Reproductive Health

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"Exploring the factors associated with early sexual debut among young women in Kinshasa: evidence from two cross-sectional studies "

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Abstract

Background Early sexual debut among young women in Kinshasa, Democratic Republic of Congo (DRC), represents a complex and multifaceted issue that carries significant implications for a range of factors including individual health and social dynamics.

Aim This research seeks to illuminate the factors influencing early sexual debut among young women in Kinshasa.

Method The analysis involved 1,352 young women using a chi-square test at $p < 0.05$ and 95% CI for categorical variables. A mixed-effects multilevel binary logistic regression identified determinants of early sexual debut, showing adjusted odds ratios (AOR) and related factors, with 95% CI.

Result The prevalence of early sexual debut among respondents aged 15–24 years was 16.3% with an average current age of 16.6 years. Being aged 20–24 years [AOR = 1.40, CI;1-1.97], cohabiting with a partner [AOR = 0.46, CI;0.31–0.69] or being married [AOR = 0.43, CI; 0.25–0.76], tertiary education [AOR = 7.91, CI; 3.11–20.08], high wealth index [AOR = 1.78, CI; 1.18–2.2], were significantly associated with early sexual debut. The analysis showed minimal differences across clusters, suggesting that individual factors predominantly shape attitudes towards sexual debut, while community-level attributes play a lesser role in predicting these attitudes.

Conclusion The analysis showed minimal differences across clusters, suggesting that individual factors predominantly shape attitudes towards sexual debut, while community-level attributes play a lesser role in predicting these attitudes. Furthermore, reinforcing the legal marriage and providing resources to support single and cohabiting women in delaying sexual commitments can significantly mitigate early initiation.

Plain English summary

This study explores the factors influencing early sexual debut (first sexual experience before age 15) among young women in Kinshasa, Democratic Republic of Congo. This research aims to inform policies and programs that can

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improve the health and well-being of young women in Kinshasa by addressing the factors associated with early sexual debut. The survey of 1,352 women indicated that among women aged 15–24 years, the prevalence of early sexual debut was 16.3%. The mean current age of respondents was 20.6 years (SD = 2.4). The mean age at sexual debut was 16.6 years (SD = 2.1). The youngest reported age at sexual debut was 10 years.

Key findings show that older young women (20–24 years) were more likely to have early sexual debut compared to younger ones (15–19 years). Surprisingly, those with higher education (university level) were significantly more likely to start sexual activity early, possibly due to peer influence or urban exposure. Wealthier young women also had higher rates of early sexual debut, likely linked to greater independence or access to social networks. On the other hand, married or cohabiting women were less likely to have early sexual initiation, possibly because they waited for stable relationships.

The study highlights that individual factor like age, education, and wealth play a bigger role in early sexual debut than community influences. To address this issue, the researchers suggest strengthening laws that protect young women, promoting sexual health education, and supporting economic opportunities to help delay early sexual activity.

Keywords Early sexual debut, Reproductive health, Young female, Kinshasa, Congo

Résumé

Contexte Les premières relations sexuelles précoces chez les jeunes femmes à Kinshasa, en République démocratique du Congo (RDC), constituent un enjeu complexe et multidimensionnel avec de répercussions significatives sur divers aspects, notamment la santé individuelle et les dynamiques sociales.

Objectif Cette recherche vise à identifier et analyser les facteurs déterminants des débuts sexuels précoces chez les jeunes femmes à Kinshasa.

Méthode L'étude a été réalisée sur un échantillon de 1 352 jeunes femmes, en utilisant un test du chi carré à $p < 0,05$ et un intervalle de confiance (IC) à 95% pour les variables catégorielles. Une régression logistique binaire à plusieurs niveaux a permis d'identifier les déterminants des premiers rapports sexuels, fournissant des rapports de cotes ajustés (AOR) et les facteurs connexes, avec un IC à 95%.

Résultats La prévalence des premiers rapports sexuels précoces parmi les enquêtées âgées de 15 à 24 ans s'élevait à 16,3%, avec un âge moyen de toutes les enquêtées estimé à 16,6 ans. Les résultats ont révélé que les jeunes femmes âgées de 20 à 24 ans [OR = 1,40, IC ; 1–1,97], vivant avec un partenaire [AOR = 0,46, IC ; 0,31 – 0,69] ou mariées [AOR = 0,43, IC ; 0,25 – 0,76], ayant un niveau d'éducation tertiaire [AOR = 7,91, IC ; 3,11–20,08] et appartenant à un index de richesse élevé [AOR = 1,78, IC ; 1,18 – 2,2] étaient significativement associés à des débuts sexuels précoces. L'analyse a révélé des variations minimales entre les groupes, indiquant que les facteurs individuels influencent principalement les attitudes vis-à-vis des débuts sexuels, tandis que les caractéristiques communautaires jouent un rôle marginal.

Conclusion Les variations limitées entre les groupes suggèrent que les attitudes concernant les débuts sexuels sont principalement façonnées par des facteurs individuels, tandis que les attributs communautaires ont une influence réduite. De plus, renforcer la loi sur l'âge légal du mariage et fournir des ressources d'accompagnement pour aider les femmes célibataires et cohabitantes à reporter leurs engagements sexuels pourrait réduire significativement l'initiation précoce.

Mots-clés Activité sexuelle précoce, Santé reproductive, Jeune femme, Kinshasa

Introduction

Early sexual debut represents a major public health concern in sub-Saharan Africa, including the Democratic Republic of Congo, due to its strong associations with adverse reproductive health outcomes, unintended pregnancies, and increased risk of sexually transmitted infections (STIs) [1, 2]. The capital city of Kinshasa faces a critical situation, where rapid urbanization, socioeconomic inequalities, and cultural influences dramatically shape young women's sexual behaviors, leading to early initiation of sexual activity [3]. In this context, girls typically start having sex between the ages of 10 and 18, with factors such as social conditions, cultural norms, and peer pressure playing significant roles [4]. Early sexual debut also has profound implications for young women's mental and physical well-being [5]. As a result, these pressures can lead to heightened anxiety, depression, and a diminished sense of self-worth. Furthermore, they significantly increase young women's vulnerability to sexually transmitted infections and unintended pregnancies, often leaving them with long-term consequences that can impact their futures. Early sexual debut among

young women in Kinshasa poses serious risks to their health and well-being while generating long-term consequences that extend far beyond the individual: it restricts future educational and economic opportunities, disrupts family structures and community cohesion, and ultimately exerts negative effects on the broader social and economic landscape of the city [6, 7]. Addressing these issues is crucial to fostering a healthier environment where young women can thrive mentally, emotionally, and physically. It requires comprehensive strategies that consider the interplay among health education, social support, and economic empowerment to achieve healthier outcomes for young women in Kinshasa [8].

Based on a comprehensive analysis of the Global School-based Student Health Survey (GSHS) data from 2009 to 2015 across 50 countries, representing diverse regions and income levels, the pooled global prevalence among female adolescents is 8.9%, with a range of 7.6% to 10.3%, and 46.4% in sub-Saharan Africa [1, 2]. A study conducted in Ethiopia showed proportion 17.9% among college students [9]. In Liberia, a staggering 76.4% of young women engage in early sexual initiation [10], 7% in Brazil [11], 5.3% in Southeast Asia [12], and approximately 18,4% in the region of the Americas [1].

While there are no recent accurate data on the DRC, previous studies reported several factors influencing early sexual debut among young women, including age, gender, education [13, 14], cultural and community factors [15], place of residence, wealth quantile, early marriage [16], and many other factors [17].

The DRC has nearly 114 million inhabitants [18]. The population of young women aged 15–24 is estimated to be approximately 10.1 million [19]. The Democratic Republic of the Congo lacks recent census data; the last national count was in 1984 [20]. Most population figures, including those for Kinshasa, come from UN projections rather than official enumeration [21]. This lack of reliable data makes it difficult to determine the exact number of young women aged 15–24 living in Kinshasa, despite estimates suggesting the city's population exceeds 17 million [21].

Analyzing the factors associated with early sexual debut is essential for developing impactful interventions and policies, particularly in light of the scarcity of studies on this subject over the past two decades. This research seeks to identify the factors influencing early sexual debut among young women in Kinshasa, providing valuable insights for policymakers, healthcare professionals, and community stakeholders in addressing this critical public health challenge.

Methods

Data

The research used the data from the 2019–2020 Performance Monitoring for Action (PMA), and the 2020–2021 PMA surveys [22, 23]. These surveys were conducted in Kinshasa. Information about the age at which women had their first sexual intercourse was collected [24]. Both these PMA surveys were cross-sectional studies [24]. The PMA surveys are designed to monitor key family planning and reproductive health indicators in urban settings using standardized methodologies. The sampling frame for both surveys came from a master list of Enumeration Areas (EAs) in Kinshasa. EAs were selected using a stratified multi-stage cluster design with probabilities proportional to size (PPS) [25]. In the 2019–2020 survey (Phase 1), 58 EAs were selected, yielding a total of 10,309 female respondents aged 15–49 years. For the 2020–2021 survey (Phase 2), 57 EAs were initially targeted, resulting in 12,702 respondents; however, to ensure a cross-sectional sample, 2,756 respondents who had participated in Phase 1 were excluded, leaving 9,946 respondents for analysis [22, 23], The current analysis focused on a subsample of eligible women who consented to questions regarding their sexual attitudes, including 683 respondents (58.7% of eligible participants) from the 2019–2020 survey and 669 respondents (61% of eligible participants) from the 2020–2022 survey, for a total analytic sample of 1,352 women (Fig. 1). All respondents provided informed consent, and the surveys adhered to ethical standards for data collection in reproductive health research.

The PMA survey aims to fuel a data revolution in family planning and reproductive health by generating frequent, high-quality, rapid-turnaround data through innovative mobile-assisted surveys, supporting evidence-based policies, programs, and decision-making at national and subnational levels [25].

Inclusion and exclusion criteria

The study included women aged 15–24 years. All men and women aged 25–49 years were excluded.

Dependent variable

This research focuses on early sexual debut, defined as having first sexual intercourse before the age of 15, based on previous studies, using responses from questions about age at first sexual intercourse [26, 27]. The variable was dichotomized into two categories: "Early" (sexual debut prior to age 15) and "Late" (sexual debut at or after age 15, or no sexual experience). Age 15 represents a critical developmental boundary: it marks the transition from early to middle adolescence, when most young people are still in school and have limited autonomy over reproductive decisions. From a sociocultural perspective, sexual activity before age 15 is often considered

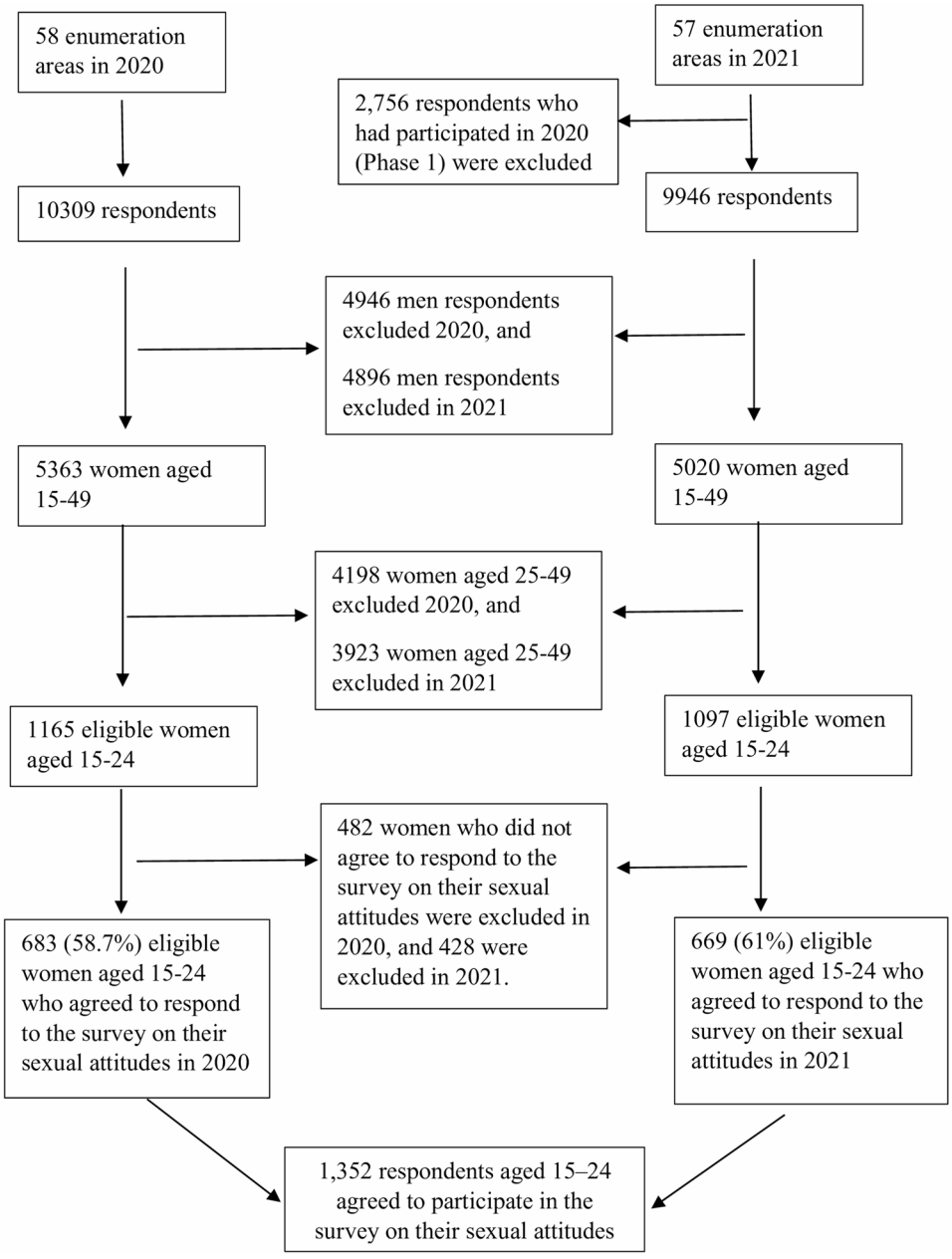

Fig. 1 Respondent inclusion and exclusion criteria flowchart

premature, as it precedes the legal age of marriage in the Democratic Republic of Congo (18 years) and occurs during a stage when adolescents are particularly vulnerable to peer pressure, exploitation, and adverse health outcomes. Using 15 rather than 14 or 16 provides comparability with international studies and global monitoring frameworks, while also situating the analysis within a developmental context where risks of unintended pregnancy, sexually transmitted infections, and psychosocial consequences are heightened. This threshold thus balances methodological consistency with developmental and sociocultural relevance [28].

Independent variables

Various independent variables at the individual and community levels, previously identified by previous studies, are used in the current study. Individual factors selected were: Age dichotomized as 15–19, and 20–24; Marital status classified as Never-married (respondents who reported being never married, or single without a partner), Cohabiting with a partner (respondents in an unofficial union or informal cohabitation), and Ever married (respondents in an official union, and those who reported being married, divorced, separated, or widowed); Religion categorized as Catholic Christian, Protestant Christian,

Charismatic Christian that differ from Catholic Christian and Protestant Christian by focusing on intense prayer, miracles, and personal spiritual renewal rather than traditional liturgy or established doctrine (Also known as Revival Churches). Two other categories of this variable are: Islam, and other religions (Vuvamu, Eglise des noirs, Animistes…); Woman's level of education, with primary, secondary, and tertiary level [29, 30]; Employment Status with categories, Employed, and Unemployed; Household size (number of people living in the household) [31]; Wealth Index (Low, Middle, High); Media exposure was generated as a dichotomous categorical variable. Respondents were asked whether they had access to television, radio, or a cellphone. Those who reported access to at least one of these media sources were classified as 'Yes,' while those who reported no access to any of them were classified as 'No.' This approach follows standard demographic survey practices, where multiple indicators of exposure are collapsed into a single binary variable for regression analysis [7, 29]. Community factors were: The Community media exposure, reflecting the proportion of women in each Enumeration Area (EA) who reported access to at least one medium. It was dichotomized into 'Yes' for media-exposed communities, and 'No' for media-non-exposed communities. Placing it under community factors is justified because it reflects shared social influences and information flow, not just individual behavior. Similar approaches have been used in previous studies to capture contextual influences beyond individual access [32, 33] ; Ethnicity, selected based on the country's language areas and geographical context. Although ethnicity is recorded at from individual responses, it was categorized under community factors because it reflects the broader cultural and linguistic environment shared by respondents in a given EA. In Kinshasa, ethnic groups often concentrate geographically, and their collective norms strongly influence attitudes toward sexuality and marriage. This categorization follows approaches used in previous studies, where ethnicity is treated as a contextual (community) factors of sexual and reproductive health outcomes in the similar context [15] ; Place of residence, although place of residence refers to where an individual lives, it was categorized as a community factor because it reflects the broader contextual environment shared by all respondents in a given cluster. Residence captures differences in infrastructure, cultural norms, and access to services between communities, making it a contextual determinant rather than a purely individual attribute. This categorization follows approaches used in DHS-based multilevel studies in the sub-Saharan African context [2, 7]; Survey year, as 2020 (2019–2020), and 2021 (2020–2121).

Statistical analysis

The data were analyzed using IBM SPSS version 28. The descriptive statistics were summarized in terms of frequencies and percentages. The Chi-square test of association was utilized to analyze the relationships between the dependent variable and each independent variable. A multilevel logistic regression model with random cluster-level intercepts was employed rather than a standard logistic regression because the data were hierarchically structured, with individuals nested within enumeration areas (clusters) [34]. Standard logistic regression assumes independence of observations, which is violated in clustered survey designs [35]. Multilevel modeling accounts for intra-cluster correlation by including random effects, thereby producing unbiased estimates of variance and adjusted odds ratios [36, 37]. Model I, a null model; and Model II, which included individual-level variables such as age, marital status, education, religion, employment status, household size, wealth index, and media exposure. Model III incorporated community-level variables, including community media exposure, ethnicity, place of residence, and survey year, Model IV combined individual- and community-level factors to evaluate their joint effects. Fixed-effect results were expressed as adjusted odds ratios (AOR) with 95% confidence intervals, while random-effect results measured variation in early sexual debut using ICC and the Median Odds Ratio (MOR). Model comparisons were made using deviance statistics, with Model IV selected as the optimal specification.

The mixed-effects multilevel binary logistic regression model was specified as:

$$Logit\left(P_{ij}\right) = 1n\left(\frac{P_{ij}}{1-P_{ij}}\right) = \beta\, o\sum{}_{k=1}^{K}\beta_{\,k}X_{ijk} + u_j$$

Where ' P_{ij}' denotes the probability of early sexual debut for individual 'i' in cluster 'j', β o is the intercept, ' $\beta_{\,k}$' are fixed-effect coefficients for individual and community-level predictors ' X_{ijk}' and ' u_j' represents the random effect at the cluster level assumed to follow a normal distribution $N(0,\delta^2_u)$.

Random effects were included at the cluster (enumeration area) level to account for unobserved heterogeneity between communities. These random intercepts allow each cluster to have its own baseline risk of early sexual debut, thereby adjusting for intra-cluster correlation and producing more reliable estimates of individual and community-level predictors. If the variance of random effects is significant, it means clusters differ substantially in their baseline risk.

Clustering effects were assessed using the intraclass correlation coefficient (ICC) and the median odds ratio (MOR). The ICC quantifies the proportion of variance

attributable to differences between clusters. An ICC close to 0 indicates that most of the variation is at the individual level, with little clustering. In contrast, an ICC closer to 1 means that most of the variation is explained by differences between clusters. The MOR translates cluster-level variance into an odds ratio, representing the median increase in odds when moving from a lower-risk to a higher-risk cluster. A MOR of 1 or less means no cluster effect (no difference between communities).

Results

Among women aged 15–24 years, the prevalence of early sexual debut was 16.3%. The mean current age of respondents was 20.6 years (SD = 2.4). The mean age at sexual debut reported by respondents was 16.6 years (SD = 2.1, $n = 1352$). The youngest reported age at sexual debut was 10 years.

Analysis of individual and community factors revealed significant differences in the prevalence of early sexual debut. At the individual level, age was associated with initiation, as 19.5% of women aged 15–19 years reported early sexual debut compared to 14.7% of those aged 20–24 years ($p < 0.05$). Marital status showed notable variation, with 13.2% of never-married women reporting early debut, compared to 29.3% of cohabiting women and 21.8% of ever married women ($p < 0.001$). Educational attainment demonstrated a strong gradient: 33.3% of women with primary education reported early sexual debut, 18.5% with secondary education, while only 3.2% of those with tertiary education reported early initiation ($p < 0.001$). Religious affiliation also influenced outcomes, with prevalence rates of 17% among Catholic Christians, 12.7% among Protestant Christians, 16% among Charismatic Christian Churches members, 15.6% among Muslims, and 34.9% among women of other religions ($p < 0.05$). Wealth was inversely associated with early sexual debut, with 21.7% in the lowest wealth group, 16.3% in the middle group, and 9% in the highest group ($p < 0.01$). Media exposure showed a protective effect, as 15.4% of women with access to media reported early sexual debut compared to 20.3% among those without exposure ($p < 0.05$).

At the community level, 15.5% of women residing in media-exposed communities reported early sexual debut, compared with 22.2% of those in media-non-exposed communities. Among respondents surveyed in 2020, the prevalence of early sexual debut was 18.2%, whereas it was 14.5% among those surveyed in 2021.With respect to place of residence, 17.9% of rural respondents reported early sexual debut, compared with 15.6% of urban respondents. Regarding regional distribution, the highest prevalence of early sexual debut was observed among respondents from Cuvette Centrale (22.5%), followed by Uele (20.0%), Kasai (17.5%), and other regions (16.7%) **(**Table 1**).**

In the multilevel regression analysis several individual-level factors were the strongest predictors of early sexual debut among young women in Kinshasa. Women aged 20–24 years were more likely to report early initiation compared to those aged 15–19 years (AOR = 1.40, 95% CI: 1–1.97). Marital status showed a protective effect, with cohabiting women (AOR = 0.46, 95% CI: 0.31–0.69) and ever married women (AOR = 0.49, 95% CI: 0.25–0.76) less likely to experience early sexual debut compared to never-married women. Educational attainment was strongly associated with early initiation, with women with tertiary education reporting markedly higher odds (AOR = 7.91, 95% CI: 3.11–20.08). Wealth also played a role, with women in the highest wealth index more likely to report early initiation (AOR = 1.78, 95% CI: 1.18–2.66) than those in the lowest wealth index (21.7%). Community-level factors such as community media exposure (AOR = 1.49, 95% CI: 1.02–2.21) showed initial associations but lost statistical significance after adjustment for individual-level variables. Ethnicity and place of residence did not demonstrate significant effects. However, the survey year demonstrated statistical significance after adjustment, with the women surveyed in 2021 being more likely to report early sexual debut than their counterparts in 2020 (AOR = 1.38, 95% CI:1.02–1.88) **(**Table 2**).**

Table 3 presents the variance components and model fit statistics across the four multilevel logistic regression models. The null model (Model I), which contained no predictors, revealed substantial clustering effects, with the intraclass correlation coefficient (ICC) indicating that 42.38% of the total variation in early sexual debut was attributable to differences between clusters. In comparison, 57.62% was attributable to individual-level variability. The Median Odds Ratio (MOR) of 4.39 further illustrated notable heterogeneity in the likelihood of early sexual debut across clusters. When individual-level variables were introduced (Model II), the deviance decreased, demonstrating improved model fit and confirming that age, marital status, education, and wealth explained a significant portion of the variance. Model III, which incorporated community-level variables, showed only modest improvements, suggesting that contextual factors such as media exposure, ethnicity, and residence contributed minimally to explaining early sexual debut. Model IV, which combined both individual and community-level predictors, exhibited the lowest deviance, confirming it as the best-fitting model. In this specification, individual-level factors remained statistically significant, while community-level attributes lost explanatory power. The reduction of the variance and ICC in Model IV underscores that individual characteristics rather than

Table 1 Bivariate analysis of sexual debut attitudes by respondent characteristics

		sexual debut		
		Early	Late	
Predictors *n* = 1352	**Categories**	***n* (%)**	***n* (%)**	***P*-value**
Age (years)	15–19	89 (19.5)	368 (80.5)	0.028[a]
	20–24	132 (14.7)	763 (85.3)	
Marital status	Never Married	137 (13.2)	900 (86.8)	< 0.001[b]
	Cohabiting with a partner	60 (29.3))	145 (70.7)	
	Ever Married	24 (21.8)	86 (78.2)	
Level of education	Primary	21 (33.3)	42 (66.7)	< 0.001[b]
	Secondary	192 (18.5)	844 (81.5)	
	Tertiary	8 (3.2)	245 (96.8)	
Religion	Catholic Christian	50 (17)	244 (83)	0.031[a]
	Protestant Christian	20 (12.7)	138 (87.3)	
	Charismatic Christian	100 (16)	526 (84)	
	Islam	36 (15.6)	195 (84.4)	
	Other	15 (34.9)	28 (65.1)	
Employment Status	Unemployed	156 (16.2)	806 (83.8)	0.83
	Employed	65 (16.7)	325 (83.3)	
Household size	0–5	84 (17.7)	390 (82.3)	0.44
	6–10	109 (15.1)	611 (84.9)	
	> 10	28 (17.7)	130 (82.3)	
Media exposure	No	53 (20.3)	210 (79.8)	0.69
	Yes	168 (15.4)	921 (84.6)	
Wealth index	Low	136 (21.7)	492 (78.3)	< 0.001[b]
	Middle	44 (16.3)	226 (83.7)	
	High	41 (9)	413 (91)	
Community media exposure	No	37 (22.2)	130 (77.8)	0.036[a]
	Yes	184 (15.5)	1001 (84.5)	
Survey year	2020	124 (18.2)	559 (81.8)	0.69
	2021	97 (14.5)	572 (85.5)	
Place of residence	Rural	81 (17.9)	371 (82.1)	0.27
	Urban	140 (15.6)	760 (84.4)	
Ethnicity	Bakongo	51 (15)	288 (85)	0.038[a]
	Kasai	99 (17.5)	466 (82.5)	
	Cuvette Centrale	25 (22.5)	86 (77.5)	
	Uele	5 (20)	20 (80)	
	Maniema-Kivu	2 (4.5)	42 (95.5)	
	Katanga	22 (11.7)	166 (88.3)	
	Others	3 (16.7)	15 (83.3)	

[a] Significant at *p*-value < 0.05–0.01

[b] Significant at *p*-value < 0.01

contextual influences essentially explained the observed differences across clusters (Table 3).

Discussion

This research reveals the factors influencing early sexual debut among young women in Kinshasa, DRC, where the prevalence rate stands at 16.3%. This figure is comparable to 16.6% in Rwanda [10] 17.8% in Mali [38]. However, it remains significantly lower than the 27% seen in Nigeria [39], 55% in Ghana [40], and over 9.8% in Malaysia [41]. In Kinshasa, the average age for first sexual experience is 16.6 years, compared to 17.58 years reported in a 2007 study in the DRC [42]. These findings could be explained by considering several contextual factors that influence early sexual initiation across different regions and cultures, highlighting a call for immediate action on a global scale.

The present study found that factors such as age, marital status, education, wealth were strongly associated with early sexual debut in Kinshasa. The analysis showed minimal differences across clusters, suggesting that individual factors predominantly shape attitudes towards sexual debut, while community-level attributes play a lesser role in predicting these attitudes.

Table 2 Mixed-effects multilevel binary logistic regression: factors associated with early sexual debut among young women in Kinshasa

Predictors *n* = 1352	Categories	Model I (Null Model)	Model II	Model III	Model IV
Intercept (95% CI)		-1.64(-2.01 to -1.27)	-	-	-
Age (years)	15–19		1		
	20–24		1.40 (1.07–1.96)[a]		1.40 (1–1.97)[a]
Marital status	Never married		1		
	Cohabiting with a partner		0.46 (0.31–0.68)[b]		0.46 (0.31–0.69)[b]
	Ever married		0.49 (0.27–0.80)[b]		0.43 (0.25–0.76)[a]
Level of education	Primary		1		
	Secondary		1.78 (0.97–3.03)		1.64 (0.92–2.92)
	Tertiary		8.38 (3.34–21.05)[b]		7.91 (3.11–20.08)[b]
Religion	Catholic Christian		1		
	Protestant Christian		1.54 (0.86–2.78)		1.55 (0.86–2.81)
	Charismatic Christian		1.34 (0.90–1.98)		1.31 (0.88–1.96)
	Islam		1.45 (0.88–2.38)		1.44 (0.87–2.39)
	Other		0.68 (0.32–1.43)		0.69 (0.32–1.49)
Employment Status	Unemployed		1		
	Employed		1.01 (0.71–1.45)		0.97 (0.69–1.37)
Household size	0–5		1		
	6–10		0.98 (0.69–1.37)		0.98 (0.69–1.39
	> 10		0.85 (0.51–1.42)		0.92 (0.54–1.54)
Media exposure	No		1		
	Yes		1.03 (0.71–1.49)		0.97 (0.54–1.75)
Wealth index	Low		1		
	Middle		1.18 (0.79–1.76)		1.16 (0.77–1.73)
	High		1.88 (1.26–2.81)[b]		1.78 (1.18–2.2)[a]
Community media exposure	No			1	
	Yes			1.49 (0.99–2.21)[a]	1.10 (0.56–2.2)
Survey year	2020			1	
	2021			1.31 (0.98–1.77)	1.38 (1.02–1.88)[a]
Place of residence	Rural			1	
	Urban			1.22 (0.90–1.65)	1.15 (0.83–1.58)
Ethnicity	Bakongo			1	
	Kasai			0.84 (0.58–1.21)	0.86 (0.58–1.27)
	Cuvette Centrale			0.62 (0.36–1.06)	0.67 (0.38–1.19)
	Ubangi			0.61 (0.31–1.19)	0.64 (0.31–1.3)
	Uele			0.72 (0.26–2.02)	0.76 (0.26–2.27)
	Maniema-Kivu			3.84 (0.90–16.42)	2.83 (0.63–12.67)
	Katanga			1.35 (0.79–2.32)	1.14 (0.64–2.03)
	Others			0.95 (0.26–3.42)	1.28 (0.31–4.83)

1 Reference group

[a] Significant at *p*-value < 0.05–0.01

[b] Significant at *p*-value < 0.01

Females aged 20–24 were more likely to experience early sexual debut than their counterparts aged 15–19. These findings contrast with previous studies conducted in South Africa, and in Ghana [10, 43]. Sampling approaches might differ from those in South Africa and Ghana, affecting how age groups report their experiences. In addition, the complex urban environment of Kinshasa, which strongly influences the rising urban crime and widespread poverty, could lead to today's adolescents aged 15–19 postponing their first sexual intercourse. This delay may stem from increased family oversight and heightened awareness of potential risks and consequences. In contrast, the circumstances that shaped the lives of the older age group, 20 to 24, may have encouraged them to engage in sexual activities at an earlier age. Thus, the divergence in sexual initiation among these groups highlights the profound impact of socioeconomic and historical factors on personal choices.

Table 3 Random effects estimates and model fit comparison for multilevel models of early sexual debut

	Model I (Null Model)	Model II	Model III	Model IV
Random effect				
Community variance	2.42	2.49	1.64	2.09
ICC%	42.38	43.07	33.26	38.85
MOR	4.39	4.49	3.39	3.97
Model comparison				
Log Likelihood	-3,264.87	-3,321.96	-2,774.59	-2,520.69
Deviance	6529.74	6643.93	5549.19	5041.386
N	1352	1352	1352	1352

The findings of the present study indicate that young women who are in marriages or cohabiting are less likely to have early sexual experiences than their never-married counterparts. These results are consistent with a study conducted in sub-Saharan Africa [44]. In contrast, findings from other studies conducted in Africa suggest that young married women tend to engage in sexual activity at an earlier age than single women [45–47]. In Kinshasa, the cultural prevalence of early marriage is less pronounced than in other African regions, often making marriage a precursor to sexual activity. Girls who marry before the age of 15 or 16, often older men, typically initiate sexual activity as part of their marital union, thereby increasing their likelihood of early sexual debut, while the legal age for marital union is 18 in the DRC. Conversely, young single women who cohabitate often elect to postpone their sexual commitments until they have a stable relationship, reflecting either urban societal norms or personal choices. Moreover, numerous African studies fail to provide a clear definition of cohabitation, often inadequately contrasting it with formal marriage and single status. This oversight may lead to skewed results that favor married girls, while the implications of early marriage as a significant risk factor remain evident.

The present study identified a significant association between higher education levels and an increased propensity for early sexual initiation among female university students. The odds ratio for this relationship was determined to be 8.38, meaning that each unit increase in education raised the likelihood of early sexual initiation by 8.38 times. These findings corroborate earlier research indicating that peer influence and the university setting amplify the risk of early sexual activity among female students [15, 48, 49]. Women who pursue higher education are likely to be more exposed to urban environments, diverse social networks, and modern cultural influences. These factors may multiply the opportunities for early sexual relations compared to those with little education, who often remain in traditional or rural environments. Sexual health education can inform women, but it can also expose them to peer influence or societal pressures that encourage early sexual activity. In addition, women with higher levels of education may have greater autonomy and decision-making power, which could influence their sexual behavior. A nationwide study conducted in the DRC in 2007 supported this observation [42].

Wealth plays a pivotal role in the timing of sexual debut among young women in Kinshasa. Those in the highest wealth quintile are more inclined to engage in sexual experiences earlier than their counterparts in lower wealth quintiles. Previous studies supported this observation, which underscore the importance of wealth as a key factor influencing early sexual debut among women [40, 50–52]. Individuals of higher economic status in Kinshasa are more likely to reside in urban areas and be exposed to modern lifestyles, media, and peer influence. These factors have the potential to influence attitudes and behaviors related to sexuality, which can result in earlier sexual debut. In some cases, wealth modifies cultural expectations. For instance, wealthier families may exhibit a reduced emphasis on conventional norms that dictate delayed sexual initiation, such as early marriage or stringent parental oversight.

The findings of this study highlight the significant policy implications of early sexual debut, particularly in settings where early marriage remains prevalent. Strengthening community engagement and enforcing legal frameworks against child marriage have proven effective in delaying sexual initiation and improving adolescent reproductive health outcomes. Evidence from South Asia and sub-Saharan Africa demonstrates that mobilizing local leaders, fostering community dialogue, and ensuring statutory enforcement can reduce coercive unions and thereby mitigate the risks associated with early sexual debut [53, 54]. Our results reinforce these observations, suggesting that community-driven approaches, when combined with legal enforcement, are critical to addressing structural drivers of adolescent vulnerability.

Equally important are interventions that promote gender empowerment and economic support. Programs that provide educational opportunities, vocational training, and conditional cash transfers have been shown to reduce economic dependence and enhance agency

among adolescent girls, thereby delaying sexual initiation [55, 56] The consistency of our findings with these studies underscores the importance of structural empowerment in shaping sexual and reproductive decision-making. By reducing poverty-related vulnerability and promoting gender equity, such interventions not only address proximate determinants of early sexual debut but also contribute to broader social transformation.

Compared with previous studies, our findings reveal both similarities and differences. Consistent with earlier research, community engagement and legal enforcement were effective in contexts where early marriage is a primary driver of early sexual debut [53]. However, differences emerged regarding the impact of economic support programs. While Baird et al. [55] reported significant reductions in early sexual initiation following cash transfer interventions in Malawi, our findings suggest that financial support alone may be insufficient without complementary empowerment strategies. This divergence may reflect contextual variations in program design, cultural norms, and baseline poverty levels. In settings where economic deprivation intersects with entrenched gender inequities, integrated approaches that combine financial support with empowerment initiatives appear more effective than economic interventions alone. Taken together, these findings emphasize the need for multi-sectoral strategies that address both structural and cultural determinants of adolescent sexual and reproductive health.

Strengths and limitations

This study benefits from high-quality PMA survey data, a large analytic sample, and advanced multilevel modeling that accounts for clustering. The inclusion of both individual and community-level variables provides a comprehensive perspective, while two consecutive survey waves enhance robustness. However, the cross-sectional design limits causal inference, and reliance on self-reported sexual behavior introduces recall and social desirability bias. The focus on Kinshasa reduces generalizability to the rest of the country. Another limitation is that respondents who reported sexual debut at age 15 or later were combined with those who had never experienced sexual intercourse, a binary categorization that simplifies analysis but conflates two conceptually distinct groups; sensitivity analyses separating "late" and "never" would help assess whether results differ. These limitations underscore the need for future longitudinal and mixed-methods research to deepen understanding of the determinants of early sexual initiation among young women in the DRC.

Conclusion

This analysis of early sexual debut among young women in Kinshasa, DRC, emphasizes individual and contextual factors influencing sexual initiation timing. It advocates for targeted interventions, prioritizing sexual health education for youth and economic empowerment for lower-income families to reduce disparities in early debut. Public campaigns should challenge cultural norms around early sexual activity. Additionally, reinforcing the legal marriage age of 18 and providing resources for women can help delay sexual commitments, reduce risks like unintended pregnancies and sexually transmitted infections, and promote healthier transitions into adulthood.

Abbreviations

AOR	Adjusted Odds Ratios
CI	Confidence Interval
DRC	Democratic Republic of Congo
ICC	Intraclass Correlation Coefficient
MOR	Median Odds Ratio
PMA	Performance Monitoring for Action

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Authors' contributions

- Conceptualization: All authors- Data curation: R.M.I, H.H.D, Y.C; Formal analysis R.M.I, Y.C; Writing – original draft: R.M.I, S.Y.K, E.N.K, H.H.D; Methodology: R.M.I, S.Y.K, E.N.K, H.H.D, Review: S.Y.K, E.N.K, Y.C, H.H.D; Supervision S.Y.K, E.N.K, Validation S.Y.K, E.N.K, Project administration S.Y.K, E.N.K.

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Data availability

All relevant data are within the manuscript and its Supporting Information files. Any further requests regarding the data used for this study could be made through the corresponding author, subject to completion of a data sharing agreement. For additional information https://www.pmadata.org.

Declarations

Ethics approval and consent to participate

During the surveys, the adolescents interviewed were considered emancipated minors and gave free and informed consent like all other survey participants. This approach received dual approval from the University of Kinshasa School of Public Health Ethics Committee under No. ESP/CE/030B/2019 of October 10, 2019, and the John Hopkins Bloomberg School of Public Health Institutional Review Board Office of June 24, 2019 (IRB No. 00009677). The research protocol assured participants that their responses would remain confidential and would be reported in aggregate form without identifying information.

Competing interests

The authors declare no competing interests.

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