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Regional and Sex Differences in the Prevalence and Correlates of Early Sexual Initiation Among Adolescents Aged 12–15 Years in 50 Countries

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A B S T R A C T

Purpose: This study aimed to investigate the regional and sex differences in the prevalence of early sexual initiation and its correlates among school-going adolescents in 50 countries.
Methods: We used data from the Global School-based Health Survey from 50 countries in 2009–2015 for 124,091 adolescents (53.5% girls) aged 12–15 years. Using meta-analysis with random effects, we estimated the prevalence of early sexual initiation (i.e., having first sexual intercourse at ≤14 years) by sex, region, and country income classification. Multilevel mixed-effect logistic regressions including a random intercept for countries were used to investigate the correlates of early sexual initiation.
Results: Overall, 14.2% (95% confidence interval: 12.1–16.2) of adolescents aged 12–15 years had early sexual initiation, with boys reporting much higher than girls (19.7%, 16.9–22.5 vs. 8.9%, 7.6–10.3). The prevalence of early sexual initiation was the highest in the region of the Americas (18.4%, 15.2–21.5) and the lowest in the South-east Asia region (5.3%, 2.6–8.0). Adolescents from high-income and lower middle-income countries had the highest (19.5%, 13.5–25.5) and the lowest (7.3%, 5.5–9.0) prevalence, respectively. Older age, anxiety, loneliness, suicidal ideation, being bullied, physical fight, school truancy, smoking, drinking alcohol, illicit drug use, physical activity, and being overweight were associated with higher odds of early sexual initiation, whereas female sex, parental monitoring, and peer support were protective. There was little or no evidence of heterogeneity by sex and across regions for these associations.
Conclusions: Substantial differences in the prevalence are observed by sex and across regions for early sexual initiation among adolescents, whereas its correlates remain relatively similar when examined separately by these characteristics.

IMPLICATIONS AND CONTRIBUTION

This study provides sex-specific estimates for early sexual initiation among adolescents in accordance with country, WHO regions, and the World Bank country income groups. Findings will help shaping strategies for reducing early sexual initiation and subsequently other risky sexual behaviors among adolescents from different regions.

First sexual intercourse before 15 years of age is often considered as early sexual initiation [1,2]. Early sexual initiation among adolescents is an important aspect of adolescent sexual and reproductive health, particularly due to its downstream

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negative impacts on physical and mental health during adolescence and in later life. Many previous studies have reported that early sexual debut is associated with sexually transmitted infections, HIV/AIDS, inconsistent contraception use, sexual violence, unplanned and early pregnancies, and unsafe abortion [3–7]. Early sexual initiation can also give rise to mental health problems, poor academic performance, and possible gateway to nonsexual risk behaviors such as alcohol and illicit drug use [8–11]. Despite all these negative consequences, a significant proportion of adolescents engage in sexual intercourse in quite early ages. Recent reports from the U.S. and other countries showed that the proportion of adolescents who experienced sexual intercourse before their 15th birthday ranged between 5% and 27% [2,12–15]. However, we observed wide variability in the underlying age distribution of the study sample, and sexual activity is generally lower in younger adolescents than that in older adolescents [12]. For these reasons, it is difficult to compare the rates of early sexual initiation across studies or over time from the existing evidence.

The current evidence base for early sexual initiation among adolescents is limited by several factors. First, although most studies investigating early sexual initiation among adolescents come from developed countries, a nascent body of evidence has been emerging from developing countries, particularly from using data from demographic and health surveys. However, these surveys have limited information on factors that might be associated with early sexual initiation. Second, sexual and reproductive health risks and outcomes are heavily influenced by complex interactions between social and cultural norms and gender scripts, which can translate into different sets of predictors and consequences of early sexual activity between boys and girls [2,16,17]. Therefore, it is important to explore correlates of early sexual initiation separately among boys and girls. Third, differences in variable definitions, study populations, and analytical approaches in the existing studies have made cross-country and cross-region comparisons quite difficult. In addition, no study thus far has compared the prevalence and correlates of early sexual debut among adolescents across various regions. To address these limitations and to help shaping global adolescent sexual and reproductive health, a large-scale epidemiological investigation into early sexual initiation among adolescents from different regions is needed.

The Global School-based Health Survey (GSHS) provides useful data on sexual behaviors and a wide range of sociodemographic, psychosocial, lifestyle, and protective factors among adolescents from many countries across various regions [18]. Using country-representative samples from the GSHS in 50 countries, in this study, we aimed to (1) estimate country-specific prevalence of early sexual initiation among adolescents aged 12–15 years; (2) compare the prevalence by sex, World Health Organization (WHO) regions, and World Bank country income classifications; and (3) investigate the sociodemographic, psychosocial, parental and peer, and lifestyle correlates of early sexual initiation and their differences in accordance with sex and regions.

Methods

Data sources

We used data from the GSHS surveys conducted between 2009 and 2015 in 50 countries. We did not include surveys conducted before 2009 because the variables of our interest were either absent or collected using different questions in the questionnaire. For countries where more than one surveys were conducted in the period of 2009–2015, the latest survey was included for analysis.

The details about GSHS data have been described elsewhere [18] and summarized here. The GSHS is a population-based survey for school-going adolescents conducted in many countries around the world with the support of WHO and the U.S. Centers for Disease Control and Prevention (CDC) and in collaboration with UNICEF, UNESCO, and UNAIDS. The main objectives of the GSHS are to help countries develop appropriate interventions and policies for promoting adolescent health and to facilitate cross-country comparisons for various aspects of adolescents' behaviors and protective factors.

The GSHS uses the same methodology for sampling. Participants in the GSHS were selected using a standardized two-stage cluster sampling process. At the first stage, schools were selected using a probability-proportionate-to-size sampling method. At the second stage, classrooms with students of the target age group were randomly selected from these schools, and all students in the selected classrooms were asked to participate in the survey [18]. The age range of participating students varied across countries. We restricted our analysis to adolescents aged 12–15 years because all countries had data for this age range.

The GSHS used a validated questionnaire which was self-administered during one regular class period. Where necessary, the questionnaire was translated into an appropriate language using standard protocols, and country-specific examples, options, and phrases were used to incorporate sociocultural adaptation [18].

In each participating country, the ethics approval for the GSHS was taken from a national government administrative body or an institutional ethics review committee, or both. Informed written or verbal consent was taken from students' parents or guardians, and assent for participation was obtained from students. We used publicly available data from the GSHS, so no separate ethics approval was required for this study.

Variable definitions

Our outcome variable of interest was participants' age at first sexual intercourse. Participants were asked "How old were you when you had sexual intercourse for the first time?" with the following responses: "I have never had sexual intercourse", "11 years old or younger", "12 years old", "13 years old", "14 years old", "15 years old", and "16 years old or older". Early sexual initiation was defined as having the first sexual intercourse before 15 years of age (i.e., $\leq$14 years) [1,2].

We used 20 explanatory variables in our study: sex, age group, proxy for below average socioeconomic status, anxiety, loneliness, suicidal ideation, being bullied, parental support, parental monitoring, parental supervision, parental respect of privacy, physical fight, truancy, peer support, having close friend, smoking, alcohol drinking, illicit drug use, physical activity, and overweight. Detailed descriptions of these variables and their coding are presented in Supplementary Table S1. We grouped these variables into sociodemographic factors, psychosocial factors, parental and peer factors, and lifestyle factors.

Statistical analysis

We followed the instructions for GSHS data analysis provided by the CDC [18]. We computed country-specific weighted

prevalence estimates of early sexual initiation in accordance with sex by using the sampling weights provided by the CDC. The sampling weights accounted for nonresponse and the varying probability of selection of schools, classrooms, and students in the survey. The country-specific prevalence of early sexual initiation can be influenced by the underlying age distribution of the survey sample. For fairer comparison across countries, we estimated the prevalence adjusted for age distribution in the sample. We used the exact method to compute 95% confidence intervals (CIs) for prevalence estimates. We then conducted meta-analysis using the 'metaprop' program in Stata 16.0 to calculate pooled prevalence estimates in accordance with WHO regions, World Bank country income groups [19], and overall. Because there was substantial heterogeneity in prevalence estimates among countries (as indicated by $I^2 > 95\%$), we used random-effect models for meta-analysis.

To investigate the correlates of early sexual initiation, we used multilevel mixed-effect logistic regressions including a random intercept for countries to deal with common cluster-level random effects within countries and with adjustments of various individual-, country-, and WHO region-level variables. Regression models were adjusted for survey year, WHO region, sex, age group, socioeconomic status, anxiety, loneliness, suicidal ideation, being bullied, parental support, parental monitoring, parental supervision, parental respect of privacy, physical fight, truancy, peer support, having close friend, smoking, alcohol drinking, illicit drug use, physical activity, and overweight, as appropriate. To explore whether there were any sex-specific differences in the associations of these factors with early sexual initiation, we also examined the associations separately among boys and girls. To explore any potential heterogeneity across regions, we also looked at the associations stratified in accordance with WHO regions and World Bank country income groups [19].

Participants who had valid information on age at the first sexual intercourse were included in the analysis. Missing or nonapplicable values for covariates were treated as a separate category. We did sensitivity analysis restricting to participants who had valid information for all variables and found no substantial differences (data not shown). Where we present results in figures, the prevalence estimates are represented by squares, and their corresponding 95% CIs are represented by lines. Statistical significance was set at a two tailed $p < .05$.

Results

We included GSHS data sets from 50 countries with 124,091 adolescents (54.5% girls) aged 12–15 years in this analysis. Table 1 shows the characteristics of the included surveys and the participants. We included surveys from four WHO regions: nine from the African region, 21 from the regions of the Americas, five from the South-east Asia region, and 15 from the Western Pacific region. No survey from the Eastern Mediterranean region had information on sexual intercourse. In accordance with the World Bank country income classification, included surveys were from five low-income countries, 14 lower middle-income countries, 17 upper middle-income countries, 12 high-income countries, and two countries with no classification information. The range of sample size per country was from 77 in Tokelau to 20,129 in Argentina. We included 95.2% of the total sample in our analysis. The mean (standard deviation) age of all included adolescents was 13.9 (.9) years (Table 1).

Prevalence of early sexual initiation among adolescents

Overall, 14.2% (95% CI: 12.1–16.2) of adolescents aged 12–15 years had early sexual initiation, with boys reporting much higher than girls (19.7%, 16.9–22.5 vs. 8.9%, 7.6–10.3) (Figure 1). The prevalence of early sexual initiation was the highest in the region of the Americas (18.4%, 15.2–21.5) and the lowest in the South-east Asia region (5.3%, 2.6–8.0). Adolescent boys and girls in high-income countries reported the highest (19.5%, 13.5–25.5) prevalence of early sexual initiation, whereas those in lower middle-income countries reported the lowest (7.3%, 5.5–9.0). Across all WHO regions and country income groups, we observed much lower prevalence of early sexual initiation among girls than boys (Figure 1). Adolescents in Vietnam had the lowest prevalence of early sexual initiation (1.2%, .7–1.8), and adolescents in Samoa had the highest prevalence (33.2%, 30.9–35.5) (Table 2). The country-specific prevalence estimates varied the most in the Western Pacific region (cross-country range: 1.2%–33.2%) and the least in the South-east Asia region (1.6%–8.0%). In all 50 countries, girls had lower prevalence of early sexual initiation than boys. The country-specific prevalence of early sexual initiation exceeded the overall pooled estimate of 14.1% in 24 of 50 countries (48%). The prevalence estimates in all five countries from the South-east Asia region were lower than the overall pooled estimate (Table 2).

Correlates of early sexual initiation among adolescents

We examined the correlates of early sexual initiation from fully adjusted multilevel logistic regression models, by sex and overall (Table 3). Girls were less likely to have early sexual debut than boys (adjusted odds ratio [aOR] .43, 95% CI .41–.44). Adolescents aged 14–15 years had much higher odds of having early sexual initiation than adolescents aged 12–13 years (aOR 1.72, 1.64–1.80). Among the psychosocial factors, anxiety (aOR 1.16, 1.08–1.24), loneliness (aOR 1.10, 1.03–1.17), suicidal ideation (aOR 1.57, 1.49–1.66), and being bullied (aOR 1.11, 1.06–1.17) were significantly correlated with early sexual initiation. Parental monitoring was significantly associated with lower odds of early sexual initiation (aOR .78, .75–.82), whereas we did not observe significant associations for parental support, parental supervision, and parental respect of privacy. Adolescents who were involved in physical fight (aOR 1.69, 1.62–1.76) and truancy (aOR 1.49, 1.42–1.56) had higher odds ratios of early sexual initiation than their counterparts. Peer support offered some protective effect on early sexual initiation, particularly among girls. Lifestyle risk behaviors such as smoking (aOR 1.93, 1.82–2.04), drinking alcohol (aOR 2.28, 2.17–2.38), and illicit drug use (aOR 3.58, 3.34–3.84) were the strongest correlates of early sexual initiation. Those who were physically active and overweight were also likely to report early sexual debut. We did not observe any significant differences between boys and girls for these correlates (Table 3).

When examined separately across WHO regions, we found that suicidal ideation, drinking alcohol, and illicit drug use were more strongly associated with early sexual initiation among adolescents in the South-east Asia region than other regions (Table 4). Parental supervision had also some protective effect among adolescents in this region. The associations for physical fight, physical activity, and overweight with early sexual debut were stronger for adolescents living in the region of the Americas than other regions. For other correlates, there was weak evidence

Table 1
Survey characteristics, by country

Country	Income group	Survey year	n/N	Analysis sample (%)	Boys, n (%)	Girls, n (%)	Mean age (SD)
African region							
Benin	L	2016	686/717	95.7	304 (44.3)	382 (55.7)	14.2 (.9)
Ghana	LM	2012	1005/1110	90.5	512 (50.9)	493 (49.1)	13.8 (1.0)
Malawi	L	2009	2076/2224	93.3	954 (46.0)	1122 (54.0)	13.9 (.8)
Mauritania	LM	2010	1177/1285	91.6	533 (45.3)	644 (54.7)	14.2 (.9)
Mauritius	UM	2011	2064/2074	99.5	955 (46.3)	1109 (53.7)	13.8 (1.0)
Mozambique	L	2015	587/668	87.9	288 (49.1)	299 (50.9)	14.3 (.9)
Namibia	UM	2013	1770/1936	91.4	711 (40.2)	1059 (59.8)	14.0 (.9)
Seychelles	H	2015	1877/2061	91.1	844 (45.0)	1033 (55.0)	13.4 (1.1)
Tanzania	L	2014	2496/2615	95.4	1110 (44.5)	1386 (55.5)	13.7 (1.1)
Regions of the Americas							
Anguilla	NA	2009	632/701	90.2	291 (46.0)	341 (54.0)	13.7 (1.0)
Antigua and Barbuda	H	2009	1124/1235	91.0	518 (46.1)	606 (53.9)	13.9 (.9)
Argentina	UM	2012	20,129/21,528	93.5	9309 (46.2)	10,820 (53.8)	14.1 (.8)
Bahamas	H	2013	1254/1308	95.9	571 (45.5)	683 (54.5)	13.4 (.9)
Barbados	H	2011	1426/1504	94.8	646 (45.3)	780 (54.7)	14.1 (.8)
Belize	UM	2011	1486/1600	92.9	709 (47.7)	777 (52.3)	13.5 (1.1)
Bolivia	LM	2012	2669/2804	95.2	1299 (48.7)	1370 (51.3)	14.0 (.9)
British Virgin Islands	H	2009	1162/1195	97.2	508 (43.7)	654 (56.3)	13.5 (1.1)
Chile	H	2013	1312/1353	97.0	640 (48.8)	672 (51.2)	13.6 (1.0)
Costa Rica	UM	2009	2215/2265	97.8	1046 (47.2)	1169 (52.8)	13.9 (.8)
Curacao	H	2015	1406/1498	93.9	651 (46.3)	755 (53.7)	13.8 (1.0)
Dominica	UM	2009	1223/1310	93.4	515 (42.1)	708 (57.9)	13.5 (1.1)
El Salvador	LM	2013	1565/1615	96.9	817 (52.2)	748 (47.8)	14.1 (.8)
Guatemala	UM	2015	3349/3611	92.7	1583 (47.3)	1766 (52.7)	14.0 (.9)
Guyana	UM	2010	1847/1973	93.6	811 (43.9)	1036 (56.1)	14.1 (.8)
Honduras	LM	2012	1427/1486	96.0	669 (46.9)	758 (53.1)	13.6 (1.0)
Peru	UM	2010	2324/2359	98.5	1119 (48.1)	1205 (51.9)	14.2 (.8)
Saint Kitts Nevis	H	2011	1386/1471	94.2	586 (42.3)	800 (57.7)	14.1 (.8)
Suriname	UM	2009	1014/1046	96.9	472 (46.5)	542 (53.5)	13.9 (1.0)
Trinidad and Tobago	H	2011	2282/2363	96.6	1244 (54.5)	1038 (45.5)	13.5 (1.1)
Uruguay	H	2012	2781/2869	96.9	1306 (47.0)	1475 (53.0)	14.1 (.8)
South-east Asia region							
Bangladesh	LM	2014	2697/2753	98.0	1028 (38.1)	1669 (61.9)	14.1 (.8)
Indonesia	LM	2015	8606/8806	97.7	3943 (45.8)	4663 (54.2)	13.5 (1.0)
Nepal	L	2015	4335/4616	93.9	1950 (45.0)	2385 (55.0)	13.9 (1.0)
Thailand	UM	2015	3985/4132	96.4	1839 (46.1)	2146 (53.9)	13.6 (1.0)
Timor-Leste	LM	2015	1419/1631	87.0	571 (40.2)	848 (59.8)	14.0 (1.0)
Western Pacific region							
Brunei	H	2014	1794/1824	98.4	832 (46.4)	962 (53.6)	13.9 (.9)
Cambodia	LM	2013	1768/1812	97.6	775 (43.8)	993 (56.2)	14.0 (.9)
Fiji	UM	2016	1441/1537	93.8	696 (48.3)	745 (51.7)	14.4 (.7)
French Polynesia	H	2015	1843/1902	96.9	890 (48.3)	953 (51.7)	13.9 (1.0)
Kiribati	LM	2011	1304/1340	97.3	538 (41.3)	766 (58.7)	14.1 (.9)
Laos	LM	2015	1616/1644	98.3	673 (41.6)	943 (58.4)	14.5 (.7)
Malaysia	UM	2012	16,003/16,273	98.3	8142 (50.9)	7861 (49.1)	14.0 (.8)
Mongolia	LM	2013	3648/3707	98.4	1736 (47.6)	1912 (52.4)	13.7 (1.0)
Nauru	UM	2011	310/367	84.5	123 (39.7)	187 (60.3)	13.7 (1.0)
Samoa	UM	2011	1638/2200	74.5	634 (38.7)	1004 (61.3)	14.0 (.8)
Tokelau	UM	2014	77/85	90.6	42 (54.5)	35 (45.5)	13.5 (1.2)
Tuvalu	UM	2013	647/679	95.3	308 (47.6)	339 (52.4)	13.3 (1.1)
Vanuatu	LM	2011	825/852	96.8	340 (41.2)	485 (58.8)	13.6 (1.0)
Vietnam	LM	2013	1719/1743	98.6	796 (46.3)	923 (53.7)	14.5 (.5)
Wallis Futuna	NA	2015	665/718	92.6	311 (46.8)	354 (53.2)	13.7 (1.1)
Total			124,091/130,405	95.2	57,688 (46.5)	66,403 (53.5)	13.9 (.9)

Country income classification was based on 2018 gross national income (GNI) per capita in accordance with the World Bank list of economies by income group. H = high income; L = low income; LM = lower middle income; N = total number of participants aged 12–15 years included in the GSHS; n = number of participants who had valid response on age at the first sexual intercourse and included in this analysis; NA = not available; SD = standard deviation; UM = upper middle income.

of heterogeneity across four WHO regions. When examined separately among boys and girls, we observed no substantial sex differences in correlates across regions (Supplementary Tables S2 and S3).

We did additional analyses examining correlates of early sexual initiation separately for country income groups (Supplementary Table S4). The observed associations for smoking, illicit drug use, and suicidal ideation were much stronger among adolescents from low- and middle-income countries, whereas effects of physical fight, truancy, physical activity, and overweight were much stronger among adolescents in high-income countries.

Discussion

In this multicountry study based on nationally representative samples of adolescents aged 12–15 years, we found that nearly one in seven adolescents had early sexual initiation. Boys were

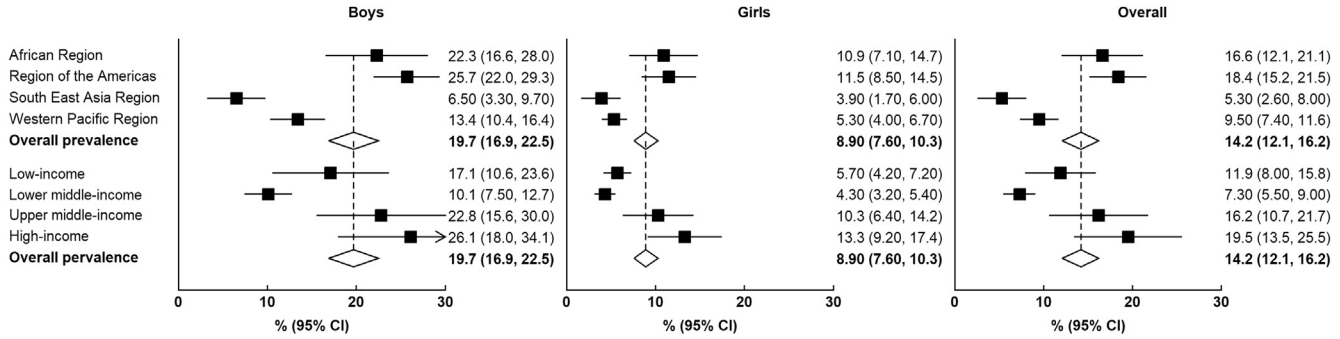

Figure 1. Prevalence of early sexual initiation among adolescents (boys, girls, and overall) aged 12–15 years, by WHO regions and country income groups. Country-specific sampling weights were used to yield country representative estimates. Estimates were also adjusted for underlying age distribution in each country's sample. Random-effect meta-analysis was used to calculate the pooled estimates. Country income groups are based on the 2018 gross national income (GNI) per capita in accordance with the World Bank list of economies by income.

more likely to report early sexual initiation than girls. There were substantial variations in the prevalence of early sexual debut across WHO regions and country income groups. Older age, anxiety, loneliness, suicidal ideation, being bullied, engaged in physical fight, truancy, smoking, alcohol drinking, illicit drug use, physical activity, and being overweight were significantly associated with early sexual initiation. On the other hand, adolescents who were girls, had parental monitoring, and had peer support were less likely to report early sexual initiation.

Although many previous studies investigated early sexual initiation among adolescents in a specific country [7,15,20–24] or in several countries within a specific region [2,4,6,25], our study is the first to examine the prevalence of early sexual initiation among adolescent boys and girls across four WHO regions. Data from prior global research on the prevalence rates of early sexual initiation support our findings on substantial differences in early sexual initiation across regions. For example, a recent study based on eight African countries reported that 27.3% adolescents had experienced sexual intercourse before the age of 15 years [6]. Another study based on Violence Against Children Surveys from Kenya, Malawi, Nigeria, Tanzania, and Uganda found that the prevalence of early sexual debut ranged between 8.6% and 17.7%, with boys having significantly higher prevalence than girls [2]. Nearly one in five adolescents aged younger than 15 years in the U.S. have had sex [12]. However, it is important to remember that cross-country and cross-region comparisons based on these prior studies might not be appropriate because of various methodological differences. The observed striking regional differences in early sexual initiation among adolescents in our study may be partly due to religious, social, and cultural differences between countries [2,7,26,27]. The rate of early sexual initiation is generally lower in communities practicing religious and cultural norms to be remaining sexually abstinent before marriage [28]. On the other hand, the rate of early sexual initiation is higher in societies where child marriage and coercion of younger girls into sexual activities are common [29]. It is important to note that although we found substantial differences in early sexual debut across WHO regions and country income groups, there might be major country differences within these regions which deserve further exploration to reduce rates of early sexual initiation.

In our study, boys were more likely to report early sexual debut than girls in all regions and country income groups. Previous studies conducted across multiple countries in sub-Saharan Africa and in the Caribbean also reported similar sex differences in the prevalence of early sexual initiation [2,4,7,13,25]. One way of explaining this sex difference could be that the cultural scripts on masculinity encouraging men to have sex early are widespread across culture, region, and ethnicity [17]. Furthermore, the impact of cultural double standard which rewards boys for engaging in sexual activity while shaming girls for doing so cannot be ignored [30]. However, the relationship between gender and early sexual debut is more complex in communities with unequal power dynamics between genders as it limits women's ability to negotiate sexual activities, and a significant portion of early sexual initiation might be forced or coerced [31].

We found that the correlates of early sexual initiation are rather homogenous across regions, when examined overall and stratified in accordance with sex. Our study showed that early sexual debut is correlated with clusters of psychosocial factors (internalization problems) and risk-taking behaviors (externalizing problems). Previous studies also reported that adolescents with anormal internalizing and externalizing symptoms were more likely to engage in early sexual activities [5,32,33]. We found that psychosocial factors such as anxiety, loneliness, suicidal ideation, and being bullied are strongly correlated with early sexual initiation. There were also stronger associations for loneliness, suicidal ideation, and being bullied among girls than boys. Many previous studies reported associations between early sexual debut and negative mental health outcomes, with stronger effects among adolescent girls [14,25,34,35]. However, it is unclear whether mental health factors are predictors or outcomes of early sexual initiation. Some researchers argue that the relationship between early sexual intercourse and psychological distress is bidirectional, particularly among girls [11,36]. Those struggling with various forms of psychosocial distress can be more likely to engage in early sexual activity to alleviate their emotional sufferings [36], whereas early sexual debut can also contribute to internal guilt, low self-esteem, bullying, and social shaming, which, in turn, can lead to symptoms such as anxiety, depression, and suicidal thoughts [11,16,37]. Coerced or nonconsensual sexual initiation has strong negative impacts on adolescents' mental health [5], but we could not investigate these issues in this study. Adolescents with externalizing problems often engage in impulsive and overt risk-taking behaviors [38], and we found that early sexual debut was correlated with risky behaviors such as school truancy, physical fight, smoking, alcohol consumption, and illicit drug use, both in adolescent boys

Table 2
Country-specific, pooled-regional, and pooled-overall proportions of adolescents who had early sexual debut (i.e., before 15 years), by sex and overall

Country	% (95% CI)[a]		
	Boys	Girls	Overall
African region			
Benin	23.0 (18.4–28.2)	7.6 (5.1–10.7)	17.6 (14.9–20.7)
Ghana	14.1 (11.2–17.4)	9.9 (7.4–12.9)	12.0 (10.1–14.2)
Malawi	14.8 (12.6–17.2)	6.1 (4.7–7.6)	10.4 (9.1–11.8)
Mauritania	15.2 (12.3–18.5)	11.3 (9.0–14.0)	13.4 (11.5–15.5)
Mauritius	27.0 (24.2–30.0)	14.0 (12.0–16.2)	20.4 (18.7–22.2)
Mozambique	32.6 (27.3–38.4)	9.7 (6.6–13.6)	20.4 (17.3–23.9)
Namibia	35.0 (31.5–38.7)	11.5 (9.7–13.6)	21.2 (19.4–23.2)
Seychelles	28.7 (25.6–31.9)	24.7 (22.1–27.4)	26.6 (24.6–28.6)
Tanzania	11.5 (9.7–13.6)	4.0 (3.0–5.1)	7.5 (6.5–8.6)
Pooled estimates[b]	22.3 (16.6–28.0)	10.9 (7.1–14.7)	16.6 (12.1–21.1)
Region of the Americas			
Anguilla	32.0 (26.6–37.7)	15.0 (11.3–19.2)	22.9 (19.7–26.4)
Antigua and Barbuda	40.3 (36.1–44.7)	19.1 (16.1–22.5)	29.6 (27.0–32.4)
Argentina	31.0 (30.0–31.9)	21.0 (20.2–21.7)	25.7 (25.1–26.3)
Bahamas	30.3 (26.6–34.2)	10.0 (7.8–12.5)	19.5 (17.3–21.8)
Barbados	34.1 (30.4–37.9)	15.4 (12.9–18.1)	24.8 (22.5–27.1)
Belize	21.9 (18.9–25.1)	7.9 (6.1–10.0)	14.7 (13.0–16.6)
Bolivia	14.9 (13.0–17.0)	7.2 (5.8–8.6)	11.0 (9.8–12.2)
British Virgin Islands	34.8 (30.7–39.2)	15.6 (12.9–18.6)	24.5 (22.1–27.1)
Chile	19.5 (16.5–22.8)	12.8 (10.4–15.6)	16.2 (14.2–18.3)
Costa Rica	14.9 (12.8–17.2)	7.7 (6.2–9.4)	11.2 (9.9–12.5)
Curacao	14.0 (11.4–16.9)	9.4 (7.4–11.7)	11.7 (10.0–13.5)
Dominica	42.1 (37.8–46.5)	22.7 (19.7–26.0)	32.3 (29.7–35.0)
El Salvador	18.1 (15.5–20.9)	7.2 (5.5–9.3)	12.5 (10.9–14.2)
Guatemala	13.7 (12.1–15.5)	3.1 (2.3–4.0)	8.4 (7.5–9.4)
Guyana	32.7 (29.5–36.0)	10.2 (8.5–12.2)	21.0 (19.2–22.9)
Honduras	22.0 (18.9–25.3)	5.3 (3.8–7.1)	13.0 (11.3–14.8)
Peru	18.9 (16.7–21.4)	6.1 (4.8–7.6)	12.4 (11.1–13.8)
Saint Kitts Nevis	38.1 (34.1–42.1)	12.7 (10.5–15.3)	25.1 (22.8–27.5)
Suriname	22.0 (18.4–26.0)	10.3 (7.9–13.2)	15.1 (12.9–17.4)
Trinidad and Tobago	22.3 (20.0–24.7)	9.6 (7.9–11.6)	15.9 (14.4–17.4)
Uruguay	24.9 (22.6–27.3)	14.6 (12.8–16.5)	19.3 (17.9–20.8)
Pooled estimates[b]	25.7 (22.0–29.3)	11.5 (8.5–14.5)	18.4 (15.2–21.5)
South-east Asia region			
Bangladesh	6.0 (4.7–7.7)	3.1 (2.3–4.0)	5.0 (4.2–5.9)
Indonesia	2.3 (1.9–2.9)	.9 (.6–1.2)	1.6 (1.3–1.9)
Nepal	6.1 (5.0–7.2)	4.1 (3.3–5.0)	5.0 (4.4–5.7)
Thailand	10.7 (9.3–12.2)	5.5 (4.6–6.5)	8.0 (7.2–8.9)
Timor-Leste	7.7 (5.7–10.2)	6.1 (4.6–8.0)	6.8 (5.6–8.3)
Pooled estimates[b]	6.5 (3.3–9.7)	3.9 (1.7–6.0)	5.3 (2.6–8.0)
Western Pacific region			
Brunei	2.6 (1.7–4.0)	1.9 (1.1–2.9)	2.2 (1.6–3.0)
Cambodia	2.1 (1.2–3.3)	1.3 (.7–2.2)	1.6 (1.1–2.3)
Fiji	12.8 (10.4–15.5)	3.9 (2.6–5.5)	8.0 (6.6–9.5)
French Polynesia	23.8 (21.1–26.8)	14.2 (12.0–16.5)	18.9 (17.1–20.7)
Kiribati	23.4 (19.9–27.2)	3.8 (2.5–5.4)	12.7 (10.9–14.6)
Laos	2.4 (1.4–3.8)	.8 (.4–1.7)	1.5 (1.0–2.3)
Malaysia	2.8 (2.4–3.1)	1.0 (.8–1.3)	1.9 (1.7–2.1)
Mongolia	5.6 (4.6–6.8)	2.0 (1.5–2.8)	3.8 (3.2–4.5)
Nauru	23.6 (16.4–32.1)	13.9 (9.3–19.7)	18.4 (14.2–23.2)
Samoa	44.6 (40.7–48.6)	23.5 (20.9–26.3)	33.2 (30.9–35.5)
Tokelau	21.4 (10.3–36.8)	11.4 (3.2–26.7)	16.9 (9.3–27.1)
Tuvalu	13.3 (9.7–17.6)	2.9 (1.4–5.4)	7.6 (5.7–9.9)
Vanuatu	9.7 (6.8–13.4)	5.4 (3.5–7.8)	7.5 (5.8–9.5)
Vietnam	1.8 (1.0–2.9)	.7 (.2–1.4)	1.2 (.7–1.8)
Wallis Futuna	24.4 (19.8–29.6)	8.2 (5.6–11.6)	15.9 (13.2–18.9)
Pooled estimates[b]	13.4 (10.4–16.4)	5.3 (4.0–6.7)	9.5 (7.4–11.6)
Overall estimate[b]	19.7 (16.9–22.5)	8.9 (7.6–10.3)	14.2 (12.1–16.2)

CI = confidence interval.
[a] Country-specific sampling weights were used to yield country representative estimates. Estimates were also adjusted for underlying age distribution in each country's sample.
[b] Random-effect meta-analysis was used to calculate the pooled estimates.

and girls. Previous studies also reported that early sexual debut co-occurred with smoking, substance use, alcohol, and low school attachment [6,38]. It is possible that positive family and school environments can deal with adolescents' internalization and externalization problems which, in turn, can reduce risky sexual behaviors among them. In addition, it might be an

Table 3
Correlates of early sexual initiation among adolescents aged 12–15 years, by sex and overall

Variables	ORs (95% CIs)[a]		
	Boys	Girls	Overall
Sociodemographic factors			
Sex			
Boys			1.00 (Ref)
Girls			.43 (.41–.44)
Age group			
12–13 years	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
14–15 years	1.66 (1.57–1.77)	1.80 (1.67–1.94)	1.72 (1.64–1.80)
Socioeconomic status			
Average	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Below average	1.04 (.94–1.15)	.98 (.86–1.11)	1.01 (.93–1.09)
Psychosocial factors			
Anxiety			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.14 (1.03–1.25)	1.17 (1.07–1.29)	1.16 (1.08–1.24)
Loneliness			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.08 (.98–1.19)	1.11 (1.01–1.21)	1.10 (1.03–1.17)
Suicidal ideation			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.51 (1.40–1.63)	1.67 (1.55–1.80)	1.57 (1.49–1.66)
Bullied			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.08 (1.02–1.15)	1.17 (1.09–1.26)	1.11 (1.06–1.17)
Parental and peer factors			
Parental support			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.02 (.96–1.08)	1.00 (.92–1.08)	1.01 (.96–1.06)
Parental monitoring			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.77 (.72–.82)	.80 (.74–.87)	.78 (.75–.82)
Parental supervision			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.04 (.98–1.11)	.91 (.85–.99)	.99 (.94–1.04)
Parental respect of privacy			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.96 (.90–1.02)	.95 (.88–1.02)	.95 (.91–1.00)
Physical fight			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.77 (1.68–1.87)	1.56 (1.46–1.67)	1.69 (1.62–1.76)
Truancy			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.42 (1.34–1.51)	1.59 (1.48–1.71)	1.49 (1.42–1.56)
Peer support			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.95 (.89–1.01)	.91 (.85–.98)	.93 (.89–.98)
Close friend			
Yes	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
No	1.00 (.90–1.10)	1.14 (1.00–1.29)	1.05 (.97–1.14)
Lifestyle factors			
Smoking			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.90 (1.77–2.05)	2.00 (1.83–2.18)	1.93 (1.82–2.04)
Alcohol drinking			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	2.25 (2.12–2.39)	2.35 (2.18–2.53)	2.28 (2.17–2.38)
Illicit drug use			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	3.62 (3.30–3.97)	3.64 (3.26–4.07)	3.58 (3.34–3.84)
Physical activity			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.23 (1.16–1.31)	1.15 (1.05–1.25)	1.20 (1.14–1.26)
Overweight			
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.06 (.99–1.13)	1.13 (1.05–1.23)	1.08 (1.03–1.14)

CI = confidence interval; OR = odds ratio.
[a] Multilevel mixed-effect logistic regressions were used accounting for clustering of adolescents within countries with a random intercept. Models were adjusted for survey year, WHO region, and all variables listed in the table, as appropriate.

Table 4
Correlates of early sexual initiation among adolescents aged 12–15 years, by WHO regions

Variables	ORs (95% CIs)[a]			
	African region	Region of the Americans	South-east Asia region	Western Pacific region
Sociodemographic factors				
Sex				
Boys	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Girls	.47 (.42–.52)	.40 (.38–.42)	.83 (.70–.98)	.44 (.39–.49)
Age group				
12–13 years	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
14–15 years	1.64 (1.47–1.84)	1.95 (1.84–2.07)	1.37 (1.15–1.63)	1.36 (1.20–1.55)
Socioeconomic status				
Average	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Below average	.97 (.82–1.15)	1.00 (.89–1.12)	1.22 (.92–1.62)	1.06 (.89–1.25)
Psychosocial factors				
Anxiety				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.86 (.72–1.03)	1.07 (.98–1.16)	1.20 (.92–1.56)	1.17 (1.00–1.38)
Loneliness				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.92 (.78–1.10)	.97 (.90–1.05)	1.27 (1.00–1.62)	1.14 (.97–1.34)
Suicidal ideation				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.49 (1.29–1.71)	1.26 (1.18–1.34)	2.47 (2.00–3.04)	1.49 (1.30–1.71)
Bullied				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.21 (1.08–1.35)	1.05 (1.00–1.12)	.99 (.82–1.19)	1.49 (1.31–1.70)
Parental and peer factors				
Parental support				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.05 (.91–1.21)	1.01 (.95–1.07)	1.00 (.81–1.23)	1.01 (.88–1.16)
Parental monitoring				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.74 (.64–.86)	.74 (.70–.78)	.79 (.65–.96)	.83 (.73–.95)
Parental supervision				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.05 (.91–1.20)	1.04 (.98–1.10)	.72 (.59–.87)	1.09 (.95–1.24)
Parental respect of privacy				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.02 (.89–1.16)	.97 (.92–1.03)	.94 (.79–1.13)	.93 (.82–1.05)
Physical fight				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.64 (1.47–1.82)	2.10 (2.00–2.21)	1.47 (1.24–1.75)	1.98 (1.75–2.23)
Truancy				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.47 (1.28–1.68)	1.52 (1.44–1.60)	1.58 (1.33–1.88)	1.34 (1.19–1.52)
Peer support				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.88 (.76–1.02)	.93 (.88–.98)	.67 (.56–.82)	.93 (.82–1.06)
Close friend				
Yes	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
No	.95 (.79–1.15)	1.08 (.98–1.19)	1.24 (.92–1.67)	1.26 (1.02–1.56)
Lifestyle factors				
Smoking				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	2.48 (2.12–2.90)	1.77 (1.66–1.90)	1.96 (1.57–2.44)	2.22 (1.94–2.55)
Alcohol drinking				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	2.33 (2.05–2.65)	2.09 (1.98–2.21)	2.62 (2.10–3.28)	2.22 (1.94–2.54)
Illicit drug use				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	3.37 (2.74–4.13)	2.89 (2.64–3.15)	8.18 (6.40–10.45)	6.15 (5.20–7.28)
Physical activity				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1.19 (1.03–1.38)	1.44 (1.36–1.53)	.81 (.63–1.05)	1.19 (1.02–1.38)
Overweight				
No	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	.99 (.84–1.16)	1.14 (1.08–1.21)	.92 (.71–1.20)	1.12 (.99–1.27)

CI = confidence interval; OR = odds ratio.
[a] Multilevel mixed-effect logistic regressions were used accounting for clustering of adolescents within countries with a random intercept. Models were adjusted for survey year and all variables listed in the table, as appropriate.

effective approach to integrate programs for sexual health promotion and mental health promotion in schools.

Parental and family factors have significant influence on adolescents' age of sexual initiation. Family factors that are associated with early sexual initiation in previous studies include single-parent family structure, poor parent-adolescent relationship, lower level of parental monitoring, and parents' permissive attitude toward sexual activities [39–42]. In our study, we found that parental monitoring rather than parental support had strong influence on decreasing the odds of having early sexual debut among adolescents. Although some previous studies reported that parental monitoring was significant only among girls [42,43] or among boys [16], we did not observe significant heterogeneity in such association by sex. The influence of peers on risky sexual behaviors is not clear yet, but we found that peer support reduced the odds of having early sexual debut, especially among girls. Previous evidence suggests that family and school microsystem factors can be independently and mutually related to early sexual initiation and risky sexual behaviors among adolescents [44].

Our study is the first study to examine the prevalence of early sexual initiation among adolescents from four WHO regions. We also explored the correlates of early sexual initiation in a large multicountry sample. Although these are clear strengths of our study, there are also several limitations. First, the GSHS only recruited adolescents who had attended school at the time of survey. School-going adolescents might not be representative of all adolescents in a country, particularly because there are possibilities that sexual activities might vary between these two groups. Second, because of the cross-sectional nature of the study, we cannot establish the temporal direction of associations between early sexual debut and various factors. Third, information about sexual behaviors was collected using self-reported measures, which can introduce reporting bias. Because of the sensitive nature of the questions asked, it is possible that adolescents under-reported and/or provided answers that are considered as "socially desirable/acceptable". Definition of sexual intercourse was not provided in the questionnaire which can lead to misinterpretations, and some adolescents might include activities like mutual masturbation as sexual intercourse. In addition, response to questions about sexual intercourse can be heavily influenced by the age of the adolescents. Although we adjusted for underlying age distribution in our analyses, age distribution across countries can still modify the observed findings. Fourth, we could not assess many factors that are considered to be associated with early sexual initiation, particularly about whether the sexual intercourse was consensual or coerced.

The large difference in the prevalence of early sexual initiation between boys and girls across regions in our study suggests that public health programs focusing on sexual and reproductive health should consider gender-specific curriculums and interventions to be more effective. The observed differences between boys and girls in our study are more likely to be socially constructed as opposed to biological differences. In addition, sexual and reproductive health interventions should incorporate adolescents' psychosocial, lifestyle, family, and peer factors as sexual behaviors are often intertwined with these factors. Our study also provides useful insights on regional differences in the rates and correlates of early sexual initiation, suggesting the needs of specific interventions to deal with relevant social, cultural, and religious practices. We only used the GSHS data to explore the regional differences, but it might be interesting to access data from other sources to look at multilevel factors that may be driving these differences between countries or regions in the future.

In conclusion, our study using a large global sample of adolescents shows that there are substantial regional differences in the proportion of adolescent boys and girls who engage in early sexual activities, with boys reporting much higher than girls. We also found that clusters of psychosocial factors (e.g., anxiety, loneliness, suicidal ideation, bullying victimization) and risky lifestyle factors (e.g., smoking, alcohol drinking, illicit drug use, school truancy) are significantly correlated with early sexual initiation, with little or no variation across regions. In contrast, adolescents with parental monitoring and peer support are less likely to engage in early sexual activities. Our findings will help shaping strategies for promoting sexual and reproductive health among adolescents in different regions through reducing early sexual debut and subsequently other risky sexual behaviors.

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Supplementary Data

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