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Prevalence and Predictors of Multiple Sexual Partnerships among School-Going Adolescents in Benin: A Cross-Sectional Analysis of GSHS Data

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Abstract

This research examined how common multiple sexual partnerships are among in-school adolescents and identified factors associated with this behavior. Data were drawn from the 2016 Global School-Based Student Health Survey (GSHS) and re-analyzed to estimate the prevalence and predictors of having multiple sexual partners among 2,496 adolescents aged 13–17 years attending school in Benin. Overall, 26.1% of adolescents reported having more than one sexual partner. In multivariable analyses, being male (AOR = 4.80, 95% CI 3.78–6.09), skipping school without permission (AOR = 1.69, 95% CI 1.35–2.12), physical inactivity (AOR = 1.28, 95% CI 1.00–1.62), cigarette use (AOR = 3.14, 95% CI 1.95–5.07), and alcohol consumption (AOR = 1.78, 95% CI 1.44–2.20) were linked to significantly higher odds of engaging in multiple sexual partnerships. Conversely, younger adolescents (AOR = 0.37, 95% CI 0.25–0.56), students in lower school grades (AOR = 0.52, 95% CI 0.42–0.65), and those experiencing parental supervision (AOR = 0.71, 95% CI 0.55–0.91) showed reduced likelihood of reporting multiple partners. Interventions aimed at reducing unsafe sexual practices should address individual behaviors, school-related factors, and psychosocial influences through integrated, multidisciplinary strategies. Such efforts may support progress toward Sustainable Development Goal 3, target 3.4, which focuses on adolescent mental health and well-being, as well as Goal 4, target 4.1, which emphasizes equitable access to quality education among adolescents in Benin.

Keywords: Multiple Sexual partnerships, School adolescents, Mental health, Unsafe sexual practices

Introduction

Adolescence, spanning ages 10–19 years, represents a critical developmental phase marked by profound biological, emotional, and social transformation. Globally, approximately 1.3 billion individuals fall within this age group, accounting for slightly more than one-quarter of the world's population (United Nations Children's Fund [1]). During this stage, young people experience rapid physical maturation, evolving psychological identity, and expanding social interactions [2-4].

From a biological perspective, bodily changes such as breast development in girls and genital growth in boys often heighten awareness of sexual maturation and bodily curiosity [5]. Psychologically, adolescents may grapple with uncertainty surrounding sexual identity, fluctuating self-esteem, unintended pregnancies, and emotional vulnerability within intimate relationships [6, 7]. At the social level, peer influence plays a significant role, as discussions of sexual experiences among friends may create pressure to initiate sexual activity. Together, these developmental dynamics can intensify curiosity and experimentation, including early sexual engagement, which may carry long-term implications for health and overall well-being [8, 9].

Considerable global attention has been directed toward curbing risky sexual behaviors among adolescents. Key

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initiatives include the Ottawa Charter for Health Promotion (1986), the International Conference on Population and Development (1994), and the establishment of youth-friendly health services and adolescent-focused care units designed to address sexual and reproductive health needs [10-12]. Despite these measures, adolescents continue to bear a disproportionate burden of HIV and other sexually transmitted infections (STIs) [13]. Currently, an estimated 38.4 million individuals worldwide are living with HIV, with approximately 1.5 million new infections reported in 2021 [14]. The epidemic is particularly severe in sub-Saharan Africa (SSA), where adolescent girls aged 15–19 years account for six out of every seven new HIV infections, and the region contributes roughly 70% of new global HIV cases [13, 14]. These patterns highlight persistent structural and behavioral vulnerabilities among young people in SSA.

Research has consistently linked the high prevalence of HIV and STIs in SSA to risky sexual practices, including inconsistent condom use, age-disparate sexual relationships, and early sexual debut [15-17]. Engaging with multiple sexual partners further elevates the likelihood of STI and HIV transmission [18]. Multiple sexual partnerships refer to having two or more sexual partners within a defined time frame, either sequentially (serial monogamy) or simultaneously (concurrent partnerships) [19]. This behavior represents a major public health challenge across settings [20, 21]. Evidence suggests that young people engaging in multiple partnerships face a 79% increased risk of acquiring HIV [2], with several studies identifying this behavior as one of the strongest predictors of HIV infection [22, 23].

Empirical findings indicate that multiple sexual relationships are relatively common among adolescents in SSA [24-26]. A multi-country study involving Benin, Mozambique, Namibia, Seychelles, and Tanzania reported a pooled prevalence of 20.9% among adolescents [25]. However, national estimates vary widely, ranging from 85.2% in Sierra Leone and 75.3% in Liberia [24] to 12% among adolescent girls and 13% among boys in Rwanda [27]. Factors influencing engagement in multiple sexual partnerships operate at multiple levels, encompassing individual characteristics, household context, interpersonal dynamics, and community influences. These include age, timing of sexual initiation, alcohol and substance use, socioeconomic status, exposure to mass media, and place of residence [28-30].

Associated factors in Benin remain limited. In particular, systematic empirical data documenting the magnitude and predictors of having multiple sexual partners among adolescents attending school in Benin are scarce, despite clear indications that sexual initiation has risen markedly in this group over time [31]. Available statistics indicate that in Benin, the proportion of school-going adolescents who had initiated sexual activity by the age of 15 was approximately 13% in 2006; this figure rose dramatically to 85% by 2010 (Institute National de la Statistique et de l'Analyse Economique [31, 32]). Moreover, findings from recent Demographic and Health Surveys (DHS) conducted across sub-Saharan African countries between 2011 and 2021 show that the prevalence of early sexual debut among young females in Benin reached 51.97% in 2017/2018 [33]. Such levels of early sexual initiation may pose a serious challenge to Benin's progress toward achieving Sustainable Development Goal 3, which seeks to ensure healthy lives and promote well-being for individuals of all ages [34].

Against this background, gaining updated insights into the prevalence of multiple sexual partnerships and the factors that contribute to such behaviors among in-school adolescents in Benin is essential for informing the development of effective, school-based sexuality education and health promotion programs aimed at postponing sexual debut and reducing engagement in multiple partnerships. Accordingly, the present study investigates both the prevalence and the determinants of having multiple sexual partners among school-attending adolescents in Benin. It is postulated that relevant risk factors operating at the micro- and meso-system levels will emerge as significant predictors of multiple sexual partnerships among adolescents. Nevertheless, given the multifaceted nature of adolescent sexual behavior and the influence of context-specific conditions, no a priori assumptions were made regarding the direction or strength of associations between the explanatory variables and the outcome of interest.

Theoretical framework: bioecological systems theory

This study is grounded in Bronfenbrenner's bioecological systems theory, which conceptualizes human behavior as the outcome of dynamic interactions between individuals and their surrounding environments [35, 36]. These interactions may be shaped by the presence of both risk and protective factors, thereby explaining differences in health-related outcomes within populations [37, 38]. From this theoretical perspective,

sexual behaviors are influenced by characteristics at multiple ecological levels, including individual and household factors (microsystem), interpersonal relationships (mesosystem), and broader community contexts (exosystem), as well as institutional and policy-level influences (macrosystem) [39-41]. Sexual behavior is therefore understood as the result of reciprocal interactions between personal attributes and environmental conditions [37, 38]. On this basis, variables located within these ecological systems are expected to play a role in shaping adolescent sexual behavior.

In line with this framework, the study incorporated indicators at the micro level—such as sociodemographic and personal characteristics including sex, age, school grade, truancy, hunger, and sedentary behavior—as well as factors situated within the meso- and exosystem levels. These latter factors comprised psychosocial variables such as experiences of physical attack, involvement in physical fights, serious injuries, excessive worrying, suicidal behaviors (including ideation, planning, and attempts), number of close friends, exposure to smoking by others, parental tobacco use, parental supervision of schoolwork, parental understanding, parental awareness of adolescents' leisure-time activities, and parents or guardians who rarely or never searched adolescents' belongings without permission. Previous studies have linked many of these factors to risky sexual behaviors, including engagement in multiple sexual partnerships [42-44]. For example, research indicates that adolescents who skip school, participate in physical altercations, consume alcohol, or smoke cigarettes have a higher likelihood of maintaining multiple sexual relationships [45-47]. To our knowledge, no variables representing the macro-level system were included in the present analysis. Importantly, adolescents' cumulative sexual experiences over time are known to shape subsequent patterns of sexual behavior.

Materials and Methods

Data source and study design

The analysis utilized secondary data derived from the 2016 Benin Global School-Based Student Health Survey (GSHS). The GSHS is a school-based surveillance system that uses a self-completed questionnaire to collect information on health-risk behaviors and protective factors linked to the leading causes of morbidity and mortality among young people worldwide. Designed as a cross-sectional survey, the GSHS is implemented in World Health Organization (WHO) member states seeking to address adolescent health risks, including risky sexual practices. In Benin, the survey targeted adolescents aged 13–17 years who were enrolled in school. The GSHS was developed by the WHO in collaboration with the United Nations Children's Fund (UNICEF), the Joint United Nations Program on HIV/AIDS (UNAIDS), and the United Nations Educational, Scientific and Cultural Organization (UNESCO), with technical and financial support provided by the United States Centers for Disease Control and Prevention (CDC) [48].

Sampling procedure, data collection, and sample size

The GSHS employed a two-stage cluster sampling strategy designed to generate nationally representative data for students enrolled in Grades 6–12 and the terminal grade in each participating country. These grade levels typically include adolescents aged 13–17 years. During the first sampling stage, schools were selected as primary sampling units using probability proportional to enrolment size. In the second stage, classes within the selected schools were chosen through systematic random sampling. All students in the selected classes were eligible to participate and were invited to complete the survey. Clear instructions were provided prior to administration, and participants retained the right to decline participation or skip any question. The questionnaire was translated into French, pre-tested to ensure clarity and comprehension, and administered anonymously during regular class time. No personal identifiers were collected. The school participation rate was 100%, while the student response rate was 78%, yielding an overall response rate of 78%. In total, 2,536 students took part in the Benin GSHS; however, 2,496 questionnaires were included in the final analysis after excluding responses with more than 10% missing data.

Variables in the study

The main outcome of interest was engagement in multiple sexual partnerships by the participants. This was assessed through a question on whether the respondent had ever had sexual relations with two or more partners. Answers were dichotomised as "1 = yes" and "0 = no". Respondents selecting "yes" were classified as having experienced multiple partnerships, whereas those selecting "no" were grouped as not having done so.

Predictor variables were organized into several domains: demographic characteristics (gender, age group, and school level), individual behaviors (skipping school, food insecurity, and physical inactivity), substance-related factors (recent marijuana consumption, recent drinking, and recent tobacco use), and psychosocial elements (history of physical assault, participation in fights, severe injuries, anxiety severe enough to impair concentration, suicidal ideation/planning/attempts, presence of close friendships, exposure to smoking by others, parental smoking, parental supervision of homework, empathetic parenting, parental oversight of leisure activities, and limited parental searching of personal items without consent) **(Table 1).**

Table 1. Descriptions and coding schemes for independent variables

Category	Subcategory	Variable	Survey Question	Coding
Micro-level	Demographic	Gender	What is your gender?	1 = Male 2 = Female
		Age group	How old are you?	1 = 12–14 years 0 = 15–17 years
		School level	Which grade are you currently in?	1 = Grades 1–3 0 = Grades 4–6
	Personal factors	School absenteeism	In the past 30 days, have you skipped classes or school without permission?	1 = Yes 0 = No
		Physical inactivity	Do you typically spend 3 or more hours per day on sitting activities?	1 = Yes 0 = No
	Substance use	Cigarette smoking	In the past 30 days, have you smoked any cigarettes?	1 = Yes 0 = No
		Alcohol consumption	In the past 30 days, have you consumed at least one alcoholic drink?	1 = Yes 0 = No
		Marijuana use	In the past 30 days, have you used marijuana?	1 = Yes 0 = No
Mesosystem & exosystem-level	Psychosocial	Physical assault	Have you ever been physically assaulted?	1 = Yes 0 = No
		Involvement in fights	Have you ever participated in a physical fight?	1 = Yes 0 = No
		Severe injury	In the past 12 months, have you sustained any serious injuries?	1 = Yes 0 = No
		Excessive anxiety	Do you often or always feel so worried that it prevents you from sleeping?	1 = Yes 0 = No
		Suicidal ideation	In the past 12 months, have you seriously thought about attempting suicide?	1 = Yes 0 = No
		Suicide planning	In the past 12 months, have you made a specific plan for attempting suicide?	1 = Yes 0 = No
		Suicide attempt	In the past 12 months, have you actually attempted suicide?	1 = Yes 0 = No
		Having close friends	Do you have any close friends?	1 = Yes 0 = No
		Exposure to second-hand smoke	In the past 12 months, has anyone smoked in your presence?	1 = Yes 0 = No
		Parental tobacco use	Do any of your parents or guardians use tobacco products?	1 = Yes 0 = No
		Homework supervision	In the past 30 days, have your parents or guardians checked whether you completed your homework?	1 = Yes 0 = No
		Empathetic parenting	In the past 30 days, have your parents or guardians shown understanding of your problems and concerns?	1 = Yes 0 = No

		Oversight of free time	In the past 30 days, have your parents or guardians known what you do in your free time?	1 = Yes 0 = No
		Respect for privacy	In the past 30 days, have your parents or guardians rarely or never gone through your personal belongings without permission?	1 = Yes 0 = No
Outcome variable	-	Multiple sexual partners	Have you ever had sexual intercourse with two or more partners?	1 = Yes 0 = No

Analytical approach

Analyses were conducted with SPSS version 27.0. To achieve national representativeness for Beninese youth and adjust for differential non-response, weighting was implemented across school, individual, and gender-by-grade strata. Missing observations were addressed via multiple imputation procedures [49]. Imputation was applied, given low missing rates around 1%, with total missingness between 1% and 10% considered missing at random. Five imputed datasets were created automatically to ensure robust handling of incomplete data. Comparisons between imputed and complete-case results were performed to confirm reliability.

Each adolescent represented the analytical unit. Preliminary screening of associations between the outcome and predictors employed Pearson's Chi-square tests. Predictors reaching significance in these tests were retained for multivariable modelling. A binary logistic regression framework was fitted to estimate predictive effects, defining significance at $p < 0.05$ [50]. Effect estimates were expressed as adjusted odds ratios accompanied by 95% confidence intervals.

Results and Discussion

Rates of multiple sexual partnerships among Beninese school adolescents by selected characteristics

Overall, 651 participants (26.1%) indicated a history of multiple sexual partners (**Figure 1**). Of these, 534 cases (21.4%) involved male students. Higher rates appeared among older adolescents aged 16–18 years (619 cases, 24.8%) and those in final or penultimate grades (344 cases, 13.8%). Additionally, reports came from 184 (7.4%) students who skipped classes and 251 (10.1%) with inactive lifestyles. Other notable subgroups included 168 (6.7%) assaulted youths, 184 (7.4%) involved in fights, 312 (12.5%) with major injuries, and 164 (6.6%) burdened by excessive anxiety. Links to suicidality showed 115 (4.6%) with ideation, 140 (5.6%) with plans, and 134 (5.4%) with attempts. Further associations involved 59 (2.4%) with supportive friendships, 388 (15.5%) exposed to environmental tobacco smoke, 92 (3.7%) with smoking caregivers, 199 (8.0%) under homework supervision, 183 (7.3%) with supportive parents, 151 (6.0%) whose leisure was monitored, and 562 (22.5%) experiencing minimal privacy invasion **(Table 2).**

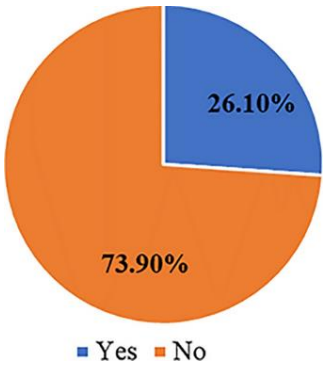

Figure 1. Rates of multiple sexual partnerships in Beninese school-attending youth

Table 2. Unadjusted associations between predictors and multiple sexual partnerships in school adolescents from Benin (N = 2496)

Category	Variable	Multiple sexual partners		Phi	Chi-square (χ^2)
		No (%)	Yes (%)		
Demographic	**Sex**				
	Male	822 (32.9%)	534 (21.4%)	0.330	272.36***
	Female	1023 (41.0%)	117 (4.7%)		
	Age				
	13–15 years	320 (12.8%)	32 (1.3%)	−0.157	61.36***
	16–18 years	1525 (61.1%)	619 (24.8%)		

	Grade				
	Grades 1–3	1239 (49.6%)	307 (12.3%)	−0.181	81.62***
	Grades 4–6	606 (24.3%)	344 (13.8%)		
Personal factors	**Hunger**				
	Yes	310 (12.4%)	118 (4.7%)	0.015	0.59
	No	1535 (61.5%)	533 (21.4%)		
	Sedentary lifestyle				
	Yes	390 (15.6%)	184 (7.4%)	0.074	13.80***
	No	1455 (58.3%)	467 (18.7%)		
	Truancy				
	Yes	324 (13.0%)	251 (10.1%)	0.219	119.64***
	No	1521 (60.9%)	400 (16.0%)		
Drugs and substance use	**Cigarette smoking**				
	Yes	37 (1.5%)	77 (3.1%)	0.207	106.52***
	No	1808 (72.4%)	574 (23.0%)		
	Alcohol consumption				
	Yes	699 (28.0%)	381 (15.3%)	0.183	83.51***
	No	1146 (45.9%)	270 (10.8%)		
	Marijuana use				
	Yes	13 (0.5%)	24 (1.0%)	0.108	29.30***
	No	1832 (73.4%)	627 (25.1%)		
Psychosocial factors	**Physically attacked**				
	Yes	355 (14.2%)	168 (6.7%)	0.071	12.52***
	No	1490 (59.7%)	483 (19.4%)		
	Involved in physical fight				
	Yes	381 (15.3%)	184 (7.4%)	0.080	15.93***
	No	1464 (58.7%)	467 (18.7%)		
	Seriously injured				
	Yes	764 (30.6%)	312 (12.5%)	0.058	8.33**
	No	1081 (43.3%)	339 (13.6%)		
	Bullied				
	Yes	764 (30.6%)	288 (11.5%)	0.025	1.58
	No	1081 (43.3%)	363 (14.5%)		
	Loneliness				
	Yes	255 (10.2%)	107 (4.3%)	0.033	2.65
	No	1590 (63.7%)	544 (21.8%)		
	Excessive worry				
	Yes	367 (14.7%)	164 (6.6%)	0.057	8.07**
	No	1478 (59.2%)	487 (19.5%)		
	Suicidal ideation				
	Yes	255 (10.2%)	115 (4.6%)	0.047	5.63*
	No	1590 (63.7%)	536 (21.5%)		
	Suicide plan				

Yes	268 (10.7%)	140 (5.6%)	0.083	17.14***
No	1577 (63.2%)	511 (20.5%)		
Suicide attempt				
Yes	251 (10.1%)	134 (5.4%)	0.085	17.97***
No	1594 (63.9%)	517 (20.7%)		
Has close friends				
Yes	237 (9.5%)	59 (2.4%)	−0.051	6.59**
No	1608 (64.4%)	592 (23.7%)		
Exposure to others smoking				
Yes	873 (35.0%)	388 (15.5%)	0.108	29.05***
No	972 (38.9%)	263 (10.5%)		
Parental tobacco use				
Yes	158 (6.3%)	92 (3.7%)	0.081	16.56***
No	1687 (67.6%)	559 (22.4%)	−0.070	
Parental homework checking				
Yes	706 (28.3%)	199 (8.0%)		12.34***
No	1139 (45.6%)	452 (18.1%)		
Understanding parents				
Yes	637 (25.5%)	183 (7.3%)	−0.060	8.977**
No	1208 (48.4%)	468 (18.8%)		
Parental awareness of leisure activities				
Yes	698 (28.0%)	151 (6.0%)	−0.136	45.93***
No	1147 (46.0%)	500 (20.0%)		
Parents rarely/never check belongings				
Yes	1486 (59.5%)	562 (22.5%)	0.066	10.94***
No	359 (14.4%)	89 (3.6%)		

Phi values indicate association magnitude and direction. Percentages are calculated by cell to highlight specific contributions within the sample distribution.

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

Chi-square examinations of multiple partnerships across predictors

Significant Chi-square results linked the outcome to gender ($\chi^2 = 272.36$, $p < 0.001$), age category ($\chi^2 = 61.36$, $p < 0.001$), school level ($\chi^2 = 81.62$, $p < 0.001$), physical inactivity ($\chi^2 = 13.80$, $p < 0.001$), class skipping ($\chi^2 = 119.64$, $p < 0.001$), recent tobacco use ($\chi^2 = 106.52$, $p < 0.001$), recent drinking ($\chi^2 = 83.51$, $p < 0.001$), and recent marijuana consumption ($\chi^2 = 29.30$, $p < 0.001$). Additional significant links emerged for assault history ($\chi^2 = 12.52$, $p < 0.001$), fight participation ($\chi^2 = 15.93$, $p < 0.001$), major injury ($\chi^2 = 8.33$, $p < 0.01$), high anxiety ($\chi^2 = 8.07$, $p < 0.01$), ideation ($\chi^2 = 5.63$, $p < 0.05$), suicide planning ($\chi^2 = 17.14$, $p < 0.001$), and attempts ($\chi^2 = 17.97$, $p < 0.001$). Other predictors showing significance included friendship support ($\chi^2 = 6.59$, $p < 0.01$), smoke exposure ($\chi^2 = 29.05$, $p < 0.001$), caregiver smoking ($\chi^2 = 16.56$, $p < 0.001$), homework oversight ($\chi^2 = 12.34$, $p <$

0.001), parental empathy ($\chi^2 = 8.977$, $p < 0.001$), leisure monitoring ($\chi^2 = 45.93$, $p < 0.001$), and reduced privacy intrusion **(Table 2).**

Adjusted predictors of multiple sexual partnerships in Beninese school youth

Adjusted logistic regression findings appear in **Table 3.** Male participants exhibited markedly elevated odds compared to females (AOR = 4.80, 95% CI 3.78–6.09). Adolescents aged 13–15 years displayed lower odds than older peers (AOR = 0.37, 95% CI 0.25–0.56). Lower-grade students had reduced odds relative to those in final years (AOR = 0.52, 95% CI 0.42–0.65). Skipping classes raised odds (AOR = 1.69, 95% CI 1.35–2.12), alongside physical inactivity (AOR = 1.28, 95% CI 1.00–1.62). Recent tobacco use (AOR = 3.14, 95% CI 1.95–5.07) and alcohol consumption (AOR = 1.78, 95% CI 1.44–2.20) also increased odds. Conversely, parental awareness of leisure activities conferred protection (AOR = 0.71, 95% CI 0.55–0.91).

Table 3. Adjusted regression examining factors linked to multiple sexual partnerships in Beninese school adolescents

Category	Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	
			Lower	Upper
Micro-level	**Demographic factors**			
	Male (ref: Female)	4.80***	3.78	6.09
	Age 13–15 years (ref: 16–18 years)	0.37***	0.25	0.56
	Grades 1–3 (ref: Grades 4–6)	0.52***	0.42	0.65
	Personal factors			
	Truancy (ref: No truancy)	1.69***	1.35	2.12
	Sedentary lifestyle (ref: No)	1.28*	1.00	1.62
	Substance use			
	Current cigarette smoking (ref: No)	3.14***	1.95	5.07
	Current alcohol consumption (ref: No)	1.78***	1.44	2.20
	Current marijuana use (ref: No)	2.06	0.87	4.87
Mesosystem & exosystem-level	**Psychosocial factors**			
	History of physical assault (ref: No)	1.15	0.89	1.49
	Involvement in physical fights (ref: No)	1.30	1.01	1.68
	Experienced serious injury (ref: No)	1.03	0.83	1.27
	Excessive worry (ref: No)	1.17	0.91	1.49
	Suicidal ideation (ref: No)	0.92	0.64	1.32
	Suicide planning (ref: No)	1.53	1.08	2.16
	Suicide attempt (ref: No)	1.24	0.90	1.70
	Having close friends (ref: No)	0.90	0.64	1.26
	Exposure to second-hand smoke (ref: No)	1.23	0.99	1.51
	Parental tobacco use (ref: No)	1.04	0.76	1.44
	Parental homework supervision (ref: No)	1.02	0.81	1.29
	Empathetic parents (ref: No)	0.99	0.77	1.26
	Parental awareness of leisure activities (ref: No)	0.71**	0.55	0.91
	Parents rarely/never check belongings (ref: No)	1.31	0.98	1.77

Constant	0.18***	—	—

Hosmer-Lemeshow goodness-of-fit: $\chi^2(8) = 6.91$, $p = 0.56$
*p < 0.05, **p < 0.01, ***p < 0.001

Drawing on data from the 2016 GSHS, this investigation quantified the extent of multiple sexual partnerships among adolescents attending school in Benin. The analysis revealed that 26.1% of respondents reported having more than one sexual partner. This proportion is greater than the 23.5% documented among school learners in South Africa [44], yet lower than the levels observed in Ghana (33.3%) [51] and Uganda (40.6%) [52]. Discrepancies in prevalence estimates across studies may be attributed to differences in the timing of data collection, sample characteristics, cultural settings, and the operationalization of key variables. Furthermore, unlike some earlier studies that restricted analysis to a single sex, this study considered both male and female adolescents. Irrespective of these methodological differences, the observed level of multiple sexual partnerships among adolescents in Benin presents a considerable reproductive health concern. Consequently, there is a clear need to intensify educational and preventive initiatives aimed at sensitizing school-going adolescents in Benin to the risks associated with engaging in multiple sexual partnerships.

The findings further indicate that male adolescents in Benin were almost five times more likely to engage in multiple sexual partnerships compared with their female peers. This pattern mirrors results reported in studies conducted in South Africa [44], North Ethiopia [43], and Northeast Ethiopia [42]. Several social and cultural dynamics may underpin this disparity. Within many sub-Saharan African contexts, male involvement in multiple sexual relationships is often socially tolerated or even endorsed, reflecting entrenched cultural expectations [53]. In such settings, dominant norms of masculinity frequently promote the notion that men should maintain both a regular partner and additional concealed sexual relationships [54-56]. These behaviors are often pursued to fulfil sexual desires and are reinforced by adverse cultural beliefs that normalize having more than one sexual partner [55]. As a result, the higher participation of male school-going adolescents in multiple sexual partnerships in Benin is consistent with prevailing socio-cultural norms.

Age was identified as a significant factor influencing engagement in multiple sexual partnerships among adolescents in Benin. Adolescents aged 13–15 years exhibited a lower likelihood of reporting multiple sexual partners compared with those aged 16–18 years. This finding is consistent with evidence from other studies that have reported increased engagement in multiple sexual partnerships among older adolescents relative to younger age groups [51, 52], despite variations in age classifications across studies. This trend can be interpreted within the framework of adolescent sexual development. Evidence from Benin indicates that the mean age at first sexual intercourse is 14.75 years [57], while DHS 2017–2018 data report a median age of sexual debut of 17.3 years among women [58]. Following sexual initiation, adolescents may progressively explore sexual relationships, which can culminate in multiple sexual partnerships by late adolescence. Individuals who initiate sexual activity earlier may become increasingly familiar with sexual experiences over time, thereby heightening their vulnerability to behaviors such as maintaining multiple sexual partners [25, 26, 59]

Students in lower school grades were less likely to report multiple sexual partnerships compared with those in their final grades. Although no direct empirical evidence was identified to explain this association, it may be inferred that adolescents in lower grades have more limited exposure to sexual experiences. Additionally, while the average age of sexual initiation among school-going adolescents in Benin is reported as 14.75 years [57], this does not necessarily correspond uniformly to lower grade placement. Even when adolescents of this age are in lower grades, they may not yet have encountered sufficient sexual opportunities or influences to engage in multiple sexual partnerships. In contrast, students in higher grades are more likely to experience increased exposure through experimentation, peer pressure, greater autonomy, and the broader sexual transitions characteristic of later adolescence.

Truancy was also associated with a higher probability of engaging in multiple sexual partnerships among adolescents in Benin when compared with regular school attendees. This observation is supported by previous studies demonstrating that truancy is a predictor of risky sexual behaviors among school-going adolescents [47, 60]. It is plausible that the structured school environment limits opportunities for engaging in multiple sexual partnerships. Conversely, absence from school may

afford adolescents greater freedom and time to pursue sexual experimentation, including maintaining multiple partners. This suggests that truancy could be utilized as an early warning indicator for identifying adolescents at heightened risk of engaging in multiple sexual partnerships and other forms of risky sexual behavior. Accordingly, interventions aimed at improving school attendance may play a critical role in mitigating such risks.

Finally, adolescents who reported sedentary behaviors were more likely to engage in multiple sexual partnerships than their non-sedentary counterparts. This result contrasts with earlier evidence suggesting that sedentary behavior is linked to sexual inactivity [61]. The mechanism underlying the association between sedentary lifestyles and multiple sexual partnerships remains insufficiently explained in the literature. One plausible explanation is that sedentary behavior may be linked to underlying depressive symptoms. In support of this, Tesfaye *et al*. [62] reported a significant association between depressive symptoms and risky sexual behaviors among Ethiopian school adolescents. Although the present analysis adjusted for certain indicators of depression, as well as suicidal ideation and attempts, the observed relationship may still reflect unmeasured factors, such as time spent studying or engaging with television and internet content, which were not assessed in this study.

Adolescents who reported current cigarette smoking and those who consumed alcohol were respectively three times and two times more likely to engage in multiple sexual partnerships. Existing literature provides substantial evidence linking general risk-taking tendencies with unsafe or illicit sexual behaviors among adolescents. Numerous studies have consistently documented associations between substance use or misuse and adolescents' involvement in multiple sexual relationships and other forms of risky sexual behavior [45, 46, 63]. For instance, adolescents who consume alcohol, smoke cigarettes, or use psychoactive substances may exhibit heightened sensation-seeking tendencies that predispose them to additional risk behaviors, including sexual activity; consequently, substance use may act as an indirect indicator of multiple sexual partnerships. From a biological standpoint, ethanol and nicotine—key constituents of alcohol and cigarettes—function as stimulants of the central nervous system and have been shown to heighten sexual arousal [64, 65]. In the context of school-going adolescents in Benin, preventive strategies within schools could prioritize the early identification of students vulnerable to substance use and misuse as a means of reducing engagement in multiple sexual partnerships.

Engagement in multiple sexual partnerships was less common among adolescents whose parents were aware of how they spent their leisure time. This parental awareness of adolescents' whereabouts and daily activities reflects an important dimension of parental monitoring. Such parental involvement and connectedness may function as a protective social mechanism that limits adolescents' involvement in risk-taking behaviors [25, 26]. Supporting this observation, evidence from a meta-analysis demonstrated a significant effect of parental monitoring on adolescents' sexual behaviors [66]. It is plausible that consistent and effective parental supervision reduces adolescents' permissive attitudes towards maintaining multiple sexual partner relationships.

Strength and limitations

A major strength of this study lies in its use of a nationally representative dataset, which enabled the inclusion of a large and diverse sample of adolescents in the analysis. Consequently, the findings offer meaningful insights into the magnitude and correlates of multiple sexual partnerships among adolescents in Benin. The results also provide a valuable evidence base to support policymakers in developing and implementing targeted interventions aimed at reducing risk-taking behaviors, including multiple sexual partnerships, within this population. Notwithstanding these strengths, several limitations must be acknowledged. First, the GSHS focuses exclusively on in-school adolescents; therefore, the findings cannot be generalized to adolescents who are not enrolled in school in Benin. This is noteworthy given that out-of-school adolescents or school dropouts may be particularly vulnerable to sexual risk behaviors. Second, the cross-sectional design of the GSHS limits the ability to establish causal relationships between the variables examined. Additionally, the survey did not collect information on several critical dimensions of sexual risk, such as the nature of sexual partners (casual, regular, or occasional), frequency of sexual encounters, duration of multiple sexual partnerships, or whether these partnerships occurred concurrently or sequentially. The absence of such variables also restricted the ability to determine whether reported sexual relationships were consensual, an issue of particular importance among adolescents who initiate sexual activity at early ages.

Furthermore, the reliance on self-reported data for sensitive behaviors related to sexuality may have introduced reporting bias through under-reporting or over-reporting, despite efforts to ensure confidentiality and anonymity throughout the survey process.

Implications for research and intervention

The findings of this study highlight several important considerations for both policy action and future research aimed at reducing multiple sexual partnerships among school-going adolescents in Benin. School administrators are encouraged to implement comprehensive disciplinary and preventive frameworks that address modifiable risk factors such as truancy, cigarette smoking, and alcohol misuse. In addition, strengthening access to psychological and mental health support services within schools should be prioritized. Such services could assist students in understanding the consequences of engaging in risky behaviors and motivate behavior change. Psychosocial interventions may further benefit adolescents by promoting participation in constructive and meaningful activities that divert attention away from risky sexual practices. Future research should seek to clarify causal mechanisms and contextual influences underlying adolescents' engagement in multiple sexual partnerships. Moreover, qualitative studies are warranted to provide deeper insights into adolescents' motivations, perceptions, and lived experiences related to multiple sexual partnerships in Benin.

Conclusion

A substantial proportion of in-school adolescents in Benin reported having multiple sexual partners, influenced by a range of factors including male sex, truancy, sedentary behavior, cigarette smoking, and alcohol use or misuse. These determinants are shaped by the broader environments in which adolescents grow and develop, encompassing individual characteristics, social norms, and family contexts. Overall, the findings provide strong evidence that ecological risk factors significantly increase the likelihood of multiple sexual partnerships among school-going adolescents. Accordingly, comprehensive sexuality and reproductive health education programs are urgently needed in Benin to address these risks. Through school-based sexual and reproductive health education, adolescents can acquire accurate knowledge about healthy relationships, effective communication, and responsible sexual decision-making. Such programs can also equip students with essential skills to evaluate risks, understand consequences, and build respectful interpersonal relationships. In addition, strengthening parental connectedness may represent an effective protective strategy for reducing harmful sexual behaviors among in-school adolescents across the country.

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