ORIGINAL ARTICLE

The prevalence and correlates of physical activity/inactivity and sedentary behaviour among high-school adolescents in Iran: a cross-sectional study

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Abstract

Background Physical inactivity and sedentary behaviour are the main risk factors for non-communicable diseases in all stages of life. However, there is a lack of reliable data regarding the recommended level of physical activity and its correlates related to physical inactivity and sedentary behaviour among school students in Iran. The aim of the present study was to report the prevalence and correlates of physical activity/inactivity and sedentary behaviour among Iranian high school adolescents.

Methods The Global School-based Student Health Survey (GSHS) was used for data collection. Related data comprising socio-demographics, health risk behaviour and protective factors were obtained from 1517 high school students. Multivariate logistic regression was used to assess the association between relevant independent variables (e.g. gender) and the dependent outcome variable (physical inactivity/sedentary behaviour).

Results The prevalence of recommended physical activity by WHO was 27.8%, physical inactivity 72.2% and sedentary behaviour 71.4%. Being female, being overweight or obese, walking/cycling to or from school on 1–4 days, sitting 3 or more hours/day (sedentary behaviour), insufficient vegetable intake, being bullied and lack of parental support, peer support and parental connectivity (protective factors) were positively associated with physical inactivity. On the other hand, walking/cycling to or from school on 5–7 days and inadequate fruit intake were negatively associated with physical inactivity. Walking/cycling to or from school on 1–4 days, being physically inactive, inadequate fruit intake and being bullied were positively associated with sedentary behaviour.

Conclusion The prevalence of physical inactivity and sedentary behaviour was high in our studied sample. Interventions that address the issue of active school transport, sedentary behaviour, fruit and vegetable intake, family and peer support and bullying should be given more priority by the public health authorities.

Keywords Physical activity · Physical inactivity · Sedentary behaviour · Students · Global school-based student health survey · Iran

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Background

According to data from the World Health Organization (WHO), non-communicable diseases (NCDs) will be responsible for the deaths of 52 million people globally by 2030. Developing countries suffer the highest burden of NCDs. For instance, in the Eastern Mediterranean Region (EMRO) NCDs are the leading cause of death and each year 1.7 million people lose their lives (WHO 2011). Cardiovascular disease, diabetes, cancer and chronic respiratory ailments are known as NCDs or lifestyle-related diseases. By simple life-style changes many of the deaths from these diseases could be prevented. Physical inactivity, unhealthy diet, tobacco use and harmful alcohol drinking are related to high blood pressure, obesity, hyperlipidaemia and high blood glucose, which increase the risk of NCDs (Global status report on non-communicable diseases 2014). Almost all of these risk factors are related to physical activity (PA) and diet, and these play an important role in preventing disease and maintaining health (Global Strategy on Diet, Physical Activity and Health 2004).

Adolescence is a critical period in life and has an important role in the formation of behavioural and nutritional habits. Some studies have shown that behavioural risk factors associated with NCDs, such as lack of exercise, persist from adolescence into adulthood (Veltsista et al. 2010), while this period of life is the best time for adoption of physical activity (PA) behaviour (Paudel et al. 2014). According to WHO, the recommended global PA level for children and adolescents aged 5–17 years is at least 60 min of moderate to vigorous PA per day for maintaining healthy body weight, healthy musculoskeletal tissue and improving the cardiorespiratory system (Global recommendations on physical activity for health 2010). Additionally, physically active adolescents have more negative attitudes to tobacco smoking and alcohol consumption than their peers (Diet and physical activity: a public health priority 2004).

The adolescents' PA patterns have changed and decreased due to time spent watching TV, and screen-based activities. According to the evidence, watching TV more than 2 h per day is correlated with reduced physical and psychosocial health (Tremblay et al. 2011). Physical activity levels lower than 60 min per day on at least 5 days per week are defined as physical inactivity and sitting 3 or more hours per day is defined as sedentary behaviour (Al Subhi et al. 2015, Guthold et al. 2010).

Physical inactivity is related to psychological complaints among males and females (Marques et al. 2015), and according to a review study, sedentary behaviour and having higher levels of screen time activities are associated with more attention problems and reduced psychological well-being (Suchert et al. 2015). Furthermore, studies have shown that physical inactivity and sedentary behaviour in adolescents are associated with factors such as age (Dumith et al. 2011), younger

age (Trang et al. 2009), older age (Baharudin et al. 2014), gender (Teng et al. 2014), being female (Trang et al. 2009), socioeconomic status (Lord et al. 2015) and higher socioeconomic status (Muthuri et al. 2014). Body mass index (BMI) has also been identified as an important factor: In some studies, higher BMI was related to physical inactivity (Trang et al. 2009, Baharudin et al. 2014), and in others was related to sedentary behaviour (Prentice-Dunn and Prentice-Dunn 2012). Being bullied (Henriksen et al. 2016), inadequate fruit and vegetable intake (Pate et al. 1996), not attending physical education classes (Tassitano et al. 2010), smoking (de Winter et al. 2016), lack of breakfast (Baharudin et al. 2014) and lack of social and parental support for physical activity (Tate et al. 2015, Siceloff et al. 2014) have also been found to be associated with physical inactivity and sedentary behaviour.

According to a study comparing adolescents attending school (aged 13–15 years) in 34 countries, who participated at the Global School-based Student Health Survey (GSHS), only 23.8% of boys and 15.4% of girls met WHO recommendations for physical activity (Guthold et al. 2010). Another study among adolescents, aged 13–15 years in eight African countries, showed that only 14.2% of school children were active and met the WHO recommendation for PA, and among school students aged 13–17 years in ten EMRO countries, the overall prevalence of PA was 19% (Al Subhi et al. 2015). In the United States and among high school students in 2013, only 29% participated in PA at least 60 min per day (Center for Disease Control and Prevention 2015).

According to a literature review and to the author's knowledge, there are no studies in Iran that report the PA level in Iranian adolescents based on the WHO recommendation. Additionally, most Iranian studies reported only mixed results of PA levels such as the Metabolic Equivalent of Task (MET), nutritional habits and screen time activities (Baygi et al. 2015, Kelishadi et al. 2007). According to the Caspian-III study in Iran, screen time activities, such as working with a computer, among Iranian adolescents is more than 4 h per day of which at least 3 h is watching TV (Baygi et al. 2015).

Therefore, the aim of the present study was to assess the prevalence of self-reported PA activity/inactivity level and sedentary behaviour and their correlates among a representative sample of high school students in the city of Tabriz, by using the reliable and valid, Persian version of the GSHS comprehensive questionnaire (Ziaei et al. 2014).

Methods

Study site and sampling

Tabriz, a city in the northwest of Iran with approximately 1,700,000 inhabitants, was the site of the present cross-sectional study. High school students (grades 9 to 11) included

62,714 students, of which 29,935 were female and 32,779 males during the 2013–14 academic years. A two-stage cluster sampling was used to select representative high schools and classes. At the first stage, high-schools were selected with probability proportional to the enrolment size, and at the second stage, classes were randomly selected, and all students in the selected classes were then eligible to participate in the study. Overall, 30 high-schools, including 16 girls' and 14 boys' high-schools, and 90 classes [(grades 9 to 11)] (Education System in Iran n.d.) were chosen to participate in the study. The full details of the methodology have been reported earlier (Ziaei et al. 2016, Ziaei et al. 2017, Ziaei et al. 2019).

Data collection

A reliable, valid and anonymous, self-administered, Persian version of the GSHS PA module questionnaire was used for data collection (Ziaei et al. 2014, Global School-based Student Health Survey Core Expanded Questionnaire 2009). The questions in this module measure physical activity, travel to and from school, participation in physical education classes and participation in sedentary leisure behaviour (Global School-based Student Health Survey Item Rationale 2009).

Data collection took place over approximately three months from 26 December 2013. GSHS is a global, youth behavioural surveillance system designed by WHO, with technical support from the US Center for Disease Control and Prevention (CDC). Questionnaires were administered to students during an ordinary school day in selected schools and classes by Province Health Center staff, who, one week prior to the survey date, had attended a workshop on GSHS methodology. Answering time for questions was around 15 min.

Data processing and analysis

Measures

There are two dependent outcome variables: leisure time PA, which was defined as "any activity that increases your heart rate and makes you breathe hard, such as playing with friends, walking to school, running, walking fast, cycling, dancing and playing football", and leisure time sedentary behaviour, which was assessed by asking about the time that students spend mostly sitting when they are not in school or doing homework. Leisure time PA was assessed by the question, "During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?", and leisure time sedentary behaviour by, "How much time do you spend during a typical or usual day sitting and watching television, playing computer games, talking with friends, or engaging in other sitting activities?". Detailed response options are presented

in Table 1, and the prevalence of physical activity and sedentary behaviour in Table 2.

Physical activity was defined as having at least 60 min' moderate to vigorous physical activity per day on at least 5 days per week. Less than 5 days/week was defined as physical inactivity, with sedentary behaviour being defined as sitting 3 or more hours per day when not attending school or doing homework (Al Subhi et al. 2015, Guthold et al. 2010).

Body mass index (BMI) was calculated (age and gender-specific) from self-reported body height and weight according to the formula (weight (kg)/height (m2)). Cut off points defining overweight and obesity were used. Students were considered overweight if their BMI was > +1SD from the median and obese if their BMI was > +2SD from the median for BMI for their age and sex (Cole et al. 2000). According to the CDC and WHO, insufficient fruit consumption was defined as eating fruit less than twice a day and inadequate vegetable consumption defined as less than 3 times a day (State Indicator Report on Fruits and Vegetables 2013, Agudo 2004, Adults Meeting Fruit and Vegetable Intake Recommendations 2013).

Parental support and encouragement was addressed by the question, "During the past 30 days, how often did your parents or guardians support and encourage you?" and the alternative answers were, "always", "most of the time", "sometimes", "rarely" and "never". The answers were then classified into "Yes" or "No". "Always" and "Most of the time" were classified as "Yes", and "Sometimes", "Rarely" and "Never" were classified as "No".

Peer support in school was addressed by the question, "During the past 30 days, how often were most of the students in your school kind and helpful?" and parental or guardian connectedness by the question, "During the past 30 days, how often did your parents or guardians understand your problems and worries?". The responses were classified in the same way as with the parental support question.

Data analysis

Data analysis was carried out using SPSS software version 24.0. Descriptive statistics were used to report frequency, percentages, mean and standard deviation. The two main outcome variables were self-reported physical activity and sedentary behaviour. A multivariate logistic regression was used to assess the association between relevant independent variables such as age, gender, grade, being bullied and the dependent outcome variables (physical activity and sedentary behaviour? Yes/No). Reporting of adjusted odds ratios (AORs) and unadjusted odds ratios (UAORs) was done after controlling for factors identified as significant in the bivariate analysis. AORs and UAORs with 95% confidence intervals (CI) were reported. A p value less than 0.05 was considered as statistically significant for other statistical tests.

Table 1 Sample characteristics ($N = 1517$)

Variable	Boys no. (%)	Girls no. (%)	Total no. (%)
Gender	727 (47.9)	790 (52.1)	1517 (100)
School grade 9	66 (9.1)	369 (46.7)	435 (28.7)
School grade 10	323 (44.4)	216 (27.3)	539 (35.5)
School grade 11	338 (46.5)	205 (25.9)	543 (35.8)
Total	727 (47.9)	790 (52.1)	1517 (100)
Age ± SD	16.1 ± 0.76		

Results

Prevalence of physical activity/inactivity and sedentary behaviour

The prevalence of recommended physical activity by WHO was 27.8%, physical inactivity 72.2% and sedentary behaviour 71.4%. There was a gender difference in physical activity, and girls were less physically active than boys. However, no gender difference was found in sedentary behaviour, although the boys had more sedentary behaviour than girls. Table 1 describes the sample characteristics and Table 2 the prevalence of physical activity/inactivity and sedentary behaviour.

Association with physical inactivity

Regression analysis has shown that being female, being overweight or obese, walking/cycling to or from school on 1–4 days, sitting 3 or more hours/d (sedentary behaviour), inadequate vegetable intake, being bullied, lack of parental and peer support and lack of parental connectivity (protective factors) were positively associated with physical inactivity. On the other hand, walking/cycling to or from school on 5–7 days, and inadequate fruit intake were negatively associated with physical inactivity (see Table 3).

Association with sedentary behaviour

Regression analysis has shown that walking/cycling to or from school on 1–4 days, being physically inactive, inadequate fruit intake and being bullied were positively associated with sedentary behaviour (see Table 4).

Discussion

The present study has shown a high prevalence of leisure time physical inactivity (72.2%) and sedentary behaviour (71.4%) as well as their correlates among high-school students in the city of Tabriz. Findings from other studies have shown a similar high prevalence of physical inactivity (Al Subhi et al. 2015, Guthold et al. 2010, Center for Disease Control and Prevention 2015, Baygi et al. 2015, Kelishadi et al. 2007).

Our findings show a gender difference with regard to PA levels, with girls having 48% higher odds of being physically inactive than boys. Such gender differences have also been reported earlier (Al Subhi et al. 2015, Kelishadi et al. 2007, Wang et al. 2016, Al-Hazzaa et al. 2011). This gender difference can be considered from different perspectives, such as social and environmental determinants of physical activity in terms of access to facilities, safe pavements and the possibility of engaging in physical activity in public places (Trang et al. 2009, Li et al. 2006). In Iran, females are prohibited from using bicycles in public places, thus resulting in girls being unable to cycle to and from school. The safety of pavements is another factor that encourage parents to provide school busses from or to schools. In general, social barriers for PA are more widespread for girls than boys.

The students with a higher BMI, i.e. overweight or obese, have 2.22 times higher odds of being physically inactive; our results being consistent with previous studies (Trang et al. 2009, Baharudin et al. 2014, de Onis et al. 2007, Pouliou et al. 2015). In Iran, research among school students has shown that there is a significant association between students' PA level and their weight. Physically active students had a normal weight and were less engaged in sedentary behaviour (Moayeri et al. 2006). In some studies, higher BMI was associated with sedentary behaviour (Prentice-Dunn and Prentice-Dunn 2012, Collins et al. 2008) but not in the present study.

Table 2 Prevalence and duration of physical activity/inactivity and sedentary behaviour

Prevalence of physical activity	Male %	Female %	Total %	Prevalence of sedentary behaviour	Male %	Female %	Total %
< 3 days	41.8	50.0	46.1	< 1 h	5.4	10.4	8.0
3–4 days	27.2	25.2	26.2	1–2 h	21.9	19.5	20.6
5–7 days	30.9	24.8	27.8	3–4 h	38.2	34.3	36.2
Total	100	100	100	≥5 h	34.5	35.8	35.2
Physical inactivity (<5 days/weeks)	69.0	75.2	72.2	**Sedentary behaviour(≥3 h or more)**	72.8	70.1	71.4

Table 3 Associations between physical inactivity and independent variables among students ($n = 1517$)

Independent variables	UAOR	CI 95%	AOR	CI 95%
Age [a] in years				
15	1.00			
16	0.81	0.59–1.11		
17	0.76	0.55–1.07		
Gender [a]				
Girl	1.35	1.08–1.70**	1.48	1.08–2.03*
Boy [b]	1.00		1.00	
Grade [a]				
First [e]	1.00		1.00	
Second [c]	0.72	0.54–0.96*	0.88	0.62–1.27
Third [d]	0.74	0.55–098*	0.94	0.65–1.36
BMI [a]				
Normal/underweight [b]	1.00		1.00	
Overweight/obese	1.75	1.17–2.62**	2.22	1.23–2.92****
Walk/bike to or from school				
0 days	1.00		1.00	
1–4 days	1.24	0.75–1.30	1.57	1.09–2.25*
5–7 days	0.39	0.30–0.51****	0.44	0.32–0.60****
Sedentary behaviour (≥3 h/d)				
Yes	1.55	1.22–1.98****	1.85	1.39–2.46****
No	1.00		1.00	
Fruits intake (≥2 daily)				
Yes	1.00		1.00	
No	0.89	0.68–1.16	0.57	0.41–0.80**
Vegetables intake (≥3 daily)				
Yes	1.00		1.00	
No	1.56	1.20–2.01***	1.44	1.06–1.97*
Bullied				
Yes	1.60	1.18.2.16**	1.56	1.08–2.25*
No	1.00	1.00		
Current cigarette smoking				
Yes	1.18	0.86–1.64		
No	1.00			
Parental support				
Yes	1.00		1.00	
No	1.35	1.06–1.72**	1.54	1.14–2.07**
Parental connectivity				
Yes	1.00		1.00	
No	1.50	1.19–1.88****	1.44	1.10–1.90**
Peer support				
Yes	1.00		1.00	
No	1.49	1.19–1.87***	1.36	1.04–1.78*
Escaping breakfast				
Yes	1.11	0.87–1.42		
No	1.00			

CI confidence interval, *AOR* adjusted odds ratio, *UAOR* unadjusted odds ratio

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.0001$

[a] Categorical variable

[b] Reference group

[c] Second level of high school

[d] Third and final level of high school

[e] First level of high school

Students who reported walking/cycling to or from school on 5–7 days of week had 56% lower odds of being physically inactive than students who did not walk/cycle to or from school. On the other hand, students who walked/cycled to or from school on 1–4 days had 57% higher odds of being physically inactive. Research has shown that physically active school transport is the best way to promote PA levels and prevent overweight and obesity among school adolescents (Arango et al. 2011, Bere et al. 2011). In Iran, the main obstacles to physically active school transport were the use of cars (Moayeri et al. 2006), lack of safe pavements and some rules restricting females' PA in public places. Our results showed

Table 4 Associations between sedentary behaviour (sitting ≥3 h) and independent variables among students (*n* = 1517)

Independent variables	UAOR	CI 95%	AOR	CI 95%
Age [a] in years				
15	1.00			
16	1.23	0.91–1.67		
17	1.07	0.78–1.47		
Gender [a]				
Girl	0.87	0.70–1.09		
Boy [b]	1.00			
Grade [a]				
First [eb]	1.00			
Second [c]	0.94	0.71–1.25		
Third [d]	0.86	0.65–1.13		
BMI [a]				
Normal/underweight [b]	1.00			
Overweight/obese	0.78	0.55–1.10		
Walk/bike to or from school				
0 days	1.00		1.00	
1–4 days	1.59	1.20–2.11***	1.40	1.05–1.88**
5–7 days	1.22	0.94–1.59	1.27	0.97–1.67
Physical activity (≥5d/w)				
Yes	1.00		1.00	
No	1.55	1.22–1.98****	1.53	1.19–1.97***
Fruits intake (≥2 daily)				
Yes	1.00		1.00	
No	1.97	1.47–2.63****	1.79	1.33–2.41****
Vegetables intake (≥3 daily)				
Yes	1.00			
No	1.05	0.81–1.37		
Bullied				
Yes	1.99	1.46–2.72****	1.70	1.23–2.33***
No	1.00		1.00	
Current cigarette smoking				
Yes	1.28	0.92–1.77		
No	1.00			
Parental support				
Yes	1.00			
No	1.15	0.91–1.46		
Parental connectivity				
Yes	1.00			
No	1.18	0.94–1.48		
Peer support				
Yes	1.00		1.00	
No	1.35	1.08–1.69**	1.20	0.95–1.51
Escaping breakfast				
Yes	0.92	0.73–1.17		
No	1.00			

CI confidence interval, *AOR* adjusted odds ratio, *UAOR* unadjusted odds ratio

*p < 0.05; **p < 0.01; ***p < 0.001; ****p < 0.0001

[a] Categorical variable

[b] Reference group

[c] Second level of high school

[d] Third and final level of high school

[e] First level of high school

that students walking/cycling 1–4 days from or to schools have 40% higher odds of sedentary behaviour.

Students with sedentary behaviour (sitting ≥3 h./day) have 53% higher odds of being physically inactive than students who sit less. According to an Iranian national study, Iranian school students had 4 h/day or more screen time activities (Baygi et al. 2015, (Kelishadi et al. 2007), i.e. in excess of the recommended time for screen time activities (not to exceed 2 h per day) by the American Academy of Pediatrics (AAP) (American Academy of Pediatrics 2001), and this long screen time leads to sedentary behaviour and negative health outcomes (Marques et al. 2015, Suchert et al. 2015). The

association between sedentary behaviour and physical inactivity has been confirmed in various studies (Peltzer and Pengpid 2016, McVeigh and Meiring 2014) and our results showed that the physically inactive students had 85% higher odds of engaging in sedentary behaviour.

According to research, inadequate fruit and vegetable intake is associated with physical inactivity (Pate et al. 1996, (Winkvist et al. 2016). However, our results showed a negative association between physical inactivity and inadequate fruit intake. This means students reporting inadequate daily fruit intake (< 2 daily) showed 43% lower odds of being physically inactive, whilst students with an inadequate vegetable intake had 44% higher odds of being physically inactive. Regarding sedentary behaviour, our study suggested that students with inadequate fruit intake have 81% higher odds of sedentary behaviour.

We found that students who were bullied at school have higher odds for both physical inactivity and sedentary behaviour; previous research has shown that being bullied is associated with physical inactivity and sedentary behaviour (Peltzer and Pengpid 2016, (McVeigh and Meiring 2014). In a Danish study of school students aged 13–15 years old, exposure to bullying was associated with physical inactivity (Henriksen et al. 2016).

Research has also shown that family support can play an important role in the PA level of the adolescents (Tate et al. 2015, Siceloff et al. 2014, Xu et al. 2015) and, as our results show, the students with a lack of family support, parental connectivity and peer support have higher odds for being physically inactive compared to students with such supports. Previous research has shown that increased parental encouragement is positively associated with increased physical activity levels in both genders (Vander Ploeg et al. 2013). By providing facilities in terms of equipment, physically active school transportation (walking/cycling) and planning for leisure time PA, such as playing soccer or other sports with their children, parents can have an active role in increasing PA levels (Tate et al. 2015, Siceloff et al. 2014, Kuo et al. 2007). Therefore, families or guardians should be taken into consideration when planning interventions.

In one study a positive association between family and peer support at school and physical activity was found, also confirming peer and family support in terms of PA (Van Der Horst et al. 2007).

Study limitations

The present study has some limitations. First it is a cross-sectional study and does not allow establishing causality to any of the associated factors in the study. Second, the students were from an urban centre in Iran and they may not be representative of those from rural areas, and adolescents not attending school. Third, despite the anonymous nature of the study, participants may have over or under-reported when answering the questions.

Fourth, the assessment in one city limits the generalizability of the findings to other cities. The desire to present a positive picture in self-reports can also affect the study results.

Conclusions

The present study showed the prevalence and correlates of physical activity/inactivity and sedentary behaviour among high-school adolescents in the city of Tabriz. The prevalence of leisure physical inactivity and sedentary behaviour in our representative sample is high. Identified risk and protective factors should be taken into consideration by public health authorities in the development and implementation of interventions aiming at promoting physical activity programmes in adolescents attending schools in the city of Tabriz.

Availability of data and materials The data supporting the conclusions of this article are not available to the public because of the Internal Research Data Base Rules of the Islamic Republic of Iran. However, questionnaires will be made available to researchers upon request to the corresponding author once they have agreed to sign the non-disclosure agreements.

Compliance with ethical standards

Ethical considerations The Ethics Committee of Tabriz University of Medical Sciences granted approval for the study [5/4/7180, 1391/08/10]. One week prior to the survey, consent forms were distributed to all parents of students in the participating classes through the school authorities and these were collected from students on the day of administration. In Iran, parents or legal guardians are legally responsible for their children under the age of 18; therefore, their consent was necessary. All parents or legal guardians provided consent to participate on behalf of their child. All students also were informed about the voluntary and anonymous nature of the study and were told that they could terminate their participation at any time during the survey.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of interest   There are no conflict of interests.

Informed consent   Informed consent was obtained from all individual participants included in the study.

Consent for publication   Not applicable.

Appendix

Table 5   Sample characteristics (N=1517)

During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?			
0 days	86 (11.8)	123 (15.6)	209 (13.8)
1 day	99 (13.6)	158 (20.0)	257 (16.9)
2 days	119 (16.4)	114 (14.4)	233 (15.4)
3 days	108 (14.9)	116 (14.7)	224 (14.8)
4 days	90 (12.4)	83 (10.5)	173 (11.4)
5 days	65 (8.9)	75 (9.5)	140 (9.2)
6 days	43 (5.9)	22 (2.8)	65 (4.3)
7 days	117 (16.1)	99 (12.5)	216 (14.2)
Total	727 (47.9)	790 (52.1)	1517 (100)
During the past 7 days, on how many days did you walk or ride a bicycle to or from school?			
0 days	152 (20.9)	386 (48.9)	538 (35.5)
1 day	81 (11.1)	102 (12.9)	183 (12.1)
2 days	69 (9.5)	51 (6.5)	120 (7.9)
3 days	67 (9.2)	24 (3.0)	91 (6.0)
4 days	21 (2.9)	31 (3.9)	52 (3.4)
5 days	57 (7.8)	24 (3.0)	81 (5.3)
6 days	70 (9.6)	63 (8.0)	133 (8.8)
7 days	210 (28.9)	109 (13.8)	319 (21.0)
Total	727 (47.9)	790 (52.1)	1517 (100)
During this school year, on how many days did you go to physical education (PE) class each week?			
0 days	0(0)	0(0)	0(0)
1 day	713 (98.1)	772 (97.7)	1485 (97.9)
2 days	0(0)	0(0)	0(0)
3 days	0(0)	0(0)	0(0)
4 days	0(0)	0(0)	0(0)
5 or more days	0(0)	0(0)	0(0)
Total	713 (47.0)	790 (50.8)	1485 (97.9)
How much time do you spend during a typical or usual day sitting and watching television, playing computer games, talking with friends, or doing other sitting activities?			
Less than 1 hour per day	39 (5.4)	82 (10.4)	121 (8.0)
1 to 2 hours per day	159 (21.9)	154 (19.5)	313 (20.6)
3 to 4 hours per day	278 (38.2)	271 (34.3)	549 (36.2)
5to 6 hours per day	145 (19.9)	130 (16.5)	275 (18.1)
7 to 8hours per day	90 (12.4)	141 (17.8)	231 (15.2)
More than 8 hours per day	16 (2.2)	12 (1.5)	28 (1.8)
Total	727 (47.9)	790 (52.1)	1517 (100)

Table 5 (continued)

Knowledge and sources of information			
During this school year, were you taught in any of your classes how to develop a physical fitness plan for yourself?			
Yes	73 (10.0)	69 (8.7)	142 (9.4)
No	626 (86.1)	695 (88.0)	1321 (87.1)
I do not know	28 (3.9)	26 (3.3)	54 (3.6)
Total	727 (47.9)	790 (52.1)	1517 (100)
During this school year, were you taught in any of your classes about preventing injury during physical activity?			
Yes	131 (18.0)	136 (17.2)	267 (17.6)
No	572 (78.7)	622 (78.7)	1194 78.7)
I do not know	24 (3.3)	32 (4.1)	56 (3.7)
Total	727 (47.9)	790 (52.1)	1517 (100)
During this school year, were you taught in any of your classes the benefits of physical activity?			
Yes	126 (17.3)	241 (30.5)	367 (24.2)
No	574 (79.0)	524 (66.3)	1098 (72.4)
I do not know	27 (3.7)	25 (3.2)	52 (3.4)
Total	727 (47.9)	790 (52.1)	1517 (10)
During this school year, were you taught in any of your classes about opportunities for physical activity in your community?			
Yes	61 (8.4)	129 (16.3)	190 (12.5)
No	651 (89.5)	635 (80.4)	1286 (84.8)
I do not know	15 (2.1)	26 (3.3)	41 (2.7)
Total	727 (47.9)	790 (52.1)	1517 (100)
Health risk status and behaviour			
Body mass index (BMI)			
Underweight/normal weight	497 (68.4)	605 (76.6)	1102 (72.6)
Overerweight or obese	110 (15.1)	66 (8.4)	176 (11.6)
Total	607 (40.0)	671 (44.2)	1278 (84.2)
During the past 30 days, how often did you eat breakfast?			
Never	21 (2.9)	27 (3.4)	48 (3.2)
Rarely	70 (9.6)	125 (15.8)	195 (12.9)
Sometimes	100 (13.8)	136 (17.2)	236 (15.6)
Most of the times	159 (21.9)	177 (22.4)	336 (22.1)
Always	377 (51.9)	325 (41.1)	702 (46.3)
Total	727 (47.9)	790 (52.1)	1517 (100)
During the past 30 days, how many times per day did you usually eat fruit?			
I did not eat fruit during the past 30 days	0(0)	4(0.5)	4 (0.3)
Less than one time per day	76 (10.5)	54 (6.8)	130 (8.6)
1 time per day	129 (17.7)	100 (12.7)	229 (15.1)
2 times per day	164 (22.6)	167 (21.1)	331 (21.8)
3 times per day	190 (26.1)	232 (29.4)	422 (27.8)
4 times per day	85 (11.7)	118 14.9)	203 13.4)
5 or more times per day	83 (11.4)	115 (14.6)	198 (13.1)
Total	727 (47.9)	790 (52.1)	1517 (100)
During the past 30 days, how many times per day did you usually eat vegetable?			
I did not eat fruit during the past 30 days	71 (9.8)	44 (5.6)	115 (7.6)
Less than one time per day	178 (24.5)	238 (30.1)	416 (27.4)
1 time per day	176 (24.2)	183 (23.2)	359 (23.7)
2 times per day	138 (19.0)	140 (17.7)	278 (18.3)
3 times per day	84 (11.6)	118 (14.9)	202 (13.3)
4 times per day	26 (3.6)	36 (4.6)	62 (4.1)
5 or more times per day	54 (7.4)	31 (3.9)	85 (5.6)
Total	727 (47.9)	790 (52.1)	1517 (100)
During the past 30 days, did you smoke cigarettes?			
No	581 (79.9)	707 (89.5)	1288 (84.9)
Yes	146 (20.1)	83 (10.5)	229 (15.1)
Total	727 (47.9)	790 (52.1)	1517 (100)
Have you been bullied during the past 30 days?			
No	534 (73.5)	670 (84.8)	1204 (79.4)
Yes	193 (26.5)	120 (15.2)	313 (20.6)
Total	727 (47.9)	790 (52.1)	1517 (100)
Protective factors			
During the past 30 days, how often did your parents or guardians support and encourage you?			
Never	43 (5.9)	48 (6.1)	91 (6.0)
Rarely	77 (10.6)	54 (6.8)	131 (8.6)
Sometimes	190 (26.1)	123 (15.6)	313 (20.6)

Table 5 (continued)

Most of the times	194 (26.7)	214 (27.1)	408 (26.9)
always	223 (30.7)	351 (44.4)	574 (37.8)
Total	727 (47.9)	790 (52.1)	1517 (100)
During the past 30 days, how often did your parents or guardians understand your problems and worries?			
Never	102 (14.0)	127 (16.1)	229 (15.1)
Rarely	189 (26.0)	149 (18.9)	338 (22.3)
Sometimes	156 (21.5)	161 (20.4)	317 (20.9)
Most of the time	132 (18.2)	172 (21.8)	304 (20.0)
Always	148 (20.4)	181 (22.9)	329 (21.7)
Total	727 (47.9)	790 (52.1)	1517 (100)
During the past 30 days, how often were most of the students in your school kind and helpful?			
Never	71 (9.8)	38 (4.8)	109 (7.2)
Rarely	173 (23.8)	156 (19.7)	329 (21.7)
Sometimes	222 (30.5)	184 (23.3)	406 (26.8)
Most of the time	147 (20.2)	248 (31.4)	395 (26.0)
Always	114 (15.7)	164 (20.8)	278 (18.3)
Total	727 (47.9)	790 (52.1)	1517 (100)

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