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Assessing Components of Ghana's Comprehensive Sexuality Education on the Timing of Sexual Debut Among In-School Youth

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Abstract

Although Ghana's comprehensive sexuality education (CSE) program has been lauded, no study has examined its association with the sexual health outcomes of Ghanaian youth. Using data collected from 2,982 in-school youth (male = 1,820 and female = 1,162) aged 15 to 17 years in three administrative regions of the country, we applied discrete-time hazard models to examine associations between components of Ghana's CSE on the timing of sexual debut among male and female youth. Results indicate significant relationships between components on HIV prevention and timing of sexual debut for male youth. Male youth who learned about HIV prevention delayed sexual debut; however, male youth who endorsed myths about HIV transmission started sex early. Females who learned about values and interpersonal skills delayed their sexual debut, but the influence of this variable was attenuated by respondents' demographic characteristics. Female respondents residing in the Greater Accra and Northern regions delayed sex, compared with those in the Brong Ahafo region.

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Introduction

Despite the slow progress, Ghana's human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) prevention campaign has been successful (Stuart, 2013). With a prevalence of about 1.9%, HIV infection in Ghana remains one of the lowest in sub-Saharan Africa, and the country has committed to creating an "AIDS-free" society by 2030 (Boneh & Jaganath, 2011; Kharsany & Karim, 2016; Poku, 2016). However, Ghanaian youth seem extremely vulnerable to new infections. Data from the Ghana AIDS Commission indicate HIV prevalence increased by 45% for young people below 24 years, and risky sex explained their vulnerability (Ghana AIDS Commission, 2015). To reach the goal of an AIDS-free society, it will be crucial to decrease the incidence of HIV infection among Ghanaian youth. Suggestions include introducing behavior change programs that emphasize delaying sexual intercourse (sexual abstinence), using condoms, and eschewing multiple and concurrent sexual partners (Mavedzenge et al., 2011; Michielsen et al., 2010; Ross et al., 2006).

While condom use is often considered a pragmatic and realistic option for young people, some research, especially from sub-Saharan Africa, shows that delaying first sexual intercourse could be an effective strategy (Coates et al., 2009; Cohen et al., 2008; Onsomu et al., 2013). Previous literature associates early sexual initiation with longer periods of exposure to sexual activity, lack of condom use, access to a network of multiple and concurrent sexual partners, and increased risks of contracting HIV (Bankole et al., 2004; Langille et al., 2010; Magnusson et al., 2012; Pettifor et al., 2004; Tuoyire et al., 2018). As a result, delaying sexual debut has been one of the prime targets of HIV interventions in sub-Saharan Africa (Bertrand, 2015; Macintyre et al., 2001; Michielsen, 2012; Tenkorang et al., 2009). While several contextual factors may influence the timing of sexual debut, previous studies, mostly in sub-Saharan Africa, find young people delay sexual intercourse when they possess comprehensive and significant knowledge about HIV/AIDS and are able to identify and reject myths and misconceptions (Ankomah et al., 2011; Cohall et al., 2001). A Kenyan study, Tenkorang and Maticka-Tyndale (2008, 2014), found it was important for in-school Kenyan youth to possess knowledge about HIV to delay sexual debut, but the significance of being

knowledgeable could be undermined by strong beliefs in myths surrounding the transmission of the virus. Several other studies suggest the need to motivate young people by raising their perceptions of risks and equipping them with appropriate behavioral skills to engage in risk-reducing behaviors, including delaying sexual debut (Crosby et al., 2003; Guzmán et al., 2015; Noar et al., 2006).

School-based CSE has been identified as a multi-pronged and multidisciplinary approach to addressing the sexual health needs of adolescents and young people around the world (UNESCO, 2015; United Nations Population Fund [UNFPA], 2010). CSE aims at equiping young people with knowledge, skills, attitudes, and values relevant for making life-changing decisions about their sexual health and overall well-being (UNESCO, 2015). To achieve this, the program uses schools as conduits to disseminate information about adolescent development, particularly their psychological, emotional, physical and social development. Since its inception, Ghana's CSE program has focused on aspects/dimensions of HIV prevention among young people of in-school age (Biddlecom et al., 2007; Keogh et al., 2018; National Population Council, 2000). The program covers the "ABCs" of HIV prevention (abstinence, being faithful to sexual partners, condom use) but goes beyond this to address other significant areas of the sexual reproductive health of youth in the country. These include interpersonal skills and values, reproductive physiology, contraception, and pregnancy prevention, among others. At present, no study has examined the associations between components of the CSE program and the timing of sexual debut. We fill this gap by exploring whether information learned about the various components of the comprehensive sexual health education program is associated with delays in the timing of sexual debut among in-school youth in Ghana.

Adolescent Development and Ghana's CSE Program

Adolescence is a critical period in the lives of young people globally. During this period of biological, social, and psychological maturation, youth are exposed to sexual and reproductive health risks and vulnerabilities, including early sexual debut (usually marked by first sexual intercourse before age 15), teenage pregnancy, early childbearing, and other adverse health behaviors and outcomes (Chandra-Mouli et al., 2017; Naswa & Marfatia, 2010). Meanwhile, information required to avert these risks may not be reliable and could be confusing and conflicting. It is also a period of opportunity where young people develop their sexual agency and gender identity before transitioning into adulthood (Goldman, 2011).

A survey conducted in Ghana found one in every five Ghanaian was an adolescent aged between 10 and 19 years (Performance Monitoring and Accountability, 2020). Similar to other countries in the world, adolescents in Ghana face acute reproductive health challenges; they experience sexual intercourse earlier in the life course, and many have multiple sexual partners (Awusabo-Asare et al., 2017; Guttmacher Institute 2004). It is estimated that about 12% and 9% of Ghanaian adolescent females and males had initiated sex before turning 15 years, respectively (Awusabo-Asare et al., 2017). Regional analyses show that a higher proportion of adolescent females in the Brong Ahafo region (21%) initiate sex before turning 15 compared with those in the Greater Accra (5%) and the Northern region (8%). It is also documented that about 69% of adolescents in Ghana aged 15 to 19 years reported pregnancies that were unintended and over one-third do not use contraceptives (Ameyaw, 2018; Awusabo-Asare & Annim, 2008).

Given these problems, Ghanaian policymakers consider the sexual and reproductive health (SRH) needs of adolescents a priority (Awusabo-Asare et al., 2017; Esantsi et al., 2015). For some time, Ghana has maintained a strong legal and policy hold on the development and implementation of SRH education (Awusabo-Asare et al., 2017). Schools were formalized as conduits for teaching SRH when the country's first Adolescent Sexual and Reproductive Health Policy came into effect in 2000 (Ghana Education Service, Ministry of Education, 2012).

The 2015 revisions of the policy address a broader and comprehensive set of reproductive health concerns, including HIV/sexually transmitted infection (STI) prevention, gender and reproductive rights, contraception and unintended pregnancies, values and interpersonal skills, and sexual and reproductive physiology (Awusabo-Asare et al., 2017). The HIV/STI prevention component focuses on information about HIV/AIDS and STIs, access to HIV services, and prevention of mother-to-child transmission. Gender and reproductive health focuses on a broad range of gender and SRH-related issues, including prevention of sexual violence, gender equality, sexual orientation, and so on. For contraception and unintended pregnancies, youth are taught about the access to and use of contraceptives, abortion, and the avoidance of teenage and unwanted pregnancies. Under values and interpersonal skills, young people learn how to communicate and make decisions in their sexual relationships, how to say no and abstain from sex, and how to handle other important issues related to their sexuality. The final component, sexual and reproductive physiology, focuses on physical changes in the body, information about the reproductive organs, and pregnancy and childbirth (Awusabo-Asare et al., 2017).

As the above framework suggests, the sexual health information provided to youth in Ghana is comprehensive. It is also consistent with UNFPA's operational guidance for CSE, a holistic approach to sexual health education aimed at equipping youth and children with the skills and values needed to develop a positive view of their sexuality (UNFPA, 2010). This approach to teaching sex education derives from the idea that knowledge and information are crucial to the sexual development of young people and that schools provide viable and enduring systems/infrastructure for delivering CSE programs. The role of the school setting is more compelling when gauged against the premium CSE places on scientifically accurate information to learners. In Ghana, young people are taught SRH from primary school (grade 4), when some begin sexual activity, through to junior and senior high school (Panchaud et al., 2019). Introducing SRH as part of basic education is considered ideal, given high enrolments at this level mainly because of the free compulsory basic education. Even for those not attending school, SRH information is disseminated by alternative out-of-school sources, including pamphlets, friends, family members, radio, television, and other social media outlets provided by sexual reproductive health right-focused (SRHR) non-governmental organizations (Awusabo-Asare et al., 2017).

Although CSE coverage and content are considered more advanced in Ghana than in other countries with similar characteristics, the approach is criticized for being reactive with too much focus on abstinence-only messages. There is a lack of emphasis on condom use, and premarital sexual activity is problematized (Keogh et al., 2018). Furthermore, not many students learn about contraceptive methods, communication in relationships, and other important dimensions of CSE. In Ghana and many other sub-Saharan African countries, there has been open public opposition against introducing CSE in the educational curriculum in schools. The opposition primarily emerge from deep-seated misconceptions about the intentions of CSE. For instance, it has been described as a Western agenda to inculcate sexual values (e.g., comprehensive abortion care and lesbian, gay, bisexual, transgender and intersex—LGBTI) that are "alien" to African cultures (CitizenGO Africa 2019; Ngnenbe, 2019). Nevertheless, it is expected that CSE will improve the confidence of Ghanaian youth and enhance their ability to negotiate safer sex, including abstaining or delaying sexual intercourse (Awusabo-Asare et al., 2017; Panchaud et al., 2019).

At the moment, however, we are unaware of studies that examine how key values, concepts, and messages conveyed in Ghana's comprehensive sexuality program influence the reproductive health outcomes of Ghanaian youth. Specifically, we do not know whether exposure to the various CSE components or concepts is associated with the timing of sexual debut among youth.

This article makes a contribution to the literature by investigating associations between the concepts and components of Ghana's sexuality education program and the timing of sexual intercourse among in-school youth.

Method

Data were collected in 2015 as part of a multi-country initiative to examine the implementation of sexuality education in four countries: two from Africa (Ghana, Kenya) and two from Latin America (Guatemala, Peru). Ghana and Guatemala are considered to be in advanced stages of implementing SRH education, while Kenya and Peru are in the early stages (Panchaud et al. 2019). The objective of this particular study was to provide a comprehensive analysis of SRH education and its implementation in secondary schools in Ghana.

Sampling

The Ghanaian study focused on three geographical or ecological zones: the southern, middle, and northern belts. Three regions, Greater Accra, Brong Ahafo, and the Northern regions, were selected to represent the south, middle, and north, respectively.[1] With a land surface of 3,245 square kilometers of the total land area of Ghana, the Greater Accra region is the smallest of the 16 administrative regions in the country. However, it has the second largest population after the Ashanti region (Ghana Statistical Service, 2013). The Greater Accra region hosts the national capital and the seat of the Ghana government. The Brong Ahafo region is located in the middle part of Ghana covering an area of 39,557 square kilometers. Meanwhile, the Brong Ahafo region is not as populated as the Greater Accra region. It is often considered the "food basket" of Ghana because it serves as a major link or transit point between southern and northern Ghana (Ghana Statistical Service, 2013). Of the three regions, the Northern region is the largest with a total land area of 70,384 square kilometers. Surveys show the Northern region is the poorest of all the three regions used in this study (Ghana Statistical Service, 2013). While Brong Ahafo and the Northern regions were randomly selected, the Greater Accra region was selected purposively because it houses the national capital and thus contains decision-makers at different levels of governance. A total of 82 schools were then randomly selected from the three regions. To ensure a representative selection of schools, schools were stratified by type (private or public) and coeducational status (mixed, only males, and only females). In each of the sampled schools, the head teacher or the assistant head teacher (if the head

was unavailable) was asked to complete a survey. Four schools were omitted from the sample because head teachers or their assistants were not available to respond to survey questions, leaving a total sample of 78 schools and a response rate of 95% at the school level (Awusabo-Asare et al., 2017). At the individual level, all students aged 15 to 17 years in Forms 2 or 3 were considered eligible for the study. Their eligibility was based on the idea that students at this age and in these grades would have been exposed to at least one year of SRH education in high school and could answer the questions (Awusabo-Asare et al., 2017). Although students aged 15 to 17 years were targeted, younger students aged 13 to 14 years and those older than 17 years in Forms 2 or 3 were also interviewed. A minimum of 35 students were selected based on school and grade sizes. Overall, about 2,990 students were interviewed from 78 schools in the three identified regions. To ensure representativeness, the number of students sampled per school was proportionate to the size of the school. Eligible students were gathered in a room, and a ballot box was used to randomly select the desired sample for the study. Questionnaires were used to elicit information from students. The analytic sample for this study comprised youth who were sexually active and those who were not ($N = 2, 982$). Ethics clearance was received from the University of Cape Coast and the Guttmacher Institute.

Measures

Age at first sex. The outcome variable was the age at which youth experienced first sexual intercourse, given our interest in examining the timing of sexual debut. Youth were asked to self-report their age at first sex after being asked if they had ever experienced vaginal sexual intercourse. A few respondents experienced their sexual debut before turning 10 and were deleted from the sample. Consequently, we limited the age at first sex to 10 years. It was important to limit the age at first sex to 10 years given the timing of Ghana's CSE, which begins early in class (grade) 4 when children are 10 years old. This means none of the respondents in this study would have experienced their sexual debut before exposure to the CSE.

Thus, for respondents who experienced first sexual intercourse, the timing of first sex measures the duration from age 10 until they experienced their sexual debut. For censored cases, duration was measured as age at the time of survey minus age 10.

Focal predictors captured five components of Ghana's CSE (sexual and reproductive physiology, HIV/STI prevention, contraception and unintended pregnancy, values and interpersonal skills, and gender and SRH rights).

Sexual and reproductive physiology. This component is a derived variable created from four questions asking youth if they learned about puberty/physical changes in the body, the reproductive organs and menstruation, and pregnancy and childbirth from classes/talks/activities in the school. The items were coded "no-0," "yes = 1," and "not answered = 2." Respondents learned about "sexual and reproductive physiology" if they answered in the affirmative or said "yes" to at least one of the four questions measuring this variable; otherwise, they were coded "no." Respondents who did not answer questions on all four items were coded "not answered."

HIV/STI prevention. This component was derived from three questions asking youth if they learned about HIV and other STIs and where to access STI/HIV services from classes/talks/activities in the school. The items were coded "no = 0," "yes = 1," and "2 = not answered." Respondents learned about "HIV/STI prevention" if they answered in the affirmative or said "yes" to at least one of the three questions measuring this variable; otherwise, they were coded "no." Respondents who did not answer questions on all three items were coded "not answered."

Values and interpersonal skills. This component was derived from six questions asking youth if they learned about chastity/abstinence, moral issues related to sexuality, decision-making skills, sex in exchange for money or gifts, communicating within relationships, and sexual behavior from classes/talks/activities in the school. The items were coded "no = 0," "yes = 1," and "2 = not answered." Respondents learned about "values and interpersonal skills" if they answered in the affirmative or said "yes" to at least one of the six questions measuring this variable; otherwise, they were coded "no." Respondents who did not answer questions on all six items were coded "not answered."

Gender and SRH. This component was derived from four questions asking if youth learned about SRH, prevention of violence/sexual abuse, sexual orientation, and equality between men and women from classes/talks/activities in the school. The items were coded "no = 0," "yes = 1," and "2 = not answered." Respondents learned about "gender and SRH" if they answered in the affirmative or said "yes" to at least one of the four questions measuring this variable; otherwise, they were coded "no." Respondents who did not answer questions on all four items were coded "not answered."

Contraception and unintended pregnancy. This component was derived from four manifest variables indicating if youth learned about abortion, contraceptive methods, how to use contraceptive methods, and where to get

contraceptives from classes/talks/activities in school. The items were coded "no = 0," "yes = 1," and "2 = not answered." Respondents learned about "contraception and unintended pregnancy" if they answered in the affirmative or said "yes" to at least one of the four questions measuring this variable; otherwise, they were coded "no." Respondents who did not answer questions on all four items were coded "not answered."

From a qualitative perspective learning even one item on any of the five CSE measures is important and could constitute information that may lead to sexual behavioral change (Awusabo-Asare et al., 2017). This way of categorizing our data separated respondents who learned at least one item from those who did not learn anything at all. Thus, in quantifying, we did not underestimate the change that a single item may also bring. For analytical purposes, youth who did not answer questions specific to these dimensions were coded "not answered." This methodological decision was taken to keep respondents who did not give answers to these specific measures but provided answers on other measures including the outcome (age at first sex). This way, we are able to assess if they are selectively different from those who learned some information on specific CSE measures.

Other theoretically relevant variables included respondents' knowledge about HIV/AIDS and myths surrounding HIV transmission.

Knowledge about HIV/AIDS. This measure was created from four questions that asked youth if one can get HIV/AIDS by having unprotected sex with someone, by receiving blood transmission from an infected person, by injecting a needle that was infected, and through mother-to-child transmission. All variables were coded "no = 0" and "yes = 1." Factor analysis (with principal component analysis as the extraction method) was used to determine if specific indicators loaded on the same underlying variable. Thus, "knowledge about HIV/AIDS" is a weighted summative scale derived from the extracted factor scores—specifically, the Anderson-Rubin factor scores. Factor loadings for this variable ranged between 0.605 and 0.749 and were rotated using the varimax rotation procedure. As the response categories for the items are dichotomous, factor loadings were derived based on their polychoric/tetrachoric correlations. Eigen values for the factors were greater than one. Higher values on the factor scores mean higher knowledge about HIV/AIDS.

Myths surrounding HIV transmission. This measure was derived from three questions asking youth if one can get HIV/AIDS through mosquito bites, by shaking hands with an infected person, and through a curse/juju/witchcraft/bad omen. All variables were coded "no = 0" and "yes = 1." The variables

loaded on the same underlying construct using factor analysis with principal component analysis as the extraction method. The weighted Anderson-Rubin factor scores for these indicators were then extracted as "myths surrounding HIV/AIDS." Factor loadings ranged between 0.654 and 0.740. Higher values on the factor scores mean endorsing myths about HIV transmission.

Respondents' demographic characteristics were used as control variables; these included ethnicity coded (0 = Akan, 1 = Ga Dangme, 2 = Ewe, 3 = Mole Dagbani, 4 = Guan, 5 = Others), religion coded (0 = Christian, 1 = Muslim, 2 = Others), region of residence coded (0 = Brong Ahafo, 1 = Greater Accra, 2 = Northern region), form or level at senior secondary school coded (0 = Form 2, 1 = Form 3), type of school attended coded (0 = Mixed school, 1 = Only boys/girls), and status of the school coded (0 = Public, 1 = Private, 2 = Joint). Duration dummies, coded (0 = less than 15 years, 1 = 15 years, 2 = 16 years, 3 = 17 years) were used to adjust for length of time since sexual debut.

Analysis

Discrete-time hazard models were used to examine associations between components of Ghana's CSE and age at first sexual intercourse. The discrete-time hazard model is often preferred over continuous time models when the time unit for the dependent variable—in this case, age at first sexual intercourse—is large and reported in complete years, leading to several ties in the data, as is the case in this study (Allison, 2003; Tenkorang & Maticka-Tyndale, 2014). Like other event history techniques, the discrete-time hazard model requires respondents who have not experienced the event of interest (age at first sex) to be right censored. The application of this technique also requires that the data be restructured in such a manner that each respondent has a sequence of observations, one for each time interval until event occurrence or censoring (Singer & Willett, 1993). In other words, in this case, the data had to be transformed from person-level to person-year period. Consequently, a total observation of 15,870 person-year periods (males = 6,104 and females = 9,766) was recorded for 2,982 adolescents. For each given period, the outcome variable was whether first sex occurred within the interval or not. Time intervals were grouped as piecewise constants with the assumption that the risk of experiencing first sexual intercourse was constant within the interval (Tenkorang & Adjei, 2015).

One important feature of the data is that they were hierarchical or multilevel in nature, with students nested in schools. It is possible that students in the same school were alike or shared common characteristics, violating assumptions underlying standard or conventional regression techniques. Thus, unless accommodated, standard errors could be underestimated and

statistical inferences might be biased as a result of clustering in the data. To account for this, we specified a two-stage random intercept model, with respondents *i* nested in households *j*. The two-level discrete time hazard model can be expressed as

$$\log\left(\frac{P_{ij}}{1-P_{ij}}\right) = \alpha_{t-1} + x_{ij}\beta + \omega_j$$

where $\log(p_{ij}/1-p_{ij})$ is the odds of first sex for the ith student belonging to the jth school; x_{ij} is a vector of covariates corresponding to the ith student in the jth school; α_{t-1} is a function of time indexed by a series of dummies; β is a vector of unknown regression parameters associated with the explanatory variables; and ω_j is the variance associated with the jth school.

Clustering across schools may be estimated using intra-class correlations. This is done by calculating the ratio of the variance at the school level to the sum of the variances at both the school and individual levels: $\rho = (\omega_j/\omega_j + (\pi^2/3))$, where ω_j is the estimated school level variance and $\pi^2/3$ is the variance of a standard logistic regression (Pebley et al., 1996).

The regression coefficient β can be exponentiated and interpreted as an odds ratios; if a particular covariate is greater than one, it means students with such characteristics are at higher odds of experiencing sexual intercourse or will experience their sexual debut earlier than those in the reference category. An odds ratio lower than one indicates a lower risk of experiencing first sexual intercourse or a later age of sexual initiation. We used the GLLAMM program in STATA to estimate the multilevel discrete time logit (for more information, see Rabe-Hesketh et al., 2004; Rabe-Hesketh & Skrondal, 2005).

Results

Descriptive results are presented in Table 1. Results are stratified by gender, given that previous research shows differences in the sexual behaviors of male and female youth. The majority of respondents selected for interviews attended public and mixed schools and were Christians. Unlike female youth, the majority of male youth were spread evenly across the three regions. A substantial proportion of youth had experienced sexual intercourse at the time of the interview (male = 25% vs. female = 22%). While not shown, a lifetable analysis demonstrated no significant gender difference in the median age at first sexual intercourse (17 years for both male and female youth). Similarly, the average age at first sexual intercourse was 16.5 years and 16.3 years for male and female youth, respectively. Results also indicated that the majority of youth, both male and female, had learned and were aware of the

Table 1. Mean/Percentage Distribution of Selected Dependent and Independent Variables.

	Boys (N = 1,162)		Girls (N = 1,820)	
Variables	*N*	%	*N*	%
Whether student experienced first sex in the interval				
No	868	74.7	1,418	77.9**
Yes	294	25.3	402	22.1
Mean age at first sex (years)	17.0		16.3	
Components of sexuality education				
Did students learn about sexual and reproductive physiology?				
No	33	2.8	24	1.3***
Yes	1,078	92.8	1,681	92.4
Not Answered (NA)	51	4.4	115	6.3
Did students learn about HIV and STI prevention?				
No	59	5.1	4.9	89
Yes	1,048	90.2	88.6	1,613
N/A	55	4.7	6.5	118
Did students learn about contraception and unintended pregnancy?				
No	265	22.8	348	19.1***
Yes	823	70.8	1,312	72.1
N/A	74	6.4	160	8.8
Did students learn about values and interpersonal skills?				
No	19	1.6	40	2.2
Yes	1,040	89.5	1,574	86.5
N/A	103	8.9	206	11.3
Did students learn about gender and SRH rights?				
No	62	5.3	78	4.3***
Yes	1,018	87.6	1,551	85.2
N/A	82	7.1	191	10.5
Mean score for knowledge about HIV/AIDS	1,162	.067	1,820	−.041***
Mean score for myths about HIV transmission	1,162	−.035	1,820	.024
Demographic (control)				
Type of school				
Public	1,057	91.0	1,674	92.0
Private	105	9.0	146	8.0

(continued)

Table 1. (continued)

Variables	Boys (*N* = 1,162)		Girls (*N* = 1,820)	
	N	%	*N*	%
School status				
Mixed school	1,009	86.8	1,543	84.8
Only boys/girls	153	13.2	277	15.2
Form/level at the senior secondary school				
Form 2	922	79.3	1,416	77.8
Form 3	240	20.7	404	22.2
Ethnicity				
Akan	402	34.6	639	35.1**
Ga Dangme	120	10.3	173	9.5
Ewe	81	7.0	129	7.1
Mole Dagbani	363	31.2	593	32.6
Guan	35	3.0	27	1.5
Others	162	13.9	258	14.2
Religion				
Christian	754	64.9	1,192	65.5
Muslim	386	33.2	612	33.6
Others	22	1.9	16	0.9
Region of residence				
Brong Ahafo	353	30.4	455	25.0
Greater Accra	356	30.6	455	25.0
Northern region	453	39.0	910	50.0

Note. Chi-square tests used for categorical variables and t-tests for continuous variables. SRH = sexual and reproductive health.
**$p < .05$. ***$p < .01$.

dimensions and the core components of Ghana's sexuality education. For instance, over 90% had learned about sexual and reproductive physiology and over 70% knew about contraceptives and unintended pregnancies. Positive scores for male youth indicated they were more knowledgeable about HIV than female youth who had negative scores. Negative scores on myths for male youth showed they largely rejected myths of HIV transmission, while positive scores for females indicated endorsement or acceptance.

Bivariate results in Table 2 show significant relationships between specific components of Ghana's CSE and the timing of sexual debut. For instance, compared with those who did not learn about HIV prevention, male youth who did so delayed their sexual debut (OR = 0.502). Compared with those who did not learn about values and interpersonal skills, female youth who did learn about them delayed their sexual debut (OR = 0.675). Several

Table 2. Bivariate Multilevel Discrete-Time Hazard Models for Ghanaian Youth by Gender, 2017.

	N = 1,162	*N* = 1,820
	Males	Females
Variables	Expβ	Expβ
Time/duration		
Less than 15 years (ref)	1.00	1.00
15 years	0.444 (.258)***	0.138 (.386)***
16 years	0.235 (.364)***	0.084 (.506)***
17 years or more	0.295 (.419)***	0.033 (1.03)***
Components of sexuality education		
Did students learn about sexual and reproductive physiology?		
No	1.00	1.00
Yes	1.04 (.433)	0.675 (.410)
N/A	0.015 (.376)***	0.763 (.622)
Did students learn about HIV and STI prevention?		
No	1.00	1.00
Yes	0.502 (.283)**	0.880 (.309)
N/A	0.537 (.430)	0.439 (.462)
Did students learn about contraception and unintended pregnancy?		
No	1.00	1.00
Yes	0.757 (.172)	1.09 (.188)
N/A	1.16 (.294)	0.745 (.308)
Did students learn about values and interpersonal skills?		
No	1.00	1.00
Yes	1.03 (.241)	0.675 (.211)**
N/A	1.15 (.326)	0.658 (.288)
Did students learn about gender and SRH rights?		
No	1.00	1.00
Yes	0.807 (.312)	0.948 (.333)
N/A	0.811 (.411)	0.840 (.333)
Knowledge about HIV/AIDS	0.955 (.074)	0.966 (.066)
Myths about HIV transmission	1.14 (.072)*	1.05 (.067)
Demographic (control) variables		
Type of school		
Public	1.00	1.00
Private	1.03 (.299)	2.37 (.515)*
Joint (public and private)	0.604 (.684)	4.44 (.416)***

(continued)

Table 2. (continued)

	N = 1,162	*N* = 1,820
	Males	Females
Variables	Expβ	Expβ
School status		
Mixed school	1.00	1.00
Only boys/girls	0.742 (.294)	0.893 (.349)
Form/level at senior secondary school		
Form 2	1.00	1.00
Form 3	1.31 (.189)	1.23 (.178)
Ethnicity		
Akan	1.00	1.00
Ga Dangme	1.12 (.247)	0.782 (.296)
Ewe	0.975 (.295)	0.649 (.313)
Mole Dagbani	0.705 (.213)	0.642 (.233)
Guan	0.958 (.447)	0.326 (.741)
Others	0.890 (.243)	0.671 (.247)
Religion		
Christian	1.00	1.00
Muslim	0.637 (.180)***	0.705 (.191)*
Others	0.794 (.601)	5.26 (.436)***
Region of residence		
Brong Ahafo	1.00	1.00
Greater Accra	0.832 (.213)	0.340 (.284)***
Northern region	0.579 (.213)***	0.357 (.290)***

Note. odds ratios are reported with robust standard errors in brackets. SRH = sexual and reproductive health.
*$p < .1$. **$p < .05$. ***$p < .01$.

demographic variables used as controls were significantly associated with the timing of sexual debut. Compared with youth in the Brong Ahafo region, male and female youth in the Northern region delayed their sexual debut. Female youth in the Greater Accra region delayed the timing of their sexual debut longer than those in the Brong Ahafo region. While male Muslim youth delayed their sexual debut compared with their Christian counterparts, female youth identifying with other religious denominations had higher odds of experiencing early sexual intercourse.

While the bivariate findings are useful, they only show the gross associations of the focal predictors (components of the CSE) with the outcome. Tables 3 and 4 show the independent (net) associations between the

Table 3. A Multilevel Discrete Time Hazard Model of Age at First Sex Among Male Ghanaian Youth.

	N = 1,162	*N* = 1,162	*N* = 1,162
	Model 1	Model 2	Model 3
Variables	Expβ	Expβ	Expβ
Time/duration			
Less than 15 years (ref)	1.00	1.00	1.00
15 years	0.452 (.258)***	0.454 (.258)***	0.435 (.266)***
16 years	0.239 (.365)***	0.239 (.365)***	0.244 (.365)***
17 years or more	0.298 (.420)***	0.301 (.420)***	0.298 (.421)***
Components of sexuality education			
Did students learn about sexual and reproductive physiology?			
No	1.00	1.00	1.00
Yes	1.26 (.455)	1.24 (.455)	1.23 (.454)
N/A	0.032 (1.16)***	0.035 (1.15)***	0.031 (1.16)***
Did students learn about HIV and STI Prevention?			
No	1.00	1.00	1.00
Yes	0.691 (.301)**	0.503 (.300)**	0.473 (.304)***
N/A	0.067 (1.08)***	0.067 (1.08)***	0.067 (1.08)***
Did students learn about contraception and unintended pregnancy?			
No	1.00	1.00	1.00
Yes	0.780 (.186)	0.770 (.187)	0.760 (.191)
N/A	1.30 (.406)	1.25 (.408)	1.34 (.408)
Did students learn about values and interpersonal skills?			
No	1.00	1.00	1.00
Yes	1.25 (.430)	1.27 (.274)	1.25 (.276)
N/A	1.28 (.430)	1.32 (.433)	1.21 (.443)
Did students learn about gender and SRH rights?			
No	1.00	1.00	1.00
Yes	0.921 (.346)	0.900 (.346)	0.889 (.347)
N/A	0.697 (.524)	0.668 (.529)	0.609 (.540)
Knowledge about HIV/AIDS		0.960 (.078)	0.942 (.079)
Myths about HIV transmission		1.14 (.073)*	1.16 (.074)**
Demographic (control) variables			
Type of school			
Public			1.00
Private			1.20 (.308)
Joint (public and private)			0.458 (.691)

(continued)

Table 3. (continued)

	N = 1,162	*N* = 1,162	*N* = 1,162
	Model 1	Model 2	Model 3
Variables	Expβ	Expβ	Expβ
School status			
Mixed school			1.00
Only boys/girls			0.736 (.301)
Form/level at senior secondary school			
Form 2			1.00
Form 3			1.34 (.195)
Ethnicity			
Akan			1.00
Ga Dangme			1.14 (.272)
Ewe			1.07 (.311)
Mole Dagbani			1.15 (.321)
Guan			1.26 (.475)
Others			1.23 (.284)
Religion			
Christian			1.00
Muslim			0.687 (.234)
Others			0.742 (.623)
Region of residence			
Brong Ahafo			1.00
Greater Accra			0.760 (.248)
Northern region			0.608 (.540)
Random intercepts			
Variance components	0.201(.105)	0.214 (.109)	0.149 (.102)
Intra-class correlation	0.056	0.061	0.043

Note. Odds ratios are reported with robust standard errors in brackets. with the exception of the intercepts where we report the coefficients. SRH = sexual and reproductive health.
*$p < .1$. **$p < .05$. ***$p < .01$.

predictors and the timing of the sexual debut of male and female youth, respectively. We estimated three multivariate models for male and female youth. In the first model, we examined associations between the specific components of the CSE on the timing of sexual debut. The second model added the respondents' knowledge of HIV transmission and their belief in myths, and the third model added demographic characteristics. In all the

Table 4. A Multilevel Discrete-Time Hazard Model of Age at First Sex Among Female Ghanaian Youth.

	N = 1,820	*N* = 1,820	*N* = 1,820
	Model 1	Model 2	Model 3
Variables	Expβ	Expβ	Expβ
Time/duration			
Less than 15 years (ref)	1.00	1.00	1.00
15 years	0.138 (.386)***	0.138 (.386)***	0.141 (.386)***
16 years	0.084 (.506)***	0.084 (.506)***	0.085 (.507)***
17 years or more	0.033 (.998)***	0.033 (.998)***	0.033 (.998)***
Components of sexuality education			
Did students learn about sexual and reproductive physiology?			
No	1.00	1.00	1.00
Yes	0.748 (.428)	0.842 (.456)	0.840 (.458)
N/A	0.115 (1.16)	0.101 (1.16)**	0.129 (1.17)
Did students learn about HIV and STI prevention?			
No	1.00	1.00	1.00
Yes	0.938 (.324)	0.946 (.324)	0.897 (.323)
N/A	0.093 (1.07)**	0.093 (1.07)**	0.095 (1.07)**
Did students learn about contraception and unintended pregnancy?			
No	1.00	1.00	1.00
Yes	1.23 (.200)	1.23 (.201)	1.14 (.202)
N/A	0.824 (.397)	0.810 (.398)	0.816 (.399)
Did students learn about values and interpersonal skills?			
No	1.00	1.00	1.00
Yes	0.647 (.223)**	0.645 (.223)**	0.719 (.237)
N/A	0.910 (.352)	0.915 (.356)	1.01 (.358)
Did students learn about gender and SRH rights?			
No	1.00	1.00	1.00
Yes	1.20 (.353)	1.11 (.351)	1.14 (.351)
N/A	1.09 (.448)	1.06 (.453)	1.13 (.453)
Knowledge about HIV/AIDS		0.955 (.067)	0.946 (.066)
Myths about HIV transmission		1.07 (.069)	1.04 (.069)
Demographic (control) variables			
Type of school			
Public			1.00
Private			2.14 (.327)**
Joint (public and private)			2.80 (.397)***

(continued)

Table 4. (continued)

	N = 1,820	*N* = 1,820	*N* = 1,820
	Model 1	Model 2	Model 3
Variables	Expβ	Expβ	Expβ
School status			
Mixed school			1.00
Only boys/girls			0.934 (.301)
Form/level at senior secondary school			
Form 2			1.00
Form 3			1.34 (.174)
Ethnicity			
Akan			1.00
Ga Dangme			1.05 (.303)
Ewe			0.844 (.326)
Mole Dagbani			0.989 (.284)
Guan			0.509 (.751)
Others			0.835 (.259)
Religion			
Christian			1.00
Muslim			0.784 (.216)
Others			5.2 (.424)***
Region of residence			
Brong Ahafo			1.00
Greater Accra			0.350 (.283)***
Northern region			0.447 (.424)***
Random intercepts			
Variance components	0.778 (.198)***	0.761 (.196)***	0.316 (.135)***
Intra-class correlation	0.191	0.188	0.088

Note. Odds ratios are reported with robust standard errors in brackets. with the exception of the intercepts where we report the coefficients. SRH = sexual and reproductive health.
*$p < .1$. **$p < .05$. ***$p < .01$.

models, we estimated intra-class correlations to examine the influence of clustering and to explore variance/heterogeneity at the school level.

Compared with those who did not, male youth who learned about HIV prevention delayed the timing of their sexual debut. Those who did not answer questions on sexual and reproductive physiology and HIV prevention

might have been selective as they were significantly less likely to have started sex earlier. Male youth who endorsed myths about HIV transmission had higher odds (AOR = 1.16) of engaging in early sex. Estimates from the variance components showed no significant heterogeneity at the school level for male youth. This indicates that the individual level variables may be sufficient in explaining variance in the timing of sexual debut among male youth in Ghana.

For the females, none of the CSE components was significant. However, as in our bivariate findings, the component values and interpersonal skills was significant until the demographic characteristics of the respondents were controlled (see model 3 in Table 2). Females in private schools and joint private/public schools[2] were more likely to engage in early sex than those in public schools. Compared with those in the Brong Ahafo region, female youth in the Greater Accra and Northern regions delayed their sexual debut. Compared with Christians, female youth identifying with other religious denominations were significantly more likely to engage in early sex. Unlike the male model, the variance at the school level for females was significant, suggesting some unobserved school level characteristics may be important in explaining the timing of sexual debut among female youth in Ghana.

Discussion

Ghana's adolescent SRH strategy recognizes schools as important avenues for disseminating sexual health information. Sexual health education in Ghanaian schools begins in late childhood and lasts throughout adolescence and is expected to comply with UNFPA's guidelines on comprehensive sexuality education (Awusabo-Asare et al., 2017). This education aims at providing young people with information, motivation, and life skills to make important decisions about their SRH, including abstaining or delaying sexual intercourse. Despite the country's emphasis on education, to the best of our knowledge, no previous study has examined associations between components/values of Ghana's sexuality education and the timing of sexual debut among the country's youth.

In seeking to fill this gap, we found significant relationships between some components of Ghana's CSE and the timing of sexual debut. Most importantly, the findings were gendered. We found higher HIV knowledge among male than female youth, a finding consistent with other studies in sub-Saharan Africa (see Tenkorang & Maticka-Tyndale, 2008). This gender difference may be reflection of the entrenched patriarchal structures that deny females access to knowledge, expect them to know less, and have limited control over their sexuality than their male colleagues

(Ekstrom et al., 2004). Following this, we found that male youth who learned about HIV prevention as part of CSE were significantly more likely to delay sexual intercourse than those who did not learn about it. This is not surprising, especially as the HIV/STI component of the CSE exposes youth to HIV/STI risk reduction strategies and prevention. Specifically, this module teaches youth the signs and symptoms of and ways to protect against the transmission of HIV/STIs. Previous research has identified AIDS knowledge as an important source of self-empowerment that can evoke sexual behavior change (Zellner, 2003). While knowledge about HIV may be empowering, myths surrounding the transmission of HIV could potentially disempower youth by undermining preventive behaviors. In our study, male youth who endorsed HIV myths had higher odds of starting sex early. This finding is in keeping with other studies that conclude it is not sufficient to provide young people with "facts" about HIV prevention; education must also address the myths and misconceptions of the transmission of the virus (Tenkorang & Maticka-Tyndale, 2008, 2014). In addition, the finding that information learned about HIV leads to sexual behavioral change for males reflects the control they have over their sexuality and in deciding when sex occurs compared with their females counterparts (Tenkorang & Maticka-Tyndale, 2014).

For females, the module on values and interpersonal skills was significant until the demographic characteristics of the respondents were controlled. This module equips youth with important decision-making skills and teaches them how to communicate with sexual partners in relationships. When females are empowered with the right information on sexuality, they are better positioned to negotiate safer sex, including delaying sexual debut (Salazar et al., 2005). For the females in our study, some demographic variables were also significant. For instance, females in the Greater Accra and Northern regions delayed sexual intercourse compared with those in the Brong Ahafo region. Using the same data, Awusabo-Asare et al. (2017) reported similar results; they found that a significantly higher proportion of female youth in the Brong Ahafo region had experienced sexual intercourse before the age of 15. They also reported significantly lower levels of CSE among youth in the Brong Ahafo region than among those in the Greater Accra region. Although not exhaustive, our findings may partially explain the early timing of sexual debut among youth in this region of the country.

Our finding that females in private schools were significantly more likely to start sex early than those in public schools was expected. Awusabo-Asare et al. (2017) indicate that public and private schools often use the same curriculum, but the latter, some of which are religious, regulate the scope and content of their curriculum, including courses related to sexuality. As a result,

private schools, including others that are semi-autonomous (such as the joint public/private schools), may be limited in their approach to comprehensive sex education.

Policy Implications

Our findings could have important policy implications. The significant links between some components of Ghana's CSE and the timing of sexual debut among youth, specifically male youth, could possibly indicate the effectiveness of sexual health education in Ghanaian schools. This may not be surprising as schools in Ghana are implementing a more advanced sexual health program than other countries in the sub-Saharan African region. However, our findings also suggest it may be relevant to target females, especially those in the Brong Ahafo region, given their vulnerability to experiencing sexual intercourse much earlier than their contemporaries in the two other regions. Although useful, a notable weakness of CSE as implemented in Ghana is the lack of focus on condoms and contraception (Awusabo-Asare et al., 2017). Meanwhile, researchers indicate that CSE must be well implemented to be effective including a focus on condoms (Chandra-Mouli et al., 2015; Gallant & Maticka-Tyndale, 2004).

Limitations

Some limitations are worth noting. Our findings should be interpreted with caution. We are unable to draw causal connections between components of Ghana's CSE and the timing of sexual debut, given the cross-sectional nature of our data. However, this limitation is not unique to this study but common to all cross-sectional surveys where data are collected contemporaneously. Similar to all surveys, response to questions may be subject to recall and social desirability bias, especially for age at first sexual intercourse. For instance, it has been documented that while young girls in sub-Saharan Africa underestimate their sexuality, young boys overestimate theirs (Tenkorang & Maticka-Tyndale, 2008). In this regard, the use of discrete-time hazard models helps because it models age at first sex as discrete and not a continuous outcome. The latter requires the data to be more precise with age at first sex reported in exact years and free from errors. Last but not the least, we acknowledge that learning about CSE does not necessarily mean respondents understood correctly or had knowledge about the various components of the program. Despite the limitations, the findings may be useful for scholars and policymakers interested in the sexual reproductive health of youth in SSA and Ghana. Future

research should consider examining relationships between components of the CSE and other sexual and reproductive health outcomes, including condom use. Longitudinal data with proper time sequencing are needed to explore these relationships. Research evaluating the relevance and impact of CSE for the several sub-Saharan African countries implementing this program is also needed.

Conclusion

Ghana's youthful population and their reproductive health challenges have made CSE a top priority for researchers and policy makers. More specifically, as in many sub-Saharan African countries, adolescents in Ghana struggle with the consequences of unplanned pregnancies, including early childbearing and with the realities of HIV infection and transmission (Glover et al., 2003; Thatte et al., 2016). This makes the provision of accurate health information to adolescents crucial. While important, increasing the self-efficacy of adolescents and equipping them with the requisite skills to negotiate safer sex is even more relevant, especially in the context of high HIV risks.

Typically, SRH interventions empower young people by providing information and equipping them with the requisite skills to make informed choices about their sexual health. One of such interventions is the CSE: a school-based sexual health program implemented in several developing countries. In the last few years, several African countries, including Ghana, have collaborated with international organizations (e.g., UNESCO) to develop CSE curricula that is locally relevant and culturally sensitive for in-school and out-of-school implementation. As part of the process, teachers are trained to impart age-appropriate and accurate information to young people. This study used data collected in Ghana as part of a multi-country initiative to examine relationships between several components of the CSE and the timing of sexual debut. Compared with those who did not, male youth who learned about HIV as part of the CSE delayed sexual debut. Although its effect was attenuated, female youth who learned about values and interpersonal skills were also more likely to delay sex. Our results provide qualified support for the efficacy of the CSE program. We recommend the replication of this study in countries where CSE is implemented for comparative purposes.

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Notes

1. At the time the study was designed, there were 10 administrative regions. Currently, there are 16 with the Brong Ahafo and Northern regions split into three each; the formerly Brong Ahafo is now made of Bono, Bono East and Ahafo while the Northern has been split into North East, Savannah and Northern regions respectively.
2. Schools funded through public and private partnership.

References

Allison, P. (2003). Discrete-time methods for the analysis of event histories. *Sociological Methodology*, 13, 61–98.

Ameyaw, E. K. (2018). Prevalence and correlates of unintended pregnancy in Ghana: Analysis of 2014 Ghana Demographic and Health Survey. *Maternal Health, Neonatology and Perinatology*, *4*, Article 17.

Ankomah, A., Mamman-Daura, F., Omoregie, G., & Anyanti, J. (2011). Reasons for delaying or engaging in early sexual initiation among adolescents in Nigeria. *Adolescent Health, Medicine and Therapeutics*, *2*(1), 75–84.

Awusabo-Asare, K., & Annim, S. K. (2008). Wealth status and risky sexual behaviour in Ghana and Kenya. *Applied Health Economics and Health Policy*, *6*(1), 27–39.

Awusabo-Asare, K., Stillman, M., Keogh, S., Doku, D. T., Kumi-Kyereme, A., Esia-Donkoh, K., Leong, E., Amo-Adjei, J., & Bankola, A. (2017). *From paper to practice: Sexuality education policies and their implementation in Ghana*. Guttmacher Institute. https://www.guttmacher.org/report/sexuality-education-ghana

Bankole, A., Singh, S., Woog, V., & Wulf, D. (2004). *Risk and protection: Youth and HIV/AIDS in sub-Saharan Africa*. The Alan Guttmacher Institute.

Bertrand, R. (2015). AIDS prevention in sub-Saharan Africa: As easy as ABC? *African Journal of Infectious Diseases*, *10*(1), 1–9.

Biddlecom, A., Hessburg, L., Singh, S., Bankole, A., & Darabi, L. (2007). *Protecting the next generation in Sub-Saharan Africa: Learning from adolescents to prevent HIV and unintended pregnancy*. Guttmacher Institute.

Boneh, G., & Jaganath, D. (2011). Performance as a component of HIV/AIDS education: Process and collaboration for empowerment and discussion. *American Journal of Public Health*, *101*(3), 455–464.

Chandra-Mouli, V., Lane, C., & Wong, S. (2015). What does not work in adolescent sexual and reproductive health: A review of evidence on interventions commonly accepted as best practices. *Global Health: Science & Practice*, *3*(3), 333–340.

Chandra-Mouli, V., Plesons, M., Adebayo, E., Avni, A., Avni, M., Kraft, J. M., Lane, C., Brundage, C. L., Kreinin, T., Bosworth, E., Garcia-Moreno, C., & Malarcher, S. (2017). Implications of the global early adolescent study's formative research findings for action and for research. *Journal of Adolescent Health*, *61*(Suppl. 4), S5–S9.

CitizenGO Africa. (2019). *Reject "School Health Policy" promoting abortion and CSE in Kenya*. https://www.citizengo.org/en-af/fm/171576-reject-school-health-policy-promoting-abortion-and-cse-kenya

Coates, T. J., Richter, L., & Caceres, C. (2009). Behavioural strategies to reduce HIV transmission: How to make them work better. *The Lancet*, *372*(9639), 669–684.

Cohall, A., Kassotis, J., Parks, R., Vaughan, R., Bannister, H., & Northridge, M. (2001). Adolescents in the age of AIDS: Myths, misconceptions, and misunderstandings regarding sexually transmitted diseases. *Journal of the National Medical Association*, *93*(2), 64–69.

Cohen, M. S., Kaleebu, P., & Coates, T. (2008). Prevention of the sexual transmission of HIV-1: Preparing for success. *Journal of the International AIDS Society*, *11*(1), 4–4.

Crosby, R. A., DiClemente, R. J., Wingood, G. M., Salazar, L. F., Harrington, K., Davies, S. L., & Oh, M. K. (2003). Identification of strategies for promoting condom use: A prospective analysis of high-risk African American female teens. *Prevention Science*, *4*(4), 263–270.

Ekstrom, A. M., Ragnarsson, A., & Thorson, A. (2004). *Gender and HIV/AIDS in Eastern Europe and Asia* [Report for the WHO Regional Office for Europe]. http://www.euro.who.int/__data/assets/pdf_file/0019/76510/E90383.pdf

Esantsi, S. F., Onyango, F., Asare, G. J. Q., Kuffour, E. O., Tapsoba, P., Birungi, H., & Askew, I. (2015). *Understanding the reproductive health needs of adolescents in selected slums in Ghana: A public health assessment* [STEP UP Research Report]. Population Council. https://www.popcouncil.org/uploads/pdfs/2015STEPUP_RHAdolGhana.pdf

Gallant, M., & Maticka-Tyndale, E. (2004). School-based HIV prevention programmes for African youth. *Social Science & Medicine*, *58*(7), 1337–1351.

Ghana AIDS Commission. (2015). *Country AIDS response progress report—Ghana* [Prepared by the Ghana AIDS Commission]. https://www.unaids.org/sites/default/files/country/documents/GHA_narrative_report_2015.pdf

Ghana Education Service, Ministry of Education. (2012). *School health education programme: Policy guidelines*.

Ghana Statistical Service. (2013, May). *National analytical report: 2010 population and housing census* [Technical Report by Ghana Statistical Service].

Glover, E. K., Bannerman, A., Pence, B. W., Jones, H., Miller, R., Weiss, E., & Nerquaye-Tetteh, J. (2003). Sexual health experiences of adolescents in three Ghanaian towns. *International Family Planning Perspectives*, *29*(1), 32–40.

Goldman, J. D. G. (2011). An exploration in health education of an integrated theoretical basis for sexuality education pedagogies for young people. *Health Education Research*, *26*(3), 526–541.

Guttmacher Institute. (2004). *Adolescents in Ghana: Sexual and reproductive health*. https://www.guttmacher.org/sites/default/files/report_pdf/rib1-04.pdf

Guzmán, B. L., Schlehofer-Sutton, M. M., Villanueva, C. M., Dello Stritto, M. E., Casad, B. J., & Haberland, N. A. (2015). The case for addressing gender and power in sexuality and HIV education: A comprehensive review of evaluation studies. *International Perspectives on Sexual and Reproductive Health*, *41*(1), 31–42.

Keogh, S. C., Stillman, M., Awusabo-Asare, K., Sidze, E., Monzón, A. S., Motta, A., & Leong, E. (2018). Challenges to implementing national comprehensive sexuality education curricula in low- and middle-income countries: Case studies of Ghana, Kenya, Peru and Guatemala. *PLOS ONE*, *13*(7), Article e0200513.

Kharsany, A. B. M., & Karim, Q. A. (2016). HIV Infection and AIDS in Sub-Saharan Africa: Current status, challenges and opportunities. *The Open AIDS Journal*, *10*(1), 34–48.

Langille, D. B., Asbridge, M., Flowerdew, G., & Allen, M. (2010). Associations of sexual risk-taking with having intercourse before 15 years in adolescent females in Cape Breton, Nova Scotia, Canada. *Sexual Health*, *7*(2), 199–204.

Macintyre, K., Brown, L., & Sosler, S. (2001). It's not what you know, but who you knew: Examining the relationship between behavior change and AIDS mortality in Africa. *AIDS Education and Prevention*, *13*, 160–174.

Magnusson, B. M., Masho, S. W., & Lapane, K. L. (2012). Early age at first intercourse and subsequent gaps in contraceptive use. *Journal of Women's Health*, *21*(1), 73–79.

Mavedzenge, S. M. N., Dolyle, A. M., & Ross, D. A. (2011). HIV prevention in young people in sub-Saharan Africa: A systematic review. *Journal of Adolescent Health*, *49*(6), 568–586.

Michielsen, K. (2012). HIV prevention for young people in sub-Saharan Africa: Effectiveness of interventions and areas for improvement. Evidence from Rwanda. *Afrika Focus*, *25*(2), 132–146.

Michielsen, K., Chersich, M., Luchters, S., De Koker, P., Van Rossem, R., & Temmerman, M. (2010). Effectiveness of HIV prevention for youth in sub-Saharan Africa: Systematic review and meta-analysis of randomized and nonrandomized trials. *AIDS*, *24*(8), 1193–1202.

Naswa, S., & Marfatia, Y. S. (2010). Adolescent HIV/AIDS: Issues and challenges. *Indian Journal of Sexually Transmitted Diseases and AIDS*, *31*(1), 1–10.

National Population Council. (2000). *Adolescent Reproductive Health Policy (ARHP)*. Republic of Ghana.

Ngnenbe, T. (2019). *Ghanaians divided over new sexuality education*. https://www.graphic.com.gh/news/general-news/ghanaians-divided-over-new-sexuality-education.html

Noar, S. M., Carlyle, K., & Cole, C. (2006). Why communication is crucial: Meta-analysis of the relationship between safer sexual communication and condom use. *Journal of Health Communication*, *11*(4), 365–390.

Onsomu, E. O., Kimani, J. K., Abuya, B. A., Arif, A. A., Moore, D., Duren-Winfield, V., & Harwell, G. (2013). Delaying sexual debut as a strategy for reducing HIV epidemic in Kenya. *African Journal of Reproductive Health*, *17*(2), 46–57.

Panchaud, C., Keogh, S. C., Stillman, M., Awusabo-Asare, K., Motta, A., Sidze, E., & Monzón, A. S. (2019). Towards comprehensive sexuality education: A comparative analysis of the policy environment surrounding school-based sexuality education in Ghana, Peru, Kenya and Guatemala. *Sex Education*, *19*(3), 277–296.

Pebley, A. R., Goldman, N., & Rodriguez, G. (1996). Prenatal and delivery care and childhood immunization in Guatemala: Do family and community matter? *Demography*, *33*:, 197–210.

Performance Monitoring and Accountability (2020). *Adolescents and young adults health brief*. https://www.pma2020.org/adolescent-health-brief

Pettifor, A. E., Measham, D. M., Rees, H. V., & Padian, N. S. (2004). Sexual power and HIV risk, South Africa. *Emerging Infectious Diseases*, *10*(11), 1996–2004.

Poku, N. K. (2016). HIV prevention: The key to ending AIDS by 2030. *The Open AIDS Journal*, *10*(1), 65–77.

Rabe-Hesketh, S., & Skrondal, A. (2005). *Multilevel and longitudinal modeling using Stata*. Stata.

Rabe-Hesketh, S., Skrondal, A., & Pickles, A. (2004). Generalized multilevel structural equation modeling. *Psychometrika*, *69*(2), 167–190.

Ross, D., Dick, B., & Ferguson, J. (2006). *Preventing HIV/AIDS in young people: A systematic review of the evidence from developing countries*. World Health Organization.

Salazar, L. F., Crosby, R. A., DiClemente, R. J., Wingood, G. M., Lescano, C. M., Brown, L. K., & Davies, S. (2005). Self-esteem and theoretical mediators of safer sex among African American female adolescents: Implications for sexual risk reduction interventions. *Health Education & Behavior*, *32*(3), 413–427.

Singer, J. D., & Willett, J. B. (1993). It's about time: Using discrete survival analysis to study duration and timing of events. *Journal of Educational Statistics*, *18*(2), 155–195.

Stuart, E. (2013). How to achieve an AIDS-free generation? *Ghana has a few ideas*. https://www.pri.org/stories/2013-12-06/how-achieve-aids-free-generation-ghana-has-few-ideas

Tenkorang, E. Y., & Adjei, J. K. (2015). Household living arrangements and transition to adolescent sexual debut in Ghana. *Sex Education*, *15*(1), 1–18.

Tenkorang, E. Y., & Maticka-Tyndale, E. (2008). Investigating the timing of first sexual intercourse among young people in Nyanza, Kenya. *International Family Planning Perspectives*, *34*(4), 177–188.

Tenkorang, E. Y., & Maticka-Tyndale, E. (2014). Individual and school level influences on the timing of sexual debut among youth in Nyanza, Kenya. *International Perspectives on Sexual and Reproductive Health*, *40*(2), 68–78.

Tenkorang, E. Y., Rajulton, F., & Maticka-Tyndale, E. (2009). Perceived risks of HIV/AIDS and first sexual intercourse among youth in Cape Town, South Africa.' *AIDS & Behavior*, *13*(2), 234–245.

Thatte, N., Bingenheimer, J. B., Ndiaye, K., & Rimal, R. N. (2016). Unpacking the barriers to reproductive health services in Ghana: HIV/STI testing, abortion and contraception. *African Journal of Reproductive Health*, *20*(2), 53–61.

Tuoyire, D. A., Anku, P. J., Alidu, L., & Amo-Adjei, J. (2018). Timing of first sexual intercourse and number of lifetime sexual partners in sub-Saharan Africa. *Sexuality & Culture*, *22*(2), 651–668.

UNESCO. (2015). *Emerging evidence, lessons and practice in comprehensive sexuality education: A global review*.

United Nations Population Fund. (2010). *Comprehensive sexuality education: Advancing human rights, gender equality and improved sexual and reproductive health*.

Zellner, S. L. (2003). Condom use and the accuracy of AIDS knowledge in Cote d'Ivoire. *International Family Planning Perspectives*, *29*(1), 41–47.

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