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Wealth Status and Risky Sexual Behaviour in Ghana and Kenya

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Abstract

Background: Emerging evidence seems to suggest that there is some association between individual socioeconomic status and sexual risk-taking behaviour in sub-Saharan Africa. A number of broad associations have emerged, among them, positive, neutral and negative relationships between wealth status and sexual risk-taking behaviour.

Reduction in the number of sex partners as a behavioural change has been advocated as an important tool in HIV prevention, and affecting such a change requires an understanding of some of the factors that can influence social behaviour, interactions and activities of subpopulations.

Objectives: To further explore the determinants of sexual risk-taking behaviour (individuals having multiple sex partners), especially the effects that variations in household wealth status, gender and different subpopulation groups have on this behaviour.

Methods: The relationship between wealth status and sexual risk-taking behaviour in the context of HIV/AIDS infection in Ghana and Kenya was assessed using raw data from the 2003 Demographic and Health Surveys of each country. Wealth quintiles were used as a proxy for economic status, while non-marital and non-cohabiting sexual partnerships were considered indicators for risky sexual behaviour.

Results: For females, there appears to be an increasing probability of sexual risk taking by wealth status in Kenya, while, in Ghana, an inverted J-shaped relationship is shown between wealth status and sexual risk taking. When controlled for other variables, the relationship between wealth status and sexual risk-taking behaviour disappears for females in the two countries. For males, there is no clearly discernable pattern between wealth status and sexual risk-taking behaviour in Ghana, while there is a general trend towards increasing sexual risk-taking behaviour by wealth status in Kenya. For Ghana, the highest probabilities are among the highest and the middle wealth quintiles; in Kenya, high probabilities were found for the two highest wealth quintiles. Controlling for the effects of

other factors, the pattern for Ghana is further blurred (not statistically significant), but the relationship continues to show in the case of Kenya, and is significant for the highest quintile. In general, for both Ghana and Kenya, men in the highest wealth quintile were found to be more likely to have multiple sexual partners than the other groups.

Conclusion: The changing phases of HIV infection indicate that it is no longer poverty that drives the epidemic. Rather, it is wealth and a number of other sociodemographic factors that explain sexual risk-taking behaviour that puts people at risk. Understanding local specific factors that predispose individuals towards sexual risk taking could help to expand the range of information and services needed to combat the HIV pandemic.

Background and Objective

At the global level, there is a negative association between the level of human welfare as measured by the Human Development Index and the level of HIV infection. Sub-Saharan Africa, one of the least developed areas, has consistently accounted for over 60% of all infection over the last 2 decades, and in 2007, accounted for 68% of the 2.5 million new infections in the world.[1] Within sub-Saharan Africa, HIV infection seems to be positively associated with socioeconomic status, with countries such as Botswana, South Africa and Ivory Coast, some of the wealthier countries, reporting a high incidence of infection.[1,2] At the micro (individual/household) level, the pattern seems to be mixed, and this has generated interest in the association between individual wealth status and HIV infection (for example, see references[3-6]). With regard to the micro-level relationship, it has been observed that individual/household background characteristics are associated with sexual risk-taking behaviours, and these behaviours have been found to fuel the epidemic, but at the same time, these characteristics can constitute protective factors for intervention.[2,4,7-9]

While some of these discussions link wealth status and levels of infection,[2] some measure sexual risk-taking behaviours against wealth status, and others use sexual risk-taking behaviour and level of infection interchangeably (for example, see Shelton et al.[5]). Using the proximate determinants model, and with wealth status as a background variable, Mishra et al.[2] identified proximate factors that mediate between the identified background variable to influence levels of infection. Multiple sexual partners is captured as one of the proximal factors fuelling the spread of HIV infection in sub-Saharan Africa.[7,10,11]

The emerging evidence of an association between wealth status and sexual risk-taking behaviour points to three broad associations: positive, neutral and negative relationships. The first argument is that relatively wealthy people (especially males) with more disposable income are more likely to be involved in extra non-marital, non-cohabiting partnerships and to have wide social networks.[4,12] This postulated positive association between high socioeconomic status and a higher incidence of sexual risk-taking behaviour challenges the view that poverty is the driving force behind sexual risk taking, a behaviour that has been partly responsible for the rapid spread of the epidemic in sub-Saharan Africa.[3,5] Inherent in this observation is an association between a high incidence of sexual risk-taking behaviour and "urban living, having a good education and having good income."[13] It is also possible that, although the relatively wealthy may be involved in sexual networking, which will put them at

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risk, they are also likely to use their resources to obtain reliable information that will enable them to take protective measures (such as condom use or the treatment of sexually transmitted infections) against adverse outcomes, or to obtain services.[9] This second argument is a blurred association (or lack of one) between wealth status and sexual risk-taking behaviour. The observation of the weak relationship emerges as the co-variates for HIV prevalence and/or sexual risk-taking behaviour are expanded to include other dimensions such as biological pathways and behavioural and sociodemographic factors.[2]

The third argument is a negative association between wealth status and sexual risk-taking behaviour. One dimension of the argument is that poor people take risks as part of survival strategies, given the thin line between survival and deprivation and/or death. Furthermore, poverty-induced vulnerability puts poor people at risk of infection generally, including reproductive tract infection, creating high disease burdens. Already susceptible to other diseases, such populations are prone to HIV infection.[14] Finally, the poor are unable to reduce their vulnerability because they lack the capability to take action to minimize possible infection or obtain support when needed.[3] In other words, low socioeconomic status makes it difficult or impossible for the poor to pursue protective behaviours, even if they have the knowledge about HIV prevention, because "their financial dependence on their partners … reduces their sexual negotiating power".[6]

These arguments may not be mutually exclusive; the high incidence of sexual risk-taking behaviours in non-poor populations and the vulnerability of these groups can constitute two ends of a curve that can then lead to a U-shaped or J-shaped relationship between wealth status and sexual risk-taking behaviour. Mishra et al.[2] have observed an inverted U-shaped relationship between wealth status and HIV infection for Ghana and Lesotho. It could be hypothesized that, within each country, people in the highest and lowest wealth quintiles are more likely to engage in risky sexual behaviour as a result of their relative situations. Furthermore, given the well known gender-based inequalities and the vulnerability of females to HIV infection, especially those in resource-poor situations,[15] the nature of the relationship between risk taking and wealth will differ among females and males in sub-Saharan Africa.

This study contributes to the debate on the association between wealth status and sexual risk-taking behaviour for both males and females in Ghana and Kenya. Our aim was to explore the relationship (if any) between wealth status and sexual risk-taking behaviour that puts individuals at risk of HIV/AIDS infection, using the 2003 Demographic and Health Survey (DHS) of each country. The view is that partner reduction as a behavioural change strategy will continue to be an important tool in HIV prevention and that understanding of some of the factors that can influence social behaviour, interactions and activities of subpopulations will contribute to the development of a new generation of interventions.[7]

Ghana and Kenya were selected for their similarities, for differences in their demographic profiles and because of their different levels of HIV infection. The prevalence rates of HIV/AIDS infection from surveillance surveys in Ghana show a decline: 3.6% in 2003, 3.2% in 2004, 2.7% in 2005 and 1.9% in 2007.[16] Those in Kenya have also declined: 15.0% in 2001, 6.7% in 2003, 6.1% in 2005 and 5% in 2006.[17] The rates of HIV/AIDS prevalence in Kenya reached double digits in the 1990s and declined thereafter, while the overall rates in Ghana over a similar time period have been much lower, remaining below 5%. The decline in the rates for Kenya has been attributed to partner reduction.[18] Estimated prevalence rates of HIV infection among women aged 15–24 years were 1.3% and 5.2%, respectively, for Ghana and Kenya, while the rates for males of the same age were 0.2% and 1.0%,

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respectively, for Ghana and Kenya.[1,16] Overall, the estimated rates of infection in 2005 for individuals aged 15–49 years were 2.3% and 6.1%, respectively, for Ghana and Kenya.[19] Thus, the two countries are going through different waves of the HIV/AIDS epidemic.

Methods

Sources of Data

Raw data from the 2003 DHS of Kenya and that of Ghana were used to assess the relationship between wealth status and sexual risk-taking behaviour. These surveys constitute a detailed and comprehensive data source for participating countries. The data, collected for females aged 15–49 years and males aged 15–54 years, are nationally representative, detailed and have been assessed for their validity and reliability.[20,21] The number of females interviewed in Ghana was 5691, and in Kenya, it was 8195. For the males, 5015 were interviewed in Ghana and 3578 were interviewed in Kenya.

Methods of Estimation

The two main measures are sexual risk-taking behaviour and wealth status. The study adopts the definition of sexual risk-taking behaviour used in the DHS as sex with a non-marital, non-cohabiting partner within the last 12 months.[20,21] Household wealth quintiles were calculated using the approach developed for DHS.[22] Theoretically, each quintile should consist of 20% of the population if wealth is evenly distributed. The independent variables used are wealth quintiles, age, ethnicity, education level completed, rural/urban location, religion, marital status, working or not working and whether the individual has heard of HIV/AIDS. These independent variables are considered important in influencing the behaviour of individuals, and could be risk or protective factors.

The logit model was adopted to estimate odds ratios for females aged 15–49 years and males aged 15–54 years who had reported that they have been or are sexually active. Data on the selected variables were extracted from the individual formats of the 2003 DHS of the two countries. The logit model was chosen in order to overcome the inherent problems associated with linear probability models because it provides relative estimation based on probabilities.[23] The estimations were made for females and males given the gender dimensions of multiple partnerships. Two estimation models are presented for each sex. Model 1 uses estimates for work, education, age and wealth status as the independent variables. In model 2, marital status, rural-urban residence, ethnicity and religion are added because these attributes are considered to influence behaviour (for example, see Awusabo-Asare et al.[24]).

Results

The sociodemographic background of respondents indicates marked differences between Ghana and Kenya. For instance, there are more males and females with formal education in Kenya than Ghana: about twice as many females in Kenya (7.09%) have had higher education than Ghana (2.53%), and twice as many Ghanaian females (33.68%) had no formal education compared with Kenya (15.75%). The wealth quintiles in Ghana cluster around the average of 20% for both males and females, but the data from Kenya shows wide variability. Furthermore, while about half of both females and males in Kenya are in the two highest quintiles, with only 15–17% in the lowest quintile, about 40% were in the two highest quintiles in Ghana. There were more females working in Ghana (78.47%) than in Kenya (60.48%). Information about HIV/AIDS is universal in both countries, indicating the attention that has been given to the epidemic. Approximately 12% of females and approximately a third of males in both Ghana and Kenya

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Table I. Sociodemographic background and risky behaviour: male

Characteristics	Category	Ghana (%)	Kenya (%)
Current age (y)	15–24	17.87	32.01
	25–34	33.68	30.22
	35–44	24.07	23.35
	45+	24.38	14.42
Wealth index	Lowest	23.47	14.56
	Below average	19.17	15.39
	Average	17.79	15.99
	Above average	18.10	21.52
	Highest	21.46	32.54
Settlement	Rural	62.37	66.96
	Urban	37.54	33.04
Educational level	No education	25.21	8.19
	Primary	14.25	52.07
	Secondary	53.22	27.48
	Higher	7.32	12.26
Marital status	Married	65.36	60.76
	Never married	21.70	33.74
	Living together	5.52	0.87
	Not living together	4.01	2.23
	Widowed	0.78	0.77
	Divorced	2.63	1.63
Currently working	No	10.10	19.45
	Yes	89.90	80.55
Religion	Catholic	16.7	27.09
	Protestant/other Christian	48.80	56.85
	Muslim	20.90	9.43
	No religion	7.10	6.36
	Other	6.50	0.27
Ever heard of AIDS	No	0.57	0.57
	Yes	99.43	99.43
Last intercourse used condom[a]	No	83.13	83.22
	Yes	16.87	16.78
Number of other sexual partners	0	71.89	69.45
within the last 12 months	1 or more	28.11	30.55

a Sample size used in the regression includes only those who had had intercourse.

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had one or more sexual partners in the last 12 months. The results point to the known gender bias regarding multiple sexual partners, where such behaviour is tacitly condoned for males, but condemned among females in both countries,[18,25,26] (tables I and II). The level of condom use at last sexual encounter was similar for males in both countries, but varied for females: Kenya (1.66%) and Ghana (7.92%). The subpopulations discussed here were used for the analysis.

The results of the models are shown for men in Ghana (table III), men in Kenya (table IV), women in Ghana (table V) and women in Kenya (table VI). The relationship between sociodemographic variables and sexual risk taking are significant for age, education and wealth status for males and females in Ghana, and for females in Kenya. The results indica-

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Table II. Sociodemographic background and risky behaviour: female

Characteristics	Category	Ghana (%)	Kenya (%)
Current age (y)	15–24	37.08	43.08
	25–34	31.35	30.70
	35–44	22.77	20.00
	45+	8.80	6.22
Wealth index	Lowest	23.53	16.79
	Below average	17.55	15.94
	Average	17.40	16.85
	Above average	18.98	19.13
	Highest	22.54	31.29
Settlement	Rural	41.71	66.43
	Urban	58.29	33.57
Educational level	No Education	33.68	15.75
	Primary	19.54	53.06
	Secondary	44.25	24.10
	Higher	2.53	7.09
Marital status	Married	57.51	54.29
	Never married	26.52	30.09
	Living together	7.40	5.21
	Not living together	3.58	4.55
	Widowed	2.11	4.11
	Divorced	2.88	1.74
Currently working	No	21.53	39.52
	Yes	78.47	60.48
Religion	Catholic	17.12	23.45
	Protestant/other Christian	56.07	61.64
	Muslim	17.80	12.52
	No Religion	5.31	2.04
	Other	3.71	0.35
Ever heard of AIDS	No	2.16	1.58
	Yes	97.84	98.42
Last intercourse used condom[a]	No	92.08	94.06
	Yes	7.92	1.66
Number of other sexual partners	0	87.24	87.74
within the last 12 months	1 or more	12.76	12.26

a Sample size used in the regression includes only those who had had intercourse.

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te increasing probability of sexual risk taking by wealth status among females in Kenya (2.02: model 1), while those for Ghana show an inverted J-shaped relationship between wealth status and sexual risk taking.[2] The observed inverted J-shaped relationship between sexual risk taking and wealth differs from the U-shaped relationship between wealth status and HIV infection rate for Ghana. The variation in the pattern of association between wealth status on one hand and infection or sexual risk-taking behaviour as dependent variables on the other presents challenges for programming. When controlled for other variables (model 2), the relationship between wealth status and sexual risk-taking behaviour virtually disappears for females in the two countries.

For males, there is no discernable pattern between wealth status and sexual risk-taking beha-

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viour for Ghana, but there is a general trend towards increasing sexual risk-taking behaviour by wealth status in Kenya. For Ghana, the highest probabilities are among the highest and the middle wealth quintiles, while for Kenya, the high probabilities are for the two highest wealth quintiles. When controlled for the effects of other factors, the pattern for Ghana is further blurred (not significant), but the relationship continues to show in the case of Kenya and is significant for the highest quintile (model 2). In both Ghana and Kenya, men in the highest wealth quintile are more likely to have multiple sexual partnerships than the other groups.

Level of education also appears to be positively associated with multiple sexual partnerships for Ghana, with the probabilities being higher for fe-

Table III. Odds ratios (95% CI) for sexual risk taking (multiple sex partners) among men in Ghana

Characteristics	Category	Model 1 (n = 3839)	Model 2 (n = 3839)
Employment	Not working (ref)	1.00	1.00
	Working	0.84 (0.65, 1.08)	1.73 (1.30, 2.31)*
Education level	No education (ref)	1.00	1.00
	Primary	1.93 (1.46, 2.55)*	1.73 (1.24, 2.39)**
	Secondary	1.86 (1.46, 2.38)*	1.59 (1.18, 2.15)**
	Higher	2.10 (1.44, 3.05)*	1.86 (1.20, 2.90)***
Age (y)	15–24 (ref)	1.00	1.00
	25–34	0.54 (0.49, 0.60)*	0.83 (0.73, 0.95)***
	35–44	0.50 (0.46, 0.54)*	0.78 (0.70, 0.87)*
	45+	0.52 (0.48, 0.56)*	0.74 (0.68, 0.81)*
Wealth index	Lowest (ref)	1.00	1.00
	Lower	0.95 (0.73, 1.24)	0.85 (0.62, 1.15)
	Middle	1.33 (1.02, 1.73)**	1.26 (0.92, 1.73)
	Higher	1.26 (0.96, 1.65)***	1.12 (0.78, 1.62)
	Highest	1.46 (1.11, 1.92)**	1.17 (0.78, 1.74)
Marital status	Married (ref)	NA	1.00
	Never married	NA	14.91 (11.48, 19.37)*
	Living together	NA	3.76 (2,71, 5.22)*
	Not living together	NA	10.26 (7.15, 14.74)*
	Divorced	NA	11.09 (7.21, 17.06)*
	Widowed	NA	8.62 (3.98, 18.69)*
Settlement	Rural (ref)	NA	1.00
	Urban	NA	0.88 (0.68, 1.15)
Ethnicity	Akan (ref)	NA	1.00
	Hausa	NA	0.77 (0.31, 1.95)
	Gruma	NA	1.70 (0.97, 2.96)***
	Grussi	NA	0.74 (0.41, 1.32)
	Mole	NA	0.74 (0.54, 1.01)***
	Guan	NA	1.11 (0.69, 1.79)
	Ga	NA	1.39 (0.98, 1.98)***
	Ewe	NA	1.33 (1.02, 1.75)**
	Other	NA	0.90 (0.53, 1.53)
Religion	Catholic (ref)	NA	1.00
	Protestant	NA	0.84 (0.67, 1.05)
	Moslem	NA	0.10 (0.73, 1.37)
	Traditional/other	NA	1.09 (0.69, 1.71)

NA = not applicable; **ref** = reference; * $p < 0.001$, ** $p < 0.05$, *** $p < 0.1$ vs reference group.

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Table IV. Odds ratios (95% CI) for sexual risk taking (multiple sex partners) among men in Kenya

Characteristics	Category	Model 1 (n = 3002)	Model 2 (n = 3002)
Employment	Not working (ref)	1.00	1.00
	Working	1.09 (0.87, 1.38)	1.98 (1.52, 2.59)*
Education level	No education (ref)	1.00	1.00
	Primary	1.49 (0.97, 2.28)	1.26 (0.71, 2.22)
	Secondary	1.12 (0.71, 1.75)	0.93 (0.52, 1.70)
	Higher	1.50 (0.91, 2.46)	1.50 (0.79, 2.85)
Age (y)	15–24 (ref)	1.00	1.00
	25–34	0.46 (0.41, 0.51)*	0.76 (0.66, 0.87)*
	35–44	0.45 (0.41, 0.49)*	0.74 (0.65, 0.84)*
	45+	0.49 (0.45, 0.54)*	0.73 (0.65, 0.83)*
Wealth index	Lowest (ref)	1.00	1.00
	Lower	1.35 (0.95, 1.90)	1.05 (0.71, 1.56)
	Middle	1.23 (0.87, 1.74)	1.06 (0.72, 1.58)
	Higher	1.76 (1.27, 2.44)**	1.33 (0.91, 1.95)
	Highest	2.01 (1.46, 2.76)*	1.54 (0.99, 2.40)***
Marital status	Married (ref)	NA	1.00
	Never married	NA	12.19 (9.05, 16.43)*
	Living together	NA	1.31 (0.43, 3.96)
	Not living together	NA	22.08 (12.48, 39.06)*
	Divorced	NA	13.90 (7.47, 25.83)*
	Widowed	NA	6.07 (2.41, 15.23)*
Settlement	Rural (ref)	NA	1.00
	Urban	NA	1.27 (0.94, 1.73)
Ethnicity	Kikuyu (ref)	NA	1.00
	Kuria	NA	2.86 (0.96, 8.55)***
	Turkana	NA	2.19 (0.86, 5.61)
	Taita	NA	2.53 (1.12, 5.71)**
	Somali	NA	0.11 (0.02, 0.50)**
	Mijikenda	NA	2.07 (1.27, 3.40)**
	Meru	NA	1.05 (0.64, 1.70)
	Masai	NA	4.81 (2.36, 9.82)*
	Luo	NA	2.24 (1.57, 3.21)*
	Luhya	NA	1.73 (1.24, 2.40)**
	Kisii	NA	1.88 (1.18, 3.00)**
	Kamba	NA	1.27 (0.88, 1.83)
	Kalenjin	NA	1.68 (1.15, 2.47)**
	Embu	NA	1.65 (0.74, 3.64)
	Other	NA	1.18 (0.55, 2.51)

NA = not applicable; **ref** = reference; * $p < 0.001$, ** $p < 0.05$, *** $p < 0.1$ vs reference group.

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males than males. That is, a female with higher education in Ghana is about five times more likely to be involved in sexual risk taking than a female without formal education, while for males, the probability is twice as high. For Kenya, sexual risk taking is highest among females with secondary education and lowest among the reference group (no education), but for males, the highest probabilities are among those with primary and higher education. As is the case for Ghana, the probabilities for females are higher than those of males. However, for females the pattern disappears when controlled for

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other factors (model 2), while the pattern continues to exist for males. For males and females in both Ghana and Kenya, sexual risk-taking behaviour is higher among the youth (the reference point) than any other age category. Odds ratios are particularly low for older females in the two countries. This is one variable that is significant and consistent in the two countries, even after controlling for other factors.

In model 2, for both Kenya and Ghana, marital status was the most discriminatory sexual risk-taking variable. The probability of sexual risk taking for males who were single (never married) was, in Ghana, about 15 times and, in Kenya, about 12 times higher than that for the reference group (married)

Table V. Odds ratios (95% CI) for sexual risk taking (multiple sex partners) among women in Ghana

Characteristics	Category	Model 1 (n = 4828)	Model 2 (n = 4828)
Employment	Not working (ref)	1.00	1.00
	Working	0.36 (0.29, 0.43)*	0.84 (0.64, 1.11)
Education level	No education (ref)	1.00	1.00
	Primary	2.89 (2.15, 3.86)*	1.26 (0.85, 1.85)
	Secondary	4.54 (3.48, 5.90)*	1.62 (1.14, 2.31)*
	Higher	5.14 (2.96, 8.92)*	1.62 (0.78, 3.38)
Age (y)	15–24 (ref)	1.00	1.00
	25–34	0.39 (0.32, 0.48)*	0.59 (0.45, 0.77)*
	35–44	0.33 (0.18, 0.63)*	0.84 (0.39, 1.78)
	45+	0.23 (0.15, 0.35)*	0.45 (0.27, 0.75)*
Wealth index	Lowest (ref)	1.00	1.00
	Lower	1.29 (0.93, 1.77)	1.15 (0.75, 1.78)
	Middle	1.33 (0.97, 1.82)**	1.13 (0.74, 1.74)
	Higher	1.90 (1.41, 2.57)*	1.24 (0.77, 2.01)
	Highest	1.34 (0.98, 1.83)**	0.77 (0.46, 1.29)
Marital status	Married (ref)	NA	1.00
	Never married	NA	554.12 (293.70, 1045.45)*
	Living together	NA	73.62 (38.73, 139.96)*
	Not living together	NA	172.25 (88.22, 336.33)*
	Divorced	NA	156.08 (78.37, 310.86)*
	Widowed	NA	69.50 (32.16, 150.22)*
Settlement	Rural (ref)	NA	1.00
	Urban	NA	1.08 (0.77, 1.50)
Ethnicity	Akan (ref)	NA	1.00
	Hausa	NA	1.97 (0.63, 6.14)
	Gruma	NA	1.76 (0.64, 4.81)
	Grussi	NA	1.14 (0.49, 2.67)
	Mole	NA	1.27 (0.78, 2.07)
	Guan	NA	1.06 (0.52, 2.14)
	Ga	NA	1.12 (0.74, 1.69)
	Ewe	NA	1.20 (0.86, 1.69)
	Other	NA	1.35 (0.69, 2.63)
Religion	Catholic (ref)	NA	1.00
	Protestant	NA	0.86 (0.64, 1.15)
	Muslim	NA	0.91 (0.55, 1.48)
	Traditional/other	NA	0.55 (0.19, 1.60)

NA = not applicable; **ref** = reference; * $p < 0.001$, ** $p < 0.05$, *** $p < 0.1$ vs reference group.

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Table VI. Odds ratios (95% CI) for sexual risk taking (multiple sex partners) among women in Kenya

Characteristics	Category	Model 1 (n = 6765)	Model 2 (n = 6765)
Employment	Not working (ref)	1.00	1.00
	Working	1.41 (1.21, 1.64)*	1.21 (0.99, 1.47)***
Education level	No education (ref)	1.00	1.00
	Primary	1.78 (1.36, 2.34)*	1.14 (0.79, 1.63)
	Secondary	2.07 (1.54, 2.79)*	1.14 (0.77, 1.70)
	Higher	1.92 (1.32, 2.78)*	0.80 (0.49, 1.29)
Age (y)	15–24 (ref)	1.00	1.00
	25–34	0.36 (0.30, 0.42)*	0.98 (0.78, 1.24)
	35–44	0.31 (0.25, 0.38)*	0.88 (0.66, 1.17)
	45+	0.22 (0.15, 0.33)*	0.49 (0.31, 0.78)*
Wealth index	Lowest (ref)	1.00	1.00
	Lower	1.18 (0.88, 1.57)	0.68 (0.47, 0.99)**
	Middle	1.35 (1.02, 1.79)**	0.76 (0.53, 1.09)
	Higher	1.50 (1.13, 1.97)*	0.70 (0.49, 1.00)***
	Highest	2.02 (1.56, 2.62)*	0.82 (0.54, 1.23)
Marital status	Married (ref)	NA	1.00
	Never married	NA	92.83 (68.00, 126.73)*
	Living together	NA	6.03 (3.89, 9.37)*
	Not living together	NA	53.92 (38.43, 75.66)*
	Divorced	NA	55.32 (34.90, 87.71)*
	Widowed	NA	29.06 (19.92, 42.40)*
Settlement	Rural (ref)	NA	1.00
	Urban	NA	1.01 (0.76, 1.32)
Ethnity	Kikuyu (ref)	NA	1.00
	Kuria	NA	0.31 (0.04, 2.72)
	Turkana	NA	0.50 (0.17, 1.47
	Taita	NA	1.41 (0.77, 2.61)
	Somali	NA	0.03 (0.00, 0.21)*
	Mijikenda	NA	1.44 (0.95, 2.16)***
	Meru	NA	1.53 (1.02, 2.29)**
	Masai	NA	1.85 (0.89, 3.87)
	Luo	NA	1.82 (1.35, 2.46)*
	Luhya	NA	1.05 (0.79, 1.40)
	Kisii	NA	1.05 (0.70, 1.56)
	Kamba	NA	1.50 (1.10, 2.04)**
	Kalenjin	NA	0.87 (0.59, 1.28)
	Embu	NA	1.10 (0.52, 2.35)
	Other	NA	0.97 (0.45, 2.08)

NA = not applicable; **ref** = reference; * $p < 0.001$, ** $p < 0.05$, *** $p < 0.1$ vs reference group.

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[p = 0.001]. This was followed by respondents in relationships, but who were not living with their partner (approximately ten times higher probability than the reference group in Ghana and approximately 22 times higher in Kenya), divorcees and widowers. The probabilities are even higher for females. Being single (never married, divorced and separated) is associated with higher risk-taking factors. Two groups that emerge but for whom less attention has been given are divorcees and widowers.

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Discussion and Conclusion

Wealth status constitutes one of many distant (background) variables that influence proximal factors such as multiple sexual partnerships that lead to sexual risk-taking behaviour and subsequently HIV infection.[2] However, the study fails to identify a discernable pattern for both males and females and in both countries. For instance, controlling for other factors for males, in Ghana, the relationship is statistically insignificant, while in Kenya it posits a statistically significant relationship between wealth status and sexual risk-taking behaviour.

In general, people with higher education are more likely to be in positions that enable them to be relatively well off compared with those with no formal education. Thus, the high probabilities of sexual risk-taking behaviour among the high wealth quintiles may be linked to education status. The high probabilities by education for females in both Ghana and Kenya could be due to the mobility that formal education offers to these women and the networking among groups with this socioeconomic status (see also Mishra et al.[2]). This is one area that will need to be explored for its interface and implications for intervention programmes.

The economic dimension of sexual networking among those with high disposable income is consistent with the economic axiom of 'more is better'. The literature in economics and psychology vary in their assessment of the factors that influence well-being but seem to converge in their assessment of sexual risk-taking behaviour. Rodgers'[27] internalized (autonomous) and externalized (controlled) psychological behavioural patterns of sexual networking at the household level is akin to the economist axiom of 'more is better'. While economists argue that income has a positive influence on well-being, psychologists argue that non-monetary factors such as marital status and age rather than income have positive relationships with well-being.[28] What is emerging is the interface of the two views, with wealth being used to enhance social well-being, leading to such behaviours as multiple sexual partnerships.

In both Ghana and Kenya, young people reported higher sexual risk-taking behaviour than any other age group. Such young people are less likely to be married and, when in a relationship, are more likely to be living apart, factors that are also associated with sexual risk-taking behaviour.

High and significant probabilities of sexual risk-taking behaviour are associated with never having been married, not living with partner, and being widowed or divorced for both males and females and for both countries. One study of the Ghana DHS data has observed that marriage does not seem to be protective of HIV infection for females.[29] While this may be the case, those that have never married, divorcees and widows may be connected in a web of relationships. As observed elsewhere,[11] one defining factor in multiple sexual partnerships in sub-Saharan Africa is the concurrent nature of sexual networks. The absence of a regular partner can precipitate sexual networking with social and economic dimensions. The influence of being single on sexual risk-taking behaviour is an area that needs further research.

Over the years, education on HIV/AIDS, in addition to providing general information, has specifically stressed the sexual risk-taking behaviour of young people and those individuals associated with poverty. Very little attention has been paid to those in the higher income groups who can use their disposable income for multiple sexual partnerships. There is the well known 'sugar-daddy syndrome', which involves older males and young females, and can involve commercial sex in some cases. HIV/AIDS education programmes targeting the sexual networking of young females with older males mostly concentrate on females to the neglect of males who drive the system.[30] The people who have disposable income that creates conditions for

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sexual risk-taking behaviour should also be targeted for intervention activities. Furthermore, divorcees and widowers are at risk, but these groups are rarely considered in programmes. With the emerging results, HIV/AIDS education groups need to develop programmes that separately target such groups as widows and divorcees, those in sexual unions but not living with their partners (a group for whom the 'B' in the ABC [Abstain, Be faithful, use Condoms] campaign is also meant for), males in the high economic income bracket and people with relatively high formal education who have multiple sexual partners.

Understanding the factors that predispose individuals to sexual risk taking can help to expand the range of information and services needed by such people. The changing phases of HIV infection indicate that it is no longer poverty that drives the epidemic. Rather, there are a number of other socio-odemographic factors that explain sexual risk-taking behaviour that puts people at risk. Programmes will need to go beyond ABC by promoting activities that lead to behavioural change in the area of multiple sexual partnerships. Behavioural change takes time, but the available evidence on the decline of new HIV infections in Ghana and the recent increases in Uganda point to changes in behaviour associated with multiple sexual partnerships.[7,17]

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