

Time to First Sexual Experience and Its Determinants Among Female Youths: A Survival Analysis of Rwanda Demographic Health Survey (2019-2020)

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Background: Understanding the timing of first sexual experience is crucial for informing reproductive health policies and interventions. However, little is known about this area of research in Rwanda. This study aims to estimate the determinants of time to first sexual experience among female youths in Rwanda.

Methods: A secondary data analysis of the Rwanda Demographic and Health Survey (RDHS 2019–2020) was conducted. Kaplan–Meier survival curves and Cox proportional hazards regression models were utilized to estimate the median age at first sexual experience and identify significant determinants; a significance level of 0.05 was considered. All analyses were performed using R (Version 4.3.3).

Results: The study found that 2090 (36.9%) of female youths in Rwanda had their first sexual experience before the age of 25, with 7.0% initiating sexual activity before 15. The median age at first sexual experience was 18 years (Interquartile range: 16–19). Determinants associated with a reduced hazard of early first sexual experience included being aged 20–24 years (75%) (AHR = 0.25, 95% CI: 0.23–0.29), living in rural areas (15%) (AHR = 0.85, 95% CI: 0.74–0.99), having tertiary education (38%) (AHR = 0.62, 95% CI: 0.42–0.90), being married (AHR = 0.49, 95% CI: 0.42–0.56), and listening to the radio at least once a week (13%) (AHR = 0.87, 95% CI: 0.76–0.99).

Conclusion: Enhancing educational opportunities, promoting stable partnerships, and increasing access to media information in rural areas may be effective strategies in delaying first sexual experience.

Keywords: sexual experience, survival analysis, female youths, Rwanda

Background

Adolescence is a critical period marked by physical, emotional, and social changes, often accompanied by increased exploration of sexual behaviors, which account for 13% of the diseases affecting this age group.¹ Early initiation of sexual activities can have significant implications for reproductive health, including unintended pregnancies, and sexually transmitted infections (STIs).² In contrast, delayed sexual debut is associated with improved educational attainment, enhanced economic opportunities, and overall wellbeing.³ According to the centers for disease prevention and control (CDC), 30% of the youths have ever had sexual experience, and consequently 19% acquired new HIV infections and 53% acquiring new STIs.⁴

Studies suggest that the timing of first sexual activities among female youths is influenced by a complex interplay of individual, familial, socio-economic and culture factors. Low parental monitoring, exposure to sexual content in the media, and peer pressure were significant predictors of early first sexual experience among female adolescents.^{5–7} These findings highlighted the importance of comprehensive sexuality education, access to sexual

and reproductive health services, and gender-equitable social norms in delaying sexual and promoting healthy sexual behaviors among adolescents. A study conducted in sub-Saharan Africa found that 16.6% of young females in Rwanda initiated sexual activity at an early age. Additionally, media exposure, lower levels of education, and living in rural areas were associated factors.⁸ Another study examining factors associated with sexual debut among secondary students in Rwanda found that alcohol use, peer pressure and living away from biological mothers were also contributing factors.⁹

Despite advancements in reproductive health research, there is a lack of data specifically examining the timing of the first sexual experience among female youth in Rwanda. The existing literature primarily focuses on parental communication about sexuality, access to reproductive health services, and peer influence as significant factors influencing the first sexual experience among female adolescents, without adequately addressing determinants and timing of early or delayed first sexual experience among female youths.⁹

This study aimed to fill this gap by conducting a survival analysis of the determinants of time to first sexual experience among female youths in Rwanda, utilizing data from the Rwanda Demographic and Health survey (RDHS) 2019–2020.¹⁰ By utilizing Kaplan–Meier survival curves and Cox proportional hazards regression models, this approach allowed us to estimate the median age at first sexual intercourse and assess the impact of various sociodemographic and behavioral factors on the timing of this event. This method accounts for censored data, which is crucial when some participants have not yet experienced the event (first sexual experience) by the time of the survey. The findings of this study provide insights into the drivers of youth sexual behavior in Rwanda and inform targeted interventions aimed at promoting healthy sexual decision-making and improving reproductive health outcomes among young women.

Methods

Aim, Design, and Setting of the Study

This study aimed to estimate the time to first sexual experience among female youths in Rwanda and to identify the determinants. This research was cross-sectional and secondary data from Rwanda Demographic and Health Survey (RDHS) 2019–2020 was utilized.¹⁰ The RDHS is a nationally representative survey conducted by the National Institute of Statistics of Rwanda (NISR) in collaboration with the Ministry of Health and other stakeholders. It provides comprehensive data on various health and demographic indicators including reproductive health behaviors. This survey is conducted nationwide in Rwanda, a country located in East of Africa with a population of 13,798,561, of which approximately 65.3% are under 30 years of age.¹¹

Characteristics of Study Population

The Rwanda Demographic and Health Survey (RDHS) 2019–2020 utilized a two-stage stratified sampling design to ensure national representativeness. In the first stage, enumeration areas (EAs) were selected using probability proportional to size, based on the national population census. In the second stage, households within each selected EA were systematically sampled. Female youths aged 15–24 years who were part of the RDHS 2019–2020 were included in this analysis. The dataset comprises information collected through face-to-face interviews and biomarker measurements. Variables of interest include socio-demographic characteristics and reproductive health behaviors. A data extraction form was used to extract the relevant variables from women's dataset, which included 14,634 respondents, of whom 5672 (38.7%) were female youths (weighted percentage).

Description of Processes, Interventions, and Comparisons

The primary outcome of interest is the time to first sexual experience among female youths. Participants were asked about their age at first sexual experience, with responses used to calculate the duration between birth and first sexual experience. Potential determinants of first sexual experience include sociodemographic factors such as age, residence, wealth status, marital status, education level, employment status, and behavioral factors such as cigarette smoking, age at first sexual intercourse, and frequency of listening to the radio and watching television.

Statistical Analysis

Survival analysis techniques, specifically Kaplan–Meier (KM) survival curves and Cox proportional hazards regression models, were employed because they effectively handle the censored data from female youths who had not yet experienced their first sexual experience by the time of the survey (right-censored). The age at first sexual experience was treated as the time-to-event variable. The risk period for first sexual experience began at a pre-defined age. KM curves were used to estimate the probability of sexual experience over time, while the Cox proportional hazards regression model identified determinants associated with the timing of the first sexual experience. Adjusted Hazard Ratios (AHRs) and their corresponding 95% confidence intervals (CIs) were calculated to assess the strength and direction of associations. The dataset was weighted and all analyses were conducted using the R programming language (R.4.3.3).

Results

Sociodemographic Distribution of the Participants in Rwanda

The results in (Table 1) included a total of 5672 female youths aged 15–24 years. The findings showed that 57.4% of the respondents were aged between 15 and 19 years, 46.2% of the females were from rich families, and 83.4% of female youths were never married. The majority of female youths (79.9%) were from rural areas, 28.5% of females were from the eastern province, and 55.3% of were working or employed. The majority (46.5%) were protestants, and Half (49.7%) of female youths completed primary education, while 46.7% completed secondary education.

Table 1 Sociodemographic Distribution of the Female Youths in Rwanda

Variable	Weighted Frequency (N= 5672)	Weighted Percentage (%)	Median Survival Time (Inter-Quartile Range- IQR)	Log Rank p-value
Age				<0.001
15–19	3258	57.4	16 (14, 17)	
20–24	2414	42.6	18 (17, 20)	
Wealth status				0.798
Poor	1986	35	18 (16, 19)	
Middle	1065	18.8	18 (16, 19)	
Rich	2621	46.2	18 (16, 19)	
Marital status				<0.001
Never married	4733	83.4	17 (15, 19)	
Married	185	3.3	20 (18, 22)	
Living together	638	11.3	18 (17, 20)	
Separated	116	2	18 (17, 19)	
Employment status				0.071
Not working	2537	44.7	17 (16, 19)	
Working	3135	55.3	18 (16, 19)	
Province				0.105
Kigali	809	14.3	18 (16, 19)	
South	1150	20.3	18 (16, 20)	
West	1215	21.4	18 (16, 20)	
North	879	15.5	18 (17, 20)	
East	1619	28.5	18 (16–19)	
Residence				0.161
Urban	1140	20.1	18 (16, 19)	
Rural	4532	79.9	18 (16, 20)	

(Continued)

Table 1 (Continued).

Variable	Weighted Frequency (N= 5672)	Weighted Percentage (%)	Median Survival Time (Inter-Quartile Range- IQR)	Log Rank p-value
Religion				0.035
Catholic	2155	38	18 (16, 20)	<0.001
Protestant	2635	46.5	18 (16, 19)	
Adventist	678	12	18 (17, 19)	
Muslim	114	2	17 (16, 18)	
Others	90	1.6	17 (14, 19)	
Education status				
No education	77	1.4	18 (15, 18)	
Primary	2820	49.7	18 (16, 19)	
Secondary	2649	46.7	18 (16, 20)	
Tertiary	126	2.2	19 (18, 20)	

Notes: Researcher's analysis of RDHS 2019–2020.

Behavior Characteristics of the Female Youths

The analysis of behavioral characteristics of female youths, as detailed in Table 2 showed that the majority of the females (99.6%) were not cigarette smokers, 67.7% of female youths listened to radio at least once a week, and only 22.3% of the females watched Television (TV) at least once a week.

Table 2 Behavior Characteristics of the Female Youths in Rwanda

Behavioral Characteristics	Weighted (N=5672)	Weighted Percentage (%)	Median Survival Time (Inter-Quartile Range (IQR))	Log Rank p-value
Cigarette smoking				0.912
No	5651	99.6	18 (16, 19)	0.405
Yes	21	0.4	17 (16, 18)	
Frequency of listening to radio				
Not at all	929	16.4	18 (16, 19)	0.503
Less than once a week	903	15.9	18 (16, 20)	
At least once a week	3840	67.7	18 (16, 19)	
Frequency of watching TV				0.503
Not at all	2842	50.1	18 (16, 20)	
Less than once a week	1565	27.6	18 (16, 19)	
At least once a week	1265	22.3	18 (16, 19)	

Notes: Researcher's analysis of RDHS 2019–2020.

First Sexual Experience at Different Ages

The analysis of first sexual experience among female youths in Rwanda shows significant variations across different sociodemographic factors, as shown in (Table 3). For age groups, 72.7% of participants aged 15–19 years had their first sexual experience within 15–19 years, while 63.1% of those aged 20–24 had their first experience between 15 and 19 years. When examining the wealth index, 65.6% of participants from poor backgrounds initiated sexual activity between 15 and 19 years, with similar percentages for middle-income (66.4%) and rich participants (65.1%).

Table 3 First Sexual Experience at Different Ages

Determinants	Age at First Sexual Experience		
	8–14 years (N=216) (N, %)	15–19 years (N=1370) (N, %)	20–24 years (N=504) (N, %)
Age			
15–19	147 (27.3)	392 (72.7)	NA
20–24	69 (4.4)	978 (63.1)	504 (32.5)
Wealth index			
Poor	88 (10.5)	550 (65.6)	200 (23.9)
Middle	35 (9.4)	247 (66.4)	90 (24.2)
Rich	93 (10.6)	573 (65.1)	214 (24.3)
Marital status			
Never married	196 (17)	757 (65.8)	197 (17.1)
Married	1 (0.5)	71 (38.4)	113 (61.1)
Living together	16 (2.5)	458 (71.7)	165 (25.8)
Separated	3 (2.6)	84 (72.4)	29 (25)
Employment status			
Not working	72 (13.4)	350 (64.9)	117 (21.7)
Working	144 (9.3)	1020 (65.8)	387 (24.9)
Province			
Kigali	27 (8.1)	236 (70.9)	70 (21)
South	51 (12.4)	247 (60.2)	112 (27.3)
West	47 (11.6)	251 (61.8)	108 (26.6)
North	20 (6.1)	211 (64.5)	96 (29.4)
East	71 (11.6)	425 (69.2)	118 (19.2)
Residence			
Urban	40 (8.9)	315 (70.3)	93 (20.8)
Rural	176 (10.7)	1055 (64.3)	411 (25)
Religion			
Catholic	98 (12.2)	482 (59.9)	225 (28)
Protestant	78 (8.2)	667 (69.9)	209 (21.9)
Adventist	25 (10.3)	158 (65.3)	59 (24.4)
Muslim	5 (9.3)	44 (81.5)	5 (9.3)
Others	10 (28.6)	19 (54.3)	6 (17.1)
Education status			
No education	8 (16.7)	34 (70.8)	6 (12.5)
Primary	129 (10.7)	826 (68.3)	254 (21)
Secondary	79 (9.9)	493 (61.5)	229 (28.6)
Tertiary	0 (0)	17 (53.1)	15 (46.9)

Notes: Researcher's analysis of RDHS 2019–2020. NA: Not applicable

Marital status also played a role, with 65.8% of never-married individuals having their first sexual experience between 15 and 19 years. Among married individuals, the majority (61.1%) had their first experience at ages 20–24. For employment status, the majority of those not working (64.9%) and quite similar to those working (65.8%), who had their first sexual experience between ages 15 and 19. Late initiation (20–24 years) was more frequent among employed individuals (24.9%) compared to those not working (21.7%).

Looking at province, 70.9% of participants from the Kigali city reported their first sexual experience between 15 and 19 years, the percentages of sexual experience below 15 years among provinces are quite similar (11–12%) quite above Northern province (6.1%) and Kigali city (8.1%). Additionally, Northern province has a higher percentage of female youths with later sexual experience (29.4%). In terms of residence, 64.3% of rural residents had their first sexual experience between 15 and 19 years, compared to 70.3% of urban residents in the same age range. Late initiation was more common among rural residents (25%) compared to urban residents (20.8%).

The results on religion showed that 69.9% of Protestants initiated sexual activity between 15 and 19 years, which was higher compared to Catholics (59.9%) and Adventists (65.3%). In terms of education status, early sexual experience (less than 15 years) was most common among those with no formal education (16.7%), while late initiation was highest among those with secondary education (28.6%) and tertiary education (46.9%), indicating a possible trend of later sexual initiation with higher education levels.

The Time to First Sexual experience Among Female Youths in Rwanda

The findings showed that 2090 (36.9%) of the females had their first sexual experience before their 25th birthday. The overall median age to first sexual experience was 18, with an inter-quartile range (IQR) of 16 to 19 years (Figure 1).

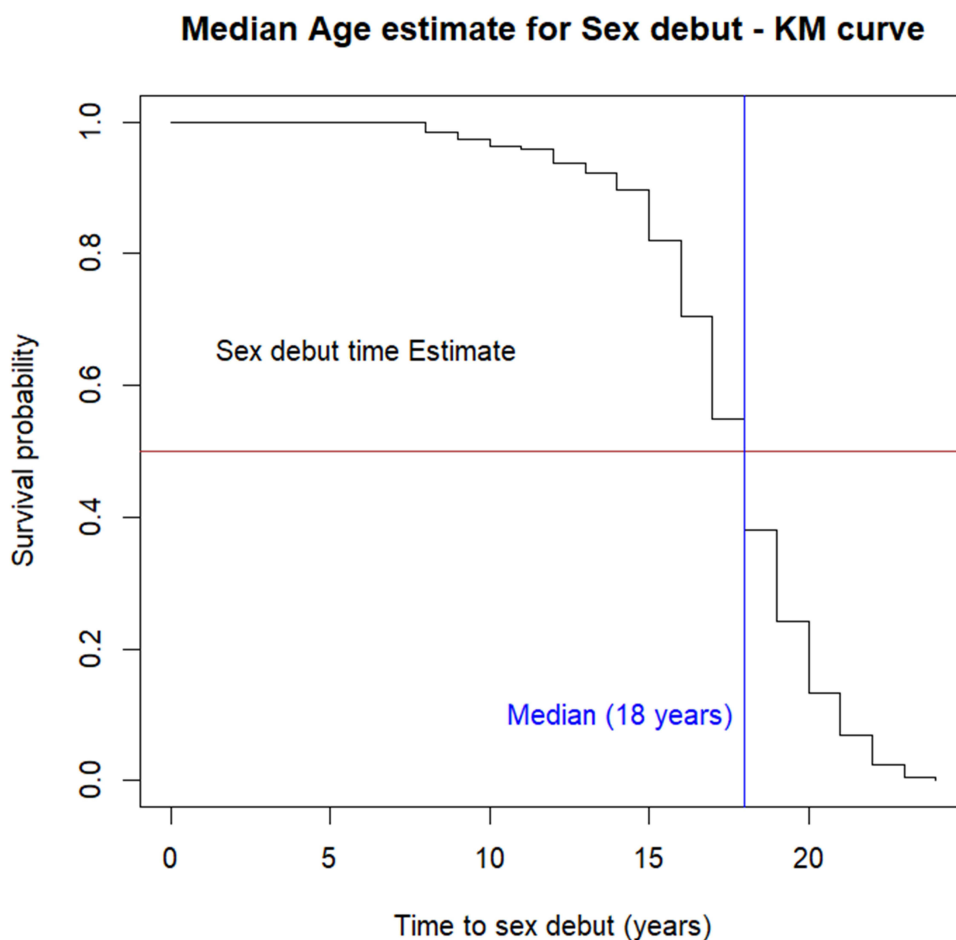


Figure 1 Time to first sexual experience among female youths in Rwanda.

The Time to First Sex Among Female Youths in Rwanda by Age, Education, Employment and Marital Status

The Kaplan–Meier (KM) survival curves and the Log rank test were used to compare the survival time of different demographics. If the curve of a certain category is lower, its survival probability is lower, implying a higher probability of the event occurring (first sexual experience) than the upper one. The results indicated that females aged 15–19 years of age have a high probability of having their first sexual experience as compared to those aged 20–24 years (Figure 2). Female youths with no formal education start their first sexual experience earlier than those with formal education (Figure 3). Female youths who were not working initiated sex activity at an earlier age (Figure 4). Lastly, never-married females had their first sexual experience at earlier ages comparing to others in relationships (Figure 5).

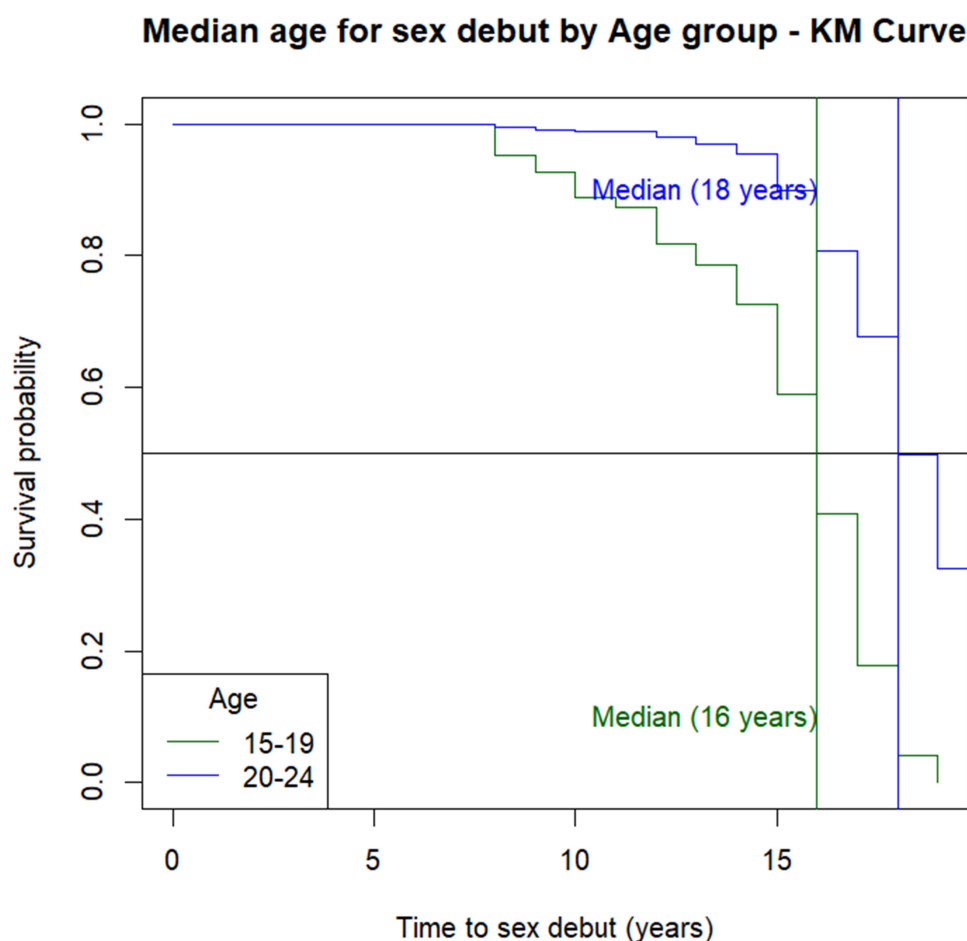


Figure 2 First sexual experience among female youths by Age.

Bivariable and Multivariable Cox Regression Analysis for Determinants of Time to First Sexual Experience Among Female Youths in Rwanda

Results in Table 4 (Bivariable and multivariable Cox regression analysis for determinants of time to first sexual experience among female youths in Rwanda) present the Cox proportional hazard regression model for identifying factors for first sexual experience among the female youths. The findings from the bivariable Cox model indicated that respondents' age, province, residence, religion, education status, wealth status, marital status, employment status, frequency of listening to radio and frequency of watching TV were significantly related to sexual debut at p -value <0.05 ; these were included in the multivariate Cox model.

From the multivariable model, the females aged 20–24 years had 75% (AHR = 0.25 95% CI: 0.23–0.29) reduced hazard of early sexual experience compared to those aged 15–19 years. Youths living in rural areas were significantly less likely to have early first sexual experience (AHR = 0.85 95% CI: 0.74–0.99) compared to their counterparts living in urban areas. Additionally, females with tertiary education had a 38% reduced hazard (AHR = 0.62 95% CI: 0.42–0.90) of engaging in early sexual experience compared to those with no formal education, which was significant at 5% significant level. Regarding marital status, those who were married and those that were living with their partners were 0.49 times (AHR = 0.49 95% CI: 0.42–0.56) and 0.84 times (AHR = 0.84 95% CI: 0.75–0.94) less likely to have early first sexual experience, respectively, than those who were never-married. Lastly, those who listened to radio for at least once week had a 13% (AHR = 0.87 95% CI: 0.76–0.99) reduced hazard of having early sexual debut compared to those that did not listen to radio at all.

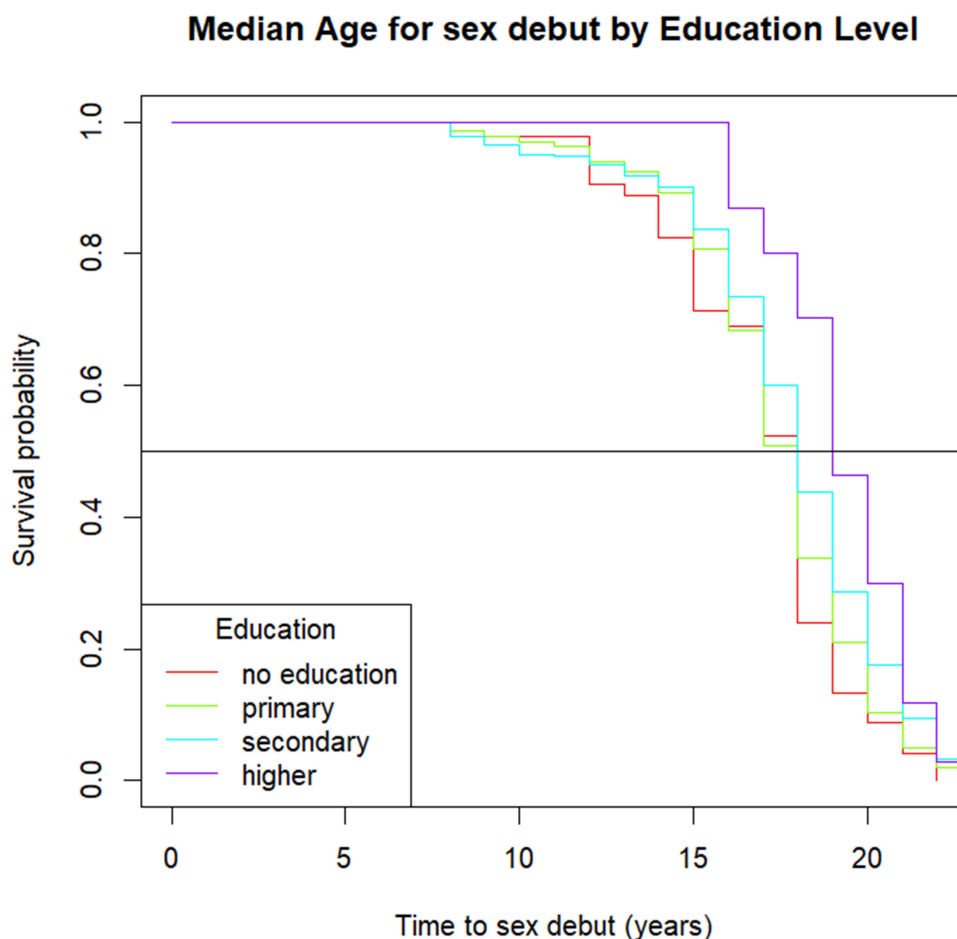


Figure 3 First sexual experience among female youths by Education Level.

Discussion

This study aimed to determine the time to first sexual experience and the determinants among female youths aged 15–24 years in Rwanda. The results indicated that 36.9% of female youths started having sex before their 25th birthday, with 7% did their first sex before 15 years of age. This percentage of early first sexual experience (7%) is lower than 22.6% reported in a study from Uganda,¹² 26.9% from a study conducted in six Caribbean Countries,¹³ 17.9% from a study conducted in southwest of Ethiopia,¹⁴ 26.2% from the study conducted in Tigray, in Ethiopia,¹⁵ 46.39% from the study in sub-Saharan Africa that also indicated 16.6% in Rwanda,⁸ but it is equal to 7% in a study conducted on Brazilian adolescents.¹⁶

The differences in the percentage of first sexual experience among female youths in Rwanda can be attributed to social norms that emphasize the importance of abstinence until marriage, especially for young women, which contributes to later sexual initiation;¹⁷ the effectiveness of sexual education programs, such as comprehensive sexuality education (CSE) programs in schools, which promote delayed sexual initiation and safe sexual practices;¹⁸ and improving socio-economic conditions, particularly in education and healthcare. The government's focus on universal education, especially for girls, has led to increased school attendance and higher secondary and tertiary education completion rates, which are associated with delayed sexual debut.¹⁹ Rwanda's strategies could serve as a model for above-mentioned regions to reduce the early sexual initiation by influencing youth behavior.

Knowing the percentage of first sexual experience is essential to identify the extent of the issue and inform public health strategies. Understanding the magnitude of percentage helps to design interventions to delay sexual activity,

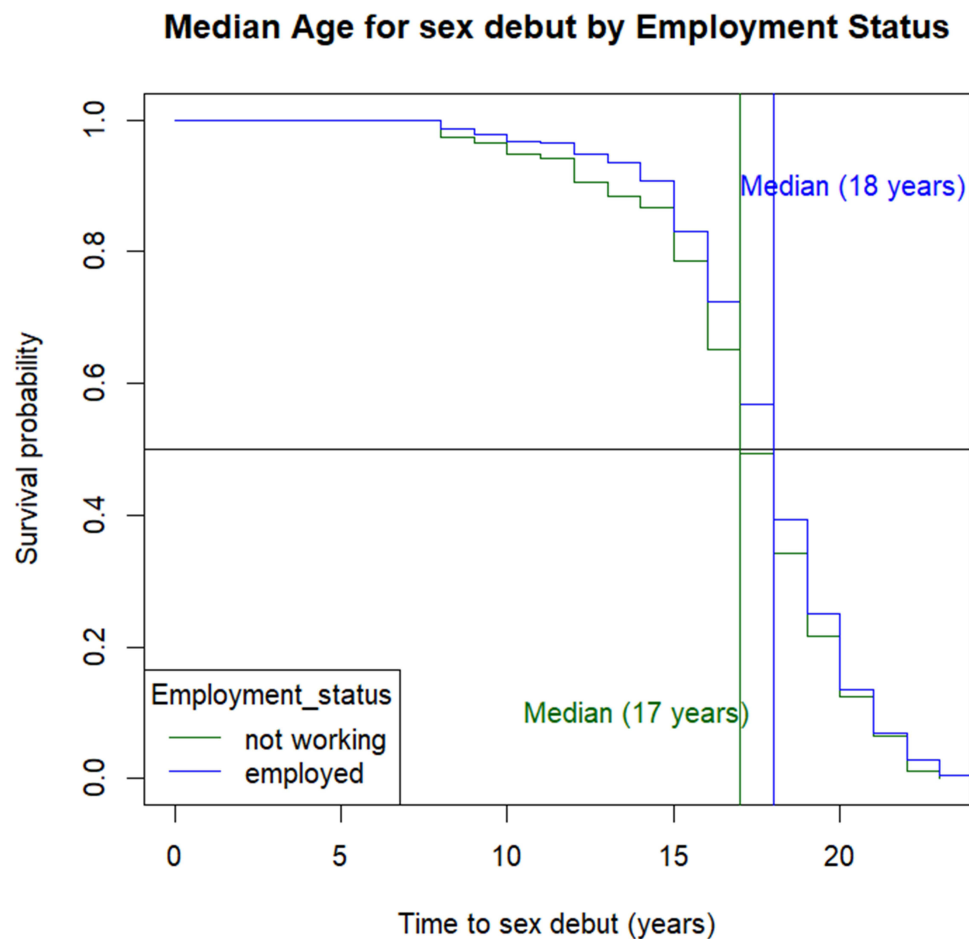


Figure 4 First sexual experience among female youths by Employment.

thereby reducing risks associated with early first sexual initiation such as sexually transmitted infections, unintended pregnancies, and negative socio-economic outcomes.

The results showed that the median age at first sexual experience among these youths was 18 years, within an interquartile range of (16–19) years. This median is higher than the 16 years reported in a study conducted in Ethiopia,²⁰ higher than 16 years in a study from Denmark,²¹ higher than 14 years in a study conducted in Uganda,¹² and slightly higher than 17.6 years in southwestern Ethiopia.¹⁴ The difference could be attributed to cultural norms in Rwanda, where later sexual activity is promoted. Access to education and employment could also influence the delay to the first sexual experience, as Rwanda prioritized health and social policies that support youth reproductive health. The median age to first sexual experience provides insights into when young females typically initiate sexual activity, allowing to design age-appropriate sexual education programs and interventions to delay the first sexual experience or promote safer practices.²²

This study highlighted that female youths aged 20–24 had a reduced hazard ratio for early sexual debut compared to females aged 15–19, similar to the study conducted by,¹⁴ which found that older age was associated with a lower risk to early sexual debut. Having tertiary education was protective, as it was associated with reduced hazard ratio to early first sexual experience compared to those with no formal education; a similar result was found from the study in Ethiopia,²⁰ which indicated that having no formal education was associated with early sexual debut. Regarding Marital status, this study indicated that those who were married at the time of the survey had a reduced hazard ratio for early sexual debut compared to those who were still single. Additionally, participants who responded listening to the Radio at least once a week had reduced hazard ratio to early sexual debut compared to those who do not listen to radio at all; a similar result was reported in a study by⁸ which found that high media exposure was associated with a lower risk of early sexual debut.

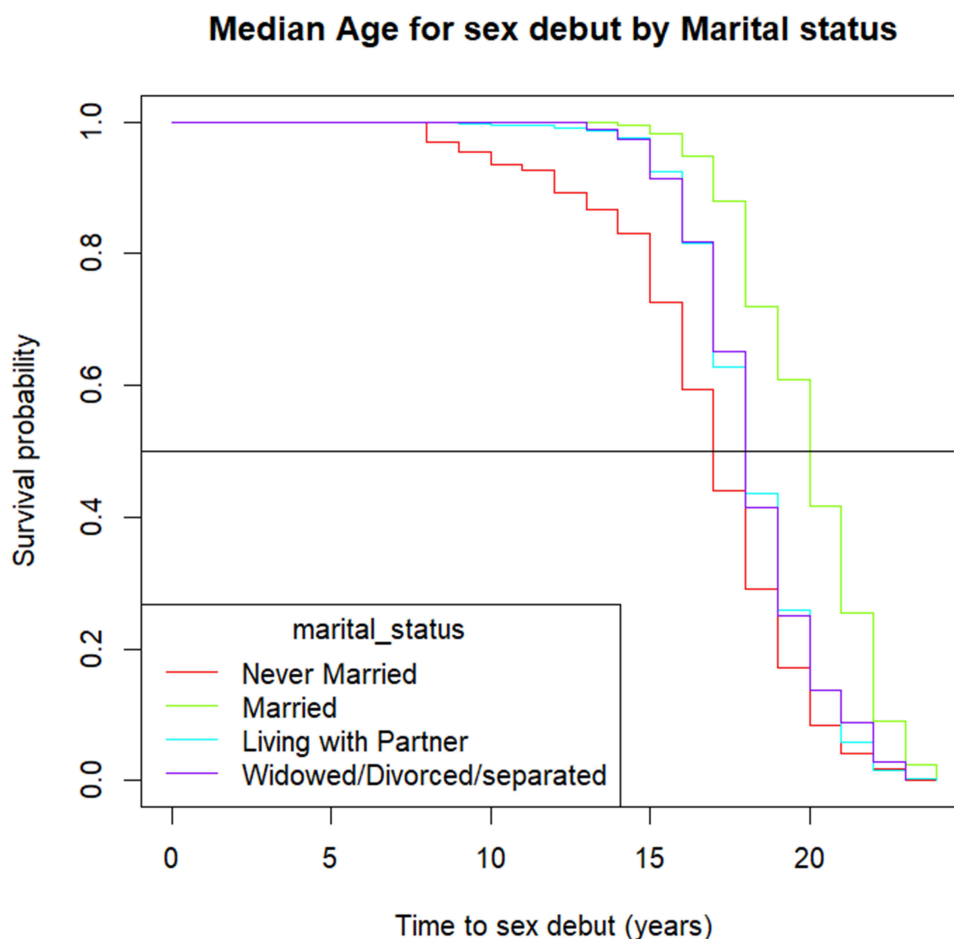


Figure 5 First sexual experience among female youths by Marital status.

Conclusions

This study highlighted that a significant percentage of female youths in Rwanda initiates sexual activity before 25th birthday, with cultural norms, education, marital status, and media exposure influencing the timing of their first sexual experience. The findings underscore the importance of targeted interventions and policies aimed at promoting delayed first sexual experience and improving sexual health outcomes among the youth population in Rwanda.

Table 4 Bivariable and Multivariable Cox Regression Analysis for Determinants of Time to First Sexual Experience Among Female Youths in Rwanda

Variable	CHR (95% CI)	p-value	AHR (95% CI)	p-value
Age				
15–19	1*			
20–24	0.23 (0.20–0.25)	<0.001	0.25 (0.23–0.29)	<0.001
Province				
Kigali	1*			
South	0.88 (0.76–1.02)	0.082	0.95 (0.78–1.15)	0.6
West	0.89 (0.76–1.04)	0.142	0.86 (0.86–1.26)	0.7
North	0.80 (0.68–0.96)	0.015	0.98 (0.78–1.22)	0.8
East	1.06 (0.92–1.21)	0.424	1.16 (0.96–1.41)	0.14

(Continued)

Table 4 (Continued).

Variable	CHR (95% CI)	p-value	AHR (95% CI)	p-value
Residence				
Urban	I*			
Rural	0.89 (0.81–0.98)	0.019	0.85 (0.74–0.99)	0.033
Religion				
Catholic	I*			
Protestant	1.12 (1.02–1.24)	0.023	1.08 (0.98–1.20)	0.13
Adventist	1.03 (0.90–1.19)	0.643	1.04 (0.90–1.20)	0.6
Muslim	1.62 (1.26–2.09)	<0.001	1.26 (0.97–1.64)	0.08
Others	1.18 (0.74–1.88)	0.482	1.12 (0.70–1.77)	0.6
Education status				
No education	I*			
Primary	0.85 (0.65–1.12)	0.253	1.15 (0.86–1.54)	0.4
Secondary	0.67 (0.51–0.88)	0.004	0.98 (0.73–1.32)	0.9
Tertiary	0.50 (0.36–0.70)	<0.001	0.62 (0.42–0.90)	0.012
Wealth status				
Poor	I*			
Middle	0.91 (0.80–1.05)	0.205	0.93 (0.81–1.06)	0.3
Rich	0.97 (0.88–1.06)	0.515	0.89 (0.79–1.02)	0.084
Marital status				
Never married	I*			
Married	0.39 (0.34–0.45)	<0.001	0.49 (0.42–0.56)	<0.001
Living with partner	0.73 (0.66–0.81)	<0.001	0.84 (0.75–0.94)	0.002
widowed/divorced/separated	0.71 (0.58–0.87)	<0.001	0.82 (0.65–1.04)	0.1
Employment status				
Not working	I*			
Working	0.87 (0.79–0.97)	0.011	0.94 (0.85–1.05)	0.3
Frequency of listening to radio				
Not at all	I*			
Less than once a week	0.89 (0.77–1.03)	0.115	0.89 (0.77–1.03)	0.13
At least once a week	0.90 (0.79–1.02)	0.096	0.87 (0.76–0.99)	0.035
Frequency of watching TV				
Not at all	I*			
Less than once a week	1.08 (0.96–1.21)	0.184	1.09 (0.96–1.24)	0.2
At least once a week	1.08 (0.96–1.22)	0.2	0.98 (0.84–1.13)	0.7
Cigarette smoking				
No	I*			
Yes	0.99 (0.39–2.55)	0.996	-	-

Notes: I*: reference category. Researcher's analysis of RDHS 2019–2020.

Study Limitation

This study utilizes cross-sectional RDHS data, which inherently limits the ability to draw causal conclusions as it does not track the same individuals over time. Although survival analysis is traditionally used for longitudinal data, it was applied here to estimate the timing of first sexual experience, taking into account censored data. However, self-reported measures may introduce recall bias, and unmeasured confounders could affect the findings. Future research should aim to validate these results with longitudinal data and consider alternative methods to address these limitations.

Abbreviations

AHR, Adjusted Hazard Ratio; CDC, Centers for disease prevention and control; CI, Confidence interval; DHS, Demographic and Health survey; FN, Florence Namalinzi; IQR, Interquartile Range; KM, Kaplan Meier; NISR,

National institute of statistics of Rwanda; ORCID, Open Researcher and Contributor ID; RDHS, Rwanda demographic and health survey; STI, Sexually transmitted infections; TK, Theogene Kubahoniyesu; TV, Television.

Data Sharing Statement

The dataset analyzed in this study can be found at DHS Program website www.dhsprogram.com and Rwanda national institute of statistics of Rwanda statistics.gov.rw.

Ethics Approval and Consent to Participate

The study utilized secondary data from the Rwanda Demographic and Health Survey (2019–2020). Female youths in the survey provided informed consent and were briefed on the survey objectives through media channels such as radio, television, and social media platforms. Permission to use the dataset for this study was obtained from the DHS Program. The ICF Institutional Review Board (IRB) and the Rwanda National Ethics Committee (RNEC) reviewed and approved the questionnaires and procedures for the standard Demographic and Health Surveys (DHS).

Acknowledgments

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Author Contributions

TK conceptualized the study, designed the methodology, developed the analysis plan, and drafted the manuscript. FN analyzed the data and contributed to writing and revising the manuscript. Both authors made significant contributions to the work reported, took part in revising or critically reviewing the article, gave final approval of the version to be published, agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

Disclosure

The authors declare that they have no competing interests.

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