 2002). Descriptive statistics and bivariate analysis were used to describe the sample, with bivariate analysis also being used to determine the joint significance between the independent variables and the main outcome measure of interest (HIV sero-status). Univariate logistic regressions were performed to determine the unadjusted odds ratios (ORs) at 95% confidence intervals (CI) with p values set at 0.05. Finally, multivariate logistic regression analyses were performed to determine the association between the predictor and the main outcome measure (Hosmer & Limeshow, 1989) among women and men after controlling for confounding.

Results

Descriptive analysis

Table 1 presents the descriptive statistics for the variables used in the study. There were more women (9%) than men (5%) who tested positive for HIV. More young men aged 8-15 engaged in early sexual encounters (41%) compared to women (27%). However, this was opposite for men and women aged 16-21 where 38% and 39%, respectively reported engaging in early sexual debut. Very few men (2%) experienced sexual debut at union/marriage compared to women (14%).

Table 1: Study population characteristics reported using percentage and number, KDHS-2003

	WOMEN		MEN	
	%	N	%	N
HIV sero-status		n=3,273		n=2,917
Negative	91	2996	95	2784
Positive	09	277	05	133
Age at sexual debut		n=3,268		n=2,907
Never had sex	16	539	15	457
08-15 years	27	795	41	1083
16-21 years	39	1238	38	1115
22-40 years	04	125	04	151
At marriage	14	571	02	101
Circumcision		n=3,260		n=2,914
Circumcised	33	1115	83	2455
Uncircumcised	67	2155	17	459
Wealth		n=3,273		n=2,917
Poorest	17	557	16	474
Poor	20	586	18	495
Middle	20	598	19	521
Rich	21	640	22	611
Richest	22	892	25	816
STIs		n=3,271		n=2,897
No	97	3153	97	2820
Yes	03	118	03	77
Residence		n=3,273		n=2,917
Urban	22	981	23	847
Rural	78	2292	77	2070
Perceived risk of acquiring HIV/AIDS		n=3,213		n=2,885
No Risk	35	1159	35	1047
Small Risk	40	1259	50	1434
Moderate Risk	16	510	10	273
High Risk	09	285	05	131
Religion		n=3,269		n=2,916
Protestant	67	2076	61	1686
Roman Catholic	25	776	27	749
Muslim	06	357	06	301
Other Religions	02	60	06	180
Province		n=3,273		n=2,917
Nairobi	08	355	09	328
Central	14	522	14	465
Coast	08	384	06	290
Eastern	15	382	16	376
Nyanza	16	465	16	417
Rift Valley	24	568	25	510
Western	13	445	12	385
North Eastern	02	152	02	146
Occupation		n=3,269		n=2,908
Agriculture/Self Employed	31	930	34	904
Professional/Teacher/Manager	04	145	07	223
Sales	14	466	08	243
Other	13	442	27	798
Not Working	38	1286	24	740
Education		n=3,273		n=2,917
<Primary School	13	513	06	246
Primary School	58	1742	56	1542
Post Primary/Vocational/Secondary	24	811	28	837
College/University	05	207	10	292
Multiple sexual partners		n=3,269		n=2,916
No	88	2876	73	2153
Yes	12	393	27	763

Bivariate analysis

Table 2 describes the various associations between the independent variables and the main outcome measure. Among those who tested positive for HIV, 45% and 41% were men and women aged 8-15, while 49% and 46% men and women who were aged 16-21, $p<0.001$ respectively. This indicates that the most affected groups were men and women who had their sexual debut during their late childhood and at adolescent phase of their lives. Among men and women who tested positive for HIV, a higher percentage were from the richest wealth bracket (40%, $p<0.05$) and (32%, $p<0.001$), from rural areas (64%, $p<0.001$) and (70%, $p<0.01$), perceived themselves to have a small risk of acquiring HIV (57%, $p=0.083$) and (44%, $p<0.001$), and were residents of Nyanza province (41% and 33%, $p<0.001$) respectively. Also, majority of men and women who tested positive for HIV had experienced their sexual debut aged 8-21 and 16-40 respectively.

Table 2: Bivariate analysis, percentage and number of the association between selected characteristics and HIV sero-status, KDHS-2003

HIV sero-status	WOMEN			MEN		
	Negative % (N)	Positive % (N)	<i>p</i> -values	Negative % (N)	Positive % (N)	<i>p</i> -values
Age at sexual debut	n=2,993	n=275		n=2,775	n=132	
Never had sex	17 (530)	03 (9)		16 (451)	03 (6)	
08-15 years	26 (693)	41 (102)		40 (1030)	45 (53)	
16-21 years	38 (1111)	46 (127)	***	38 (1047)	49 (68)	***
22-40 years	04 (118)	02 (7)		04 (148)	02 (3)	
At marriage	15 (541)	08 (30)		02 (99)	01 (2)	
Circumcision	n=2,993	n=277		n=2,782	n=132	
Circumcised	34 (1054)	22 (61)	***	84 (2380)	52 (75)	***
Uncircumcised	66 (1939)	78 (216)		16 (402)	48 (57)	
Wealth	n=2,996	n=277		n=2,784	n=133	
Poorest	17 (538)	08 (19)		17 (459)	15 (15)	
Poor	20 (540)	20 (46)		18 (475)	16 (20)	
Middle	20 (556)	16 (42)	***	19 (510)	10 (11)	*
Rich	21 (575)	24 (65)		22 (584)	19 (27)	
Richest	22 (787)	32 (105)		24 (756)	40 (60)	
STIs	n=2,994	n=277		n=2,764	n=133	
No	97 (2897)	92 (256)	**	98 (2700)	91 (120)	***
Yes	03 (97)	08 (21)		02 (64)	09 (13)	
Residence	n=2,996	n=277		n=2,784	n=133	
Urban	21 (865)	30 (116)	**	22 (785)	36 (62)	***
Rural	79 (2131)	70 (161)		78 (1999)	64 (71)	

(continued)

Table 2: (continued)

	WOMEN		<i>p</i> -values	MEN		<i>p</i> -values
	Negative % (N)	Positive % (N)		Negative % (N)	Positive % (N)	
HIV sero-status						
Perceived risk of acquiring HIV/AIDS	n=2,937	n=276		n=2,752	n=133	
No Risk	36 (1099)	21 (60)		35 (1014)	25 (33)	
Small Risk	40 (1136)	44 (123)	***	50 (1355)	57 (79)	=0.083
Moderate Risk	16 (455)	20 (55)		10 (261)	10 (12)	
High Risk	08 (247)	15 (38)		05 (122)	08 (9)	
Religion	n=2,992	n=277		n=2,783	n=133	
Protestant	66 (1883)	71 (193)		61 (1606)	62 (80)	
Roman Catholic	25 (705)	25 (71)	*	27 (712)	28 (37)	=0.565
Muslim	07 (348)	02 (9)		06 (294)	03 (7)	
Other Religions	02 (56)	02 (4)		06 (171)	07 (9)	
Province	n=2,996	n=277		n=2,784	n=133	
Nairobi	08 (316)	11 (39)		09 (305)	15 (23)	
Central	14 (483)	12 (39)		14 (455)	06 (10)	
Coast	08 (358)	06 (26)		07 (278)	06 (12)	
Eastern	16 (358)	10 (24)	***	16 (369)	05 (7)	***
Nyanza	14 (385)	33 (80)		15 (367)	41 (50)	
Rift Valley	25 (531)	19 (37)		25 (493)	18 (17)	
Western	13 (413)	09 (32)		12 (371)	09 (14)	
North Eastern	02 (152)	0 (0)		02 (146)	0 (0)	
Occupation	n=2,992	n=277		n=2,776	n=132	
Agriculture/Self Employed	32 (864)	26 (66)		34 (871)	28 (33)	
Professional/Teacher/Manager	04 (131)	04 (14)		07 (204)	14 (19)	
Sales	14 (408)	21 (58)	***	08 (228)	10 (15)	***
Other	12 (385)	20 (57)		26 (743)	41 (55)	
Not Working	38 (1204)	29 (82)		25 (730)	07 (10)	
Education	n=2,996	n=277		n=2,784	n=133	
<Primary School	14 (493)	06 (20)		07 (242)	03 (4)	
Primary School	57 (1569)	66 (173)	*	56 (1475)	55 (67)	=0.428
Post Primary/Vocational./Secondary	24 (743)	23 (68)		28 (789)	33 (48)	
College/University	05 (191)	05 (16)		09 (278)	09 (14)	
Multiple sexual partners	n=2,993	n=276		n=2,783	n=133	
No	89 (2664)	75 (212)	***	73 (2060)	70 (93)	=0.601
Yes	11 (329)	25 (64)		27 (723)	30 (40)	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Multivariate analysis: Effect of sexual debut on HIV sero-status

Two types of multivariate analyses were conducted, unadjusted logistic multivariate regression analysis and adjusted logistic multivariate regression analysis. In the unadjusted logistic analysis, there was significant association between HIV sero-status and age at sexual debut among both women and men (see Table 3-unadjusted). Women who had their sexual debut aged 8-15 were 7.97 times more likely to have tested positive for HIV (95% CI: 3.74-16.99), $p < 0.001$ compared to those who never had sex at all. Women who had their sexual debut aged 16-21 were 2.47 times more likely to have tested positive for HIV (95% CI: 1.70-3.59), $p < 0.001$ compared to those who never had sex at all. Furthermore, those who had their sexual debut at

marriage were 1.31 times more likely to have tested positive for HIV (95% CI: 1.07-1.61), $p < 0.01$ compared to those who never had have sex at all. For men, those who had their sexual debut aged 8-15 were 5.05 times more likely to have tested positive for HIV (95% CI: 2.06-12.37), $p < 0.001$ compared to those who never had sex at all. Lastly, men who had their sexual debut aged 16-21 were 2.44 times more likely to have tested positive for HIV (95% CI: 1.56-3.80), $p < 0.001$ compared to those who never had sex at all.

After adjusting for confounding, there was a slight attenuation in the odds ratios. However, there was still significant association between HIV sero-status and age at sexual debut among both women and men (see Table 3-adjusted). Women who had their sexual debut aged 8-15 were 5.88 times more likely to have tested positive for HIV (95% CI: 2.54-13.64), $p < 0.001$ compared to those who never had sex at all. Among those who had their sexual debut aged 16-21, they were 2.31 times more likely to have tested positive for HIV (95% CI: 1.52-3.51), $p < 0.05$ compared to those who never had sex at all. However, there was a slight increase in the odds ratio among those women who had their sexual debut at marriage. They were 1.45 times more likely to have tested positive for HIV (95% CI: 1.16-1.81), $p < 0.001$ compared to those who never had sex at all. Among men, those who had their sexual debut aged 8-15 were 3.19 times more likely to have tested positive for HIV (95% CI: 1.06-9.59), $p < 0.05$ compared to those who never had sex at all. Those who had their sexual debut aged 16-21 were 1.83 times more likely to have tested positive for HIV (95% CI: 1.07-3.13), $p < 0.05$ compared to those who never had sex at all.

Table 3: Unadjusted and adjusted odds ratios and 95% confidence intervals of HIV sero-status and sexual debut in a multivariate logistic regression model, KDHS-2003

	Women						Men					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
HIV sero-status	ORs	95% CIs	p-values	ORs	95% CIs	p-values	ORs	95% CIs	p-values	ORs	95% CIs	p-values
Age at sexual debut												
Never had sex	REF.			REF.			REF.			REF.		
08-15 years	7.97	3.74-16.99	***	5.88	2.54-13.64	***	5.05	2.06-12.37	***	3.19	1.06-9.59	*
16-21 years	2.47	1.70-3.59	***	2.31	1.52-3.51	***	2.44	1.56-3.80	***	1.83	1.07-3.13	*
22-40 years	1.39	0.96-2.00	0.078	1.33	0.90-1.97	0.151	1.28	0.79-2.10	0.318	1.10	0.63-1.93	0.730
At marriage	1.31	1.07-1.61	**	1.45	1.16-1.81	***	1.33	0.87-2.02	0.187	1.36	0.82-2.26	0.230
Circumcision												
Circumcised	REF.			REF.			REF.			REF.		
Uncircumcised	1.86	1.34-2.59	***	1.63	1.13-2.36	**	4.92	3.20-7.54	***	3.69	2.29-5.94	***
Wealth												
Poorest	REF.			REF.			REF.			REF.		
Poor	2.37	1.19-4.72	*	1.87	0.92-3.79	0.082	1.00	0.47-2.11	0.994	1.27	0.57-2.87	0.556
Middle	1.36	1.00-1.84	0.051	1.37	0.99-1.89	0.054	0.78	0.46-1.33	0.366	0.99	0.55-1.77	0.963
Rich	1.39	1.16-1.66	***	1.35	1.10-1.64	**	1.00	0.80-1.24	0.991	1.16	0.88-1.53	0.302
Richest	1.35	1.17-1.57	***	1.26	1.04-1.52	*	1.17	1.01-1.37	*	1.20	0.93-1.54	0.161
STIs												
No	REF.			REF.			REF.			REF.		
Yes	2.65	1.40-5.02	**	1.83	0.91-3.65	0.087	3.95	2.01-7.73	***	1.86	0.82-4.24	0.138
Residence												
Urban	REF.			REF.			REF.			REF.		
Rural	0.60	0.44-0.83	**	0.76	0.48-1.22	0.252	0.49	0.33-0.74	***	0.78	0.39-1.58	0.494
Perceived risk of acquiring HIV/AIDS												
No Risk	REF.			REF.			REF.			REF.		
Small Risk	1.93	1.37-2.74	***	1.39	0.96-2.01	0.085	1.60	1.00-2.56	0.051	1.29	0.78-2.13	0.329
Moderate Risk	1.47	1.17-1.84	***	1.16	0.92-1.48	0.213	1.16	0.83-1.63	0.384	0.94	0.67-1.30	0.694
High Risk	1.46	1.22-1.74	***	1.20	0.99-1.47	0.067	1.35	1.03-1.77	*	0.97	0.69-1.37	0.871
Religion												
Protestant	REF.			REF.			REF.			REF.		
Roman Catholic	0.91	0.66-1.24	0.533	0.87	0.63-1.20	0.392	1.03	0.67-1.58	0.891	0.96	0.62-1.49	0.841
Muslim	0.53	0.39-0.74	***	0.73	0.50-1.05	0.092	0.72	0.47-1.11	0.135	1.11	0.68-1.80	0.678
Other Religions	1.02	0.70-1.51	0.901	1.17	0.77-1.77	0.462	1.03	0.81-1.31	0.826	1.27	1.00-1.61	*

(continued)

Table 3: (continued)

HIV sero-status	Women						Men					
	Unadjusted			Adjusted			Unadjusted			Adjusted		
	ORs	95% CIs	p-values	ORs	95% CIs	p-values	ORs	95% CIs	p-values	ORs	95% CIs	p-values
Province												
Nairobi	REF.			REF.			REF.			REF.		
Central	0.61	0.37-1.02	0.059	1.05	0.56-1.95	0.886	0.25	0.12-0.52	***	0.53	0.22-1.27	0.155
Coast	0.72	0.52-1.01	0.059	1.00	0.70-1.43	0.998	0.72	0.50-1.04	0.082	0.95	0.64-1.39	0.775
Eastern	0.78	0.64-0.94	**	0.95	0.76-1.17	0.605	0.57	0.42-0.77	***	0.81	0.57-1.14	0.221
Nyanza	1.13	1.00-1.28	*	1.27	1.11-1.45	***	1.13	0.97-1.31	0.105	1.22	1.05-1.43	*
Rift Valley	0.89	0.79-1.00	*	1.00	0.90-1.12	0.938	0.84	0.73-0.96	**	0.96	0.83-1.11	0.564
Western	0.88	0.80-0.97	*	0.97	0.87-1.08	0.565	0.87	0.76-0.99	*	1.03	0.89-1.19	0.733
North Eastern ^λ	-	-	-	-	-	-	-	-	-	-	-	-
Occupation												
Agriculture/Self Employed	REF.			REF.			REF.			REF.		
Professional/Teacher/Manager	1.14	0.58-2.24	0.707	1.31	0.54-3.11	0.544	2.29	1.23-4.25	**	2.30	0.97-5.42	0.057
Sales	1.36	1.11-1.68	**	1.20	0.96-1.49	0.116	1.26	0.90-1.76	0.184	1.10	0.76-1.59	0.612
Other	1.27	1.10-1.47	***	1.18	1.01-1.38	*	1.23	1.04-1.45	*	1.06	0.86-1.31	0.566
Not Working	0.97	0.89-1.07	0.576	1.06	0.96-1.17	0.232	0.75	0.60-0.94	*	0.76	0.60-0.98	*
Education												
<Primary School	REF.			REF.			REF.			REF.		
Primary School	2.40	1.33-4.33	**	1.34	0.70-2.55	0.374	2.16	0.72-6.46	0.167	1.65	0.54-5.06	0.379
Post Primary/Vocational./Secondary	1.40	1.02-1.92	*	0.98	0.69-1.40	0.916	1.59	0.90-2.84	0.113	1.32	0.72-2.43	0.370
College/University	1.27	0.97-1.67	0.080	0.92	0.65-1.30	0.622	1.28	0.85-1.93	0.228	0.94	0.58-1.50	0.783
Multiple sexual partners												
No	REF.			REF.			REF.			REF.		
Yes	2.66	1.96-3.61	***	1.53	1.09-2.14	*	1.12	0.73-1.73	0.601	0.85	0.51-1.42	0.530

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ | REF: Reference category | ORs: Odds Ratios | CIs: Confidence Intervals | ^λ predicts failure perfectly and was dropped from the analysis

Discussion

The objectives of this study were to examine the association between HIV sero-status and age at sexual debut and to determine the factors associated with a positive HIV diagnosis. Our study findings corroborate those of previous research, which showed that early sexual debut was significantly associated with the risk of acquiring HIV infection (Konde-Lule et al., 1997; Pettifor et al., 2005; Pettifor et al., 2004). The risk of HIV infection was particularly higher among women who had sexual debut aged 8-15 compared to men of the same age category. These findings suggest that younger women are at more risk of acquiring HIV compared to their male counterparts. Similarly, women who experienced their first sexual encounter at marriage were more likely to test positive of HIV infection; however, among men the results were not statistically significant, partly explained by the small sample size in the sub-analysis. These findings are congruent with previous studies which showed that women were more vulnerable to be infected with HIV regardless of whether they were in marital or steady relationships (Carpenter, Kamali, Ruberantwari et al., 1999; Lugalla et al., 1999; NACC, 2006; WHO, 2006). One of the factors attributed to this outcome is the imbalance in gender-power relations that undermine women's ability to make decisions not only about the household, but also about their sexual and reproductive needs.

We also found that circumcision was a significant predictor of the risk of acquiring HIV, with respondents who were uncircumcised significantly being more likely to be HIV positive. This finding corroborates those of previous studies on the impact of circumcision on HIV status, which showed that circumcision had a protective effect against HIV infection (Agot, Ndinya-Achola, Kreiss et al., 2004; Bailey, Moses, Parker et al., 2007). Similar to other studies (Tenkorang & Maticka-Tyndale, 2008; Maticka-Tyndale et al., 2005; Konde-Lule et al., 1997),

we found that socioeconomic factors were also associated with the risk of acquiring HIV. Women in the poorest and middle wealth brackets were more likely to be infected with HIV relative to those in the poor wealth bracket; however, the results were only marginally significant. Women in the rich and richest wealth brackets were significantly associated with being HIV positive. This finding is not consistent with previous research which suggests that young women from poor economic backgrounds are more likely to engage in transactional sex with partners for economic reasons; hence, increasing the risk of acquiring HIV (Gregson, Nyamukapa, Garnett et al., 2002). While similar findings have been explained among older women in Ghana (Awusabo-Asare & Annim, 2008) we could not find a plausible explanation our findings among younger women and further research is needed to investigate this scenario.

Having multiple sexual partners was also an important predictor of the risk of acquiring HIV, with the risk of infection being higher among women. Previous studies have also found that young people, especially women were more likely to be associated with risky sexual behaviour including having multiple sexual partners (KAIS, 2007; Pettifor et al., 2004; Pettifor et al., 2005; Tenkorang & Maticka-Tyndale, 2008; WHO, 2006; White, Cleland, & Carael, 2000). These studies suggest one of the plausible factors associated with increased risk of HIV infection among young people is the lack of skills and education on how to deal with circumstances and issues that increase their vulnerability to HIV infection and other STIs.

Our findings suggest that there is need for HIV prevention initiatives to design strategies targeted at young people with a special focus on creating awareness about the need of delaying sexual debut. In cases where they decide to have sex; they need to understand the consequences of engaging in risky sexual behaviour. Our findings also point to the importance of educating young people about issues of sexual and reproductive health, including HIV/AIDS and other

STIs. In this regard, introducing comprehensive sexual education in all schools can be an important tool for delaying sexual debut and reducing the spread of HIV including STIs among young people (Agbemenu & Schlenk, 2011; Alford, Cheetham, & Hauser, 2005; Berry & Noble, 2007; Kiragu, 2007).

Our study findings must be interpreted in light of several *limitations*. Firstly, the sample size among those aged 8-15 and 16-21 who tested HIV positive was small. However, this limitation is beyond the control of the researchers due to the nature of the data – those that were randomly selected and offered HIV test. In addition, it was not clear if 23% males and 12% of females who experienced earlier sexual debut aged 8-14 years was voluntary or due to sexual abuse. Secondly, the self-reported nature of the data, particularly on sexual behaviour characteristics may be subject to a variety of biases including; recall bias with regard to the number of past sexual partners and social desirability bias, which may encourage men to exaggerate their number of and time of sexual debut and women to underreport their own additional partners or time of sexual debut. Thirdly, the data lacked variables related to socio-cultural factors; therefore, we were unable to assess the impact of these factors on the probability of being infected with HIV. Lastly, the cross-sectional nature of the data did not allow for trend analysis to be conducted in order to make causal references between the outcome variable and the predictor variables.

Conclusions

The findings from this study have important policy implications geared toward transforming and scaling-up the current policies as they relate to the implementation of sexual education in Kenyan schools. In Kenya, research evidence shows that the current curriculum being taught in schools is deficient since it only focuses on “abstinence-until-marriage” approach and fails to

acknowledge that young people are becoming sexually active at a relatively young age. As a result, it does not effectively protect young people against HIV infection or address their overall sexual and reproductive health needs.

As demonstrated by the findings from this study, individuals who experienced early sexual debut at a young age were more likely to be infected with HIV and associated with risky sexual behaviours, such as having multiple sexual partners. The study findings underscore the importance of introducing a comprehensive sexual education in all Kenyan schools, which is an important tool for equipping young people with skills and information about their sexual and reproductive health. Based on the results from the provinces, the government and HIV program managers should pay special attention to Nyanza province. This is because women and men from this province who engaged in earlier sexual debut were significantly associated with being HIV positive later in life. The government needs to design and implement targeted policies and integrated programs that will mitigate factors responsible for exposing young people in Nyanza province more vulnerable to HIV infection and engagement in earlier sexual debut.

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