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Original article

Global Trends in the Prevalence of Alcohol Consumption Among School-Going Adolescents Aged 12−15 Years

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A B S T R A C T

Purpose: Adolescent alcohol consumption is detrimental to multiple facets of health. However, there is a scarcity of data available on time trends in adolescents' alcohol consumption particularly from non-Western countries and low- and middle-income countries. Thus, we examined the temporal trend of alcohol use in a large representative sample of school-going adolescents aged 12−15 years from 22 countries in Africa, Asia, and the Americas.
Methods: Data from the Global School-based Student Health Survey were analyzed. Alcohol consumption referred to consuming alcohol on at least one day in the past 30 days. Crude linear trends of past 30-day alcohol consumption by country were assessed by linear regression models.
Results: Data on 135,426 adolescents aged 12−15 years were analyzed [mean (standard deviation) age 13.8 (1.0) years; 52.0% females]. The overall mean prevalence of past 30-day alcohol consumption was 14.1%. Of the 22 countries included in the study, increasing, decreasing, and stable trends were observed in 3, 8, and 11 countries, respectively. Specifically, significant increases were observed in Benin between 2009 (16.1%) and 2016 (38.6%), Myanmar between 2007 (0.9%) and 2016 (3.6%), and Vanuatu between 2011 (7.6%) and 2016 (12.2%). The most drastic decrease was observed in Samoa between 2011 (34.5%) and 2017 (9.8%), but the rate of decrease was modest in most countries.

IMPLICATIONS AND CONTRIBUTION

Alcohol consumption was analyzed in 135,426 adolescents (52.0% females) from 22 countries. Overall mean prevalence of past 30-day alcohol consumption was 14.1%. Decreasing trends in alcohol consumption were more common than increasing trends, but the rate of decrease was limited in most countries, suggesting that more global action is required.

Discussion: Among school-going adolescents, decreasing trends in alcohol consumption were more common than increasing trends, but the rate of decrease was limited in most countries, suggesting that more global action is required to curb adolescent alcohol consumption.

Alcohol consumption contributes to three million deaths each year globally, and harmful use of alcohol is accountable for 7.1% and 2.2% of the global burden of disease for males and females, respectively. Furthermore, alcohol use is the leading risk factor for premature mortality and disability among those aged 15–49 years, accounting for up to 10 percent of all deaths in this age group [1]. Importantly, alcohol consumption in adolescents is a global health concern due to its high prevalence and the fact that consuming alcohol is particularly deleterious for adolescents. Specifically, the prevalence of weekly drinking and drunkenness, defined as having been drunk on two or more occasions, is very low at age 11 but increases significantly by age 15 for boys and girls in almost all countries and regions. Indeed, one large multicountry study showed that just 2% and 1% of 11-year-old boys and girls reported having been drunk at least twice, respectively, whereas 24% of boys and 20% of girls aged 15 years reported being so [2]. Furthermore, alcohol consumption in adolescence is associated with a plethora of adverse outcomes, including, for example, psychological distress [3], poorer academic performance [4], risky sexual behavior [5], suicidal behavior [6], smoking [7], appetite changes, weight loss, eczema, headaches, liver damage, and sleep disturbance [8]. Importantly, alcohol consumption in adolescence has a detrimental impact on brain development. For instance, excessive alcohol consumption impacts the neuropsychological performance (e.g., memory functions) of young people and likely impairs growth and integrity of certain brain structures [9]. In addition, adolescent alcohol use can have long-term health effects that can persist into adulthood such as adult alcohol dependency and addiction, diminished work capacity [10], diabetes [11–13], mental health complications, and premature death [14].

Despite the known deleterious effects of alcohol consumption among adolescents, little is known about its recent temporal trends, especially in low- and middle-income countries (LMICs). This information is vital to establish effective policies or interventions that aim to reduce adolescent alcohol consumption in such settings. Targeting adolescents is crucial given that habits shaped in adolescence (e.g., alcohol consumption) often track into adulthood [15,16]. The previous studies on temporal trends on alcohol consumption among adolescents have mainly focused on high-income countries (HICs) and have often shown declining trends but some have shown increasing trends. For example, in one study including data from 1992 to 2015 on adolescents from the Netherlands, alcohol use increased substantially between 1992 and 2003, and then decreased sharply thereafter [17]. Other countries in Europe and the United States have also observed declines in adolescent alcohol use [18–20]. In one large study including over two hundred and fifty thousand adolescents aged 15 years from 39 countries and regions from Europe and North America, there was a general decreasing trend in alcohol consumption between 2002 and 2014. However, there were a few countries with increasing trends of alcohol consumption, as well as countries with consistently high levels of alcohol consumption

[21]. In another study including 39 HICs, it was observed that the timing and extent of youth drinking declines have varied markedly across countries. The decline began in the United States before 1999, followed by Northern European countries in the early 2000s; Western Europe and Australasia in the mid-2000s. The steepest declines were found in Northern Europe and the United Kingdom [22]. Furthermore, in a systematic review collating and analyzing literature on youth alcohol trends between 2005 and 2017, it was found that research from HICs provides evidence of less alcohol use since the millennium shift. Some studies showed that this is reflected at all levels of consumption, but there are also indications that the heaviest drinkers have not reduced their drinking. The decrease is predominately seen in underage youth and has been larger for boys than for girls in several countries. Teenagers across social strata drink less, but some disadvantaged subgroups have not followed the downward trend [23].

While the existing literature paints a useful picture for trends of alcohol consumption among adolescents residing in HICs, it is clear that the main limitation of the previous trend studies is that most of the studies only covered Western HICs. This is an important research gap as alcohol use, lifetime drunkenness, and alcohol-related problems have been reported to be frequent among young adolescents in LMICs [24]. Moreover, the alcohol industry has turned its attention to LMIC markets as a new source of growth and profit, likely prompting increased consumption in these settings [25].

Given this background, the aim of the present study was to examine the temporal trend of alcohol use in a sample of 135,426 school-going adolescents aged 12–15 years from 22 countries in Africa, Asia, and the Americas, which were predominantly LMICs. We hypothesized that there will be variation in the direction of trends between countries, with some trends increasing, decreasing, and others remaining stable.

Methods

The survey

We analyzed publicly available data from the Global School-based Student Health Survey (GSHS). The full details on this survey can be found at the following websites: https://www.who.int/teams/noncommunicable diseases/surveillance/data; http://www.cdc.gov/gshs. In brief, the GSHS was developed by the World Health Organization in conjunction with the United States Centers for Disease Control and Prevention and other UN organizations. The core aim of the GSHS was to identify risk factors of major noncommunicable diseases. The survey utilized a standardized two-stage probability sampling design for the selection process within each country. For the first stage, schools were selected with probability proportional to size sampling. The second stage involved the random selection of classrooms which included students aged 13–15 years within each selected school.

Table 1
Trends in prevalence (%) of past 30-day alcohol consumption in 22 countries (overall and by sex)

Country	Year	Overall				Boys				Girls			
		%	[95% CI]	Beta	[95% CI]	%	[95% CI]	Beta	[95% CI]	%	[95% CI]	Beta	[95% CI]
AFR													
Benin	2009	16.1	[12.8, 20.0]	3.22***	[2.09, 4.35]	18.0	[13.3, 23.9]	2.78***	[1.31, 4.26]	12.3	[8.8, 16.9]	4.14***	[3.01, 5.27]
	2016	38.6	[32.1, 45.6]			37.4	[29.4, 46.2]			41.3	[35.0, 47.9]		
Mauritius	2007	16.9	[13.1, 21.5]	0.30	[−0.21, 0.80]	18.3	[14.7, 22.6]	0.03	[−0.63, 0.69]	15.8	[10.6, 22.8]	0.48	[−0.40, 1.35]
	2011	23.5	[20.5, 26.7]			25.9	[20.2, 32.4]			20.9	[15.9, 27.1]		
	2017	20.9	[18.4, 23.8]			20.1	[16.1, 24.8]			21.2	[15.9, 27.7]		
Namibia	2004	32.6	[29.4, 36.1]	−1.08***	[−1.60, −0.55]	34.9	[31.0, 39.1]	−1.00**	[−1.72, −0.28]	30.5	[27.2, 34.1]	−1.08***	[−1.59, −0.57]
	2013	23.0	[19.8, 26.4]			26.0	[21.3, 31.2]			20.8	[18.0, 24.0]		
Seychelles[a]	2007	57.1	[56.2, 58.0]	−1.46***	[−1.89, −1.03]	59.6	[58.4, 60.7]	−1.83***	[−2.42, −1.25]	54.6	[52.7, 56.6]	−1.10***	[−1.63, −0.56]
	2015	45.4	[42.1, 48.7]			44.9	[40.4, 49.4]			45.9	[42.1, 49.7]		
AMR													
Anguilla	2009	41.9	[41.9, 41.9]	−1.74***	[−2.59, −0.90]	40.6	[40.6, 40.6]	−1.57**	[−2.54, −0.61]	42.7	[42.7, 42.7]	−1.90***	[−2.98, −0.82]
	2016	29.7	[24.3, 35.7]			29.6	[23.5, 36.6]			29.4	[22.6, 37.2]		
Argentina[a]	2007	51.4	[45.7, 56.9]	−0.65	[−1.91, 0.60]	54.9	[47.2, 62.2]	−1.51	[−3.12, 0.11]	48.7	[43.3, 54.1]	0.02	[−1.28, 1.32]
	2012	48.1	[45.4, 50.8]			47.3	[44.5, 50.1]			48.8	[45.3, 52.3]		
Guatemala	2009	16.1	[13.2, 19.6]	0.08	[−0.68, 0.85]	18.1	[14.8, 22.0]	−0.02	[−1.05, 1.01]	14.0	[11.3, 17.4]	0.18	[−0.65, 1.01]
	2015	16.6	[13.7, 20.1]			18.0	[13.6, 23.5]			15.1	[11.7, 19.4]		
Guyana[a]	2004	35.3	[31.0, 39.8]	0.67	[−0.30, 1.65]	46.5	[40.7, 52.4]	−0.38	[−1.68, 0.92]	25.7	[21.4, 30.4]	1.42**	[0.38, 2.46]
	2010	39.3	[35.9, 42.8]			44.2	[39.6, 49.0]			34.2	[30.4, 38.2]		
Jamaica	2010	52.4	[48.4, 56.3]	−1.02*	[−2.02, −0.03]	57.9	[53.7, 61.9]	−0.42	[-1.56,0.72]	46.8	[41.5, 52.2]	−1.52**	[−2.64, −0.39]
	2017	45.2	[39.9, 50.7]			55.0	[48.4, 61.3]			36.2	[31.0, 41.7]		
Suriname	2009	31.2	[26.5, 36.3]	0.43	[−0.43, 1.30]	34.1	[29.0, 39.6]	0.07	[−1.03, 1.18]	28.6	[23.2, 34.7]	0.70	[−0.48, 1.88]
	2016	34.2	[31.2, 37.4]			34.6	[29.7, 39.9]			33.5	[28.4, 39.1]		
Trinidad & Tobago	2007	38.1	[36.0, 40.1]	−1.14***	[−1.47, −0.80]	37.5	[33.3, 42.0]	−1.21***	[−1.75, −0.67]	38.3	[35.4, 41.3]	−1.07***	[−1.51, −0.62]
	2011	31.6	[27.5, 36.1]			33.3	[29.7, 37.3]			29.7	[23.8, 36.4]		
	2017	26.5	[24.0, 29.1]			25.5	[22.4, 28.9]			27.2	[24.0, 30.6]		
Uruguay	2006	55.2	[52.6, 57.8]	−1.67***	[−2.27, −1.07]	57.7	[53.9, 61.4]	−1.77***	[−2.60, −0.94]	53.3	[50.0, 56.6]	−1.65***	[−2.40, −0.89]
	2012	45.2	[42.8, 47.6]			47.1	[43.9, 50.3]			43.4	[40.4, 46.5]		
EMR													
Lebanon[a]	2005	19.3	[15.6, 23.7]	−0.36	[−0.97, 0.26]	27.5	[22.1, 33.7]	−0.76	[−1.53, 0.00]	12.2	[9.1, 16.2]	−0.01	[−0.58, 0.56]
	2011	28.5	[19.8, 39.2]			36.9	[26.9, 48.2]			21.2	[13.2, 32.4]		
	2017	15.6	[10.7, 22.4]			19.1	[13.3, 26.7]			12.6	[8.0, 19.2]		
SEAR													
Indonesia	2007	2.5	[1.6, 4.0]	0.14	[−0.04, 0.32]	4.3	[2.7, 6.8]	0.22	[−0.09, 0.53]	0.8	[0.4, 1.7]	0.07	[−0.02, 0.17]
	2015	3.7	[3.0, 4.5]			6.0	[4.8, 7.6]			1.4	[1.0, 1.9]		
Myanmar[a]	2007	0.9	[0.5, 1.6]	0.30***	[0.14, 0.45]	1.3	[0.7, 2.6]	0.54***	[0.30, 0.78]	0.4	[0.1, 1.3]	0.08	[−0.06, 0.21]
	2016	3.6	[2.5, 5.1]			6.2	[4.5, 8.4]			1.1	[0.4, 2.9]		
Thailand[a]	2008	14.3	[12.5, 16.3]	0.47	[−0.01, 0.95]	20.2	[17.8, 22.8]	−0.07	[−0.64, 0.49]	9.2	[7.7, 11.0]	0.88**	[0.33, 1.43]
	2015	17.6	[15.1, 20.4]			19.7	[16.9, 22.8]			15.4	[12.3, 19.0]		
WPR													
Cook Islands	2011	28.3	[28.3, 28.3]	−0.59	[−1.71, 0.53]	29.0	[29.0, 29.0]	0.08	[−1.94, 2.10]	27.6	[27.6, 27.6]	−1.11	[−2.61, 0.40]
	2015	26.0	[21.8, 30.6]			29.3	[22.1, 37.7]			23.2	[17.9, 29.6]		
Fiji	2010	16.6	[14.2, 19.4]	−0.57	[−1.34, 0.19]	22.6	[18.7, 27.0]	−1.14*	[−2.23, −0.05]	10.9	[8.5, 14.0]	−0.26	[−0.96, 0.43]
	2016	13.2	[10.0, 17.1]			15.7	[11.6, 21.0]			9.4	[6.9, 12.6]		
Philippines	2003	18.1	[15.2, 21.6]	0.02	[−0.32, 0.35]	22.9	[19.2, 27.0]	−0.20	[−0.57, 0.17]	15.0	[11.5, 19.4]	0.12	[−0.28, 0.51]
	2007	15.8	[13.2, 18.8]			19.7	[16.4, 23.4]			12.9	[9.8, 16.9]		
	2011	18.3	[15.2, 21.9]			21.4	[17.1, 26.5]			15.5	[12.2, 19.5]		
	2015	17.5	[14.9, 20.4]			19.6	[17.0, 22.4]			15.5	[12.6, 19.0]		

Table 1
Continued

Country	Year	Overall				Boys				Girls			
		%	[95% CI]	Beta	[95% CI]	%	[95% CI]	Beta	[95% CI]	%	[95% CI]	Beta	[95% CI]
Samoa[a]	2011	34.5	[29.4, 40.0]	-4.12***	[-5.07, -3.17]	43.4	[37.8, 49.2]	-5.13***	[-6.29, -3.97]	25.6	[21.4, 30.3]	-3.00***	[-3.87, -2.12]
	2017	9.8	[8.2, 11.6]			12.7	[9.4, 16.8]			7.6	[5.4, 10.6]		
Tonga[a]	2010	16.2	[13.8, 18.9]	-0.84***	[-1.28, -0.39]	14.9	[11.9, 18.4]	0.06	[-0.56, 0.69]	17.5	[14.4, 21.1]	-1.75***	[-2.27, -1.23]
	2017	10.4	[8.7, 12.3]			15.3	[12.6, 18.5]			5.3	[4.0, 6.8]		
Vanuatu	2011	7.6	[5.2, 11.0]	0.92*	[0.13, 1.71]	9.2	[6.0, 13.8]	1.23*	[0.05, 2.40]	5.4	[3.4, 8.6]	0.80*	[0.03, 1.57]
	2016	12.2	[9.8, 15.0]			15.3	[11.5, 20.1]			9.4	[7.0, 12.7]		

AFR = African Region; AMR = Region of the Americas; EMR = Eastern Mediterranean Region; CI = confidence interval; SEAR = South-East Asia Region; WPR = Western Pacific Region.
The beta is based on linear regression including survey year as a continuous variable. The beta can be interpreted as the average percentage point change in prevalence per year.
*p for trend<.05, **p for trend <.01, ***p for trend <.001.
[a] Significantly different trend by sex (p < .05).

All students in the selected classrooms were eligible to participate in the survey regardless of age. Thus, data collection was not restricted to those aged 13–15 years and included students who were not within this age range. Data collection was performed during one regular class period. The questionnaire was translated into the local language in each country and consisted of multiple-choice response options. Students recorded their response on computer scannable sheets. All GSHS surveys were approved, in each country, by both a national government administration (most often the Ministry of Health or Education) and an institutional review board or ethics committee. Student privacy was protected through anonymous and voluntary participation, and informed consent was obtained as appropriate from the students, parents, and/or school officials. Data were weighted for nonresponse and probability selection.

From all publicly available data, we selected all nationally representative data sets that included the variables pertaining to our analysis, and for which data on at least two waves were available from the same country. A total of 22 countries were included in the present study. The characteristics of each survey including the region, country, survey year, country income level, response rate, sample size, and basic demographics are provided in Table S1 of the Appendix. The surveys included in the present study were undertaken between 2003 and 2017 and were mostly from LMICs.

Alcohol use

Alcohol use was assessed by the question "During the past 30 days, on how many days did you have at least one drink containing alcohol?". The students were instructed that drinking alcohol does not include drinking a few sips of wine for religious purposes. Alcohol use was defined as having taken alcohol on at least one day in the past 30 days.

Statistical analysis

Statistical analyses were performed with Stata 14.2 (Stata Corp LP, College Station, Texas). The analysis was restricted to those aged 12–15 years as most students were within this age group, while information on the exact age outside of this age range was not available. The prevalence and 95% confidence interval (CI) of past 30-day alcohol consumption were estimated for the overall sample and sex-stratified samples for each survey. Crude linear trends in alcohol consumption were examined by linear regression models across surveys within the same country to estimate regression coefficients (beta) and 95% CI for every one-year change. The beta can be interpreted as the average point change in prevalence (%) per year. P for trends was estimated using the survey year as a continuous variable. We also conducted interaction analysis to assess whether there are differing trends between sex by including a product term (survey year X sex) in the model. Sampling weights and the clustered sampling design of the surveys were considered in all analyses.

Results

A total of 135,426 school-going adolescents aged 12–15 years from 22 countries were included in the analytical sample. The mean (standard deviation) age was 13.8 years (1.0) and 52.0% were females. The overall mean prevalence of past 30-day alcohol consumption was 14.1% (boys 16.6%, girls 11.8%) but

ranged widely across countries. Specifically, the lowest and highest prevalence were observed in Myanmar in 2007 (0.9%) and Seychelles in 2007 (57.1%), respectively. The trends in the prevalence of alcohol consumption are shown in Table 1 (overall and by sex), Figure 1 (overall), and Figure 2 (by sex). Among the 22 countries included in the study, based on the overall sample, significant increasing and decreasing trends were observed in three and eight countries, respectively. No significant decreasing or increasing trends were observed in the remaining 11 countries. Specifically, significant increases were observed in Benin between 2009 (16.1%) and 2016 (38.6%) (beta = 3.22; 95% CI = 2.09, 4.35), Myanmar between 2007 (0.9%) and 2016 (3.6%) (beta = 0.30; 95% CI = 0.14, 0.45), and Vanuatu between 2011 (7.6%) and 2016 (12.2%) (beta = 0.92; 95% CI = 0.13, 1.71). On the contrary, significant decreases were observed in Namibia between 2004 (32.6%) and 2013 (23.0%) (beta = −1.08; 95% CI = −1.60, −0.55), Seychelles between 2007 (57.1%) and 2015 (45.4%) (beta = −1.46; 95% CI = −1.89, −1.03), Anguilla between 2009 (41.9%) and 2016 (29.7%) (beta = −1.74; 95% CI = −2.59, −0.90), Jamaica between 2010 (52.4%) and 2017 (45.2%) (beta = −1.02; 95% CI = −2.02, −0.03), Trinidad & Tobago between 2007 (38.1%) and 2017 (26.5%) (beta = −1.14; 95% CI = −1.47, −0.80), Uruguay between 2006 (55.2%) and 2012 (45.2%) (beta = −1.67; 95% CI = −2.27, −1.07), Samoa between

2011 (34.5%) and 2017 (9.8%) (beta = −4.12; 95% CI = −5.07, −3.17), and Tonga between 2010 (16.2%) and 2017 (10.4%) (beta = −0.84; 95% CI = −1.28, −0.39). Furthermore, significant interaction in terms of trends by sex was found in eight countries. For example, in Guyana and Thailand, a significant increasing trend was only found among girls, while in Myanmar, this was only found among boys. Furthermore, in Tonga, a decreasing trend was only found among girls.

Discussion

Main findings

In the present study, which included large representative samples of in-school adolescents aged 12–15 years from 22 countries across multiple continents, significant increasing and decreasing trends in alcohol consumption were observed in three and eight countries, respectively. Specifically, significant increases were observed in Benin between 2009 (16.1%) and 2016 (38.6%), Myanmar between 2007 (0.9%) and 2016 (3.6%), and Vanuatu between 2011 (7.6%) and 2016 (12.2%). The most pronounced decreasing trend was observed in Samoa between 2011 (34.5%) and 2017 (9.8%), but in other countries with decreasing trends, the rate of decrease was modest. No
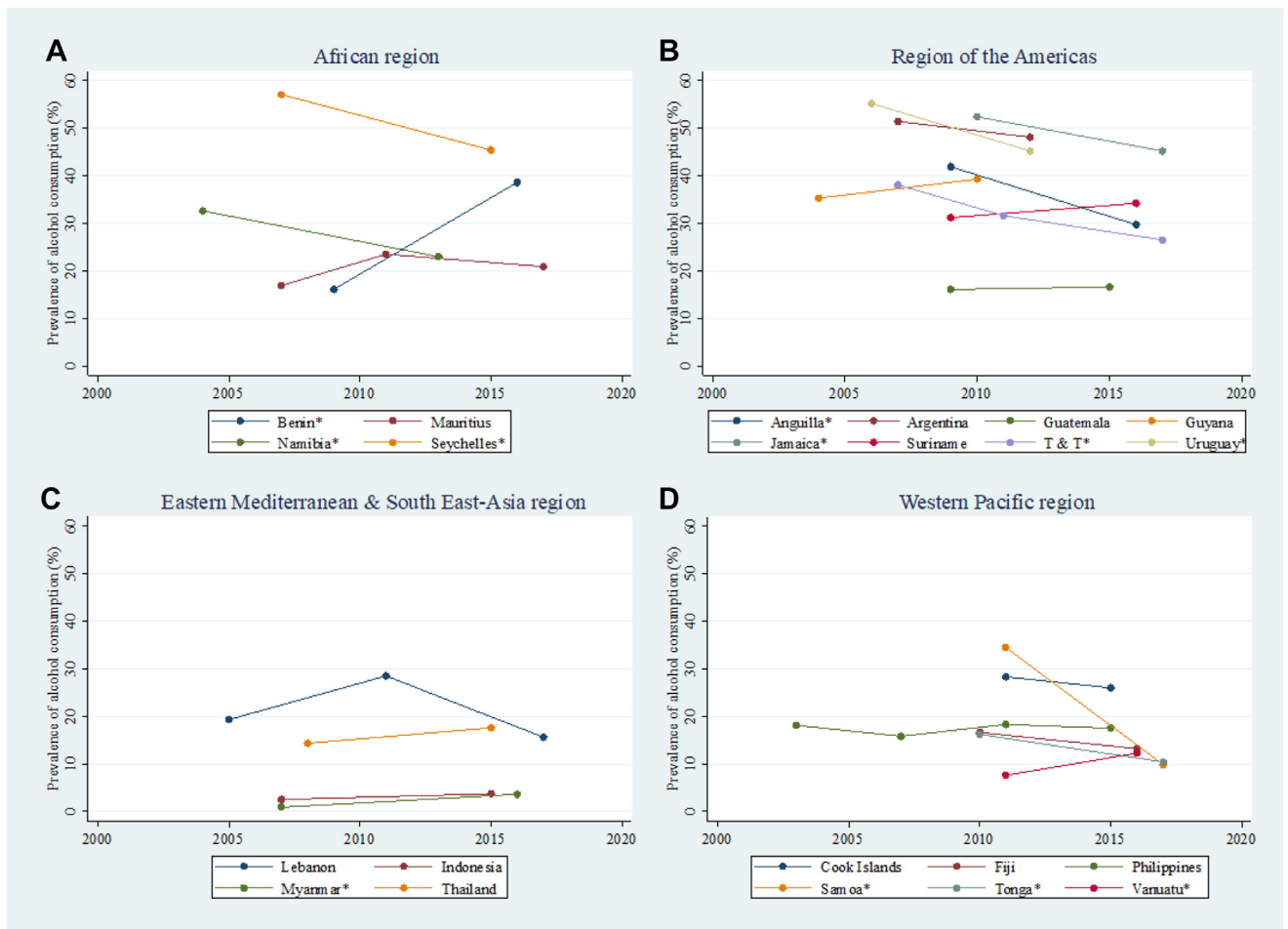

Figure 1. Prevalence (%) of past 30-day alcohol consumption across years by region and country. Abbreviation: T & T = Trinidad & Tobago. *Significant trend (*p* < .05).

significant decreasing or increasing trends were observed in the remaining countries. Finally, several distinct patterns in terms of sex differences were observed in eight countries. To the best of our knowledge, this is the first study on alcohol consumption trends with such a large number of countries for which trends were previously unknown.

Interpretation of the findings

It is encouraging that more than a third of the countries (8/22) included in our study had significant decreasing trends in alcohol consumption and that a significant increasing trend was only observed in a few countries ($n = 3$). However, it is worrying that in countries such as Benin the prevalence of alcohol consumption more than doubled between 2009 and 2016.

2009 (16.1%) and 2016 (38.6%), and quadrupled in Myanmar between 2007 (0.9%) and 2016 (3.6%), although it should be noted that in Myanmar, alcohol consumption at baseline was exceptionally low and thus highly unlikely to decrease overtime. While the reasons for this increase cannot be stated with certainty, it is worth noting that although Benin has a national alcohol policy, there is no policy to limit access to alcoholic beverages to minors (e.g., 'national legal minimum age for off- and on-premise sales of alcoholic beverages') [26]. This is also true for Vanuatu, which also observed an increasing trend in adolescent alcohol use [27]. Benin also does not have any restrictions in relation to alcohol advertising [28]. It is indeed plausible that a lack of law and regulation around alcohol consumption and sales is driving an increase in alcohol consumption among adolescents in Benin. Moreover, alcohol consumption is rising among the adult population in Benin, which may be owing to hunger and distress resulting from persistent food insecurity [29]. Importantly, literature has suggested that adolescent with parents who consume alcohol are much more likely to consume alcohol themselves [30]. Finally, alcohol consumption quadrupled in Myanmar between 2007 and 2016 and this may be owing to civil unrest which is an ongoing issue in Myanmar. It is plausible that adolescents turn to alcohol with the perception that consumption will aid in coping with external chaotic influences.

Next, decreasing trends in alcohol consumption were observed in eight countries with Samoa experiencing the most striking decline. In 2011, Samoa introduced the national legal minimum age of 21 years for off- and on-premise sales of alcoholic beverages [31,32]. Selling or serving alcohol to a person under the age of 21 years is punishable with a three hundred dollar fine, imprisonment for nine months, or both [33].
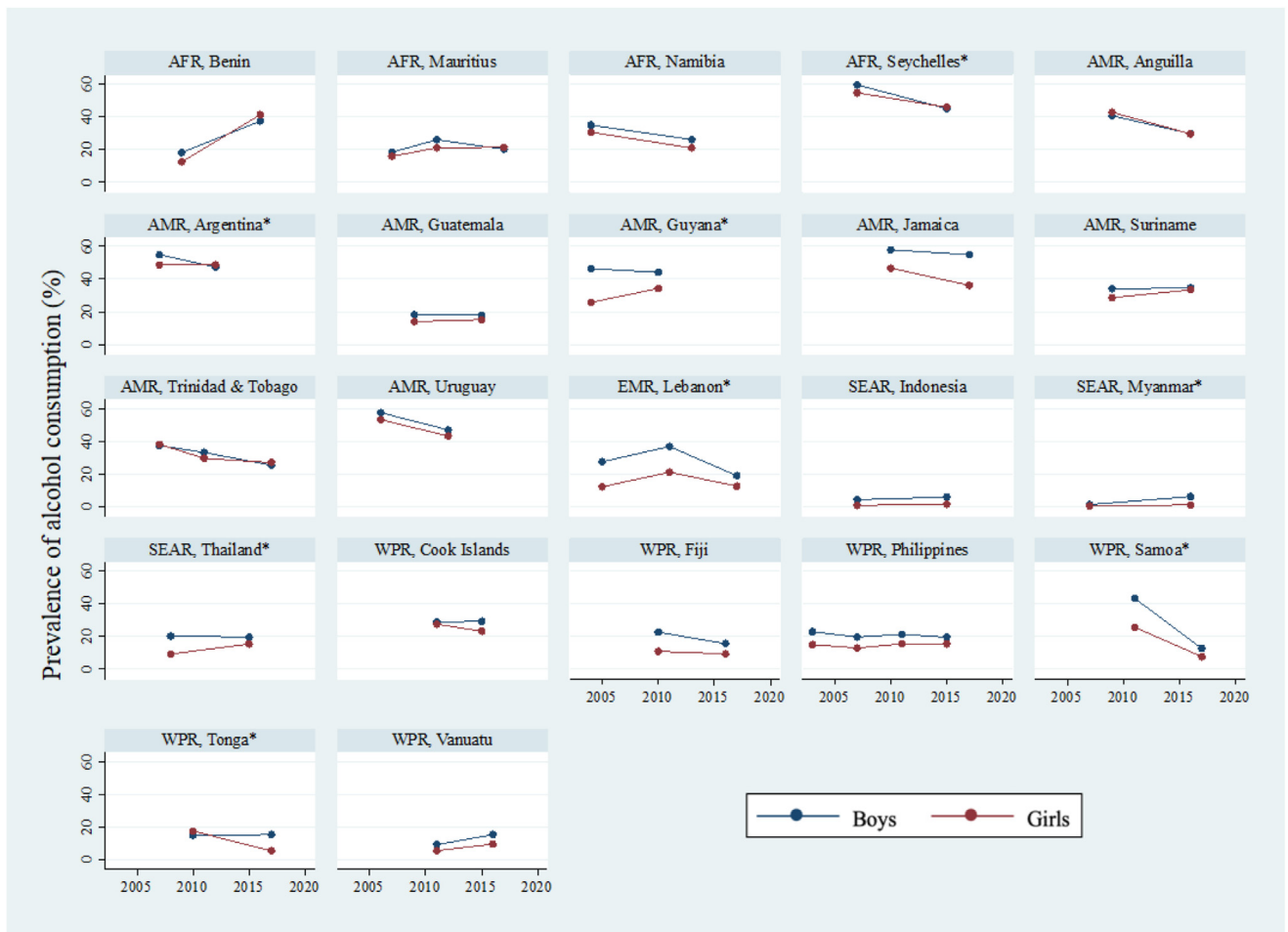

Figure 2. Prevalence (%) of past 30-day alcohol consumption across years among boys and girls in each country. Abbreviations: AFR = African Region; AMR = Region of the Americas; EMR = Eastern Mediterranean Region; SEAR = South-East Asia Region; WPR = Western Pacific Region. * Significantly different trends by sex.

Moreover, during the study period, the Ministry of Police and Prisons carried out educational awareness programs for children in schools on preventing alcohol consumption [34]. It is thus likely that the introduction of age limit to purchase alcohol in Samoa coupled with educational awareness programs collectively reduced alcohol consumption among Samoan adolescents. Interestingly, in Jamaica, which also showed a significant declining trend between 2010 and 2017 in our study, the underage drinking campaign was launched in 2013. The campaign included several components including public service announcements on radio and television targeting the high school championship and carnival periods, presentations on alcohol awareness in schools, and monitoring the enforcement of sale of alcohol to minors by auditing of popular events, as well as distributing various other alcohol awareness materials (e.g., posters) [35]. However, it should be noted that the present hypotheses to explain decreasing trends in alcohol consumption in such settings are indeed speculative, and it is not possible to truly know or elucidate on the underlying reasons. Future research across settings of a qualitative nature is required to further elucidate on mechanisms to inform future targeted intervention and policy.

It should be noted that in eight countries, trends in alcohol use varied by sex. For example, in Thailand, a significant increasing trend was only found among girls, while in Myanmar, this was only found among boys. The reason why these trends differ by sex between countries is elusive and further research is required to elucidate on potential reasons. However, it is known that correlates of alcohol consumption differ between boys and girls. Indeed, physiological and social changes particular to adolescence appear to differentially affect boys and girls. Specifically, boys begin to manifest a constellation of factors that place them at greater risk for disruptive drinking: low response to alcohol, later maturation in brain structures and executive function, greater estimates of perceived peer alcohol use, and socialization into traditional gender roles [36]. It should be noted, however, that even the statistically significant interactions may only have marginal practical significance (e.g., trends in the Seychelles, Samoa, Myanmar, etc. are not strikingly gendered).

Policy implications

Findings from the present study suggest that alcohol consumption among adolescents is a global concern. While some level of improvement was observed, further global efforts are required to curb alcohol consumption among adolescents. It does seem that the implementation of laws introducing a minimum age of at least 18 to purchase alcohol may have a positive effect in reducing levels of alcohol consumption among adolescents. In addition to the introduction of a minimum age to purchase alcohol, the World Health Organization recommends the following: regulation of the marketing of alcoholic beverages (in particular to younger people), demand reduction via taxation and pricing mechanisms, raising awareness of the health and social problems for individuals and society at large caused by the harmful use of alcohol, ensuring support for effective alcohol policies, providing accessible and affordable treatment for people with alcohol-use disorders, and implementing screening and brief intervention programs in health services for hazardous and harmful drinking [37]. Moreover, a range of school-based interventions have been developed to prevent or delay the onset of alcohol use, most of which are targeted to middle-school students. To be most effective, interventions should be theory driven, address social norms around alcohol use, build personal and social skills helping students resist pressure to use alcohol, involve interactive teaching approaches, use peer leaders, integrate other segments of the population into the program, focus on sustainability (e.g., incorporate behavior change techniques), provide training and support to facilitators, and be culturally and developmentally appropriate [38].

Strengths and limitations

The large representative samples of in-school adolescents from 22 countries are clear strengths of the present study. However, findings should be interpreted in light of the study's limitations. First, alcohol consumption was self-reported potentially introducing recall and social desirability bias into the findings. Second, our study results are only generalizable to adolescents who attend school. In relation to this, the trends may also partly be explained by the change in the characteristics of students who attend school. Finally, the years in which the surveys were conducted varied largely by country, while some countries provided data from more time points than others. Thus, the change in prevalence (%) per year should always be interpreted in conjunction with the year in which the survey was conducted, while it should also be borne in mind that countries with more data points provide more accurate estimates on the trends.

Conclusion

In the present study including large representative samples of school-going adolescents from 22 countries in Africa, Asia, and the Americas, alcohol consumption decreased in more than one third of the countries included in our study, but the rate of decrease was rather limited in most of the countries. Furthermore, increasing trends were found in three countries, and no changes were observed in the remaining countries. Although it is positive that alcohol consumption is declining among adolescents in some countries, the data suggest that further global action is required to curb adolescent alcohol consumption.

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Supplementary Data

Supplementary data related to this article can be found online at http://doi.org/10.1016/j.jadohealth.2023.10.007.

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