ORIGINAL RESEARCH ARTICLE

Factors associated with age of first sex among women screened for an observational contraceptive vaginal ring study in Kisumu, Kenya, 2014

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Abstract

Sex at an early age can have later life negative health outcomes. Insights on early sexual activity may help in the development of future health-promotion products and interventions related to pregnancy and sexually transmitted infections (STIs) prevention. Among Kenyan women participating in a contraceptive vaginal ring study, we determined: (1) the proportion with first sex at ≤15 years (early sex) and (2) factors associated with early sex. Baseline data collection and testing for pregnancy, STIs, and HIV were undertaken. A log-binomial or a modified Poisson regression was used to estimate univariable prevalence ratios and multivariable adjusted prevalence ratios (aPRs). Among 332 women aged 18-34 years, the median age of first sex was 16 years, with 40.1% experiencing early sex. Overall, 29.8% reported an older first sex partner (≥5 years); 83.9% indicated lack of readiness or intentions at first sex; and 56.2% received money, gifts, or favors as part of first sex. Early sex was more prevalent among inherited widows (a Luo cultural practice, aPR 1.49), gift recipients (aPR 1.38), women with a forced/unwanted sex history (aPR 1.42), or those with a partner of unknown or positive HIV status in the past 3 months (aPR 1.45). Sex before or at the age 15 may be associated with higher sexual risk behaviors. Complex power and gender relations may additionally influence exposure to sexual risk in our research setting. *(Afr J Reprod Health 2021; 25[1]: 101-113).*

Keywords: Kenya, women, age of first sex, risk factors

Résumé

Les rapports sexuels à un âge précoce peuvent avoir des conséquences négatives sur la santé plus tard dans la vie. Des informations sur l'activité sexuelle précoce peuvent aider au développement de futurs produits et interventions de promotion de la santé liés à la prévention de la grossesse et des infections sexuellement transmissibles (IST). Parmi les femmes kényanes participant à une étude sur l'anneau vaginal contraceptif, nous avons déterminé: (1) la proportion de femmes ayant eu un premier rapport sexuel à ≤15 ans (rapports sexuels précoces) et (2) les facteurs associés aux rapports sexuels précoces. La collecte de données de base et le dépistage de la grossesse, des IST et du VIH ont été entrepris. Une régression log-binomiale ou une régression de Poisson modifiée a été utilisée pour estimer les ratios de prévalence univariés et les ratios de prévalence ajustés multivariables (aPR). Chez 332 femmes âgées de 18 à 34 ans, l'âge médian du premier rapport sexuel était de 16 ans, 40,1% ayant eu des rapports sexuels précoces. Dans l'ensemble, 29,8% ont déclaré un premier partenaire sexuel plus âgé (≥ 5 ans); 83,9% ont indiqué un manque de préparation ou d'intentions lors du premier rapport sexuel; et 56,2% ont reçu de l'argent, des cadeaux ou des faveurs dans le cadre de leur premier rapport sexuel. Les rapports sexuels précoces étaient plus fréquents chez les veuves héritées (une pratique culturelle Luo, aPR 1,49), les bénéficiaires de cadeaux (aPR 1,38), les femmes ayant des antécédents sexuels forcés / non désirés (aPR 1,42) ou celles dont le partenaire était séropositif ou inconnu en les 3 derniers mois (aPR 1,45). Les rapports sexuels avant ou à 15 ans peuvent être associés à des comportements sexuels à risque plus élevé. Le pouvoir complexe et les relations de genre peuvent également influencer l'exposition aux risques sexuels dans notre contexte de recherche. *(Afr J Reprod Health 2021; 25[1]: 101-113).*

Mots-clés: Kenya, femmes, âge du premier rapport sexuel, facteurs de risque

Introduction

In sub-Saharan Africa (SSA), females tend to experience first sex at earlier ages than males[1]. Studies conducted in SSA define early sex at age 15 or younger[1]. Early age of first sex among adolescent girls and young women in SSA has been associated with a lack of or inconsistent contraception, including condom use[2], having risky sexual partners, age-disparate sex, multiple partners,

unintended pregnancy, unsafe abortions, and increased risk of HIV and other sexually transmitted infections (STIs)[3]. Early sex is also more likely to be non-consensual, even when reported as consensual, given that the decision to engage in intercourse is not made autonomously[4]. In situations where early sex is coerced or forced, psychological as well as physiological trauma can affect subsequent sexual risk behavior[5]. Structural factors linked to early age of first sex include economic and gender inequality, lack of education[6], as well as cultural and social factors, including family instability[7] and early marriage expectations[8].

In Kenya, the median age of first sex among women aged 20–49 years is reported as 18 years, with women in rural areas experiencing it at an earlier age compared to those in urban areas[9]. In the Nyanza region of Kenya (the location of our study), the median age of first sex (16.4 years) is younger compared to the overall country[9]. The HIV rates in this geographical region are also among the highest in the country[10]. Nationally, an estimated 5% of adolescent girls (15–19 years of age) and 14% of young women (20–24 years of age) are living with HIV[10]. While there is a large amount of literature regarding adolescent sexual and reproductive health in developing countries[5], it is important to continue to evaluate early sex among women given the potential relationship between early sex and future HIV risk behaviors and poorer health outcomes[3]. Insights on early sexual activity may also help in the development of health-promotion products and activities, such as those related to contraception and STI prevention.

As mentioned previously, absent or inconsistent contraceptive use among women is associated with early sex[2]. Additional insights on factors associated with early sex may be gleaned by focusing on young adult women who are contraceptive users (i.e., already on their own accord taking part in a health promoting behavior). We conducted an observational study in Kisumu, Kenya, among current hormonal contraceptive users to assess acceptability and adherence to a contraceptive cervical vaginal ring (CVR). From baseline data collected we 1) determined the proportion of women who experienced early sex (at ≤15 years) and 2) identified factors associated with experiencing early sex.

Methods

Study design

We conducted a single-arm observational study, from which baseline data are reported here. Details regarding the study design and methods have been published elsewhere[11]. In brief, the study involved a pre-CVR-use phase whereby women terminated existing oral or injectable contraceptive use before switching over to CVR use. CVR use occurred for six months before ending with an up to 3-month post-product phase during which women returned to oral or injectable contraceptives before exiting the study. Given that the CVR does not protect against HIV and other STIs, women were provided condoms and received risk reduction counseling at all study visits.

Participant selection

We undertook study screening from April 2014 to November 2014. We targeted women who were 18–34 years of age and had engaged in more than one episode of vaginal intercourse on different days within the past 30 days, were not currently pregnant and not intending to get pregnant for the next 12 months, lived in the Kisumu catchment area (≈150 kilometers from Kisumu), were within 30 days of their last oral contraceptive cycle or within 3 months of receipt of their last depot medroxy-progesterone acetate (DMPA) injection, had never been diagnosed with HIV, and were willing to undergo monthly pregnancy testing, periodic pelvic examination, and HIV testing at screening, 3 months and 6 months[11]. In addition, women had to be able to: i) understand and read English, Dholuo, or Swahili, ii) comprehend study procedures, and iii) provide written informed consent.

Data collection

After completing a brief pre-screening medical history by staff-administered computer-assisted personal interview (CAPI), all women who met eligibility criteria consented to complete additional behavioral and medical screening procedures. Specifically, women screened completed a self-administered audio computer-assisted interview (ACASI), provided a medical history via CAPI, and

underwent laboratory testing as well as physical examination that included a pelvic exam. Pregnancy, STI, and HIV testing procedures were conducted according to the Kenya National Guidelines.

Measures and statistical analysis

Women screened must have reported that they had sex within the past 3 months and provided age of first sex to be included in our analysis sample. We collected demographics (age, marital status, education, employment status, etc.), psychosocial information (psychological distress in the past 30 days and history of depression), self-reported CAPI medical history and laboratory results for pregnancy, STI, and HIV. We also inquired about the contextual information related to first sex (age of partner, sexual readiness, gifts or material goods received, etc.) and behaviors occurred over a woman's lifetime and in the past 12 months (collectively denoted as historical behaviors) as well as recent behaviors occurred 3–6 months before the screening interview.

Women with a history of marriage were asked whether they had ever been inherited. Among the Luo of western Kenya, widowed women may engage in a cultural inheritance practice, which is intended to ensure that a widow and her children have needed social and economic support[12]. A widow is considered a "wife of the grave" in that she remains married to her deceased spouse[12]. Even if a widow remarries or cohabits with her inheritor or another partner, her marriage to her deceased spouse is not dissolved[13]. Traditionally, a widow was inherited by, and became a wife to, a male relative of her deceased husband (levirate union); however, in more modern times, a non-in-law or professional inheritor enables a widow to comply with this cultural practice[14]. Inheritance compliance is exempt for women who are unable to bear children due to infertility or who have reached menopause. Of note, our question on inheritance did not ask women to specify whether it was based on a traditional levirate union or a modern variant.

To establish consistency with other SSA studies, we define early sex as self-report of first sex at 15 years of age or younger. All the potential demographic, behavioral, psychosocial, and contextual factors, medical history, and laboratory results were coded as categorical variables with 2–4 categories and are listed in Tables 1-3. The goal of this analysis was to estimate the prevalence of women who had experienced early sex and compare it across the independent variable categories using prevalence ratios. We summarized the categorical variables using frequency counts and percentages, and characterized continuous variables using median and interquartile range (IQR). Within the generalized linear regression framework, we used a binomial regression with a log link[15] or a modified Poisson approach[16] to estimate univariable prevalence ratios (PRs) and multivariable adjusted prevalence ratios (aPRs).

To minimize the effect of collinearity in the multivariable modeling, we included historical behavior variables or used variable combinations whenever similar recent and/or contemporary behavior variables were available. We used the chi-square test and 0.1 cut-off level to guide the variable selection into a multivariable model, checked for two-way interactions, and applied backward elimination. We also controlled for confounding factors by looking for a meaningful (>10%) change in the mean and standard error regression estimates. The analyses and report generation were performed using SAS System for Windows, version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Out of 692 women pre-screened, 463 completed the in-depth behavior and medical screening, with 332 women meeting the criteria for inclusion in the analysis. Among those who did not meet the analysis sample inclusion criteria, 115 (87.8%) reported that they had not had sex in the past 3 months (despite indicating at pre-screening that they had engaged in vaginal sex on more than one episode on different days within the past 30 days),

Table 1: Age of first sex, by demographic and health characteristics (N=332)[a], Kisumu contraceptive vaginal ring study, Kisumu, Kenya, 2014

Variable	Total (N=332) n (col %)	First sex at ≤15 yrs. (N=133) n (col %)	First sex at >15 yrs. (N=199) n (col %)	Prevalence of first sex at ≤15 yrs. (row %)	PR ≤15 vs. >15 yrs. (CI)	*p*-value
Age at screening						0.678
18-24	163 (49.1)	69 (51.9)	94 (47.2)	42.3	1.07 (0.73, 1.56)	0.731
25-29	116 (34.9)	43 (32.3)	73 (36.7)	37.1	0.94 (0.62, 1.41)	0.749
30-34	53 (16.0)	21 (15.8)	32 (16.1)	39.6	Ref.	
Ethnic group						
Luo	295 (89.1)	120 (90.2)	175 (88.4)	40.7	1.13 (0.71, 1.78)	0.609
Non-Luo	36 (10.9)	13 (9.8)	23 (11.6)	36.1	Ref.	
Marital status						0.414
Single	58 (17.8)	19 (14.5)	39 (20.1)	32.8	0.84 (0.51, 1.41)	0.517
Married	218 (67.1)	93 (71.0)	125 (64.4)	42.7	1.10 (0.75, 1.62)	0.626
Widowed/Divorced/ Separated/Other	49 (15.1)	19 (14.5)	30 (15.5)	38.8	Ref.	
Ever been inherited[c]						
Yes	82 (25.1)	45 (33.8)	37 (19.1)	54.9	1.53 (1.18, 1.98)	0.001
No	245 (74.9)	88 (66.2)	157 (80.9)	35.9	Ref.	
Religion						0.216
Roman Catholic	149 (45.0)	57 (42.9)	92 (46.5)	38.3	0.77 (0.55, 1.07)	0.114
Other Christian	126 (38.1)	48 (36.1)	78 (39.4)	38.1	0.76 (0.54, 1.07)	0.121
Non-Christian	56 (16.9)	28 (21.1)	28 (14.1)	50.0	Ref.	
Highest level of education[c]						
Primary or less	211 (63.9)	99 (74.4)	112 (56.9)	46.9	1.64 (1.19, 2.26)	0.002
Secondary or more	119 (36.1)	34 (25.6)	85 (43.1)	28.6	Ref.	
Employment status						
Employed	203 (61.5)	81 (60.9)	122 (61.9)	39.9	0.97 (0.74, 1.27)	0.851
Unemployed	127 (38.5)	52 (39.1)	75 (38.1)	40.9	Ref.	
Main source of income						0.329
None	12 (3.6)	4 (3.0)	8 (4.0)	33.3	0.74 (0.33, 1.68)	0.473
Salary-based	188 (56.8)	70 (52.6)	118 (59.6)	37.2	0.83 (0.63, 1.08)	0.159
Not salary-based	131 (39.6)	59 (44.4)	72 (36.4)	45.0	Ref.	
Psychological distress in past 30 days						0.134
Low (score 0-4)	71 (21.4)	23 (17.3)	48 (24.1)	32.4	Ref.	
Medium (score 5-12)	198 (59.6)	79 (59.4)	119 (59.8)	39.9	1.23 (0.84, 1.80)	0.279
High (score 13-24)	63 (19.0)	31 (23.3)	32 (16.1)	49.2	1.52 (1.00, 2.31)	0.051
Self-reported history of depression						
Yes	62 (18.8)	26 (19.5)	36 (18.3)	41.9	1.05 (0.76, 1.46)	0.769
No	268 (81.2)	107 (80.5)	161 (81.7)	39.9	Ref.	
Perceived overall health status[c]						
Poor	42 (12.8)	22 (16.5)	20 (10.2)	52.4	1.35 (0.98, 1.87)	0.066
Good/Excellent	287 (87.2)	111 (83.5)	176 (89.8)	38.7	Ref.	
Abnormal vaginal bleeding in past 12 months[c]						
Yes	71 (21.4)	40 (30.1)	31 (15.6)	56.3	1.58 (1.22, 2.05)	0.001
No	261 (78.6)	93 (69.9)	168 (84.4)	35.6	Ref.	
Self-reported history of sexually transmitted infection (STI)						
Yes	75 (22.6)	35 (26.3)	40 (20.1)	46.7	1.22 (0.92, 1.63)	0.169
No	257 (77.4)	98 (73.7)	159 (79.9)	38.1	Ref.	
STI/BV[d] test result (any)						
Positive	228 (69.1)	93 (69.9)	135 (68.5)	40.8	1.04 (0.78, 1.39)	0.789
Negative	102 (30.9)	40 (30.1)	62 (31.5)	39.2	Ref.	
History of HIV						
Yes	9 (2.7)	4 (3.0)	5 (2.5)	44.4	1.11 (0.53, 2.34)	0.778
No	323 (97.3)	129 (97.0)	194 (97.5)	39.9	Ref.	
HIV test result						
Positive	47 (14.2)	18 (13.5)	29 (14.6)	38.3	0.95 (0.64, 1.40)	0.779

Variable	Total (N=332) n (col %)	First sex at ≤15 yrs. (N=133) n (col %)	First sex at >15 yrs. (N=199) n (col %)	Prevalence of first sex at ≤15 yrs. (row %)	PR ≤15 vs. >15 yrs. (CI)	*p*-value
Negative	284 (85.8)	115 (86.5)	169 (85.4)	40.5	Ref.	
Pregnancy test result						
Positive	2 (0.6)	1 (0.8)	1 (0.5)	50.0	1.25 (0.31, 5.01)	0.757
Negative	329 (99.4)	132 (99.2)	197 (99.5)	40.1	Ref.	

yrs. = years; CI = 95% confidence interval (CI); PR = prevalence ratio

[a]Analysis sample was restricted to women screened who reported that they had sex within the past 3 months and provided age of first sex. Sample sizes fluctuate slightly for some variables due to missing data.

[b]A traditional Luo cultural practice whereby a widow is required to marry a male relative of her late husband (often his brother). In modern times, a non-in-law or professional inheritor enables a widow to comply with this cultural practice[14].

[c]Variables significant at 0.1 level were considered for multivariable analysis.

[d]Sexually transmitted infection = STI/BV = bacterial vaginosis. Assessment of STIs included testing for herpes simplex virus type 2, gonorrhea, syphilis, and chlamydia. While BV is not classified as a sexually transmitted infection, it increases a woman's risk for acquiring HIV and other sexually transmitted infections.

3 (2.3%) did not provide response to the sex in the past 3 months question, and the remaining 13 (9.9%) women did not report or did not know their age of first sex. The median age was 25 years (IQR 21–28); women aged 18–24 years and 25–29 years accounted for about 50% and 35% of the analysis sample, respectively. The women were predominantly Luo ethnicity (89.1%) and not inherited (74.9%). Among those reporting widow inheritance (n=82), more than half (58.5%) were 25 years of age or younger (data not shown). Over half of the women had completed primary education or less (63.9%), were married (67.1%), or were employed (61.5%) (Table 1). The median age of first sex was 16 years (IQR 14–18), and 40.1% women reported early sex. Regardless of age of first sex, most participants (83.9%) reported that they did not want or were not ready for sex at the time of first sex (Table 2). Overall, an STI (herpes simplex virus type 2, gonorrhea, syphilis, or chlamydia) or bacterial vaginosis was diagnosed in more than half of the participants (69.1%) and 14.2% tested positive for HIV (Table 1).

Univariable analyses

As shown in Table 1, on univariable analysis early sex experience was observed at a greater proportion among women who completed primary education or less compared to those who had secondary education or higher (prevalence ratio, 1.64). Similarly, early sex experience was more common among women who had been inherited (1.53) or had abnormal or non-menstruation-related vaginal bleeding in the past 12 months (1.58). Early sex experience was prevalent among women who reported they did not want or were not ready for sex (1.77), as well as among those who responded that gifts or favors were received as part of their first sex experience (1.38) (Table 2). Of the gifts we specifically inquired about in the study questionnaire, univariable relationship with early sex experience was detected for clothing (1.45) and other type of unspecified gifts (1.41). The unspecified gifts response option excluded food, non-alcoholic beverages, alcohol, school items, money, and beauty products. We looked at these items collectively and individually, but we observed no association with early sex.

Early sex occurred predominantly among women who had ever been victims of physically forced/unwanted sex (1.57) and women who had faced non-sexual physical violence from a sexual partner (1.35) (Table 3). Occurrence of early sex was also more likely among women who experienced physically forced/unwanted sex within the past three months (1.61) (Table 4). As further shown in Table 4, early sex was more widespread among women who reported ever having sexual intercourse during menses (1.39), received money from a sexual partner to take care of their menstrual needs (1.33), or had partners of unknown or positive HIV status within the past 3 months (1.54).

Multivariable regression analysis

Our multivariable analysis is presented in Table 5. Early sex was independently associated with report of being inherited, receiving gifts or favors

Table 2: Age of first sex, by first sex contextual factors (N=332)[a], Kisumu contraceptive vaginal ring study, Kisumu, Kenya, 2014

Variable	Total (N=332) n (col %)	First sex at ≤15 yrs. (N=133) n (col %)	First sex at >15 yrs. (N=199) n (col %)	Prevalence of first sex at ≤15 yrs. (row %)	PR ≤15 vs. >15 yrs. (CI)	*p*-value
Age of first partner						0.441
About same age as participant	207 (62.3)	79 (59.4)	128 (64.3)	38.2	Ref.	
5 or more years younger	26 (7.8)	13 (9.8)	13 (6.5)	50.0	1.31 (0.86, 2.00)	0.209
5 or more years older	99 (29.8)	41 (30.8)	58 (29.1)	41.4	1.09 (0.81, 1.45)	0.583
Self-assessment of first sex readiness[b]						
Did not want/was not ready	276 (83.9)	120 (90.2)	156 (79.6)	43.5	1.77 (1.08, 2.90)	0.022
Wanted/was ready	53 (16.1)	13 (9.8)	40 (20.4)	24.5	Ref.	
Received gifts or favors as part of first sex[b]						
Yes	185 (56.2)	85 (63.9)	100 (51.0)	45.9	1.38 (1.04, 1.82)	0.024
No	144 (43.8)	48 (36.1)	96 (49.0)	33.3	Ref.	
Received food or non-alcoholic beverage as part of first sex						
Yes	98 (29.9)	44 (33.3)	54 (27.6)	44.9	1.17 (0.89, 1.54)	0.252
No	230 (70.1)	88 (66.7)	142 (72.4)	38.3	Ref.	
Received alcohol as part of first sex						
Yes	6 (1.8)	3 (2.3)	3 (1.5)	50.0	1.24 (0.55, 2.80)	0.600
No	323 (98.2)	130 (97.7)	193 (98.5)	40.2	Ref.	
Received clothing as part of first sex[b]						
Yes	51 (15.5)	28 (21.1)	23 (11.7)	54.9	1.45 (1.09, 1.94)	0.012
No	278 (84.5)	105 (78.9)	173 (88.3)	37.8	Ref.	
Received school items as part of first sex						
Yes	64 (19.5)	31 (23.3)	33 (16.9)	48.4	1.25 (0.93, 1.68)	0.133
No	264 (80.5)	102 (76.7)	162 (83.1)	38.6	Ref.	
Received money as part of first sex						
Yes	133 (40.5)	58 (43.6)	75 (38.5)	43.6	1.13 (0.87, 1.47)	0.348
No	195 (59.5)	75 (56.4)	120 (61.5)	38.5	Ref.	
Received beauty products as part of first sex						
Yes	104 (31.7)	47 (35.6)	57 (29.1)	45.2	1.19 (0.91, 1.56)	0.204
No	224 (68.3)	85 (64.4)	139 (70.9)	37.9	Ref.	
Received other gifts as part of first sex[b]						
Yes	85 (25.9)	44 (33.1)	41 (21.0)	51.8	1.41 (1.09, 1.84)	0.010
No	243 (74.1)	89 (66.9)	154 (79.0)	36.6	Ref.	

yrs. = years; CI = 95% confidence interval (CI); PR = prevalence ratio
[a]Analysis sample was restricted to women screened who reported that they had sex within the past 3 months and provided age of first sex. Sample sizes fluctuate slightly for some variables due to missing data.
[b]Variables significant at 0.1 level were considered for multivariable analysis.

as part of first sex, having ever experienced physically forced/unwanted sex, and having partners of unknown or positive HIV status within the past 3 months. Specifically, the proportion of those who had early sex was 49% more prevalent among inherited women (1.49) compared to those who were not inherited and 38% more among women who received gifts or favors as part of first sex (1.38) compared to their counterparts who did not receive any reward at their first sexual encounter.

Engagement in early sex was 1.42 times as prevalent among women who had ever experienced physically forced/unwanted sex compared to those without such an experience. Also, early sex experience was 45% greater among those who reported having partners of unknown or positive HIV status within the past 3 months (1.45). Early sex experience was not independently associated with any of the biologic outcomes (STI, bacterial vaginosis, HIV, or pregnancy) in multivariable regression analysis.

Table 3: Age of first sex, by historical behaviors (N=332)[a], Kisumu contraceptive vaginal ring study, Kisumu, Kenya, 2014

Variable	Total (N=332) n (col %)	First sex at ≤15 yrs. (N=133) n (col %)	First sex at >15 yrs. (N=199) n (col %)	Prevalence of first sex at ≤15 yrs. (row %)	PR ≤15 vs. >15 yrs. (CI)	*p*-value
Ever ended up in trouble due to alcohol use						
Yes	29 (8.8)	11 (8.3)	18 (9.1)	37.9	0.94 (0.58, 1.53)	0.804
No	300 (91.2)	121 (91.7)	179 (90.9)	40.3	Ref.	
Ever engaged in illicit/recreational drug use						
Yes	19 (5.7)	10 (7.5)	9 (4.5)	52.6	1.34 (0.86, 2.10)	0.201
No	313 (94.3)	123 (92.5)	190 (95.5)	39.3	Ref.	
Number of lifetime sexual partners						0.331
One	52 (15.9)	17 (12.9)	35 (17.9)	32.7	Ref.	
Two-three	171 (52.3)	68 (51.5)	103 (52.8)	39.8	1.22 (0.79, 1.87)	0.374
Four or more	104 (31.8)	47 (35.6)	57 (29.2)	45.2	1.38 (0.89, 2.15)	0.153
Ever experienced physically forced/unwanted sex[b]						
Yes	109 (33.0)	58 (43.6)	51 (25.9)	53.2	1.57 (1.22, 2.02)	0.001
No	221 (67.0)	75 (56.4)	146 (74.1)	33.9	Ref.	
Ever experienced non-sexual physical violence by sexual partner[b]						
Yes	78 (23.5)	39 (29.3)	39 (19.6)	50.0	1.35 (1.03, 1.78)	0.031
No	254 (76.5)	94 (70.7)	160 (80.4)	37.0	Ref.	
Ever had sexual intercourse during menses[b]						
Yes	70 (21.6)	36 (27.7)	34 (17.5)	51.4	1.39 (1.05, 1.84)	0.021
No	254 (78.4)	94 (72.3)	160 (82.5)	37.0	Ref.	
Ever received money from a sexual partner to take care of her menstrual period needs[b]						
Yes	108 (32.6)	52 (39.1)	56 (28.3)	48.1	1.33 (1.02, 1.72)	0.035
No	223 (67.4)	81 (60.9)	142 (71.7)	36.3	Ref.	
A sexual partner ever bought her sanitary pads to look after her menstrual period						
Yes	265 (80.1)	102 (76.7)	163 (82.3)	38.5	0.82 (0.61, 1.10)	0.191
No	66 (19.9)	31 (23.3)	35 (17.7)	47.0	Ref.	
Excluding first sex, ever used sex to get things she wanted/needed						
Yes	116 (35.0)	52 (39.1)	64 (32.3)	44.8	1.19 (0.91, 1.55)	0.199
No	215 (65.0)	81 (60.9)	134 (67.7)	37.7	Ref.	
Excluding first sex, ever used sex to get money for herself						
Yes	59 (17.9)	25 (19.1)	34 (17.2)	42.4	1.08 (0.77, 1.51)	0.653
No	270 (82.1)	106 (80.9)	164 (82.8)	39.3	Ref.	
Excluding first sex, ever used sex to get a place to stay[b]						
Yes	30 (9.1)	16 (12.2)	14 (7.1)	53.3	1.39 (0.96, 2.00)	0.078
No	299 (90.9)	115 (87.8)	184 (92.9)	38.5	Ref.	
Excluding first sex, ever used sex to get food						
Yes	20 (6.1)	8 (6.1)	12 (6.1)	40.0	1.00 (0.58, 1.75)	0.986
No	309 (93.9)	123 (93.9)	186 (93.9)	39.8	Ref.	
Excluding first sex, ever used sex to get gifts						
Yes	14 (4.3)	6 (4.6)	8 (4.0)	42.9	1.08 (0.58, 2.01)	0.808
No	315 (95.7)	125 (95.4)	190 (96.0)	39.7	Ref.	
Excluding first sex, ever used sex to get money for someone else						
Yes	6 (1.8)	3 (2.3)	3 (1.5)	50.0	1.26 (0.56, 2.84)	0.574
No	323 (98.2)	128 (97.7)	195 (98.5)	39.6	Ref.	
Excluding first sex, ever used sex to get drug/alcohol						
Yes	2 (0.6)	1 (0.8)	1 (0.5)	50.0	1.26 (0.31, 5.06)	0.747
No	327 (99.4)	130 (99.2)	197 (99.5)	39.8	Ref.	
Excluding first sex, ever used sex to get something else						
Yes	11 (3.3)	4 (3.1)	7 (3.5)	36.4	0.91 (0.41, 2.01)	0.817
No	318 (96.7)	127 (96.9)	191 (96.5)	39.9	Ref.	

rs. = years; CI = 95% confidence interval (CI); PR = prevalence ratio
[a]Analysis sample was restricted to women screened who reported that they had sex within the past 3 months and provided age of first sex. Sample sizes fluctuate slightly for some variables due to missing data.
[b]Variables significant at 0.1 level were considered for multivariable analysis.

Table 4: Age of first sex, by behaviors in past three months (N=332)[a], Kisumu contraceptive vaginal ring study, Kisumu, Kenya, 2014

Variable	Total (N=332) n (col %)	First sex at ≤15 yrs. (N=133) n (col %)	First sex at >15 yrs. (N=199) n (col %)	Prevalence of first sex at ≤15 yrs. (row %)	PR ≤15 vs. >15 yrs. (CI)	*p*-value
Alcohol use in past 30 days						
Yes	42 (12.7)	17 (12.8)	25 (12.6)	40.5	1.01 (0.68, 1.49)	0.967
No	289 (87.3)	116 (87.2)	173 (87.4)	40.1	Ref.	
Intravaginal cleansing in past 3 months						
Yes	210 (63.8)	83 (62.9)	127 (64.5)	39.5	0.96 (0.73, 1.26)	0.768
No	119 (36.2)	49 (37.1)	70 (35.5)	41.2	Ref.	
Number of male sexual partners in past 3 months						
One	264 (82.8)	103 (81.1)	161 (83.9)	39.0	0.89 (0.64, 1.25)	0.514
Two or more	55 (17.2)	24 (18.9)	31 (16.1)	43.6	Ref.	
Exchange or transactional sex in past 3 months						
Yes	47 (14.2)	22 (16.5)	25 (12.6)	46.8	1.20 (0.85, 1.68)	0.295
No	284 (85.8)	111 (83.5)	173 (87.4)	39.1	Ref.	
Physically forced/unwanted sex in past 3 months[b]						
Yes	31 (9.4)	19 (14.3)	12 (6.1)	61.3	1.61 (1.18, 2.21)	0.003
No	300 (90.6)	114 (85.7)	186 (93.9)	38.0	Ref.	
Any partners of unknown or positive HIV status in past 3 months[b]						
Yes	159 (47.9)	78 (58.6)	81 (40.7)	49.1	1.54 (1.18, 2.02)	0.002
No	173 (52.1)	55 (41.4)	118 (59.3)	31.8	Ref.	
Last time had sex[b]						
Within the last 7 days	132 (40.0)	61 (45.9)	71 (36.0)	46.2	1.27 (0.98, 1.65)	0.071
More than a week ago	198 (60.0)	72 (54.1)	126 (64.0)	36.4	Ref.	

yrs. = years; CI = 95% confidence interval (CI); PR = prevalence ratio
[a]Analysis sample was restricted to women screened who reported that they had sex within the past 3 months and provided age of first sex. Sample sizes fluctuate slightly for some variables due to missing data.
[b]Variables significant at 0.1 level were considered for multivariable analysis.

Table 5: Age of first sex: adjusted prevalence ratios (N=292)[a], Kisumu contraceptive vaginal ring study, Kisumu, Kenya, 2014

Variable	aPR ≤15 vs. >15 yrs. (CI)	*p*-value
Ever been inherited		
Yes	1.49 (1.16, 1.92)	0.002
No	Ref.	
Received gifts or favors as part of first sex		
Yes	1.38 (1.05, 1.82)	0.022
No	Ref.	
Type of contraceptive used in past 3 months		
Depot medroxy-progesterone acetate (DMPA) injection	0.87 (0.61, 1.24)	0.437
Oral contraceptive pills	Ref.	
Ever experienced physically forced/unwanted sex		
Yes	1.42 (1.11, 1.83)	0.006
No	Ref.	
Any partners of unknown or positive HIV status in past 3 months		
Yes	1.45 (1.11, 1.90)	0.007
No	Ref.	

yrs. = years; CI = 95% confidence interval (CI); aPR = adjusted prevalence ratio
[a]Analysis sample was restricted to women screened who reported that they had sex within the past 3 months, provided age of first sex, and had no missing responses on the variables in multivariable regression.

Discussion

Two out of five women in our study experienced sex at or before the age of 15 years. Our findings further showed four factors associated independently with experiencing early sex: being inherited, receiving gifts or favors as part of first sex, a history of physically forced/unwanted sex,

and having had sex with a partner who had unknown or positive HIV status in the past 3 months.

Particular social and economic norms may foster gender inequality which then may cultivate permissions and support for sex at an early age among adolescent girls and young women[3]. Moreover, inequitable power in sexual relationship can make it challenging for adolescent girls and young women to broach sexual and reproductive topics with their partners much less negotiate condom use or contraception; question partner's risk behaviors and HIV status; or seek assistance with partner anger, emotional abuse, or violent (physical or sexual) behavior. Financial circumstances may further restrict the degree to which young women can exert control in their sexual relationships[17].

Despite delayed timing in age of first sex in African countries, data have shown an increase in premarital sex over the past twenty years[18]. Nationally, the median age of marriage among women 25-49 years of age in 2014 was 20.2 years; however, 15% had first sexual intercourse by age 15, 50% by age 18, and 71% percent by age 20[9]. Onset of puberty at a younger age and increased delays in age of marriage are thought by some researchers to influence earlier age of first sex, as well as premarital sex among adolescent girls and young women in SSA. A study conducted in Kenya and Ghana showed that a lengthy period of premarital sex is related to the spread of HIV[19]. Moreover, incompatibilities between actual behavior and societal beliefs about the appropriate age for sexual initiation may create gaps in the delivery of sexual education. A 2011 Kenyan study found that, while 95% of parents were aware of the need to provide sex education to children, almost one-third were concerned that exposure to this educational information would result in children taking part in early sexual activity[20]. Parents with high receptivity toward parent-child communication on sex in the Families Matter Programme have shown increased HIV dialogue[21]. Additional research is needed to discern associations between age of first sex and parent-child communication about sex.

In general, research that examines the association between early marriage, which is often used as proxy for age of first sex, and HIV or STIs is limited and findings are mixed; however, ecological data suggests that adolescent girls and young women in SSA who marry at a younger age are at increased risk for HIV infection[22]. This may appear to contradict the earlier statement that prolonged periods of premarital sex increase HIV sexual risk exposures. Alone or in combination with other behaviors or circumstances, prolonged premarital sex and early marriage may both contribute toward increased HIV risk for adolescent girls and young women. An early marriage spouse may be older by five or more years, infected with HIV or STIs, or may have a history of poor health or high-risk behaviors (e.g., high number of lifetime partners, concurrent partnerships, patronizing sex workers). These partner attributes may increase the chances that a young wife will become HIV infected or that she will become a widow at a relatively young age. While our study did not collect data on age of first marriage for women, especially those who reported that they were inherited, the association between early sex and widow inheritance observed in our study may be explained partially by a younger age of first marriage. Widowhood at a young age may have then led to a traditional or a modern variant of widow inheritance. To restore societal normalcy, a widow is required to undergo a cleansing ritual, following the burial of her husband. In the case of young widows, this is accomplished by obligatory sexual intercourse with a professional cleanser[12]. Widows who may have contracted HIV from their late husbands pose a risk to their inheriting relatives, while uninfected widows could be at increased risk of HIV from either cleansers or professional inheritors, or their sexual networks. Additional research is needed to better characterize younger widows in this setting. Although our study did not consider relationship stability, inheritance compliance among young widows with a history of early sex may be motivated by psychological and emotional factors not adequately covered in the traditional cultural intentions of widow inheritance and may warrant closer examination. Along with dealing with the emotional grief of losing a spouse, a young widow may not be prepared to handle the psychological stress associated with newfound uncertainty in her social status, identity, custody of

children, economic situation, and relocation or new living arrangements. Consequently, a young widow may have limited opportunity, time, or skills to make adjustments of her choosing, especially given the possibility that she could be cast out of her matrimonial home or community without any entitlements to her deceased husband's estates or held responsible for compromising the wellbeing of her offspring[23].

Research findings on transactional sex are often mixed given the challenges with defining what it is and what it is not. Transactional sex has been best described as a type of relationship in which multiple overlapping risk behaviors may occur as opposed to a single risk factor[24]. Importantly, the provision of gifts and favors by a sexual partner and their acceptance by an adolescent girl or a young woman may be situated within a social exchange system that may outwardly have little to do with a health-risk-based definition of transactional sex. However, where the access to material goods and services is held by a sexual partner, increased dependency and reduced bargaining power are likely for adolescent girls and young women[17]. Receipt of gifts or favors for sex, not just at first sex, among adolescent girls and young women has been shown to be characteristic of low-income settings, such as Kisumu[3]. Explanations for participation in transactional sex by adolescent girls and young women in SSA have been centered around three paradigms: (1) sex for basic needs which emphasizes women as subject to exploitation and victims of transactional sex, (2) sex for improved social status which positions women as sexual agents, and (3) sex as a material expression of love which places men as providers in such relationships[25]. Monetary and non-monetary gifts provided within the context of transactional sex have been shown to range from essential daily needs (food, shelter, school fees, hygiene and menstrual management products, etc.) to luxury/lavish items (cellular phone, clothing, cosmetics, etc.)[26]. Among adolescent girls and young women in SSA, the prevalence of transactional sex ranges as low as 2%[27] to as high as 52%[28].
Notably, transactional sex may introduce, exacerbate, or emerge as a consequence of gender inequality, which may increase vulnerability for

violence, including sexual violence, and discourage autonomy and empowerment of women regardless of age. Women concerned with losing material support from partners may be less likely to refuse sex, negotiate condoms, be in control of their own reproduction, or have fidelity expectations from such partners[29]. Adolescent girls and young women may be more inclined to engage in first sex at an earlier age given real or perceived prospects for gifts and other material goods available to them or their family. It is noteworthy that lowered HIV incidence among young African women has been observed with microfinance or cash transfer interventions potentially given their short-term nature and non-material benefits of transactional sexual relationships[30].

The association between early sex and physically forced/unwanted sex observed in our study is consistent with findings from a number of other SSA studies[31]. In Kenya, 18% of women 15-19 years of age and 11% of those 20-24 years of age report forced or coercive first sex[32]. While a study in three African countries showed that adolescent and adult risky sexual behaviors, including early sex experiences, were linked to childhood sexual and physical abuse[33], factors associated with early sex may be confounded or mediated by forced sex. CDC's Technical Package for Preventing Child Abuse and Neglect provides the best evidence available currently to prevent and reduce child abuse and neglect. Additional research, however, is needed to better understand both feasibility and effectiveness of multimodal approaches to safety planning and harm reduction, especially in settings where economic, social, cultural, health, legal, and other structures may hamper inadvertently women's safety and well-being.

Although a few US-based studies have examined the subsequent timing of sexual involvement, relationship quality, and other relationship dynamics[34], to our knowledge, no SSA studies have looked at the association between early sex and later partner traits. Potential qualitative research could provide further insights on how partnering occurs and whether partner selection is influenced by attributes of the first sex partner.

Poor communication influenced by first sexual experience as well as gender roles and

expectations may explain possible later-in-life reluctance to ask about a partner's HIV status. In addition, early sex may subsequently influence a woman's impulsivity and sensation-seeking behaviors[35] as well as preferences for selecting riskier sexual partners given perceptions that such partners are more adventurous or desirable[36]. Limited research has been conducted on the relationship context (romantic vs. non-romantic) associated with adolescent early sexual experiences and whether or not it influences subsequent risky behaviors[37].

Our findings suggest a lack of association between experiencing early sex and biological outcomes. Other studies have demonstrated that early sex may be neither a 'risk' nor a 'protective' factor[38]. Findings from a US-based study suggested that, while early sex and negative biological outcomes were not directly correlated, the relationship between them is likely confounded by other antecedent experiences[39], including age of menarche[40].

Our study had several limitations. Convenience sampling was used to recruit participants and thus, the women in our study may not be representative of women residing in Kisumu County. We were not able to determine causality of factors associated with early sex experiences. Given that several of the factors we examined may have co-occurred with age of first sex (e.g., physical forced/unwanted sex, transactional sex) and ordering cannot be ascertained, caution is highly warranted in deducing temporal associations. Our data were obtained through inquiries about past experience which are subject to recall bias. Finally, some potentially important variables were not included in our analysis due to low numbers (condom use) or questionnaire omission (relationship solidity, age of marriage, inheritance particulars, sexual relationship with inheritor, age of first pregnancy, or age of menarche). Despite these limitations, this study furthers our understanding of factors known to be associated with early sex as well as important factors that could indirectly measure risky sexual behavior (e.g., unknown or positive HIV status of recent sexual partner).

Ethical Approval

The study was approved by the Scientific and Ethics Review Unit of the Kenya Medical Research Institute (KEMRI), an Institutional Review Board for the United States (US) Centers for Disease Control and Prevention (CDC), and the Kenya Pharmacy and Poisons Board. Women who completed the in-depth screening process received a bar of soap, 500 Kenya Shillings (approximately $5 USD) for transport, feminine sanitary pads, and a treated malaria bed net in accordance with the local research study guidance.

Conclusion

Our results suggest that sexual intercourse before or at age 15 may be associated with greater rates of particular higher sexual risk behaviors. Complex power and gender relations, including compliance with cultural traditions, may influence women's exposure to sexual risk in our research setting. While our findings may suggest that programs targeted on delaying the onset of sexual activity and providing safe sex skills training and support for those who initiate early sex would be beneficial, additional research is needed. Optimally, initiatives, such as DREAMS (Determined, Resilient, Empowered, AIDS-free, Mentored and Safe)[41], can examine and address early sex contextual factors that may be mediating negative health behaviors and may help inform early education and intervention programs needed by adolescent and young women in Kisumu. Additionally, longitudinal studies that evaluate the potential ongoing influence of early sex on behavior as women transition from adolescence to adulthood may be helpful.

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Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Contributions of Authors

With the exception of RG, all authors contributed to the development of The Kisumu Contraceptive Vaginal Ring Study protocol under the leadership of EML. KO and EML supervised the data collection by trained research assistants. KO, DG, and EML prepared the first draft of this manuscript, while RG and GO led the data analysis. All authors made significant contributions to the manuscript and revised it for intellectual content. All authors have read and commented on the manuscript. All authors have approved the final manuscript and act as guarantors of the paper.

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