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Timing of First Sexual Intercourse and Number of Lifetime Sexual Partners in Sub-Saharan Africa

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Abstract The timing of first sexual intercourse (FSI) has been linked with subsequent sexual risk-taking behaviours and associated negative health outcomes. Nonetheless, there is a lack of multi-countries studies exploring the relationship between timing of FSI and subsequent number of sexual partnerships. Our aim in this paper was to aggregate evidence from 34 sub-Saharan African countries to investigate the association between age at FSI and lifetime number of sexual partners, using Demographic and Health Survey data. Descriptive and multilevel mixed effects Poisson regression techniques were applied to the data. The findings reveal a significant association between age at FSI and subsequent number of lifetime sexual partners. This association remained post adjusting for education, wealth, marital status and residence for both men and women. Beyond these, the results showed that wealth worked in opposite direction in men and women—higher wealth status was protective for women while it exposed men to higher number of lifetime sexual partners. Higher education exposed both women and men to

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increased number of lifetime partnerships. We conclude that there is an association between delayed onset of sexual intercourse and number of sexual partners over time, regardless of gender and socio-demographic background. Sexual and reproductive health programmes calling for sexual partner reduction should focus more on age of sexual debut while factoring in the influence of the various socio-demographic dynamics.

Keywords Timing · First sexual intercourse · Sexual partners · Sub-Saharan Africa

Introduction

The timing of first sexual intercourse (FSI) is an important transition in life that continues to attract attention globally. For many young people, in particular, it marks the beginning of their transition to adulthood and exposure to a wide range of sexual and reproductive health outcomes including pregnancy (planned and unplanned), unsafe abortion and sexually transmitted infections (STIs) (Doyle et al. 2012; Stöckl et al. 2013; Yode and LeGrand 2012). These could have detrimental health, social and economic consequences for the individual, family and community at large. Evidence suggests that these risks are further heightened in instances where FSI occurs at an early age (Bearinger et al. 2007). Early FSI has been variably defined in the literature as sexual intercourse at age 15 years and younger (Langille et al. 2010) or 16 years and younger (Cavazos-Rehg et al. 2010), or quartiles or tertiles of age at FSI based on study populations (Sandfort et al. 2008).

There is ample evidence linking a wide array of individual, parental, family, community and broader structural factors to the timing of FSI among young people. At the individual level, early onset of puberty, low self-esteem (Zimmer-Gembeck and Helfand 2008), religiosity (Edwards et al. 2011) and educational attainment (Doyle et al. 2012; Speizer et al. 2013) have been found to be associated with the timing of FSI. Parents' socio-economic status (Maticka-Tyndale et al. 2005) or their educational attainment (Price and Hyde 2009), as well as parental monitoring and family or household composition and connectedness (Kumi-Kyereme et al. 2007; Valle et al. 2009) may also determine the timing of young peoples' transition into sexual activity or intercourse. In addition, community dynamics such as gender roles/norms equally play a role in the timing of FSI. In contexts where socio-cultural norms associate masculinity with sexual prowess and otherwise for femininity, young men may be found engaging in sexual intercourse at early ages compared with women (Kabiru and Orpinas 2009). Other factors may be structural in nature including availability of youth-friendly sexual and reproductive health programmes and services.

Away from the health and social implications fore elucidated, age at FSI has been identified as a key predictor of a range of subsequent sexual risk-taking behaviours. Early FSI has been associated with having unprotected sexual intercourse, inconsistent contraceptive use, increased coital frequency, having older sexual

partners, using alcohol or drugs before sex, having forced sex and having a high number of sexual partners (Fatusi and Blum 2008; Kastbom et al. 2015). The latter is of particular public health concern, as it represents an important behavioural risk—through sexual networking—for the spread of STIs (including HIV) especially in the absence of correct and consistent condom use (Carlos et al. 2017; Fatusi and Blum 2008; Uchudi et al. 2012).

In sub-Saharan Africa where HIV is still a major public health challenge, accounting for over 65% of global HIV infections (UNAIDS 2016), age at FSI has been considered an important indicator for exposure to HIV transmission (Doyle et al. 2012; Yode and LeGrand 2012). On the other hand, most public health experts believe that multiple concurrent partnerships and high partner acquisition by both men and women lie at the root of the persistence and severity of the HIV epidemic in this region (Carlos et al. 2017; Uchudi et al. 2012). Besides advocating correct and consistent condom use, preventive programmes continue to emphasize the need for young people to delay the timing of FSI and to reduce number of sexual partners.

Consequently, scholarship on the timing of FSI (Carlos et al. 2017; Doyle et al. 2012; Kabiru and Orpinas 2009; Speizer et al. 2013; Tenkorang and Maticka-Tyndale 2008), as well as sexual partnering (Bingenheimer 2010; Uchudi et al. 2012) across sub-Saharan Africa has grown substantially. Nonetheless, few studies have explored the relationship between age at FSI and subsequent number of sexual partners. Such studies have largely focused on youth in specific societies or countries and have variedly conceptualized both the timing of FSI and sexual partnering. For instance, in a study involving 15–24 year olds in Kwazulu Natal, Harrison et al. (2008) reported that men who had their FSI before 15 years were more likely to have had multiple sexual partners, while Zuma et al. (2010) found multiple sexual partnerships to be more common among men and women in the same age group (15–24 years) who had their FSI at age 16 years and below. In the Arusha region in Tanzania, Mnyika et al. (1997) observed that men and women aged 15–54 years who initiated sex before age 16 years were more likely to have had a greater number of sexual partners.

Such inherent methodological differences in terms of study sampling and measures of timing of FSI and sexual partnering limit the comparability and/or generalizability of findings across societies or countries within the sub-region. Thus, the current study seeks to overcome such limitations and provide a multi-country perspective on the relationship between these two sexual behaviours (age at FSI and number of sexual partners) of public health importance. This study, therefore, aggregates nationally representative household survey [Demographic and Health Survey (DHS)] data from 34 sub-Saharan African countries to establish the magnitude and relationship between timing of FSI and subsequent number of sexual partner in the sub-region. Since the timing of FSI is a potential predictor of subsequent sexual behaviours and associated outcomes, this study could provide insights into public health programming.

Methods

Data

This paper assembled data from 34 nationally representative DHS surveys conducted between 2006 and 2014. The countries were included primarily by virtue of being located within the SSA region (where HIV remains a major public health concern), as well as the availability of DHS data within the period the study covered. The surveys collected information on women and men between 15 and 49 years and 15–64, respectively. The survey in each country followed a similar procedure. In the first stage of the process, regions were stratified into urban and rural areas. Enumeration areas/clusters were then selected from each stratum and in each sampled cluster, a fixed number of households were selected. In participating countries, survey design and data collection were undertaken by national statistical agencies in partnership with Inner City Fund (ICF) Macro. The general survey tool is constructed in English Language but was translated into appropriate national language before fielding.

In sampled households, all women within 15–49 years who were de facto residents were interviewed after consenting to participate in the survey. In half of the households sampled in each cluster, men between 15 and 64¹ years were interviewed. This standardized process of sampling allows for cross-country comparison, although some country specific variables may be included in the survey modules.

The key areas of the surveys included household and respondents' characteristics, marriage and sexual activity, fertility preferences, family planning, infant and child mortality, maternal health, women empowerment, HIV/AIDS, malaria and adult health behaviours among others. In each country, the survey was reviewed and approved by ethics approval bodies with mandate for such purposes. Every interviewed respondent offered both written and verbal consent. We obtained permission from Measure DHS (www.measuredhs.com) to use these datasets.

Study Variables

The key explanatory variable used in this paper is the time at which FSI occurred. In all DHS surveys, age at FSI was captured as a continuous variable. Treating this variable in a continuous manner, the number of respondents having sex at single ages would be too small with a potential for statistical instability of the models. To avoid the effects of small cell size on models, four categories of timing of FSI were created—“< 15”, “15–19 years”, “≥ 20 years” and “FSI at first union/marriage”. Although ages of respondents whose FSI occurred in marriage could overlap with the three other categories (< 15, 15–19 years and ≥ 20 years), the exact ages of FSI occurring at first union/marriage were not collected in the surveys. Respondents

¹ In some countries, the cut-off age for men is 59 while in some few countries, it is up to 64 years. The different age cut for women and men arises from the fact that the survey generally deals with men and women of reproductive ages.

who had not yet experienced sexual intercourse were excluded from the analysis since our focus is on sexual initiation.

The dependent variable for this paper is the number of lifetime sexual partners the respondents had ever had at the time of the survey which was measured continuously. Here too, we omitted respondents who had not experienced sexual activities since they did not contribute to the variable of interest. This was because they were not at risk of sexual health problems occasioned by either the timing or the life-total number of sexual partners. Other variables factored into the analysis were: education (no education, primary, secondary and higher/tertiary), age of respondents at the time of the interview (grouped), marital status (never married, married, living with partner, divorced, widowed, and separated) and residence (rural and urban). The DHS wealth quintile categories (poorest, poorer, middle, richer, and richest) were adopted in this study. The wealth index was generated using principal component analysis based on household ownership of selected assets (including televisions, bicycles, cars, materials used for housing construction and types of water access and sanitation facilities). Following this, a continuous scale of relative wealth was then categorized according to the quintile of the sample.

Study Sample

The weighted total sample of women from the 34 countries was 451,263. Of the number of women, 380,308 had had sexual intercourse of which 363,562 reported valid number of lifetime sexual partners, which was used for the descriptive analysis. Of the 211, 229 men, 170,175 were sexually active with 161,832 having useable data on number of lifetime sexual partners.

Statistical Analysis

Descriptive and inferential statistics were applied in this study. First, mean number of lifetime sexual partners were computed separately for men and women for each of the main explanatory variables as well as the covariates. Since the dependent variable—number of lifetime sexual partners respondents ever had—contained count data, Poisson regression models were applied to estimate the log outcome rate of number of lifetime sexual partners as a linear function of the age category of timing of first sex and in addition to a set of predictors or covariates.

To this end, a crude model (involving only when first occurred—either at any of the age groups or in marriage/union) and multivariable models including the aforementioned covariates were run for both women and men. The results are reported in incident risk ratios with values greater than 1 signifying higher likelihood while those less than 1 indicate lower likelihood. Data was analyzed using STATA 14 (College Station, Texas 77845 USA).

Results

Timing of FSI by Socio-Demographic Characteristics of Participants

Table 1 presents results of bivariate associations between the timing of FSI and socio-demographic characteristic of participants (wealth, education, age cohort, marital status and residence). The results indicate different dynamics in the timing of FSI for women and men and by categories of the covariates considered. Overall, more men (61.31%) than women (53.84%) had had their FSI before 20 years, while more women (36.88%) compared with men (15.23%) did so at their first union/marriage.

Regarding socio-demographic factors, the pattern of association between wealth status and timing FSI was similar for both men and women. For instance the proportion that had their FSI earlier than age 15 years seemed to decrease with wealth status (women: from 13.33% for poorest to 7.64% for richest; men: from 10.88% for poorest to 9.98% for richest), whereas the reverse was true for the proportion that had their FSI aged 15–19 years (women: from 34.52% for poorest to 49.53% for richest; men: from 46.27% for poorest to 53.62% for richest).

In terms of education, most women with primary education (14.27%) reported having their FSI before 15 years, while this was the case for men with secondary education (13.29%). Meanwhile, most of those who reported having their FSI while aged 15–19 years (women, 59.10%; men, 59.41%), aged ≥ 20 years (women, 37.10%; men, 58.62%) and at first union/marriage (women, 32.63%; men, 35.96%) had attained secondary, higher/tertiary and no education, respectively. Among those in the 15–19 year group, 21.39% of women compared with 33.43% of men reported having had their FSI before their 15th birthday. The proportions thereof declined with each subsequent age group for both sexes.

The results on timing of FSI by marital status varied widely. For instance, a greater proportion of women who reported to have had their FSI before 15 years (16.06%) or while aged 15–19 years (54.35%) were cohabiting. For men, most of those who reported that their FSI occurred before 15 years were separated (15.26%). Regarding residence, while a greater proportion of rural women had their FSI at their first union/marriage (43.69%), most of their urban counterparts did so while aged 15–19 years (51.12%). However, for most rural (47.35%) and urban (55.12%) men, their FSI occurred while they were aged 15–19 years.

Number of Lifetime Sexual Partners by Socio-Demographic Characteristics of Participants

Table 2 presents the weighted average number of lifetime partners respondents had had. There were high disparities between men and women regarding lifetime sexual partners. Generally, the average number of lifetime sexual partners for men was (6.84, SD = 12.19) over three times that of women (2.25, SD = 4.42). For both sexes, those separated (women: mean = 3.75, SD = 6.46; men: mean = 13.16, SD = 18.72) and those who had sex at first union/marriage (women mean = 1.43,

Table 1 Bivariate association between background characteristics and timing of first sexual intercourse

	Women				Men			
	< 15	15–19	≥ 20	First union/marriage	< 15	15–19	≥ 20	First union/marriage
<i>Wealth</i>								
Poorest	13.33	34.52	4.35	47.81	10.88	46.27	19.02	23.83
Poorer	12.95	39.13	5.36	42.56	11.32	49.12	20.79	18.77
Middle	11.72	42.5	7.17	38.61	11.37	50.25	22.31	16.08
Richer	10.25	46.54	9.92	33.29	10.94	51.34	24.63	13.09
Richest	7.64	49.53	17.79	25.04	9.98	53.62	28.62	8.18
<i>Education</i>								
No education	10.31	27.07	4.0	58.62	4.74	33.66	25.64	35.96
Primary	14.27	46.59	6.59	32.55	12.59	50.74	20.94	15.72
Secondary	9.4	59.1	14.85	16.66	13.29	59.41	22.17	5.12
Higher/tertiary	2.76	43.78	37.1	16.4	8.84	52.2	32.63	6.33
<i>Age cohort</i>								
15–19	21.39	53.81	3.04	24.77	33.43	65.31	2.6	1.23
20–24	10.46	50.26	7.8	31.48	13.77	65.16	14.25	6.82
25–29	9.74	41.32	11.82	37.12	10.27	50.58	24.35	14.8
30–34	9.53	40.01	11.61	38.85	8.46	47.35	27.07	17.12
35–39	9.29	38.5	11.01	41.21	7.45	45.51	27.46	19.59
40–44	9.26	37.11	10.75	42.88	6.66	44.0	29.79	19.56
45–49	9.46	34.63	9.58	46.33	5.65	43.2	29.61	21.55
50–54	–	–	–	–	5.42	41.62	32.45	20.51
55–59	–	–	–	–	3.91	37.6	33.37	25.12
60–64	–	–	–	–	4.62	40.63	47.17	7.58
<i>Marital status</i>								
Never married	14.84	6.85	16.43	0.22	19.1	63.33	17.48	8.60
Married	8.89	34.42	7.92	48.77	6.45	42.54	26.77	24.25
Living with partner	16.06	54.35	8.23	21.36	11.73	57.15	21.64	9.47
Widowed	10.84	39.72	8.61	40.83	7.05	48.49	30.32	14.14
Divorced	11.47	39.59	8.98	39.96	10.86	48.13	24.21	16.8
Separated	15.26	54.33	9.88	20.53	14.2	57.67	21.4	6.73
<i>Residence</i>								
Urban	9.72	51.12	14.07	25.1	11.77	55.12	25.91	7.21
Rural	11.78	38.02	6.51	43.69	10.22	47.35	21.82	20.61
<i>Age at first sex</i>								
< 15	11.02				10.84			
15–19	42.82				50.47			
≥ 20	9.27				23.46			
First union/marriage	36.88				15.23			

Table 2 Average number of lifetime sexual partners by background characteristics

Categories	Mean number of partners (women)	Mean number of partners (men)
<i>Age at first sex</i>		
< 15	3.45 (7.05)	11.18 (17.71)
15–19	2.70 (4.42)	8.52 (13.68)
≥ 20	2.03 (3.51)	5.20 (8.99)
First union/marriage	1.43 (3.65)	2.07 (4.62)
<i>Wealth</i>		
Poorest	2.17 (4.86)	6.42 (11.57)
Poorer	2.25 (5.10)	6.80 (12.03)
Middle	2.19 (4.42)	6.85 (12.09)
Richer	2.28 (4.30)	7.11 (12.65)
Richest	2.36 (4.38)	7.58 (13.69)
<i>Education</i>		
No education	1.94 (5.06)	4.66 (9.00)
Primary	2.28 (4.12)	6.67 (11.72)
Secondary	2.60 (4.55)	8.25 (14.06)
Higher/tertiary	2.62 (4.10)	8.61 (14.82)
<i>Age cohort</i>		
15–19	1.73 (3.20)	3.24 (4.41)
20–24	2.12 (4.32)	5.25 (8.68)
25–29	2.30 (4.80)	6.51 (10.78)
30–34	2.39 (4.91)	7.47 (12.93)
35–39	2.42 (5.04)	7.68 (13.42)
40–44	2.47 (5.05)	8.16 (13.42)
45–49	2.35 (4.40)	8.82 (15.59)
50–54	–	9.67 (16.88)
55–59	–	9.46 (17.18)
60–64	–	11.45 (17.34)
<i>Marital status</i>		
Never married	2.57 (4.41)	5.41 (9.13)
Married	2.90 (4.27)	6.66 (12.25)
Living with partner	2.97 (5.17)	11.21 (17.18)
Widowed	2.55 (5.03)	10.73 (17.12)
Divorced	2.88 (5.33)	10.16 (16.47)
Separated	3.75 (6.46)	13.16 (18.72)
<i>Residence</i>		
Urban	2.62 (4.92)	8.18 (14.14)
Rural	2.05 (4.41)	6.24 (11.31)
Total	2.25 (4.52)	6.84 (12.19)

SD = 3.65; men: mean = 2.07, SD = 4.62) reported the highest and the least mean number of lifetime sexual partners, respectively.

With respect to socio-demographic factors, men had higher mean number of lifetime sexual partners across all the factors considered. Further, the pattern indicates that the mean number of lifetime sexual partners increased with wealth status, educational attainment and age. On the other hand, urban residents (women mean = 2.62, SD = 4.92; men: mean = 8.18, SD = 14.14) had higher mean number of lifetime sexual partners compared with their rural (women mean = 2.05, SD = 4.41; men: mean = 6.24; SD = 11.31) counterparts.

Poisson Regression on Timing of FSI and Number of Lifetime Sexual Partners

Tables 3 and 4 showed the results of Poisson regression models estimated to examine the association between timing of FSI and number of lifetime sexual partners for women and men, respectively. Three models were estimated each for men and women, with the first model (1) examining the unadjusted association between timing of FSI and number of lifetime sexual partners. The effects of socio-demographic factors and country were controlled for in Models 2 and 3, respectively, for both women and men.

The unadjusted association between timing of FSI and number of lifetime sexual partners was significantly negative for both women (15–19 years, IRR = 0.78, $t = -11.45$; ≥ 20 years, IRR = 0.59, $t = -21.39$; first union/marriage, IRR = 0.41, $t = -38.14$) and men (15–19 years, IRR = 0.76, $t = -14.50$; ≥ 20 years, IRR = 0.47, $t = -35.38$; first union/marriage, IRR = 0.19, $t = -54.58$), compared with those whose FSI occurred before age 15 years. The inclusion of socio-demographic factors in Model 2 and country in Model 3 neither changed the significance nor the direction of the association between timing of FSI and number of lifetime sexual partners for both women and men. Nonetheless, the magnitude of association marginally varied across the three models.

With respect to the association between the socio-demographic factors and number of lifetime sexual partners (Model 3), some differences and similarities were observed for women and men. For women, a negative significant association was found between number of lifetime sexual partners and women in the middle (IRR = 0.95, $t = -2.62$), richer (IRR = 0.95, $t = -2.44$) and richest (IRR = 0.94, $t = -2.91$) wealth categories compared to those in the poorest category. The association was, however, positive for men, with only those in the richest (IRR = 1.08, $t = 3.15$) wealth category being significant.

While all categories of marital status were associated with number of lifetime sexual partners for men, this was the case for women who were married, divorced and separated. As age and formal education increased, so did the likelihood of having more sexual partners for both women and men. With respect to residence (rural/urban), the effect was negative, but only significant for women. The association between country of survey and number of lifetime sexual partners was similar in terms of direction of effect for both women and men in all the 34

Table 3 Poisson regression results on timing of first sexual intercourse and number of lifetime sexual partners—women

	Model 1		Model 2		Model 3	
	IRR	<i>t</i> statistics	IRR	<i>t</i> statistics	IRR	
<i>Age at first sex (< 15)</i>						
15–19	0.783***	(– 11.45)	0.748***	(– 14.21)	0.761***	(– 14.03)
≥ 20	0.589***	(– 21.39)	0.512***	(– 27.99)	0.564***	(– 25.04)
First union/marriage	0.416***	(– 38.14)	0.433***	(– 36.36)	0.514***	(– 27.03)
<i>Wealth (poorest)</i>						
Poorer			0.998	(– 0.12)	1.007	(0.42)
Middle			0.924***	(– 4.10)	0.953**	(– 2.62)
Richer			0.887***	(– 5.59)	0.952*	(– 2.44)
Richest			0.821***	(– 8.21)	0.936**	(– 2.91)
<i>Education (no education)</i>						
Primary			1.022	(1.63)	1.041**	(3.21)
Secondary			1.126***	(7.57)	1.076***	(5.25)
Higher			1.205***	(7.58)	1.162***	(6.62)
<i>Age cohort (15–19)</i>						
20–24			1.395***	(24.24)	1.413***	(25.03)
25–29			1.651***	(29.92)	1.653***	(29.75)
30–34			1.767***	(34.95)	1.757***	(34.82)
35–39			1.832***	(34.57)	1.799***	(33.77)
40–44			1.886***	(35.00)	1.848***	(34.43)
45–49			1.837***	(33.05)	1.788***	(32.55)
<i>Marital status (never married)</i>						
Married			0.792***	(– 15.40)	0.821***	(– 13.02)
Living with partner			1.042*	(2.48)	0.978	(– 1.27)
Widowed			0.918**	(– 2.75)	0.970	(– 0.97)
Divorced			1.095***	(3.53)	1.208***	(7.33)
Separated			1.284***	(12.73)	1.243***	(10.91)
<i>Residence (urban)</i>						
Rural			0.827***	(– 10.90)	0.931***	(– 4.23)
<i>Country (Burkina Faso)</i>						
Benin					1.999***	(10.39)
Burundi					0.903***	(– 5.45)
DR Congo					1.643***	(9.56)
Congo Brazzaville					1.769***	(21.00)
Cote d'Ivoire					1.429***	(13.40)
Cameroon					1.861***	(28.33)
Ethiopia					1.124**	(2.61)
Gabon					2.367***	(20.96)
Ghana					1.261***	(11.05)
Gambia					0.968*	(– 2.32)
Guinea					1.217***	(8.27)

Table 3 continued

	Model 1		Model 2		Model 3	
	IRR	<i>t</i> statistics	IRR	<i>t</i> statistics	IRR	
Kenya					1.177***	(8.03)
Comoros					1.023	(0.94)
Liberia					2.182***	(18.17)
Lesotho					1.489***	(14.98)
Madagascar					1.706***	(16.09)
Mali					1.566***	(4.88)
Malawi					1.008	(0.50)
Mozambique					1.336***	(9.27)
Nigeria					1.082***	(5.56)
Niger					0.903***	(− 5.82)
Namibia					1.324***	(11.38)
Rwanda					0.991	(− 0.38)
Sierra Leone					1.543***	(22.88)
Senegal					1.123	(1.46)
Sao Tome and Principe					0.934*	(− 2.45)
Swaziland					1.256***	(8.94)
Chad					0.940***	(− 3.77)
Togo					1.178***	(9.33)
Tanzania					1.404***	(17.67)
Uganda					1.164***	(7.00)
Zambia					1.207***	(9.78)
Zimbabwe					1.261***	(3.56)
Cons	3.457***	(58.37)	2.887***	(29.97)	1.765***	(15.76)
AIC	1,618,856.6		1,570,011.9		1,523,769.5	
Log lik.	− 809,424.3		− 784,983.0		− 761,828.7	
Chi squared	2385.1		6462.0		21,507.8	
<i>N</i>	362,480		362,443		362,443	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

countries considered, except Ethiopia (women, IRR = 2.36, $t = -2.61$; men, IRR = 0.99, $t = -0.25$), Mali (women, IRR = 1.56, $t = 2.61$; men, IRR = 0.99, $t = -0.25$), Malawi (women, IRR = 1.01, $t = 0.50$; men, IRR = 0.85, $t = -4.54$), Sao Tome and Principe (women, IRR = 0.93, $t = -2.45$; men, IRR = 1.25, $t = 3.64$) and Chad (women, IRR = 0.94, $t = -3.77$; men, IRR = 1.12, $t = 2.19$).

Table 4 Poisson regression results on timing of first sexual intercourse and number of lifetime sexual partners—men

	Model 1		Model 2		Model 3	
	IRR	<i>t</i> statistics	IRR	<i>t</i> statistics	IRR	<i>t</i> statistics
<i>Age at first sex (< 15)</i>						
15–19	0.762***	(– 14.50)	0.650***	(– 23.79)	0.667***	(– 22.72)
≥20	0.466***	(– 35.38)	0.342***	(– 49.56)	0.391***	(– 43.17)
At first union/marriage	0.186***	(– 54.58)	0.156***	(– 58.81)	0.216***	(– 43.64)
<i>Wealth (poorest)</i>						
Poorer			0.980	(– 1.19)	1.015	(0.90)
Middle			0.950**	(– 2.85)	1.019	(1.10)
Richer			0.909***	(– 4.03)	1.036	(1.60)
Richest			0.878***	(– 5.28)	1.080**	(3.15)
<i>Education (no education)</i>						
Primary			1.185***	(9.45)	1.129***	(6.49)
Secondary			1.470***	(18.96)	1.247***	(11.86)
Higher			1.479***	(14.01)	1.241***	(8.42)
<i>Age cohort (15–19)</i>						
20–24			1.908***	(32.03)	1.941***	(33.52)
25–29			2.721***	(41.80)	2.752***	(42.66)
30–34			3.310***	(45.31)	3.302***	(45.39)
35–39			3.604***	(45.91)	3.561***	(46.23)
40–44			3.935***	(48.04)	3.852***	(47.94)
45–49			4.455***	(50.94)	4.308***	(49.35)
50–54			5.014***	(46.07)	4.774***	(45.28)
55–59			5.404***	(45.78)	4.873***	(44.32)
60–64			5.902***	(19.48)	5.573***	(19.05)
<i>Marital status (never married)</i>						
Married			1.002	(0.10)	1.030	(1.45)
Living with partner			1.422***	(14.09)	1.208***	(7.42)
Widowed			1.246***	(3.94)	1.168**	(2.81)
Divorced			1.311***	(5.53)	1.395***	(7.06)
Separated			1.631***	(15.48)	1.432***	(11.72)
<i>Residence (urban)</i>						
Rural			0.866***	(– 7.15)	0.982	(– 0.94)
<i>Country (Burkina Faso)</i>						
Benin					1.589***	(9.36)
Burundi					0.739***	(– 7.83)
DR Congo					2.223***	(15.71)
Congo Brazzaville					2.273***	(18.77)
Cote d'Ivoire					2.168***	(18.05)
Cameroon					2.647***	(24.77)

Table 4 continued

	Model 1		Model 2		Model 3	
	IRR	<i>t</i> statistics	IRR	<i>t</i> statistics	IRR	<i>t</i> statistics
Ethiopia					0.990	(− 0.25)
Gabon					2.796***	(23.00)
Ghana					1.522***	(9.73)
Gambia					0.833***	(− 3.61)
Guinea					1.176***	(4.50)
Kenya					1.305***	(7.09)
Comoros					1.089	(1.35)
Liberia					2.554***	(18.24)
Lesotho					2.058***	(12.68)
Madagascar					2.175***	(17.26)
Mali					0.977	(− 0.43)
Malawi					0.858***	(− 4.54)
Mozambique					1.563***	(9.64)
Nigeria					1.118**	(3.27)
Niger					0.718***	(− 7.09)
Namibia					1.525***	(9.12)
Rwanda					0.752***	(− 7.21)
Sierra Leone					1.449***	(8.62)
Senegal					1.100*	(2.15)
Sao Tome and Principe					1.252***	(3.64)
Swaziland					1.504***	(10.73)
Chad					1.116*	(2.19)
Togo					1.320***	(7.27)
Tanzania					1.493***	(8.25)
Uganda					1.410***	(6.05)
Zambia					1.231***	(5.93)
Zimbabwe					1.357***	(7.67)
Constant	11.19***	(130.82)	3.648***	(39.26)	2.136***	(18.49)
AIC	2,002,413.8		1,764,844.1		1,646,600.5	
Log lik.	− 1,001,202.9		− 882,396.1		− 823,241.3	
Chi squared	4453.8		14,085.4		21,122.8	
<i>N</i>	161,644		161,621		161,621	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion

This study drew on comparative population-based surveys (DHS data) with the view to examining the link between the timing of FSI and subsequent number of lifetime sexual partners. Data was collated from 34 countries in sub-Saharan Africa where

data was available between 2006 and 2014. It emerged from the study that a greater proportion of men experienced their FSI before they turned 20 years and had a higher mean number of lifetime sexual partners, compared with women. This finding seems to reflect differences in sociosexual orientation between men and women in relation to sexual permissiveness and promiscuity (Simpson and Gangestad 1991).

The propositions of the sociosexuality theory suggest that people with a restrictive sociosexual orientation often require commitment and intimacy before they engage in sexual intercourse with a partner. Thus, they tend to delay initiating sexual intercourse with a partner and accumulate fewer sexual partners over time, whereas the reverse is true for those considered to have unrestricted sociosexual orientations (Simpson and Gangestad 1991). Thus, our finding suggests unrestricted sociosexual attitudes/behaviours for men and restrictive sociosexual attitudes/behaviours for women. Further, the different commitment requirements for identifying restrictive and unrestricted sociosexual orientations seem to be supported by the fact more women (36.88%) than men (15.23%) had their FSI in their first union/marriage in the current study.

The multilevel analysis performed indicated a significant association between the timing of FSI and subsequent number of lifetime sexual partners for both women and men, even after controlling for other relevant individual, household and societal level factors. In consonance with existing literature (e.g. Ghebremichael et al. 2009; Hallett et al. 2007), our findings highlight the protective effect of delaying FSI. We found that engaging in FSI later than age 15 years reduced the likelihood of both reporting a high number of subsequent sexual partners for both men and women. Indeed, our findings suggest that, postponing FSI until first marriage is associated with having a decreased number of lifetime sexual partners. Our results support the growing body of evidence on the potential effects that an often isolated factor such as the age of FSI could have on sexual risk-taking behaviours/outcomes (Sandfort et al. 2008).

The findings of this study also demonstrate the considerable gender/sex disparities in the effect of wealth on sexual risk-taking. While poverty may increase sexual risk-taking among women because of sex for survival, affluence on the other hand facilitates sexual risk-taking among men by increasing opportunities for forming and maintaining sexual partnerships (Choudhry et al. 2014; Stoebenau et al. 2016). Conceivably, this explains why the likelihood of having a high number of lifetime sexual partnerships increased with wealth for men, but not women. The protection that wealth offers against sexual risk-taking behaviours for women rather than men has similarly been reported in previous studies (Amo-Adjei and Tuoyire 2017; Awusabo-Asare and Annim 2008).

Formal education is considered an investment that increases both the individual and society's chances of being well-off in the long term. The role of education as a disincentive for engaging in risky sexual behaviours is well documented (Amo-Adjei and Tuoyire 2017; Kumi-Kyereme et al. 2014; De Walque 2007). Nonetheless, our analyses show that the chances of having higher number of lifetime sexual partners increased at each higher level of education for both men and women. This counterintuitive findings could be explained by the increased high

mobility and social networking associated with higher education (Awusabo-Asare and Annim 2008; Mishra et al. 2007). This consequently provides opportunities for sexual networking with the tendency of accumulating sexual partners either serially or concurrently. Indeed there is evidence of pervasive sexually risky lifestyles on university campuses within SSA (Amo-Adjei et al. 2014; Baba-Djara et al. 2013; Choudhry et al. 2014; Masvawure et al. 2015).

Predictably, age was positively associated with the number of lifetime sexual partners for both sexes, with stronger effects among men than women. Much as this accords with findings from prior studies (Son et al. 2016; Todd et al. 2009), it could largely be explained by the tendency to accumulate more sexual partners as one aged. The stronger effect for men than women may be associated with the persisting cultural norms in most African societies where prolific sexual engagements of men are associated with masculinity, while sexual passivity is associated with femininity for women (Stern and Buikema 2013; Uchudi et al. 2012).

By extension, such social-cultural prescriptions across the sub-region which celebrate chastity and marital fidelity for women but not men (Stern and Buikema 2013; Uchudi et al. 2012) could account for the varying trajectories between men and women in the association between marital status and number of lifetime sexual partners. We observed increased likelihood of men having a high number of lifetime sexual partners irrespective of their marital status. However, this was only true for divorced or separated women. For such women, freedom away from marital obligation as a result of marital dissolution may precipitate sexual networking for both social and economic reasons.

We found a significant negative association between rural residence and number of lifetime sexual partners for women. The association was however not significant for men. While some studies have reported positive associations (Mitsunaga et al. 2005) between place of residence and number of lifetime sexual partners, others have found no association (Oyediran et al. 2010). With respect to women some probable explanations are worth mentioning. First, in virtually all the countries studied, communal regulation of women is predictably envisaged while the anonymous urban environment can shield women who go beyond the “so-called” sexual boundaries. Women in rural areas are also more likely to marry early, which reduces their exposure to sex outside marriage as well as the number.

High probabilities of increased number of lifetime sexual partners were noticed for both women and men across almost all the countries considered in the analysis. While the reasons are ostensibly not patent, this could be attributed largely to sexual attitudes found in many cultures and societies across sub-Saharan Africa which permit a high level of heterosexual networking (Caldwell and Caldwell 1996; Uchudi et al. 2012). In Uganda for instance, Green et al. (2006) noted that keeping multiple sexual partners (sexual network) is a common phenomenon. Similar observation regarding high multiple sexual relationships among young people with associated risk factors for STIs has been reported in Malawi (Sathiyasusuman 2015). In South Africa, it has been reported that early sexual debutants are also likely to have multiple sexual partner (Zuma et al. 2010).

Despite utilizing a rich pool of data, the current study has some limitations. Self-reports of sensitive information such as timing of FSI and number of lifetime sexual

partners could be biased by respondents providing response they deem socially and culturally desirable (Zaba et al. 2004). For instance, in many parts of sub-Saharan Africa men tend to exaggerate while women under report their sexual escapades. However, in all countries, great care was taken in the interviews to minimize such biases by assuring respondents of confidentiality and privacy of information collected. The reports on timing of FSI and number lifetime partners could be prone to recall errors, given that these events occurred sometime in the past prior to the surveys.

Finally, the data did not permit the inclusion of other factors (e.g. physiological and psychological factors, parental guidance and communication, and disposable income) that could potentially influence the association between timing of FSI and subsequent number of partners.

Conclusion

Across sub-Saharan Africa, timing of FSI is associated with subsequent number of sexual partners, regardless of gender and socio-demographic background. Delaying FSI beyond the age of 15 years is associated with lower number of sexual partners over time. Nonetheless, a number of other important correlates (wealth status, age, marital status and type of locality) of sexual partnering exist across the sub-region. In particular, the conflicting role of wealth in reducing women's sexual partnerships on one hand, and increasing that of men on the other hand cannot be overemphasized. Hence, sexual and reproductive health programmes calling for sexual partner reduction should focus more on age of sexual debut while factoring in the influence of the various socio-demographic dynamics.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Human and Animal Rights For this type of study formal consent is not required.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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