

# Trends of alcohol use, dietary behaviour, interpersonal violence, mental health, oral and hand hygiene behaviour among adolescents in Lebanon: cross-sectional national school surveys from 2005, 2011 and 2017

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## Research article

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# Abstract

**Background:** Health risk behaviours during adolescence can have long-term negative consequences. Little is known, however, about the recent health risk behaviour trends in adolescents in Lebanon. This investigation aimed to report the trends in the prevalence of various health risk behaviours, such as alcohol use, dietary behaviour, interpersonal violence, mental health, oral and hand hygiene, among adolescents in Lebanon.

**Methods:** Cross-sectional nationally representative data were analysed from 13,109 adolescents (14 years median age) that participated in three waves (2005, 2011 and 2017) of the “Lebanon Global School-Based Student Health Survey (GSHS)”.

**Results:** Significant improvements were found among both boys and girls in the decline of interpersonal violence (bullying victimization, being physically attack and involvement in physical fighting), poor washing of hands after using the toilet, and suicide plan, and among girls only loneliness, worry-induced sleep disturbance and suicidal ideation. Significant increases were found among both boys and girls in the prevalence of inadequate fruit consumption, and among boys only unintentional injury and not always washing hands before eating.

**Conclusion:** Several decreases but also increases of health risk behaviours were found over three assessment points during a period of 12 years calling for continued health enhancing activities in this adolescent population.

## Background

In Lebanon, an upper middle-income country in the Arab region, “91% of all death are attributed to non-communicable diseases” [1]. The “burden of non-communicable diseases (cardiovascular disease, cancer, chronic lung diseases, and diabetes)” is on the increase in the Arab world, including Lebanon [2]. “In some parts of the Arab world, adolescents experience a greater burden of ill health due to overweight/obesity, transport injuries, cardiovascular and metabolic conditions, and mental health disorders than those in other regions of the world.” [3] “Poor diets, insufficient physical activity, tobacco use, road traffic injuries, and exposure to violence are major risk factors.” [3,4] Previous cross-sectional studies among adolescents in Lebanon found a high prevalence of various health risk behaviours. In terms of interpersonal violence, a high prevalence of involvement in physical fight (almost 42%) were found among school adolescents in Beirut, Lebanon [5]. In a national sample of adolescents in Lebanon in 2009, “76.4% and 81.2% of these had experienced physical and verbal/emotional abuse respectively at least once at school.” [6], and in an investigation in 1028 Lebanese children (8-17 years), “54% reported at least one incident of physical abuse over a 1-year period” [7], and 30% were involved in bullying [8]. Regarding mental health, in a study among adolescents (N=510) in Beirut the prevalence of suicidal ideation or attempt was 4.3% [9], 76.5% had poor sleep quality [10], and 26.1% had 30-day psychiatric disorders, including 13.1% anxiety disorders [11]. In a national survey among adolescents in Lebanon, a

high prevalence of household food insecurity (55.2%) was observed [12], and in a survey among adolescent students (N=830) in Beirut, Lebanon, in 2014, a high prevalence of sub-optimal tooth brushing (54.0%, <2 times/day) was found [13]. In the Arab region, including Lebanon, “increased education and age at marriage have transformed adolescents’ lives in the region, but the mismatch between education and job opportunities, combined with economic stagnation, changing gender roles, and the rise of social media contribute to quickly evolving and sometimes volatile environments in which young people reach adulthood. Tension between tradition, attachment to family, community, and country on the one hand, and anxiety about the future in the face of unemployment, perceived political corruption, and armed conflict present difficult choices for adolescents, and may contribute to the high mental health burden in the region.” [3]

Assessing behavioural risk factors, such as injury and violence, poor mental health, substance use, unhealthy diet and sedentary lifestyle, over time may aid in improving strategies to prevent or ameliorate reducing health risk behaviours in the adolescent population [14-16]. Studies investigating trends in health risk behaviours among adolescents showed different results [15-17], ranging from increases in the prevalence fruit and vegetable intake and in being bullied to decreases in physical inactivity, bullying victimization, fighting and injury. In a trend study in Oman poor hand hygiene behaviour increased [16], while it decreased in the Philippines [15]. A major gap in the literature is the lack of studies that have assessed trends in health risk behaviour among adolescents in countries in the Arab region, such as in Lebanon. The current investigation assessed trends of the prevalence of 19 different health risk behaviours and protective factors in the 2005, 2010 and 2017 Lebanon “Global School-based Student Health Survey (GSHS)”. It is hypothesized that the proportion of the various unhealthy behaviours assessed would be different across the three cross-sectional survey assessments over a period of 12 years. Study findings on various health risk behaviours over time could be aid in strategies promoting health programme activities in schools [18].

## Methods

### Sample and procedure

Cross-sectional nationally representative data from the 2005, 2011 and 2017 Lebanon GSHS were analyzed [19]. More detailed information on the methods of the GSHS and the data can be publicly accessed [19]. Briefly, a two-stage cluster sampling design was used to generate a national representative country sample [19]. First, schools were selected with probability proportional to sample size. Second, classes of students in grades 7-9 in 2005 and 2011 and grades 7-12 in 2017 within schools were randomly selected [19]. All students in the selected classes were eligible to participate irrespective of age [19]. Data were collected with a self-administered questionnaire in Arabic language [19]. For the 2005 Lebanon GSHS the school response rate was 92%, student response rate 96%, and the overall response rate 88%, for the 2011 Lebanon GSHS 2011 the corresponding figures were 88%, 99% and 87%, and for the 2017 Lebanon GSHS the corresponding figures were 88%, 94% and 82% [19]. The Lebanon GSHS was

approved by the Lebanon Ministry of Education and Higher Education, the Lebanon Ministry of Public Health and the World Health Organization.

### *Measures*

The questionnaire used is shown in supplementary file 1 [19]. The GSHS core questionnaire assesses 10 modules: “Alcohol use, Dietary behaviors, Drug use, Hygiene, Mental health, Physical activity, Protective factors, Sexual behaviors that contribute to HIV infection, other sexually-transmitted infections, and unintended pregnancy, Tobacco use, Violence and unintentional injury.” [19] All GSHS core modules that were assessed in the 2005, 2011 and 2017 Lebanon GSHS were included in this analysis. The consumption of less than “two or more servings of fruits in a day” and less than “three or more servings of vegetables a day” were considered inadequate [20].

### *Data analysis*

Statistical analyses were done with “STATA software version 15.0 (Stata Corporation, College Station, Texas, USA),” Data from the 2005, 2011 and 2017 Lebanon GSHS were merged and were weighted for non-response and probability selection [19]. Descriptive data are presented as proportions for each study year. Moreover, the absolute differences of each health risk behaviour outcome between the first and last study year are shown in percentages. Pearson Chi-square tests were applied for testing differences in proportion. The significance of a linear trend was tested by treating study year as categorical in logistic regression analyses, controlled for age group and experience of hunger (proxy for socioeconomic status), for boys and girls, separately. Since alcohol use, dietary behaviour, interpersonal violence, mental health, oral and hand hygiene behaviour may differ by sex, we thought it being more appropriate to conduct sex stratified analysis, in line with some previous studies [15-17]. Taylor linearization methods were utilized in all statistical analyses to account for the sample weight and complex design of the study. Under 3.5% of the data were missing for all the variables (except for injury). To assess the influence of missing values, sensitivity analyses were conducted by “comparing results to models excluding individuals with missing values, and by setting the missing values at all possible levels of a given variable,” [21] but this did not change the statistical significance of the results.  $P < 0.05$  was considered significant.

## **Results**

### *Study sample description*

The three Lebanon GSHS samples consisted of 13,109 school-going adolescents, 53.0% females and 47.0% males (14 years median age, 2 years interquartile range). The proportion older adolescents increased across the three different surveys ( $P < 0.001$ ). In surveys 2005 and 2011 only students in Grade 7-9 were included, while in the 2017 survey students in Grade 7-12 were included (39.4% in Grade 10-12) (see Table 1).

### *Health risk behaviour outcomes*

*Poor diet.* Among students, 42.2% of males and 47.2% of females, that ate less than two fruit servings daily in 2005, the proportion of inadequate fruit intake significantly increased to 50.3% among boys (p for trend 0.006) and 54.4% among girls (p for trend 0.007) in 2017. Inadequate vegetable consumption (81.4% among boys and 85.7% among girls in 2005) did not significantly change over time among both boys and girls. The prevalence of students who reported frequently experiencing hunger (3.4% among boys and 2.6% among girls in 2005) did not significantly change from 2005 to 2017 in both males and females.

*Alcohol use and misuse.* The prevalence of current alcohol use (27.8% among boys and 12.2% among girls in 2005), ever drunk (21.2% among boys and 7.1% among girls in 2005) and trouble from drinking alcohol (23.7% among boys and 11.1% among girls in 2005) did not significantly change over time among both boys and girls.

*Injury and violence-related behaviour.* The prevalence of annual injury increased significantly from 37% to 44% in boys (p for trend 0.004) but not in girls (28.4% in 2005 and 31.5% in 2017). Being bullied (38.7% among boys and 29.4% among girls in 2005), victim of physical assault (50.0% among boys and 33.4% among girls in 2005) and involved in physical fighting (64.6% among boys and 29.0% among girls in 2005) significantly decreased in both sexes (p for trend <0.001).

*Oral and hand hygiene.* The prevalence of inadequate tooth brushing was 38.4% among male and 30.4% among female students in 2005, which remained high over time. Not always washing hands prior to eating significantly increased among boys (p for trend 0.012), while not always washing hands after using the toilet decreased both among boys (p for trend 0.002) and girls (p for trend <0.001), and “not always washing hands with soap” did not change over time.

*Poor mental health.* Among all five poor mental health indications (having no close friends: 3.7% among boys and 3.3% among girls in 2005, worry-induced sleep disturbance: 9.3% among boys and 17.7% among girls in 2005, loneliness: 7.7% among boys and 16.1% among girls in 2005, suicidal ideation: 14.5% among boys and 17.5% among girls in 2005, and suicide plan: 11.0% among boys and 11.2% among girls in 2005), suicide plan decreased among boys (p for trend <0.001), and loneliness (p for trend 0.004), worry-induced sleep disturbance (p for trend 0.022), suicidal ideation (p for trend <0.001) and suicide plan (p for trend <0.001) significantly decreased among girls.

*Protective factors.* School truancy (20.9% among boys and 10.3% among girls in 2005), peer support (64.5% among boys and 73.3% among girls in 2005) and the three parental support indicators (supervision, connectedness and bonding) did not change over time among both boys and girls (see Tables 2 and 3).

## **Discussion**

The study found across three GSHS in 2005, 2011 and 2017 in Lebanon significant decreases among both boys and girls in interpersonal violence (bullying victimization, being physically attack and

involvement in physical fighting), inadequate hand hygiene (after toilet use), and suicide plan, and among girls only suicidal ideation, loneliness and worry-induced sleep disturbance. Significant increases were found among both boys and girls in the prevalence of inadequate fruit consumption, and among boys only unintentional injury and inadequate hand hygiene (before eating). In a “prospective observational study involving 50 schools from different areas of Lebanon, around 70% of the involved schools offered health-related courses in their curricula” [22]. “Dental health (74%), smoking cessation (72%) and physical activity (68%) were among other most addressed topics, while mental health was the least discussed (20%).” [22] “The study findings suggest that despite weaknesses, the majority of the sampled schools had either implemented or were in the process of implementing a health promoting school programme to improve health education and students’ well-being.”[22] Following implementation of a network of health promoting schools (HPS) in Lebanon in 2010, a cross-sectional evaluation comparing HPS with non-HPS was conducted in 2011-2012, which found no significant differences between HPS and non-HPS in the assessed risk behaviours (drug use, smoking and alcohol use) [23].

Violence-related behaviour (being bullied, physically attacked and participation in a physical fight) decreased in this study, which concurs with four other studies [14,24-26], while a few studies found an increase in one or more types of interpersonal violence, e.g., in Oman [16], the Philippines [15] and Venezuela [27]. In several older studies among adolescents in Lebanon, high rates of interpersonal violence have been reported [5-7], which compares with our high rates of interpersonal violence in the 2005 GSHS. It is possible that the high rates of interpersonal violence in 2005 were still related to the post-conflict situation in Lebanon, which subsequently subsided so that interpersonal violence decreased from 2005 to 2017. On the other hand, injury prevalence increased in this study among boys, while in the trend study in the Philippines a similar increased was observed [15], in Oman, no significant trend differences were found [16] and in Morocco a decline in the prevalence of injury among adolescents was found [28]. Considering the high proportion and significant increase in annual injury prevalence in this study intensified safety promotion and injury prevention programming is indicated in Lebanon.

The prevalence of inadequate fruit and vegetable intake was high in the 2005 GSHS and increased for fruit intake over the study period, which was also shown in a trend study in Oman [16] and other countries in the Arab region [29]. The experience of hunger (or food insecurity) was low and did not significantly differ among boys and girls over time. In a national survey among adolescents conducted in 2015 in Lebanon, a high prevalence of household food insecurity (55.2%) was observed [12], which may explain the high prevalence of food insecurity in our 2011 survey.

The prevalence of sub-optimal oral hygiene (tooth brushing <twice/day) was high across the three school surveys (almost 40%), much higher than in a study among school adolescents in four Southeast Asian countries (22.4%) [30]. In a survey among adolescent students in Beirut, also a high prevalence of sub-optimal tooth brushing was found [13], calling for oral hygiene health promotion programmes targeting schoolchildren and their parents [13]. Although poor hand washing after toilet use decreased between both sexes, poor hand washing before eating increased among boys in this study. In the Oman trend study sub-optimal hand hygiene pattern increased [16], while it decreased in the Philippines [15]. It is

possible that poor hand washing after toilet use decreased among adolescents in Lebanon from 2011, after the “Call to Action for WASH in Schools campaign was formally launched in 2010” in Lebanon [31].

Regarding mental health indicators (having no close friends, loneliness, worry-induced sleep disturbance, suicidal ideation and suicide plan), suicide plan decreased among both boys and girls, while loneliness, suicidal ideation and worry-induced sleep disturbance decreased among girls only. In comparison, in the Philippines trend study, the prevalence of suicidal ideation and suicide plan decreased among boys and suicidal ideation increased among girls over time [15]. As found in previous investigations [9-11], poor mental health, such as suicidal behaviour and anxiety-related disturbances, has been identified as a significant problem among adolescents in Lebanon.

In terms of protective factors, school attendance, peer support and the three parental support indicators (supervision, connectedness and bonding) did not change over time among both boys and girls. In the Philippines trend study protective factors did not change over time [15], in the Oman trend study only one of the protective factors (peer support) improved over time [16], while in New Zealand trend study positive family and school connections improved over time [14].

The current study results may inform public health intervention programmes targeting specific health risk behaviours among adolescents in Lebanon. For example, specific school food environment policies, such as direct provision of healthful foods/beverages, can improve targeted dietary behaviours, such as fruit and vegetable intake [32]. Universal school-based interventions that target multiple-risk behaviours, may be effective in preventing engagement in substance use, including alcohol use, among young people [33]. There is “good evidence that various whole-school health interventions are effective in preventing bullying.” [34] School dental health education can improve oral hygiene practice behaviours, such as frequency and duration of brushing, of school children

[35,36]. Increased implementation of multi-level (training, funding and policy) “hand-washing interventions can reduce the incidence of diarrhoea, respiratory infections, and school absenteeism.”[37] Universal resilience-focused interventions (particularly cognitive-behavioural therapy-based approaches) may be used for reductions in poor mental health (depressive and anxiety symptoms) for children and adolescents [38].

#### Limitations of the study

“Secondary education enrolment ratio” was 80% in Lebanon in 2005, 76% in 2011 and 63% in 2017 [39], yet this school survey did not represent all adolescents in Lebanon. Some study variables (such as sedentary behaviour, tobacco use, sexual behaviour and physical activity) were not included in this analysis, since they had not been assessed in all the three Lebanon GSHS. Although self-reported weight and height was collected, the missing values were in the wave one survey more than 30%, and therefore body mass index was not included in this report. Further, the study is limited because of its cross-sectional design and self-reported data collection.

# Conclusions

In this investigation of nationally representative school adolescents over a period of 12 years in Lebanon, significant improvements were found among both boys and girls in the decline of interpersonal violence (bullying victimization, being physically attack and involvement in physical fighting), inadequate hand hygiene (after toilet use), and suicide plan, and among girls only loneliness, worry-induced sleep disturbance and suicidal ideation. Significant increases were found among both boys and girls in the prevalence of inadequate fruit consumption, and among boys only unintentional injury and inadequate hand hygiene (before eating). Several decreases but also increases of health risk behaviours were identified over three cross-sectional surveys from 2005 to 2017 calling for continued interventions in promoting health behaviour in this adolescent population.

# Declarations

## Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. "A national ethics committee approved the study and written informed consent was obtained from the participating schools, parents and students." [19]

## Consent for publication

Not applicable.

## Availability of data and materials

The data for the current study are publicly available at the World Health Organization NCD Microdata Repository (URL: <https://extranet.who.int/ncdsmicrodata/index.php/catalog>).

## Competing interests

The authors declare that they have no competing interests.

## Funding

Not applicable.

## Authors' contributions

All authors fulfill the criteria for authorship. SP and KP conceived and designed the research, performed statistical analysis, drafted the manuscript and made critical revision of the manuscript for key intellectual content. All authors read and approved the final version of the manuscript and have agreed to authorship and order of authorship for this manuscript.

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The data source, the World Health Organization NCD Microdata Repository (URL: <https://extranet.who.int/ncdsmicrodata/index.php/catalog>), is hereby acknowledged.

## Abbreviations

GSHS: Global School-Based Student Health Survey; STATA: Statistics and data

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## Tables

Table 1: Characteristics of participating students for 2005, 2011 and 2017 surveys in Lebanon (N=13,109)

Variable	2005 (N=5,115)	2011 (N=2,286)	2017 (N=5,708)
	N (%)	N (%)	N (%)
Gender			
Male	2333 (47.7)	1064 (46.7)	2330 (46.8)
Female	2776 (52.3)	1220 (53.3)	3370 (53.2)
Missing	16	27	8
Age in years			
13 years or younger	2211 (43.1)	910 (38.5)	1543 (31.3)
14	1341 (26.1)	619 (28.6)	953 (19.1)
15	1020 (20.3)	477 (22.6)	925 (15.9)
16 years or older	522 (10.5)	267 (10.3)	2271 (33.7)
Missing	21	9	6
Grade			
7	1988 (38.8)	922 (38.1)	1247 (23.5)
8	1578 (32.1)	910 (32.7)	1125 (20.0)
9	1540 (29.1)	452 (29.2)	783 (17.1)
10-12	0	0	2526 (39.4)
Missing	13	2	2

Table 2: Health risk behaviours in 2005, 2011 and 2017 among male in-school adolescents in Lebanon

<i>Variable</i>	2005	2011	2017	Difference <sup>1</sup>	p-for trend <sup>2</sup>
	N (%)	N (%)	N (%)	%	
<b><i>Dietary behaviour</i></b>					
Fruits <2 servings/day	989 (42.2)	463 (45.4)	1152 (50.3)	+8.1	0.006
Vegetable <3 servings/day	1890 (81.4)	820 (76.6)	1888 (82.0)	+0.6	0.970
Went hungry (mostly/always) in the past 30 days	78 (3.4)	57 (5.1)	71 (3.4)	+0.0	0.959
<b><i>Alcohol use</i></b>					
Current alcohol use (past month)	637 (27.8)	320 (35.7)	497 (22.9)	-4.9	0.106
Ever drunk	490 (21.2)	239 (25.9)	381 (17.4)	-3.7	0.055
Trouble from alcohol use (lifetime)	540 (23.7)	70 (8.2)	366 (19.3)	-4.4	0.198
<b><i>Injury and violence</i></b>					
Any serious injury (past 12 months)	622 (37.0)	413 (44.0)	865 (43.5)	+6.5	0.004
Bullied (past months)	790 (38.7)	331 (33.3)	438 (21.0)	-17.7	<0.001
In physical fight (past 12 months)	1493 (64.6)	742 (70.2)	1231 (55.1)	-9.5	<0.001
Physically attacked (past 12 months)	1137 (50.0)	512 (46.0)	577 (25.0)	-25.0	<0.001
<b><i>Oral and hand hygiene</i></b>					
Brushing teeth (≤once/day/past 30 days)	897 (38.4)	415 (41.9)	959 (39.4)	+1.0	0.579
Wash hands before eating (not always) (past 30 days)	624 (26.4)	314 (32.4)	774 (32.9)	+6.5	0.012
Wash hands after toilet/ latrine use (not always) (past 30 days)	364 (15.7)	120 (11.6)	262 (10.7)	-5.0	0.002
Wash hands with soap (not always) (past 30 days)	585 (25.5)	271 (25.1)	565 (22.4)	-3.1	0.066
<b><i>Poor mental health</i></b>					
Having no close friends	85 (3.7)	42 (4.0)	90 (3.5)	-0.2	0.581
Loneliness (past 12 months)	436 (7.7)	197 (8.6)	536 (8.2)	+0.5	0.992
Worry-induced sleep disturbance (past 12 months)	214 (9.3)	88 (8.9)	233 (9.6)	+0.6	0.629
Suicidal ideation (past 12 months)	333 (14.5)	125 (12.1)	277 (12.7)	-1.8	0.193
Suicide plan (past 12 months)	248 (11.0)	104 (10.2)	176 (7.8)	-3.2	<0.001
<b><i>Protective factors</i></b>					
Truancy (past 30 days)	462 (20.9)	247 (22.5)	464 (20.2)	-0.7	0.301

Peer support (mostly/always) (past 30 days)	1489 (64.5)	644 (65.5)	1305 (64.3)	-0.2	0.536
Parents/guardians supervision (mostly/always) (past 30 days)	1168 (51.2)	518 (47.4)	949 (47.0)	-4.2	0.539
Parents/guardians connectedness (mostly/always) (past 30 days)	1058 (46.0)	471 (45.4)	953 (46.6)	+0.6	0.423
Parents or guardians bonding (mostly/always) (past 30 days)	1014 (44.3)	500 (49.1)	826 (40.9)	-3.4	0.201

<sup>1</sup>Difference between 2005 and 2017; <sup>2</sup>p for trend is controlled for age group and experience of hunger (as proxy for socioeconomic status)

Table 3: Health risk behaviours in 2005, 2011 and 2017 among female in-school adolescents in Lebanon

<i>Variable</i>	2005	2011	2017	Difference <sup>1</sup>	p-for trend <sup>2</sup>
	N (%)	N (%)	N (%)	%	
<b><i>Dietary behaviour</i></b>					
Fruits <2 servings/day	1301 (47.2)	629 (52.8)	1835 (54.4)	+7.2	0.007
Vegetable <3 servings/day	2353 (85.7)	986 (81.2)	2873 (84.7)	-1.0	0.535
Went hungry (mostly/always) in the past 30 days	71 (2.6)	38 (2.7)	91 (3.2)	+0.6	0.629
<b><i>Alcohol use</i></b>					
Current alcohol use (past month)	329 (12.2)	222 (20.3)	319 (12.8)	+0.6	0.960
Ever drunk	192 (7.1)	167 (15.8)	206 (8.1)	+1.0	0.887
Trouble from alcohol use (lifetime)	300 (11.1)	27 (2.1)	234 (9.6)	-1.5	0.817
<b><i>Injury and violence</i></b>					
Any serious injury (past 12 months)	594 (28.4)	382 (35.3)	915 (31.5)	+3.1	0.649
Bullied (past months)	736 (29.4)	191 (16.6)	371 (12.6)	-16.8	<0.001
In physical fight (past 12 months)	798 (29.0)	357 (30.2)	728 (23.5)	-5.5	<0.001
Physically attacked (past 12 months)	911 (33.4)	426 (35.6)	550 (16.6)	-16.8	<0.001
<b><i>Oral and hand hygiene</i></b>					
Brushing teeth (≤once/day/past 30 days)	839 (30.4)	342 (29.9)	1129 (30.9)	+0.5	0.890
Wash hands before eating (not always) (past 30 days)	751 (27.3)	377 (31.2)	1073 (31.1)	+3.8	0.525
Wash hands after toilet/ latrine use (not always) (past 30 days)	321 (11.6)	113 (10.1)	224 (7.5)	-4.1	<0.001
Wash hands with soap (not always) (past 30 days)	509 (18.6)	187 (15.5)	609 (16.6)	-2.0	0.065
<b><i>Poor mental health</i></b>					
Having no close friends	90 (3.3)	45 (3.3)	178 (4.6)	+1.3	0.204
Loneliness (past 12 months)	436 (16.1)	197 (16.4)	536 (15.2)	-0.9	0.004
Worry-induced sleep disturbance (past 12 months)	483 (17.7)	194 (14.5)	605 (17.2)	-0.5	0.022
Suicidal ideation (past 12 months)	471 (17.5)	209 (17.8)	487 (14.1)	-3.4	<0.001
Suicide plan (past 12 months)	299 (11.2)	158 (12.9)	322 (9.1)	-2.1	<0.001
<b><i>Protective factors</i></b>					
Truancy (past 30 days)	281 (10.3)	176 (15.1)	432 (13.3)	+3.0	0.390

Peer support (mostly/always) (past 30 days)	2002 (73.3)	818 (72.2)	2248 (72.8)	-0.5	0.615
Parents/guardians supervision (mostly/always) (past 30 days)	1303 (47.4)	505 (42.2)	1393 (45.5)	-1.9	0.206
Parents/guardians connectedness (mostly/always) (past 30 days)	1330 (48.7)	555 (49.4)	1504 (49.4)	+0.7	0.113
Parents or guardians bonding (mostly/always) (past 30 days)	1427 (52.3)	616 (56.3)	1652 (54.5)	+2.2	0.103

<sup>1</sup>Difference between 2005 and 2017; <sup>2</sup>p for trend is controlled for age group and experience of hunger (as proxy for socioeconomic status)

## Supplementary Files

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