Investigating The Prevalence of Alcohol Consumption and Its Related Factors in 13 To 17-Year-Old Adolescents: Data Extraction From 55 Eastern Mediterranean Countries

vahid famia
Kermanshah University of Medical Sciences

Touraj Ahmadi Jouybari
Kermanshah University of Medical Sciences

safora salemi (✉️ s.salemi85@yahoo.com)
Kermanshah University of Medical Sciences

Bahareh rahami
Kermanshah University of Medical Sciences

mehdi moradinazar
Kermanshah University of Medical Sciences

mostafa alikhani
Kermanshah University of Medical Sciences

Tahereh Mohammadi Majd
Kermanshah University of Medical Sciences

shahab Bahadorinia
Kermanshah University of Medical Sciences

Research

Keywords: Prevalence, Alcohol Consumption Disorder, Eastern Mediterranean Country, Adolescents

DOI: https://doi.org/10.21203/rs.3.rs-753242/v1

License: © This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background

Alcohol consumption has become very common among adolescents in recent years and its prevalence varies in different countries. The aim of this study was to investigate the prevalence of alcohol consumption and related factors in adolescents aged 13 to 17 years living in the Eastern Mediterranean Region (EMR).

Methods

The present study was a cross-sectional study that was performed on 191228 adolescents (girl, 51.1% of total) aged 13 to 17 years in 55 EMR countries. In this study, the data that were collected by the World Health Organization from students were used. In order to investigate the factors affecting alcohol consumption, univariate and multivariate logistics models with 95% confidence limits were used.

Results

The overall prevalence of alcohol consumption in adolescents was 18.2%, which was 19.2% and 17.3% in boys and girls, respectively. Multivariate analysis showed that using marijuana for more than 10 days in a month (OR = 6.27, 95%CI: 5.12–7.68), smoking (OR = 3.68, 95%CI: 3.52–3.84), having sex (OR = 3.39, 95%CI: 3.24–3.55), being alone for more than 10 days (OR = 1.84, 95%CI: 1.66–2.037), having insomnia most of the time (OR = 1.68, 95%CI: 1.54–1.83), having suicide plan (OR = 1.47, 95%CI: 1.39–1.57), being 16 and older (OR = 1.41, 95%CI: 1.33–1.48), being alone sometimes (OR = 1.41, 95%CI: 1.33–1.48), daily activity (OR = 1.24, 95%CI: 1.19–1.29), being beaten for 1–9 days a month (OR = 1.20, 95%CI: 1.14–1.26) increased the chances of consuming alcohol, respectively. Parental supervision most of the time and parental awareness sometimes reduced the likelihood of consuming alcohol.

Conclusions

Due to the high prevalence of alcohol consumption among adolescents living in EMR countries, it is suggested that educational, preventive and health intervention programs be conducted to raise students’ awareness of the effects of alcohol consumption in schools.

Introduction

Adolescents are exposed to many physical and hormonal changes during puberty (1). They face a range of changes in various physical, psychological, social and cultural aspects (2). Many adolescents go through this critical phase safely, but some of them are not able to cope with these conditions and expose themselves to high-risk behaviors such as alcohol consumption(3). Various factors may affect
adolescents’ tendency to alcohol, from a behavioral perspective sometimes people drink alcohol to relieve anxiety and loneliness (4–6). In addition to the turmoil in the family environment, the way family members treat each other, family history of drug and alcohol consumption are effective factors in this regard (7, 8).

Alcohol consumption is very common in adolescents. A study in Thailand, done on adolescents aged 10–14 evaluated 9509 people, found 30.01% of the adolescents with the experience of alcohol consumption, adolescents whose parents were divorced or neither of their parents lived with them, had a higher chance of alcohol consumption (9). Another study of 3005 adolescents, 12–17 years old, in Mexico found that 59% of adolescents had experienced alcohol consumption, which was significantly associated with increasing age, low parental supervision, and dropout rates (10). Also, a study of female students found that almost half of female high school students (12 to 17 years old) have consumed alcohol by then (11). A study conducted by Getachew et al. (12) on 3967 adolescents in the age group of 13 to 19 in 20 high schools found that 29% of them always consume alcohol. In this study it was found that one of the factors of tendency to alcohol in adolescents is to have parents who use tobacco.

A study by Leung et al. (13) examined alcohol consumption and its consequences in 68 low- and middle-income countries. In this study, it was found that alcohol consumption is much more common in men than women. On the other hand, a study by Ferreira et al. (14) on 785 adolescents found that about 25.5% of adolescents had consumed alcohol. Male gender, ages 17 to 19, not living with the mother, using a weight loss strategy in the last 3 months, and especially being a victim of domestic violence were important predictors of alcohol abuse in this study.

Alcohol use in adolescents may be associated with high-risk behaviors (15). For example, alcohol consumption may lead adolescents to have unprotected sex, which increases the prevalence of unwanted pregnancies and sexually transmitted diseases in adolescents (16). Also, drinking alcohol in adolescents may lead to high-risk driving and as a result there is an increase in life and financial losses in driving (17). On the other hand, it can be said that the adolescents who are prone to high-risk behaviors are also more prone to other high-risk behaviors. For example, the adolescents who use alcohol are more likely to use drugs than others in their age group (18) or to have aggressive behaviors, violence and suicidal tendencies (19). Therefore, alcohol consumption in these age groups should be taken seriously because it can be the beginning of other social dangers (20).

In addition to the things mentioned above alcohol consumption in adolescence is associated with serious physical harm in adulthood. Alcohol consumption can lead to many physical injuries such as cancer (21). According to the mentioned points, alcohol consumption should be considered as an important priority of health care organizations as well as an inter-sectoral program in the community. Alcohol consumption as a social issue is very important because it can lead to a variety of violent and anti-social behaviors in adolescents and young people. Hence, the high-risk behavior in adolescents has many destructive effects on both society and the individual, and its use in adolescence can lead to the use of stimulants and traditional drugs in adulthood. Due to the importance of the issue, it is necessary to identify the factors
related to alcohol consumption in adolescents in order to develop prevention programs, therefore, the aim of this study was to investigate the prevalence of alcohol consumption and its related factors in adolescents aged 13 to 17 years in Eastern Mediterranean countries.

**Materials And Methods**

The present cross-sectional study used data from the Global School-based Student Health Survey (GSHS) (obtained from World Health Organization (WHO)). The GSHS is a school-based health survey which is conducted for students who are 13–17 years old, it is performed by the WHO and the Centers for Disease Control and Prevention (CDC) in collaboration with United Nations International Children's Emergency Fund (UNICEF), United Nations Educational, Scientific and Cultural Organization (UNESCO), and United Nations programme on Human Immunodeficiency Virus/ United Nations programme on Acquired Immunodeficiency Syndrome (UNAIDS).

The aim of the GSHS is to supply data on health behaviors and protective factors among students in the age group of 13–17. The 10 core questionnaire modules address the main causes of morbidity and mortality among children throughout the world (e.g., alcohol, tobacco and drug use, nourishing behaviors, sexual behaviors contributing to Human Immunodeficiency Virus (HIV) infection, other infections which are sexually transmitted, and unexpected pregnancy plus some questionnaires regarding mental health, physical activity, accidental injuries, and violence).

A cluster sampling designed in two stages randomly was performed to choose suitable partakers in each country. At the first stage, schools were chosen with probability proportional to enrollment size. On the following stage, classes were randomly chosen, all of the students in the classes were included in the survey. The school and student response rates varied from 83–100% and 71–99%, respectively.

Ethical approval was taken according to the instructions related to each country prior to data collection (More details are available at [www.who.int/chp/gshs/factsheets/en](http://www.who.int/chp/gshs/factsheets/en)).

**Data collection and definition of variables**

The present study used data from the last accessible GSHS for 55 countries of EMR (Anguilla, Argentina National, Bahamas, Barbados, Belize, Benin, Bolivia National, British Virgin Islands, Brunei Darusalam, Cambodia, Cayman Islands, Chile National, China Beijing, Colombia Bogot (Oficial & Privado), Costa Rica, Dominica, Ecuador Guayaquil, El Salvador, Fiji, Ghana, Guatemala (National), Guyana (National), Honduras, Indonesia (National), Jamaica, Kiribati, Lebanon, Malawi (National), Malaysia, Maldives (National), Mauritius (Mauritius), Mongolia, Montserrat, Myanmar, Namibia National, Nauru, Peru, Philippines National, Samoa, Senegal, Seychelles, Solomon Islands, Suriname, Syrian Arab Republic, Tajikistan, Thailand, Trinidad and Tobago (National), Tuvalu Uganda (National, Uruguay (National), Vanuatu, Venezuela (Barinas), Viet Nam, Yugoslav Republic of Macedonia, Zimbabwe.}
Lastly, 191228 students were included in this study (Table 1). Variables were classified into six generic categories as follows: socio demographic factors (such as age, sex, and educational level); mental health factors (loneliness, insomnia due to anxiety or worry, the number of close friends, and suicide plan); protective factors (parental supervision, parental support, parental awareness, peer support, and physical activity); and other background factors (cigarette, times used marijuana, had sex, eating fruit, truancy, bullied, parental used tobacco). The details of variable description in Table 1.
| Variable                  | Survey questions and coding                                                                                                                                 |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drinking alcohol          | “During the past 30 days, on the days you drank alcohol, how many drinks did you usually drink per day?”                                                   |
| Sex                       | “What is your sex?”                                                                                                                                         |
| Age                       | “How old are you?”                                                                                                                                         |
| Grade                     | “In what grade/class/standard are you?”                                                                                                                 |
| Truancy                   | “During the past 30 days, on how many days did you miss classes or school without permission?”                                                          |
| Loneliness                | “During the past 12 months, how often have you felt lonely?”                                                                                             |
| Insomnia                  | “During the past 12 months, how often have you been so worried about something that you could not sleep at night?”                                        |
| Daily activity            | “During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?”                                          |
| Fruit                     | “During the past 30 days, how many times per day did you usually eat fruit, such as COUNTRY SPECIFIC EXAMPLES?”                                           |
| Bullied                   | “During the past 30 days, on how many days were you bullied?”                                                                                            |
| Close friend              | “How many close friends do you have?”                                                                                                                   |
| Parent used tobacco       | “Which of your parents or guardians use any form of tobacco?”                                                                                             |
| Parental supervision      | “During the past 30 days, how often did your parents or guardians check to see if your homework was done?”                                                |
| Parental support          | “During the past 30 days, how often did your parents or guardians understand your problems and worries?”                                                  |
| Parental awareness        | “During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?”                                |
| Peer support              | “During the past 30 days, how often were most of the students in your school kind and helpful?”                                                          |
| Cigarette                 | “During the past 30 days, on how many days did you smoke cigarettes?”                                                                                   |
| Times used marijuana      | “During the past 30 days, how many times have you used marijuana (also called COUNTRY SPECIFIC SLANG TERMS FOR MARIJUANA)?”                            |
| Had sex                   | “Have you ever had sexual intercourse?”                                                                                                                  |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.
Variable | Survey questions and coding
--- | ---
Suicide plan | “During the past 12 months, did you make a plan about how you would attempt suicide?”

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.

Statistical analysis and calculations

Descriptive statistics were used to report the ratio of each variable in the study population, by gender. Differences in the proportions were compared using chi-square test. Univariate and multivariate logistic regression were used to evaluate the raw and adjusted odds ratio (OR), respectively. Variables with a P value of less than 0.25 in the univariate analysis were entered into multivariate logistic regression. All analyses were performed at a significance level of 5% using Stata software version 14.1 (Stata Corp, College Station, TX, USA).

Results

Participants

Out of 269677 students, 191228 answered alcohol questions, the Response Rate was (70.9%). 90435 (48.9%) of the participants in the study were boys and the rest were girls. The highest response rates were in the Syrian Arab Republic (99.5%), Fiji (99.3%) and Malaysia (99.1%), respectively, and the lowest response rates were in the Seychelles (82.4%), Venezuela (Barinas) (86.9%) and Samoa (87.1%), respectively. The prevalence of alcohol consumption among students was 18.2%, which was 25031 (19.2%) in boys and 23570 (17.3%) in girls. Seychelles (57.9%), Colombia Bogot (Official & Privado) (54.8%) and Montserrat (54.2%) had the highest prevalence of alcohol consumption, respectively and Tajikistan (0.7%), Myanmar (1.8%) and Indonesia (National) (2.8%) had the lowest prevalence of alcohol consumption among students (Table 2).
| Country          | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence 95%CI** |
|------------------|----------------|--------|---------------------|-------------|-------------------|
| Anguilla         | 2009           | Boys   | 91.7                | 407         | 45.0 0.4–0.5     |
|                  |                | Girls  | 95.2                | 475         | 44.0 0.40–0.49   |
|                  |                | Total  | 93.4                | 888         | 44.7 0.41–0.48   |
| Argentina National | 2012       | Boys   | 91.7                | 12606       | 53.52 0.53–0.54  |
|                  |                | Girls  | 94.9                | 13876       | 53.50 0.53–0.54  |
|                  |                | Total  | 94.6                | 26828       | 53.4 0.53–0.54   |
| Bahamas          | 2013           | Boys   | 96.3                | 603         | 27.9 0.24–0.32   |
|                  |                | Girls  | 95.2                | 689         | 26.9 0.24–0.30   |
|                  |                | Total  | 95.7                | 1299        | 27.6 0.25–0.30   |
| Barbados         | 2011           | Boys   | 94.6                | 694         | 48.1 0.44–0.52   |
|                  |                | Girls  | 95.6                | 852         | 47.3 0.44–0.51   |
|                  |                | Total  | 95.2                | 1550        | 47.7 0.45–0.50   |
| Belize           | 2011           | Boys   | 96.5                | 957         | 32.2 0.29–0.35   |
|                  |                | Girls  | 96.9                | 1076        | 26.7 0.24–0.29   |
|                  |                | Total  | 96.7                | 2042        | 29.3 0.27–0.31   |
| Benin            | 2009           | Boys   | 91.8                | 1598        | 24.3 0.22–0.26   |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.
*Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                      | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|------------------------------|----------------|--------|---------------------|-------------|------------|---------|
|                              |                | Girls  | 89.4                | 832         | 16.6       | 0.14–0.19 |
|                              |                | Total  | 91.0                | 2448        | 21.7       | 0.20–0.23 |
| Bolivia                      | 2012           | Boys   | 96.4                | 1728        | 20.5       | 0.19–0.22 |
|                              |                | Girls  | 96.2                | 1676        | 15.6       | 0.14–0.17 |
|                              |                | Total  | 96.2                | 3557        | 18.3       | 0.17–0.20 |
| British Virgin Islands       | 2009           | Boys   | 95.1                | 701         | 33.8       | 0.3–0.37  |
|                              |                | Girls  | 96.5                | 886         | 35.9       | 0.33–0.39 |
|                              |                | Total  | 95.9                | 1596        | 35         | 0.33–0.37 |
| Brunei Darus salam           | 2014           | Boys   | 98.3                | 1189        | 5.7        | 0.05–0.07 |
|                              |                | Girls  | 98.7                | 1363        | 2.7        | 0.02–0.04 |
|                              |                | Total  | 98.5                | 2560        | 4.2        | 0.03–0.05 |
| Cambodia                     | 2013           | Boys   | 96.9                | 1736        | 17.9       | 0.16–0.2  |
|                              |                | Girls  | 98.1                | 1965        | 5.1        | 0.04–0.06 |
|                              |                | Total  | 97.6                | 3713        | 11.1       | 0.10–0.12 |
| Cayman Islands               | 2007           | Boys   | 85.4                | 536         | 40.7       | 0.37–0.45 |
|                              |                | Girls  | 91.3                | 605         | 37.4       | 0.34–0.41 |
|                              |                | Total  | 88.3                | 1147        | 39         | 0.36–0.42 |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO. *Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                              | Year of survey | Gender | Response rate (%) | Sample size | Prevalence | 95%CI** |
|--------------------------------------|----------------|--------|-------------------|-------------|------------|---------|
| Chile National                       | 2013           | Boys   | 96.9              | 986         | 32         | 0.29–0.35 |
|                                      |                | Girls  | 96.2              | 976         | 31.7       | 0.29–0.35 |
|                                      |                | Total  | 96.4              | 1976        | 32         | 0.30–0.34 |
| China Beijing                        | 2003           | Boys   | 92.0              | 1041        | 18         | 0.16–0.2  |
|                                      |                | Girls  | 94.8              | 1147        | 7.9        | 0.07–0.10 |
|                                      |                | Total  | 93.5              | 2195        | 12.7       | 0.11–0.14 |
| Colombia Bogot (Oficial & Privado)   | 2007           | Boys   | 90.0              | 4023        | 53.2       | 0.52–0.55 |
|                                      |                | Girls  | 92.0              | 4972        | 56.1       | 0.55–0.57 |
|                                      |                | Total  | 91.0              | 9020        | 54.8       | 0.54–0.56 |
| Costa Rica                           | 2009           | Boys   | 98.6              | 1269        | 27         | 0.25–0.29 |
|                                      |                | Girls  | 97.9              | 1353        | 25.5       | 0.23–0.28 |
|                                      |                | Total  | 98.2              | 2630        | 26.3       | 0.25–0.28 |
| Dominica                             | 2009           | Boys   | 94.5              | 675         | 54.2       | 0.5–0.58  |
|                                      |                | Girls  | 94.2              | 870         | 49.2       | 0.46–0.53 |
|                                      |                | Total  | 94.3              | 1548        | 51.5       | 0.49–0.54 |
| Ecuador Guayaquil                    | 2007           | Boys   | 83.0              | 2196        | 31.9       | 0.3–0.34  |
|                                      |                | Girls  | 84.9              | 2377        | 27.1       | 0.25–0.29 |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.
*Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                  | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95% CI** |
|-------------------------|----------------|--------|---------------------|-------------|------------|----------|
| Total                   |                |        |                     |             |            |          |
| El Salvador             | 2013           | Boys   | 96.1                | 973         | 19.7       | 0.17–0.22|
|                         |                | Girls  | 95.9                | 834         | 17.5       | 0.15–0.20|
|                         |                |        |                     |             |            |          |
| Total                   |                |        |                     |             | 19         | 0.17–0.21|
| Fiji                    | 2010           | Boys   | 98.9                | 973         | 22.8       | 0.2–0.26 |
|                         |                | Girls  | 99.6                | 948         | 11.3       | 0.09–0.13|
|                         |                |        |                     |             |            |          |
| Total                   |                |        |                     |             | 16.2       | 0.15–0.18|
| Ghana                   |                | Boys   | 94.4                | 1005        | 13.3       | 0.11–0.16|
|                         |                | Girls  | 93.3                | 847         | 11.8       | 0.10–0.14|
|                         |                |        |                     |             |            |          |
| Total                   |                |        |                     |             | 12.6       | 0.11–0.14|
| Guatemala (National)    | 2009           | Boys   | 95.8                | 2404        | 20.8       | 0.19–0.23|
|                         |                | Girls  | 96.9                | 2909        | 16.8       | 0.15–0.18|
|                         |                |        |                     |             |            |          |
| Total                   |                |        |                     |             | 18.6       | 0.18–0.20|
| Guyana NATIONAL         | 2010           | Boys   | 95.0                | 982         | 46.5       | 0.43–0.5 |
|                         |                | Girls  | 93.8                | 1246        | 36.6       | 0.34–0.39|
|                         |                |        |                     |             |            |          |
| Total                   |                |        |                     |             | 41         | 0.39–0.43|
| Honduras                | 2012           | Boys   | 95.5                | 801         | 14.5       | 0.12–0.17|

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.
*Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                  | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|-------------------------|----------------|--------|---------------------|-------------|------------|---------|
| Indonesia (NATIONAL)    | 2007           | Boys   | 95.0                | 1405        | 4.9        | 0.04–0.06|
|                         |                | Girls  | 98.3                | 1596        | 0.8        | 0.004–0.01|
|                         |                | Total  | 96.7                | 3014        | 2.8        | 0.02–0.03|
| Jamaica                 | 2010           | Boys   | 94.5                | 735         | 58.5       | 0.55–0.62|
|                         |                | Girls  | 94.1                | 769         | 48.8       | 0.45–0.52|
|                         |                | Total  | 94.3                | 1531        | 53.5       | 0.51–0.56|
| Kiribati                | 2011           | Boys   | 94.8                | 651         | 46.9       | 0.43–0.51|
|                         |                | Girls  | 96.9                | 861         | 19.9       | 0.17–0.23|
|                         |                | Total  | 95.9                | 1517        | 31.5       | 0.29–0.34|
| Lebanon                 | 2011           | Boys   | 97.4                | 1036        | 30.9       | 0.28–0.34|
|                         |                | Girls  | 98.1                | 1197        | 18.5       | 0.16–0.21|
|                         |                | Total  | 97.8                | 2235        | 24.3       | 0.23–0.26|
| Malawi (National)       | 2009           | Boys   | 95.1                | 1002        | 7.8        | 0.06–0.1|
|                         |                | Girls  | 95.9                | 1160        | 3.6        | 0.03–0.05|
|                         |                | Total  | 95.3                | 2248        | 5.9        | 0.05–0.07|

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.
*Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                  | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|-------------------------|----------------|--------|---------------------|-------------|------------|---------|
| Malaysia                | 2012           | Boys   | 98.8                | 12577       | 9.5        | 0.09–0.1 |
|                         |                | Girls  | 99.5                | 12665       | 5.7        | 0.05–0.06 |
|                         |                | Total  | 99.1                | 25285       | 7.6        | 0.07–0.08 |
| Maldives (National)     | 2009           | Boys   | 91.1                | 1323        | 7.9        | 0.07–0.09 |
|                         |                | Girls  | 94.7                | 1659        | 3.5        | 0.03–0.04 |
|                         |                | Total  | 92.9                | 2999        | 5.6        | 0.05–0.06 |
| Mauritius (Mauritius)   | 2011           | Boys   | 98.2                | 972         | 26.1       | 0.23–0.29 |
|                         |                | Girls  | 98.1                | 1150        | 21.7       | 0.19–0.24 |
|                         |                | Total  | 98.2                | 2128        | 23.9       | 0.22–0.26 |
| Mongolia                | 2013           | Boys   | 97.9                | 2464        | 9.7        | 0.09–0.11 |
|                         |                | Girls  | 98.8                | 2820        | 6.5        | 0.06–0.07 |
|                         |                | Total  | 98.4                | 5306        | 8.1        | 0.07–0.09 |
| Montserrat              | 2007           | Boys   | 88.2                | 754         | 52.5       | 0.49–0.56 |
|                         |                | Girls  | 92.2                | 1002        | 55.6       | 0.52–0.59 |
|                         |                | Total  | 90.4                | 1759        | 54.2       | 0.52–0.57 |
| Myanmar                 | 2007           | Boys   | 95.8                | 1337        | 3          | 0.02–0.04 |
|                         |                | Girls  | 98.6                | 1388        | 0.6        | 0.002–0.01 |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.
*Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country              | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|---------------------|----------------|--------|---------------------|-------------|------------|---------|
|                     |                | Total  | 97.2                | 2727        | 1.8        | 0.01–0.02 |
| Namibia National    | 2013           | Boys   | 94.1                | 1990        | 38.8       | 0.37–0.41 |
|                     |                | Girls  | 94.9                | 2237        | 27.5       | 0.26–0.29 |
|                     |                | Total  | 94.5                | 4284        | 32.8       | 0.31–0.34 |
| Nauru               | 2011           | Boys   | 87.9                | 204         | 27.5       | 0.22–0.34 |
|                     |                | Girls  | 95.0                | 306         | 26.8       | 0.22–0.32 |
|                     |                | Total  | 91.9                | 531         | 27.3       | 0.24–0.31 |
| Peru                | 2010           | Boys   | 95.0                | 1332        | 32.4       | 0.3–0.35  |
|                     |                | Girls  | 94.6                | 1383        | 27.8       | 0.25–0.30 |
|                     |                | Total  | 94.8                | 2732        | 29.9       | 0.28–0.32 |
| Philippines National| 2011           | Boys   | 97.2                | 2215        | 27         | 0.25–0.29 |
|                     |                | Girls  | 98.3                | 2934        | 14.6       | 0.13–0.16 |
|                     |                | Total  | 97.8                | 5174        | 19.9       | 0.19–0.21 |
| Samoa               | 2011           | Boys   | 86.5                | 839         | 45.3       | 0.42–0.49 |
|                     |                | Girls  | 88.1                | 1212        | 27.6       | 0.25–0.30 |
|                     |                | Total  | 87.1                | 2107        | 35.4       | 0.33–0.37 |
| Senegal             | 2005           | Boys   | 94.8                | 1619        | 5.8        | 0.05–0.07 |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO. *Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                  | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|-------------------------|----------------|--------|---------------------|-------------|------------|---------|
|                         |                | Girls  | 94.5                | 1327        | 1.7        | 0.01–0.03 |
|                         |                | Total  | 94.6                | 2984        | 3.9        | 0.03–0.05 |
| Seychelles              | 2007           | Boys   | 78.9                | 534         | 59.7       | 0.56–0.64 |
|                         |                | Girls  | 85.7                | 634         | 56.2       | 0.52–0.60 |
|                         |                | Total  | 82.4                | 1180        | 57.9       | 0.55–0.61 |
| Solomon Islands         | 2011           | Boys   | 91.3                | 642         | 28.5       | 0.25–0.32 |
|                         |                | Girls  | 92.8                | 605         | 16.7       | 0.14–0.20 |
|                         |                | Total  | 91.8                | 1305        | 23.3       | 0.21–0.26 |
| Suriname                | 2009           | Boys   | 90.7                | 784         | 41.1       | 0.38–0.45 |
|                         |                | Girls  | 87.0                | 720         | 34.3       | 0.31–0.38 |
|                         |                | Total  | 88.9                | 1510        | 37.7       | 0.35–0.40 |
| Syrian Arab Republic    | 2010           | Boys   | 100.0               | 1243        | 10.5       | 0.09–0.12 |
|                         |                | Girls  | 99.2                | 1845        | 3.4        | 0.03–0.04 |
|                         |                | Total  | 99.5                | 3088        | 6.3        | 0.05–0.07 |
| Tajikistan              | 2006           | Boys   | 94.5                | 4542        | 1          | 0.007–0.01 |
|                         |                | Girls  | 96.5                | 4627        | 0.3        | 0.002–0.005 |
|                         |                | Total  | 95.4                | 9265        | 0.7        | 0.005–0.009 |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO. 
*Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
| Country                  | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|-------------------------|----------------|--------|---------------------|-------------|------------|---------|
| Thailand                | 2008           | Boys   | 86.1                | 1175        | 21         | 0.19–0.23 |
|                         |                | Girls  | 94.5                | 1319        | 9.2        | 0.08–0.11 |
|                         |                | Total  | 90.3                | 2498        | 14.8       | 0.13–0.16 |
| Trinidad and Tobago     | 2011           | Boys   | 94.9                | 1442        | 36.3       | 0.34–0.39 |
| (National)              |                | Girls  | 94.0                | 1187        | 33.1       | 0.30–0.36 |
|                         |                | Total  | 94.5                | 2657        | 35         | 0.33–0.37 |
| Tuvalu                  | 2013           | Boys   | 92.5                | 420         | 25.2       | 0.21–0.3  |
|                         |                | Girls  | 95.6                | 461         | 7.4        | 0.05–0.10 |
|                         |                | Total  | 94.2                | 888         | 15.8       | 0.14–0.18 |
| Uganda (National)       | 2003           | Boys   | 90.2                | 1456        | 16.5       | 0.15–0.18 |
|                         |                | Girls  | 91.4                | 1395        | 13.3       | 0.12–0.15 |
|                         |                | Total  | 90.5                | 2910        | 15         | 0.14–0.16 |
| Uruguay (NATIONAL)      | 2012           | Boys   | 94.9                | 1538        | 51.7       | 0.49–0.54 |
|                         |                | Girls  | 94.6                | 1766        | 47.2       | 0.45–0.50 |
|                         |                | Total  | 94.7                | 3338        | 49.2       | 0.47–0.51 |
| Vanuatu                 | 2011           | Boys   | 95.5                | 464         | 12.5       | 0.1–0.16  |
|                         |                | Girls  | 97.7                | 603         | 6.6        | 0.05–0.09 |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO. *Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
### Prevalence of alcohol consumption

The prevalence of smoking and marijuana use was higher among the students who consumed alcohol than among the students who did not consume alcohol, so that among students who consumed alcohol, (50.9%) and (62.5%) students, respectively, among the students who drank alcohol, (50.9%) and (62.5%) students, respectively, among the students who consumed alcohol, (50.9%) and (62.5%)

---

| Country                                      | Year of survey | Gender | Response rate (%) * | Sample size | Prevalence | 95%CI** |
|----------------------------------------------|----------------|--------|---------------------|-------------|------------|---------|
| Total                                        |                |        |                     |             | 96.8       | 1083    | 9.3     | 0.08–0.11 |
| Venezuela (Barinas)                          | 2003           | Boys   | 83.5                | 886         | 37.1       | 0.34–0.4 |
|                                              |                | Girls  | 90.1                | 1052        | 28.1       | 0.25–0.31|         |
|                                              |                |        | Total               | 1954        | 32         | 0.30–0.34|         |
| Viet Nam                                     | 2013           | Boys   | 95.8                | 1491        | 30.4       | 0.28–0.33|         |
|                                              |                | Girls  | 96.2                | 1698        | 15.7       | 0.14–0.18|         |
|                                              |                |        | Total               | 3198        | 22.6       | 0.21–0.24|         |
| Yugoslav Republic of Macedonia               | 2007           | Boys   | 87.8                | 908         | 47.2       | 0.44–0.51|         |
|                                              |                | Girls  | 90.4                | 953         | 37.7       | 0.35–0.41|         |
|                                              |                |        | Total               | 1884        | 42.2       | 0.40–0.44|         |
| Zimbabwe                                      | 2003           | Boys   | 86.4                | 639         | 23.9       | 0.21–0.27|         |
|                                              |                | Girls  | 88.4                | 934         | 16.7       | 0.14–0.19|         |
|                                              |                |        | Total               | 1578        | 19.6       | 0.18–0.22|         |
| Total                                        |                |        |                      | 191228      | 18.2       | 0.18–0.21|         |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO. *Response rate (%): is defined as the percentage of the eligible sampled students of the survey population who responded to this survey. **95% (CI) = 95% Confidence Intervals.
of male and female students had a history of smoking, respectively, 83.6% of the male students who consumed alcohol had at least 10 or more days of marijuana use in 30 days, and among (39.6%) boys and (39.2%) girls, a suicide plan was observed (Table 3).
Table 3  
Characteristics of adolescents aged 11 to 16 years in the EMR region by sex

| Variables        | Categories | Boys     | Nonalcohol, N (%) | Girls    | Nonalcohol N (%) |
|------------------|------------|----------|-------------------|----------|------------------|
|                  |            | Alcohol N (%) |                  | Alcohol, N (%) |                    |
| Age              | ≤ 11 years old | 212 (23.4) | 694(76.6)*        | 177(17.0) | 864(83.0)*       |
|                  | 12 years old | 839(17.4)  | 3973(82.6)*       | 805(13.7) | 5055(86.3)*      |
|                  | 13 years old | 3207(18.7) | 13946(81.3)*      | 3506(17.7) | 16269(82.3)*     |
|                  | 14 years old | 5774(25.5) | 16832(74.5)*      | 6123(23.7) | 19708(76.3)*     |
|                  | 15 years old | 6728(31.2) | 14848(68.8)*      | 6639(28.1) | 16974(71.9)*     |
|                  | ≥ 16 years old | 8077(35.3) | 14808(64.7)*      | 6188(27.4) | 16362(72.6)*     |
| Grade            | Grade 1     | 5103(24.7) | 15545(75.3)**     | 4740(21.4) | 17367(78.6)**    |
|                  | Grade 2     | 7010(27.5) | 18483(72.5)**     | 6884(24.6) | 21098(75.4)**    |
|                  | Grade 3     | 7187(31.4) | 15695(68.6)**     | 7199(27.8) | 18672(72.2)**    |
|                  | Grade 4     | 3265(30.0) | 7634(70.0)**      | 2979(24.5) | 9177(75.5)**     |
|                  | Grade 5     | 2047(21.9) | 7295(78.1)**      | 1363(14.1) | 8291(85.9)**     |
| Truancy          | No          | 10975(22.7) | 37469(77.3)*      | 10780(19.1) | 45659(80.9)*     |
|                  | 1–5 Days    | 6892(36.3) | 12106(63.7)*      | 5527(31.5) | 11992(68.5)*     |
|                  | ≥ 6 days    | 1695(53.3) | 1487(46.7)*       | 1459(52.5) | 1319(47.5)*      |
| Loneliness       | Never       | 7880(23.5) | 25685(76.5)*      | 4328(16.0) | 22771(84.0)*     |
|                  | Rarely or sometimes | 11198(27.4) | 29677(72.6)* | 11479(22.7) | 39087(77.3)*     |
|                  | Mostly or always | 2342(35.0) | 4342(65.0)*       | 3528(31.8) | 7574(68.2)*      |
| Insomnia         | Never       | 7514(21.3) | 27828(78.7)*      | 3966(13.5) | 25314(86.5)*     |
|                  | Rarely or sometimes | 11369(29.2) | 27586(70.8)* | 12062(24.4) | 37324(75.6)*     |
|                  | Mostly or always | 2240(39.2) | 3478(60.8)*       | 3189(36.0) | 5665(64.0)*      |
| Daily activity   | No          | 14150(27.1) | 38030(72.9)*      | 16057(23.6) | 51995(76.4)*     |
|                  | Yes         | 9605(31.9) | 20492 (68.1)      | 6412(28.3) | 16255(71.7)      |
| Fruit            | No          | 15572(29.6) | 37111(70.4)       | 14598(25.3) | 43072(74.7)      |
| Variables     | Categories                  | Boys                        | Girls                       |
|---------------|-----------------------------|-----------------------------|-----------------------------|
|               | Alcohol N (%) | Nonalcohol, N (%) | Alcohol, N (%) | Nonalcohol N (%) |
|               | Yes            | 9062(28.3)          | 22938(71.7)       | 8658(24.5)       | 26731(75.5)       |
| Bullied       | No             | 14740(26.1)         | 41788(73.9)*      | 14237(22.2)      | 49775(77.8)*      |
|               | 1–9 Days       | 6643(34.7)          | 12524(65.3)*      | 6263(31.4)       | 13688(68.6)*      |
|               | ≥ 10 days      | 1265(39.3)          | 1953(60.7)*       | 1218(38.0)       | 1987(62.0)*       |
| Close friend  | No             | 1328(25.9)          | 3802(74.1)        | 1135(20.8)       | 4316(79.2)        |
|               | Yes            | 19899(26.3)         | 55624(73.7)       | 18119(21.8)      | 65027(78.2)       |
| Parent used tobacco | Neither        | 12331(24.4)         | 38215(75.6)*      | 54404(21.9)      | 42474(78.1)*      |
|               | Father or Mother or Both | 8153(32.8)         | 16739(67.2)*      | 28335(27.6)      | 20513(72.4)*      |
|               | Both           | 1812(30.4)          | 4144(69.6)*       | 6190(24.0)       | 4704(76.0)*       |
| Parental supervision | Never        | 5722 (30.9 )        | 12814 (69.1)**    | 6153 (28.6)      | 15397 (71.4)**    |
|               | Rarely or sometimes | 8000 (29.3 )      | 19329 (70.7)**    | 6687 (23.1)      | 22300 (76.9)**    |
|               | Mostly or always | 5868 (23.7 )      | 18921 (76.3)**    | 4958 (18.9)      | 21209 (81.1)**    |
| Parental support | Never          | 4197 (27.2 )        | 11230 (72.8)      | 4079 (25.4)      | 12002 (74.6)      |
|               | Rarely or sometimes | 8131 (29.3 )      | 19661 (70.7)      | 7228 (23.9)      | 22997 (76.1)      |
|               | Mostly or always | 7177 (26.4 )      | 20032 (73.6)      | 6382 (21.2)      | 23773 (78.8)      |
| Parental awareness | Never        | 4240 (32.3 )        | 8895 (67.7)**     | 3396 (28.4)      | 8569 (71.6)**     |
|               | Rarely or sometimes | 7988 (30.1 )      | 18589 (69.9)**    | 6769 (24.8)      | 20503 (75.2)**    |
|               | Mostly or always | 7204 (23.5 )      | 23390 (76.5)**    | 7480 (20.2)      | 29615 (79.8)**    |
| Peer support  | Never          | 2506 (28.1)         | 6400 (71.9)       | 1611 (24.3)      | 5011 (75.7)       |
|               | Rarely or sometimes | 9250 (27.4 )      | 24504 (72.6)      | 8300 (24.2)      | 26068 (75.8)      |
### Variables

| Variables       | Categories         | Boys Alcohol N (%) | Boys Nonalcohol, N (%) | Girls Alcohol, N (%) | Girls Nonalcohol N (%) |
|-----------------|--------------------|--------------------|------------------------|----------------------|------------------------|
| Mostly or always |                    | 7727 (27.8)        | 20046 (72.2)           | 7788 (21.9)          | 27822 (78.1)           |
| Cigarette       | Never Smoked       | 8560 (16.1)        | 44757 (83.9)*          | 10825 (13.6)         | 59833 (86.4)*          |
|                 | Smoked             | 12601 (50.9)       | 12145 (49.1)*          | 9403 (62.5)          | 6506 (37.5)*           |
| Used marijuana  | Neither            | 10998 (25.0)       | 32943 (75.0)*          | 10815 (22.6)         | 37130 (77.4)*          |
|                 | 3–9 times          | 910 (77.0)         | 272 (23.0)*            | 674 (80.4)           | 164 (19.6)*            |
|                 | ≥ 10 days          | 1401 (83.6)        | 275 (16.4)*            | 841 (83.3)           | 169 (16.7)*            |
| Had sex         | No                 | 8742 (17.4)        | 41471 (82.6)*          | 7583 (19.2)          | 53923 (80.8)*          |
|                 | Yes                | 11173 (53.4)       | 9756 (46.6)*           | 12788 (53.8)         | 6508 (46.2)*           |
| Suicide plan    | No                 | 16553 (24.3)       | 51524 (75.7)*          | 13274 (18.7)         | 57543 (81.3)*          |
|                 | Yes                | 3491 (39.6)        | 5319 (60.4)*           | 5178 (39.2)          | 8038 (60.8)*           |

Data source: Global School-based Student Health Survey (2004–2012) reported from WHO.

Chi-square test for equality of proportions p value reported. * P < 0.001; ** P < 0.05

### Determinants of alcohol consumption

After adjustment for potential confounders, the odds of drinking alcohol among girls was 17% less than boys (p < .001). Multivariate analysis showed that the Age for 16 and more than 16 years old (OR = 1.41, 95%CI: 1.33–1.48), truancy for more than 10 days (OR = 1.84, 95%CI: 1.66–2.037), Loneliness at sometimes of the times (OR = 1.27, 95%CI: 1.17–1.38), Insomnia at most of the times (OR = 1.68, 95%CI: 1.54–1.83), Daily activity (OR = 1.24, 95%CI: 1.19–1.29), Bullied for 1–9 Days in a month (OR = 1.20, 95%CI: 1.14–1.26), cigarette (OR = 3.68, 95%CI: 3.52–3.84), used marijuana for more than 10 days in a month (OR = 6.27, 95%CI: 5.12–7.68), Had sex (OR = 3.39, 95%CI: 3.24–3.55), and suicide plan (OR = 1.47, 95%CI: 1.39–1.57) were important factors affecting drinking alcohol. Fruit, parental supervision at most of the times, parental awareness at sometimes of the times decreased the odds of drinking alcohol by 0.08%, 16%, and 0.01%, respectively (Table 4).
| Variables     | drinking alcohol/N (%) | Crude OR (95%CI) * | Adjusted OR (95%CI) * | P    |
|---------------|------------------------|--------------------|-----------------------|------|
| Sex           |                        |                    |                       |      |
| Boy           | 25031/ 90435 (19.2)    | 1                  | 1                     |      |
| Girl          | 23570/ 99113 (17.3)    | .81 (.79-.83)      | .83 (.79-.86)         | < 0.001 |
| Age ≤ 11 years old | 467 / 2173 (14.9) | 1                  | 1                     |      |
| Age 12 years old | 1671/ 10767 (9.8)    | .67 (.59-.75)      | .72 (.49-.1.04)       | .085 |
| Age 13 years old | 6754/ 37100 (12.4)   | .81 (.73-.90)      | .63 (.542-.73)        | < 0.001 |
| Age 14 years old | 11985/ 48720 (17.0)  | 1.19 (1.07–1.32)   | .86 (.81-.92)         | < 0.001 |
| Age 15 years old | 13444/ 45420 (20.8) | 1.53 (1.38–1.70)   | 1.30 (1.23–1.38)      | < 0.001 |
| Age ≥ 16 years old | 14353/ 45691 (24.7) | 1.67 (1.50–1.85)   | 1.41(1.33–1.48)       |    |
| Grade         |                        |                    |                       |      |
| Grade 1       | 9927/ 43079 (15.7)    | 1                  | 1                     |      |
| Grade 2       | 14020/ 53843 (18.3)   | 1.17 (1.14–1.21)   |                       |      |
| Grade 3       | 14489/ 49037 (20.4)   | 1.40 (1.36–1.44)   |                       |      |
| Grade 4       | 6287/ 23180 (20.0)    | 1.24 (1.19–1.28)   |                       |      |
| Grade 5       | 3424/ 19061 (14.8)    | .73 (.70-.76)      |                       |      |
| Truancy       |                        |                    |                       |      |
| No            | 21958/ 105649 (14.7)  | 1                  | 1                     |      |
| 1–9 Days      | 12580/ 36914 (22.1)   | 1.97 (1.92–2.02)   | 1.25 (1.19–1.31)      | < 0.001 |
| ≥ 10 days     | 3222/ 6079 (35.0)     | 4.29 (4.07–4.53)   | 1.842 (1.665–2.037)   | < 0.001 |
| Loneliness    |                        |                    |                       |      |
| Never         | 12324/ 61193 (14.2)   | 1                  | 1                     |      |
| Variables                  | drinking alcohol/N (%) | Crude OR (95%CI) * | Adjusted OR (95%CI) * | P       |
|----------------------------|------------------------|--------------------|-----------------------|---------|
| **Variables**              |                        |                    |                       |         |
| **drinking alcohol/N (%)** |                        |                    |                       |         |
| Rarely or sometimes        | 22931/ 92220 (18.7)    | 1.31 (1.28–1.34)   | 1.27 (1.17–1.38)      | < 0.001 |
| Mostly or always           | 5965/ 18001 (22.6)     | 1.96 (1.89–2.03)   | 1.089 (1.013–1.171)   | .020    |
| **Insomnia**               |                        |                    |                       |         |
| Never                      | 11617/ 65207 (13.0)    | 1                  | 1                     |         |
| Rarely or sometimes        | 23675/ 89089 (19.5)    | 1.67 (1.62–1.71)   | 1.42 (1.35–1.49)      | < 0.001 |
| Mostly or always           | 5512/ 14772 (24.1)     | 2.74 (2.64–2.85)   | 1.68 (1.54–1.83)      | < 0.001 |
| **Daily activity**         |                        |                    |                       |         |
| No                         | 30526/ 121263 (17.6)   | 1                  | 1                     |         |
| Yes                        | 16177/ 53153 (22.2)    | 1.30 (1.27–1.33)   | 1.24 (1.19–1.29)      | < 0.001 |
| fruit                      |                        |                    |                       |         |
| No                         | 30468/ 111266 (19.1)   | 1                  | 1                     |         |
| Yes                        | 17912/ 67987 (18.6)    | .94 (.92-.96)      | .92 (.89-.96)         | .001    |
| **Bullied**                |                        |                    |                       |         |
| No                         | 29203/ 121383 (18.5)   | 1                  | 1                     |         |
| 1–9 Days                   | 13072/ 39526 (21.7)    | 1.56 (1.52–1.59)   | 1.20 (1.14–1.26)      | < 0.001 |
| ≥ 10 days                  | 2540/ 6539 (23.9)      | 2.00 (1.90–2.11)   | 1.02 (.91-.1.13)      | .720    |
| **Close friend**           |                        |                    |                       |         |
| No                         | 2502/ 10746 (15.4)     | 1                  | 1                     |         |
| Yes                        | 38419/ 160001 (17.7)   | 1.04 (.99-1.09)    |                       |         |
| **Parent used tobacco**    |                        |                    |                       |         |
| Neither                    | 24474/ 105824 (16.9)   | 1                  | 1                     |         |
| Father or Mother or Both   | 16165/ 53678 (22.8)    | 1.43 (1.39–1.46)   | 1.00 (.95-1.04)       | .932    |
| Do not know                | 3357/ 12309 (21.0)     | 1.24 (1.19–1.30)   | .91(.83-.99)          | .039    |
| **Parental supervision**   |                        |                    |                       |         |
| Never                      | 11994/ 40395 (21.7)    | 1                  | 1                     |         |
| Variables                   | drinking alcohol/N (%) | Crude OR (95%CI) * | Adjusted OR (95%CI) * | P      |
|-----------------------------|------------------------|-------------------|-----------------------|--------|
|                             |                        |                   |                       |        |
| Rarely or sometimes         | 14873/ 56818           | .80 (.81-.86)     | .85 (.81-.89)         | < 0.001|
| Mostly or always            | 10956/ 51425           | .64 (.62-.66)     | .84 (.79-.88)         | < 0.001|
| Parental support            |                        |                   |                       |        |
| Never                       | 8368/ 31786            | 1                 |                       |        |
| Rarely or sometimes         | 15552/ 58544           | 1.01 (.98-1.04)   |                       |        |
| Mostly or always            | 13708/ 57833           | .86 (.84-.89)     |                       |        |
| Parental awareness          |                        |                   |                       |        |
| Never                       | 7749/ 25405            | 1                 | 1                     |        |
| Rarely or sometimes         | 14930/ 54313           | .86 (.83-.89)     | .91 (.86-.97)         | .007   |
| Mostly or always            | 14830/ 68196           | .63 (.61-.65)     | .99 (.93-1.05)        | .847   |
| Peer support                |                        |                   |                       |        |
| Never                       | 4190/ 15741            | 1                 | 1                     |        |
| Rarely or sometimes         | 17745/ 68674           | .96 (.92-.99)     |                       |        |
| Mostly or always            | 15671/ 63872           | .896 (.861-.933)  |                       |        |
| cigarette                   |                        |                   |                       |        |
| No                          | 18103/ 123433          | 1                 | 1                     |        |
| Yes                         | 23686/ 42512           | 7.32 (7.14–7.50)  | 3.68 (3.52–3.84)      | < 0.001|
| Used marijuana              |                        |                   |                       |        |
| Neither                     | 22015/ 92604           | 1                 | 1                     |        |
| 3–9 times                   | 1616/2060 (61.7)       | 11.67 (10.49–12.97) | 5.58 (4.59–6.78) | < 0.001|
| ≥ 10 days                   | 2304/2765 (64.0)       | 16.02 (14.48–17.73) | 6.27 (5.12–7.68) | < 0.001|
| Had sex                     |                        |                   |                       |        |
| No                          | 21654/117663           | 1                 | 1                     |        |
| Yes                         | 18972/35478           | 5.09(4.96–5.22)   | 3.39 (3.24–3.55)      | < 0.001|
## Discussion

The aim of this study was to investigate the prevalence of alcohol consumption and its related factors in adolescents aged 13 to 17 years living in the Eastern Mediterranean. Analysis of the findings showed that alcohol consumption is common in adolescents, which was also found in the studies of Benjet et al. (10), Kittipichai et al. (11), and Getachew et al. (12). In a study of Thai adolescents, Luecha et al. (9) found that 31.01% of adolescents aged 10 to 14 had consumed alcohol at least once. In a study by Ting et al. (22) on 11 to 12-year-old Taiwanese adolescents, alcohol consumption was reported at 48% in this group. Explaining this finding, it can be said that seeking diversity, curiosity, easy access, misconceptions about alcohol, being influenced by friends and imitating them are among the most important causes of adolescents’ tendency to consume alcohol (10–12). It can also be stated that adolescents are exposed to high-risk behaviors such as alcohol consumption due to special conditions in this age group (23). Adolescence is a period of changes in physical, sexual, psychological, cognitive development, as well as changes in social needs, lack of appropriate conditions for passing this critical stage can lead to a tendency to consume alcohol (24).

Another finding of the present study was that the prevalence of alcohol consumption in boys is higher than girls, this finding was consistent with the findings of Alex-Hart et al. (24), Assanangkornchai et al. (25), Chaveepojnkamjorn et al. (26), Georgie et al. (27), Pengpid & Peltzer (28). Explaining this finding, we can point to the biological differences in alcohol consumption between men and women. Compared to men, women generally have less water in their body, which is why women reach the peak with less consumption, even if they consume the same amount as men, and this causes men to consume more (29, 30). We can also point to cultural differences, because in most societies drinking alcohol is masculine, and some men are better accepted by drinking alcohol in the company of their friends and have stronger personal relationships (31, 32). Social control is greater for women, and women are concerned that alcohol consumption may affect their family relationships and general behavior or make them sexually vulnerable (33, 34).

The study also found that marijuana use in adolescents greatly increases the chances of alcohol consumption. In a study conducted by Sokolovsky et al., (35) 341 young university students were surveyed. In this study, it was found that marijuana and alcohol are often used simultaneously and their simultaneous use has more negative consequences. There is a two-way relationship between alcohol

| Variables        | drinking alcohol/N (%) | Crude OR (95%CI) * | Adjusted OR (95%CI) * | P     |
|------------------|------------------------|--------------------|-----------------------|-------|
| Suicide plan     | No                     | 30106/139974 (16.7)| 1                     | 1     |
|                  | Yes                    | 8800/22387 (29.2)  | 2.36 (2.29–2.43)      | 1.47 (1.39–1.57) | < 0.001 |

95% (CI) * = 95 Confidence Intervals. The variables with a P-value of < 0.25 at the univariate analysis were introduced into the multivariate analysis.
consumption and marijuana use, adolescents who use marijuana may also use more alcohol, and vice versa, usually marijuana and alcohol are consumed simultaneously. In general, it can be said that performing a high-risk behavior in adolescence can lead to different behaviors (36–38).

Another finding of the present study was that smoking increases the likelihood of alcohol consumption. The same finding was found in the studies of Thrul et al. (39), McKee et al. (40), Piasecki et al. (41). In this regard, Thrul et al. (39) in a study showed that the simultaneous consumption of cigarette and alcohol increases the perception of rewards for consumption (39). On the other hand, some studies have shown that the simultaneous consumption of alcohol and cigarette may have a greater effect on the mesolimbic system, which in turn stimulates the reward system in the brain, and further stimulation of this system leads to increased adolescent desire to consume these two simultaneously (42, 43).

Having sex was another factor that increased the chances of consuming alcohol, alcohol consumption can be associated with engaging in sexual experiences (44). In a study, Dogan et al. (45) showed that alcohol consumption in adolescents affects the number of sexual partners. Explaining this finding, it can be said that having a positive attitude towards a behavior affects the likelihood of doing that behavior. In some adolescents, there is a view that alcohol consumption has a positive effect on sexual experiences and this view leads to alcohol consumption among them (46). Some people also believe that alcohol consumption causes a pleasurable sexual relationship and increases sexual attraction and the positive aspects of sexual behavior, all of these factors affect the increase in alcohol consumption (38, 47).

Being alone also increased alcohol consumption. Consistent with this finding, McKay et al. (48), in a study showed that being alone is effective in alcohol consumption. In addition, loneliness and gender are associated with alcohol consumption, so that being a woman and experiencing loneliness put a person at greater risk for drinking alcohol. For example, several studies have shown that alone adolescents may use alcohol, cigarette, and illegal drugs, probably Adolescents use alcohol as a form of self-medication to reduce loneliness (49, 50).

Another factor that was shown to be effective in alcohol consumption was insomnia. This finding is consistent with Barrow's research (50, 51) which showed that insomnia creates a vicious circle with alcohol consumption. As insomnia increases the risk of alcohol consumption, alcohol consumption can become problematic as well, which exacerbates insomnia. The same finding was found in the research of Rohers et al. (52) Their study found that people who experience insomnia use alcohol to improve sleep quality. On the other hand, it has been found that a history of committing suicide increases the chances of alcohol consumption. This finding is consistent with the research of Pompili et al. (53) who showed in their research that there is a two-way relationship between alcohol consumption and suicide. Explaining this finding, it can be stated that according to studies, suicide is directly related to anxiety and depression, and many people with a history of suicide use alcohol as self-medication, and when they suffer from anxiety, low mood or life problems, they turn to alcohol to forget their problems. However, constant use of alcohol can cause tolerance, dependence and ultimately addiction in the individual (54). Although alcohol consumption can temporarily reduce suicidal ideation, in fact it makes the problem worse. In most cases,
long-term alcohol abuse makes the suicidal ideation more frequent and powerful and increases the likelihood of attempting suicide (55, 56). In addition, alcohol abuse generally exacerbates the other factors influencing suicide. For example, alcohol exacerbates the symptoms of many disorders, such as bipolar disorder, borderline personality disorder, and depression, all of which can contribute to suicide. Alcoholism can also cause problems at work, within the family, interpersonal relationships, and the legal system, these problems affect suicide (55).

On the other hand, the effect of daily activity on alcohol consumption cannot be ignored. In this regard, in a study Conroy et al. (57) showed that after controlling age and gender, daily physical activity was associated with alcohol consumption. If a curious and energetic teenager does not have good entertainment and it is not possible for him/her to have proper daily activities, he/she will be drawn to activities and entertainment that are not good. Therefore, addressing the issue of alcohol consumption in adolescents and young people and preventing it by emphasizing the role of daily activities is very necessary and important.

It has also been found that a history of being beaten increases the chances of alcohol consumption in adolescents. Studying the research related to the long-term effects of child abuse has shown that most adolescents and adults who have had traumatic events as children are more likely to consume alcohol than others. Research shows that childhood abuse experiences can have long-term effects on all aspects of health, development, and well-being (58), and can lead to impaired performance and high-risk behaviors such as alcohol consumption (59). Waner et al. (60) believe that prolonged exposure to bullying predisposes the child to violence and high-risk behaviors in the future. Children who have been abused have also been found to be more aggressive and delinquent than their peers. These children are pessimistic on their social networks. These signs may be influential in shaping the tendency to consume alcohol (61).

It was also found that parental supervision is a deterrent and effective factor in reducing alcohol consumption in adolescents. The same finding was obtained in the study of Benjet et al. (10). A study by Strunin et al. (62) also found that parental supervision was effective in limiting alcohol consumption in adolescents. Parental supervision has a significant effect on delaying the tendency to consume alcohol. Adolescents and young people who have less family support and supervision show self-destructive behaviors. The higher the level of family support in adolescents is, the less they are exposed to alcohol. In fact, parental supervision is a protective factor against alcohol consumption (63, 64).

**Strengths And Limitations**

This study has several strengths, including the fact that a standard questionnaire was used to measure the prevalence of alcohol among students and the samples were selected by a scientific method. Furthermore, the sample size was high and various risk factors for adolescent alcoholism were examined, also, due to the fact that the countries included in the study were culturally, religiously, socially, demographically and healthily diverse, these cases led to the study of various factors that affected the
prevalence of alcohol in adolescents. In addition to the cases mentioned, this study also faced other limitations. First, a self-report questionnaire was used to measure the prevalence of alcohol in students, which may have led to bias in the answers, because the prevalence of alcohol may be underestimated and students may have concealed their alcohol use or not mentioned the factors affecting it for fear of being reprimanded by their parents and school teachers. Second, because the GSHS did not provide information on the prevalence of alcohol in the parents of these students, this important influencing factor has not been investigated. Third, in this study, it was found that marijuana use, smoking and having sex are some of the main factors affecting the prevalence of alcohol in adolescents, but more information in this regard, such as the age of first smoking, marijuana use or sexual intercourse and how often they were done were not available, finally, for the purpose of this study, the missing data were not replaced by statistical methods and therefore such data were removed from the analysis. The results of this study and previous reports showed that using tobacco and smoking cigarette are affected by various factors. Therefore, in order to prevent the spread of alcohol in adolescents, various factors and their risk should be considered as well, all these factors should be considered in the development of treatment and prevention programs. It is also suggested that policy makers and therapists of children and adolescents pay special attention to the prevalence of alcohol in adolescence and the factors affecting it, particularly in this study it was found that using marijuana increases the risk of alcohol consumption, which is important and should be considered for prevention. Also, more research is needed to provide better interventions to reduce alcohol consumption in adolescents.

Conclusion

Due to the importance of the prevalence of alcohol in adolescents and its role in creating high-risk behavior in adulthood, identifying and controlling the factors associated with it is of great importance. Using marijuana, having sex, loneliness, insomnia, suicide plan, and being beaten were among the most important factors associated with adolescent alcohol use in EMR. Therefore, it is recommended that school counselors, parents and policy makers of prevention and treatment programs pay attention to these issues.

Abbreviations

EMR
Eastern Mediterranean Region; GSHS:Global School-based Student Health Survey; WHO:World Health Organization; CDC:Disease Control and Prevention; UNICEF:United Nations International Children's Emergency Fund; UNESCO:United Nations Educational, Scientific and Cultural Organization; UNAIDS:United Nations programme on Human Immunodeficiency Virus/United Nations programme on Acquired Immunodeficiency Syndrome; HIV:Human Immunodeficiency Viruses; OR:odds ratio.

Declarations

Ethics approval and consent to participate
The study was approved by the ethics committee of the vice chancellery of research and technology, Kermanshah University of Medical Sciences (IR.KUMS.REC.1398.711) and the written informed consent was obtained from each participant.

**Consent for publication**

All authors consent to this manuscript’s publication.

**Availability of data and materials**

The data are available on [www.who.int/chp/gshs/factsheets/en](http://www.who.int/chp/gshs/factsheets/en).

**Competing interests**

The authors declare that they have no competing interests.

**Funding**

The Research Deputy of Kermanshah University of Medical Sciences funded the study.

**Authors’ contributions**

VF developed this manuscript, supported by TAJ and SS. MM managed all the research. TMM contributed to data analysis and interpretation. BR provided additional literature review. MA and SHB revised the manuscript. All authors contributed to the subsequent revisions of the paper and have approved the final paper for submission.

**Acknowledgments**

We sincerely thank the World Health Organization and US Centers for Disease Control for making the GSHS dataset available for free download on their website.

**References**

1. Silvers JA, Squeglia LM, Rømer Thomsen K, Hudson KA, Feldstein Ewing SW. Hunting for What Works: Adolescents in Addiction Treatment. Alcohol Clin Exp Res. 2019;43(4):578–92.

2. Kapetanovic S, Rothenberg WA, Lansford JE, Bornstein MH, Chang L, Deater-Deckard K, et al. Cross-Cultural Examination of Links between Parent-Adolescent Communication and Adolescent Psychological Problems in 12 Cultural Groups. J Youth Adolesc. 2020;49(6):1225–44.

3. Crews FT, Vetreno RP, Broadwater MA, Robinson DL. Adolescent Alcohol Exposure Persistently Impacts Adult Neurobiology and Behavior. Pharmacol Rev. 2016;68(4):1074–109.

4. Lee Y-T, Huang Y-H, Tsai F-J, Liu H-C, Sun F-J, Tsai Y-J, et al. Prevalence and psychosocial risk factors associated with current cigarette smoking and hazardous alcohol drinking among adolescents in Taiwan. Journal of the Formosan Medical Association. 2021;120(1, Part 1):265 – 74.
5. Zhao X, Kelly AB, Rowland B, Williams J, Kremer P, Mohebbi M, et al. Intention to drink and alcohol use before 18 years among Australian adolescents: An extended Theory of Planned Behavior. Addictive behaviors. 2020;111:106545.

6. Greń J, Ostaszewski K, Pisarska A, Bobrowski K. Drinking and alcohol-related problems among at-risk adolescents: The role of protective behavioral strategies. Addictive behaviors. 2021;114:106746.

7. Kuo PC, Huang JH, Wu SC, Chen WJ. Associations of parental and peer cross-substance use with 12-17-year-old adolescents' problematic alcohol use: A parent-child dyadic gender analysis. Drug Alcohol Depend. 2021;221:108611.

8. Koning I, de Looze M, Harakeh Z. Parental alcohol-specific rules effectively reduce adolescents’ tobacco and cannabis use: A longitudinal study. Drug Alcohol Depend. 2020;216:108226.

9. Luecha T, Peremans L, Dilles T, Van Rompaey B. The prevalence of alcohol consumption during early adolescence: a cross-sectional study in an eastern province, Thailand. International Journal of Adolescence Youth. 2019;24(2):160–76.

10. Benjet C, Borges G, Méndez E, Casanova L, Medina-Mora ME. Adolescent alcohol use and alcohol use disorders in Mexico City. Drug Alcohol Depend. 2014;136:43–50.

11. Kittipichai W, Sataporn H, Sirichotiratana N, Charupoonsophon P. Alcoholic beverages drinking among female students in a tourist province. Thailand Global journal of health science. 2011;4(1):57–64.

12. Getachew S, Lewis S, Britton J, Deressa W, Fogarty AW. Prevalence and risk factors for initiating tobacco and alcohol consumption in adolescents living in urban and rural Ethiopia. Public Health. 2019;174:118–26.

13. Leung J, Chiu V, Connor JP, Peacock A, Kelly AB, Hall W, et al. Alcohol consumption and consequences in adolescents in 68 low and middle-income countries - a multi-country comparison of risks by sex. Drug Alcohol Depend. 2019;205:107520.

14. de Freitas Ferreira M, de Moraes CL, Braga JU, Reichenheim ME, da Veiga GV. Abusive alcohol consumption among adolescents: a predictive model for maximizing early detection and responses. Public Health. 2018;159:99–106.

15. Korlakunta A, Reddy CMP. High-risk behavior in patients with alcohol dependence. Indian J Psychiatry. 2019;61(2):125–30.

16. Weinhardt LS, Carey MP. Does alcohol lead to sexual risk behavior? Findings from event-level research. Annu Rev Sex Res. 2000;11:125–57.

17. Shyhalla K. Alcohol involvement and other risky driver behaviors: effects on crash initiation and crash severity. Traffic Inj Prev. 2014;15(4):325–34.

18. Hamdi E, Gawad T, Khoweiled A, Sidrak AE, Amer D, Mamdouh R, et al. Lifetime prevalence of alcohol and substance use in Egypt: a community survey. Substance abuse. 2013;34(2):97–104.

19. Kendall RE. Alcohol and suicide. Substance and alcohol actions/misuse. 1983;4(2–3):121–7.

20. Adger H Jr, Saha S. Alcohol use disorders in adolescents. Pediatr Rev. 2013;34(3):103–14.
21. Teckie S, Wotman M, Marziliano A, Orner D, Yi J, Mulvany C, et al. Patterns of alcohol use among early head and neck cancer survivors: A cross-sectional survey study using the alcohol use disorders identification test (AUDIT). Oral Oncol. 2021;119:105328.

22. Ting TT, Chen WJ, Liu CY, Lin YC, Chen CY. Peer influences on alcohol expectancies in early adolescence: a study of concurrent and prospective predictors in Taiwan. Addictive behaviors. 2015;40:7–15.

23. Wade NE, Palmer CE, Gonzalez MR, Wallace AL, Infante MA, Tapert SF, et al. Risk factors associated with curiosity about alcohol use in the ABCD cohort. Alcohol (Fayetteville NY). 2021;92:11–9.

24. Waddell JT, Blake AJ, Chassin L. Relations between impulsive personality traits, alcohol and cannabis co-use, and negative alcohol consequences: A test of cognitive and behavioral mediators. Drug Alcohol Depend. 2021;225:108780.

25. Assanangkornchai S, Conigrave KM, Saunders JB. RELIGIOUS BELIEFS AND, PRACTICE, AND ALCOHOL USE IN THAI MEN. Alcohol Alcohol. 2002;37(2):193–7.

26. Chaveepojnkamjorn W. Alcohol consumption patterns among vocational school students in central Thailand. Southeast Asian J Trop Med Public Health. 2012;43(6):1560–7.

27. Georgie JM, Sean H, Deborah MC, Matthew H, Rona C. Peer-led interventions to prevent tobacco, alcohol and/or drug use among young people aged 11–21 years: a systematic review and meta-analysis. Addiction. 2016;111(3):391–407.

28. Pengpid S, Peltzer K. Alcohol use and associated factors among adolescent students in Thailand. West Indian Med J. 2012;61(9):890–6.

29. Seitz HK, Egerer G, Simanowski UA, Waldherr R, Eckey R, Agarwal DP, et al. Human gastric alcohol dehydrogenase activity: effect of age, sex, and alcoholism. Gut. 1993;34(10):1433–7.

30. Pozzato G, Moretti M, Franzin F, Crocè LS, Lacchin T, Benedetti G, et al. Ethanol metabolism and aging: the role of “first pass metabolism” and gastric alcohol dehydrogenase activity. The journals of gerontology Series A, Biological sciences and medical sciences. 1995;50(3):B135-41.

31. Holmila M, Raitasalo K. Gender differences in drinking: why do they still exist? Addiction. 2005;100(12):1763–9.

32. Rahav G, Wilsnack R, Bloomfield K, Gmel G, Kuntsche S. The influence of societal level factors on men's and women's alcohol consumption and alcohol problems. Alcohol alcoholism (Oxfordshire) Supplement. 2006;41(1):i47–55.

33. Bernard S, Graham K, Kuendi H, Hettige S, Obot I. 'I have no interest in drinking': a cross-national comparison of reasons why men and women abstain from alcohol use. Addiction. 2009;104(10):1658–68.

34. Chaiyasong S, Huckle T, Mackintosh AM, Meier P, Parry CDH, Callinan S, et al. Drinking patterns vary by gender, age and country-level income: Cross-country analysis of the International Alcohol Control Study. Drug and alcohol review. 2018;37 Suppl 2(Suppl Suppl 2):S53-s62.

35. Sokolovsky AW, Gunn RL, Micalizzi L, White HR, Jackson KM. Alcohol and marijuana co-use: Consequences, subjective intoxication, and the operationalization of simultaneous use. Drug Alcohol
36. Brière FN, Fallu JS, Descheneaux A, Janosz M. Predictors and consequences of simultaneous alcohol and cannabis use in adolescents. Addictive behaviors. 2011;36(7):785–8.

37. Earleywine M, Newcomb MD. Concurrent versus simultaneous polydrug use: prevalence, correlates, discriminant validity, and prospective effects on health outcomes. Exp Clin Psychopharmacol. 1997;5(4):353–64.

38. Patrick ME, Fairlie AM, Lee CM. Motives for simultaneous alcohol and marijuana use among young adults. Addictive behaviors. 2018;76:363–9.

39. Thrul J, Gubner NR, Tice CL, Lisha NE, Ling PM. Young adults report increased pleasure from using e-cigarettes and smoking tobacco cigarettes when drinking alcohol. Addictive behaviors. 2019;93:135–40.

40. McKee SA, Hinson R, Rounsaville D, Petrelli P. Survey of subjective effects of smoking while drinking among college students. Nicotine tobacco research: official journal of the Society for Research on Nicotine Tobacco. 2004;6(1):111–7.

41. Piasecki TM, Jahng S, Wood PK, Robertson BM, Epler AJ, Cronk NJ, et al. The subjective effects of alcohol-tobacco co-use: an ecological momentary assessment investigation. J Abnorm Psychol. 2011;120(3):557–71.

42. Doyon WM, Dong Y, Ostroumov A, Thomas AM, Zhang TA, Dani JA. Nicotine decreases ethanol-induced dopamine signaling and increases self-administration via stress hormones. Neuron. 2013;79(3):530–40.

43. Tizabi Y, Bai L, Copeland RL Jr, Taylor RE. Combined effects of systemic alcohol and nicotine on dopamine release in the nucleus accumbens shell. Alcohol Alcohol (Oxf Oxfs). 2007;42(5):413–6.

44. George WH, Davis KC, Norris J, Heiman JR, Stoner SA, Schacht RL, et al. Indirect effects of acute alcohol intoxication on sexual risk-taking: The roles of subjective and physiological sexual arousal. Arch Sex Behav. 2009;38(4):498–513.

45. Dogan SJ, Stockdale GD, Widaman KF, Conger RD. Developmental relations and patterns of change between alcohol use and number of sexual partners from adolescence through adulthood. Dev Psychol. 2010;46(6):1747–59.

46. Logan DE, Henry T, Vaughn M, Luk JW, King KM. Rose-colored beer goggles: the relation between experiencing alcohol consequences and perceived likelihood and valence. Psychology of addictive behaviors: journal of the Society of Psychologists in Addictive Behaviors. 2012;26(2):311–7.

47. Brown JL, Talley AE, Littlefield AK, Gause NK. Young women's alcohol expectancies for sexual risk-taking mediate the link between sexual enhancement motives and condomless sex when drinking. J Behav Med. 2016;39(5):925–30.

48. McKay MT, Konowalczyk S, Andretta JR, Cole JC. The direct and indirect effect of loneliness on the development of adolescent alcohol use in the United Kingdom. Addictive Behaviors Reports. 2017;6:65–70.
49. Page RM, Cole GE. Loneliness and alcoholism risk in late adolescence: a comparative study of adults and adolescents. Adolescence. 1991;26(104):925–30.

50. Brower KJ. Alcohol's effects on sleep in alcoholics. Alcohol research health: the journal of the National Institute on Alcohol Abuse Alcoholism. 2001;25(2):110–25.

51. Brower KJ. Insomnia, alcoholism and relapse. Sleep medicine reviews. 2003;7(6):523–39.

52. Roehrs T, Papineau K, Rosenthal L, Roth T. Ethanol as a hypnotic in insomniacs: self administration and effects on sleep and mood. Neuropsychopharmacology: official publication of the American College of Neuropsychopharmacology. 1999;20(3):279–86.

53. Pompili M, Serafini G, Innamorati M, Dominici G, Ferracuti S, Kotzalidis GD, et al. Suicidal behavior and alcohol abuse. Int J Environ Res Public Health. 2010;7(4):1392–431.

54. Conner KR, Duberstein PR. Predisposing and precipitating factors for suicide among alcoholics: empirical review and conceptual integration. Alcohol Clin Exp Res. 2004;28(5 Suppl):6s–17s.

55. Bernal M, Haro JM, Bernert S, Brugha T, de Graaf R, Bruffaerts R, et al. Risk factors for suicidality in Europe: results from the ESEMED study. J Affect Disord. 2007;101(1–3):27–34.

56. Flensborg-Madsen T, Knop J, Mortensen EL, Becker U, Sher L, Grønbaek M. Alcohol use disorders increase the risk of completed suicide irrespective of other psychiatric disorders. A longitudinal cohort study. Psychiatry research. 2009;167(1–2):123–30.

57. Conroy DE, Ram N, Pincus AL, Coffman DL, Lorek AE, Rebar AL, et al. Daily physical activity and alcohol use across the adult lifespan. Health psychology: official journal of the Division of Health Psychology American Psychological Association. 2015;34(6):653–60.

58. Herrenkohl TI, Jung H, Klika JB, Mason WA, Brown EC, Leeb RT, et al. Mediating and moderating effects of social support in the study of child abuse and adult physical and mental health. Am J Orthopsychiatry. 2016;86(5):573–83.

59. Yoon S, Shi Y, Yoon D, Pei F, Schoppe-Sullivan S, Snyder SM. Child Maltreatment, Fathers, and Adolescent Alcohol and Marijuana Use Trajectories. Subst Use Misuse. 2020;55(5):721–33.

60. Warner JE, Hansen DJ. The identification and reporting of physical abuse by physicians: a review and implications for research. Child Abuse Negl. 1994;18(1):11–25.

61. Moeller TP, Bachmann GA, Moeller JR. The combined effects of physical, sexual, and emotional abuse during childhood: long-term health consequences for women. Child Abuse Negl. 1993;17(5):623–40.

62. Strunin L, Díaz Martínez A, Díaz-Martínez LR, Heeren T, Kuranz S, Winter M, et al. Parental monitoring and alcohol use among Mexican students. Addictive behaviors. 2013;38(10):2601–6.

63. Kim B, Han SR, Park EJ, Yoo H, Suh S, Shin Y. The Relationship between Mother's Smartphone Addiction and Children's Smartphone Usage. Psychiatry investigation. 2021;18(2):126–31.

64. Johnson JL, Leff M. Children of substance abusers: overview of research findings. Pediatrics. 1999;103(5 Pt 2):1085–99.