

# A Profile of Unintentional Injuries Among Iranian Adolescents: Findings From the First Health Behavior in School-Aged Children Survey

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**Background:** Injuries are among the leading causes of death and disability worldwide, and main cause of mortality in schoolchildren in particular. Research into the prevalence and pattern of injuries in school-aged children is important because of its impact on learning achievements.

**Objectives:** This paper presents a perspective of injuries and consequent school absenteeism in Pakdasht District, Tehran Province, Iran.

**Patients and Methods:** We recruited 2073 students from primary, middle and high schools using two-stage cluster sampling to participate in this cross-sectional study. The tool used was a self-administered questionnaire adopted from the Health Behavior in School-Aged Children Survey model.

**Results:** A total of 44.2% of students reported at least one injury during the 12-month period prior to the study with a predominance of male gender ( $P < 0.01$ ). The positive history of trauma showed a reverse correlation with the age of the participants. Participants' residences were the location for the majority (38.5%) of injury cases; girls were more likely to be prone to home injuries, whereas school accidents were reported more frequently by male participants than females ( $P < 0.001$ ). About 50.4% of those who reported an injury incident had a history of consequent school absence.

**Conclusions:** Male students are more prone to injuries than their female peers. Trauma is a rather common incident in schoolchildren of Pakdasht. About half of the injury cases resulted in school absenteeism. Establishing injury surveillance and implementing prevention programs, including effective health education, is crucial for student's well-being and reduction of the negative impact of absenteeism on student's educational achievements.

**Keywords:** Injury; Students; School; Absenteeism

## 1. Background

Injuries, comprising 36% of deaths in those aged 15 years old or less, are the leading cause of death and illness in young people in most developed countries (1). Over 875,000 children under 18 years of age die annually worldwide because of injuries. In low-and middle-income countries, injuries account for 13% of the total burden of morbidity among children under 15 years of age (2). While childhood injuries declined by 50% in high-income countries between 1970 and 1995, unfortunately, some reports have shown a reverse trend in low-income countries (3-6). Injuries among adolescents can be considered as a marker for a high-risk lifestyle that includes multiple risk-taking behaviors and associated health-related impacts (7). Studies have shown how injury is linked with other risk behaviors such as drug abuse (8, 9) and unpermitted school absenteeism (10) and is related to frequent engagement in physical activity (9, 11). It is crucial to understand the underlying factors that contribute to the occurrence of injury among adolescents in order to develop preventive interventions (12, 13). It is important to focus

on injury prevention in sports settings. A Canadian study shows 40.2% of young people who are engaged in athletic activities experience an injury that necessitates medical attention; 8.1% are considered emergencies (9). Sports injuries among American secondary school students are caused by sprain and joint dislocations in more than 50% of cases; injuries that result in surgery most likely target the knee (14). In 2005, injuries were estimated to be the leading cause of death in Iranian adolescents (22.9 deaths per 100,000 in the 10-14 age group). Road accident injuries caused the highest death rate per 100,000 population among all types of injuries in adolescents, at 13.1 deaths for 10-14 year old. The incidence rate of injuries that lead to hospitalization was 439 per 100,000 in young people aged 5-14 years, while the rate of injuries that resulted in outpatient care was 1650 per 100,000 in the same age group (15).

## 2. Objectives

The significant role of unintentional injuries in adolescent health needs to be thoroughly addressed by devis-

### Implication for health policy/practice/research/medical education:

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ing proper surveillance and intervention programs. The first Health Behavior in School-aged Children (HBSC) survey conducted in 2005 used an internationally well recognized questionnaire to better investigate dimensions of the problem in a sample of Iranian adolescents.

### 3. Patients and Methods

An international model, the HBSC survey was adapted to develop this study. First conducted in three European countries in 1983, HBSC school-based surveys have been conducted every 4 years internationally to study a set of target health behaviors as well as socioeconomic factors among adolescents aged 11, 13, and 15 years (16). The study was a cross-sectional survey that addressed a representative sample of male and female adolescent students. The tool administered was a reliable, valid translated version of the HBSC's core (mandatory) and optional questionnaires that was tested in a pilot study through a small WHO grant in 2003 (17). This self-administered questionnaire included questions that investigated the history of injuries which occurred during the past 12 months, as follows: 1) the frequency of injury experience, 2) the place where the injury happened, 3) the nature of activity that resulted in the injury, 4) medical care the respondent received for the incident, and 5) the consequent school absenteeism. This survey was based on a cluster sampling method in which 27 primary, middle and secondary schools located in Pakdasht District, Tehran Province were selected randomly as clusters. We randomly recruited participant students using the enrolment list of each school. Only grades 5, 7, and 9 students were targeted for this purpose. Verbal consent was mandatory for participant recruitment. Questionnaires were anonymous and sealed boxes were used for their collection, once completed. The study was approved ethically by a joint committee formed by interested parties affiliated with the Ministries of Health and Education. The recommended minimum sample size for each of the three age groups was set at 691 students. This calculation assumed a 95% confidence level, standard value of 0.05 around a proportion of 30% and a design effect of 2, based on analyses of the 2003 pilot survey. The sample was further increased by 7% to account for contingencies such as non-response or recording error. Descriptive analysis and analytical statistics including chi-squared test were applied to prepare the results and assess the statistical significance of the association between some demographic factors and incidence of injury. SPSS version 11.5 was the package used for data entry and analysis.

### 4. Results

Overall, 1872 out of 2073 administered questionnaires were completed by 946 female and 926 male students. The number of girls and boys were approximately the same for each age group. The average age of school participants was 11.3 (elementary), 13.1 (middle), and 15.4 (sec-

ondary) years. Table 1 summaries a number of participant characteristics.

A considerable number (44.3%) of the respondents recalled at least one injury incident in the past 12 months: 23.4%, 9.6%, 5.8%, and 5.5% of them sustained injured from 1 to 4 times, respectively. Boys were more likely to have a positive history of injury than girls ( $P = 0.01$ ). Furthermore, the frequency of injury incidents declined with increasing age (Table 2).

About 40% of injuries occurred at home. Girls were more likely to experience home injuries, whereas school-site injuries, sport injuries and transportation incidents were more frequent in boys ( $P = 0.01$ ). Figure 1 depicts the percentage of the location of serious injuries.

Playing games, sport activities and biking were the most reported activities that could result in an injury. These were also more frequently reported causes of injury by boys compared to girls in contrast with other activities listed in the questionnaire (Figure 2).

Medical consequences of accidents were bone fractures, joint dislocations, sprains and strains or cuts in more than 60% of cases. About half (44.6%) of the injuries received medical attention at a medical office, while only 11.6% of them were medically managed at a hospital. Boys were more likely to receive care in a medical facility than girls ( $P = 0.001$ ). Figure 3 summarizes information regarding location where injured participants received medical care.

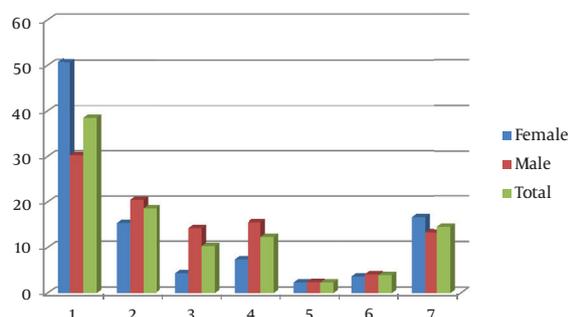
**Table 1.** Selected Characteristics of Participants

Characteristics	No. (%)
<b>Education Level, Age</b>	
Elementary, 11y	635 (33.9)
Middle, 13y	628 (33.6)
Secondary, 15y	609 (32.5)
<b>Gender</b>	
Female	946 (50.5)
Male	926 (49.5)
<b>Residence</b>	
Urban	1628 (88.4)
Rural	214 (11.6)
<b>School Type</b>	
Public	1726 (92.2)
Private	146 (7.8)
<b>Father's Education</b>	
Low education	1107 (63.2)
High education	645 (36.8)
<b>Mother's Education</b>	
Low education	1426 (79.3)
High education	372 (20.7)

**Table 2.** Distribution of Students Reporting Medically Attended Injuries in the Past 12 Months by Number of Injuries, Education Levels and Gender

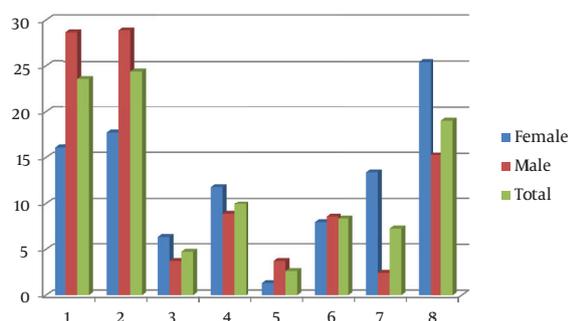
	Number of Injuries, No. (%)			P Value
	None	Injured 1, time	Injured > 1, Time	
<b>Education Level</b>				< 0.001
Elementary	(311) 48.9	(173) 27.2	(152) 24.0	
Middle	(344) 54.7	(155) 24.7	(129) 20.6	
Secondary	(389) 63.9	(111) 18.2	(108) 17.8	
Total	(1043) 55.7	(438) 23.4	(391) 20.9	
<b>Gender</b>				< 0.002
Female	(619) 65.4	(189) 20.0	(139) 14.7	
Male	(429) 46.3	(248) 26.8	(251) 27.1	
Total	(1043) 55.7	(438) 23.4	(391) 20.9	
<b>Residence</b>				< 0.04
Urban	(877) 53.9	(321) 19.7	(430) 26.4	
Rural	(120) 56.1	(51) 23.8	(43) 20.1	
Total	(997) 54.1	(372) 20.2	(473) 25.7	
<b>School Type</b>				< 0.001
Public	(955) 55.3	(406) 23.5	(365) 21.2	
Private	(83) 57.0	(30) 20.5	(33) 22.6	
Total	(1038) 55.4	(436) 23.3	(398) 21.3	

**Figure 1.** Percentage of Injury by Setting



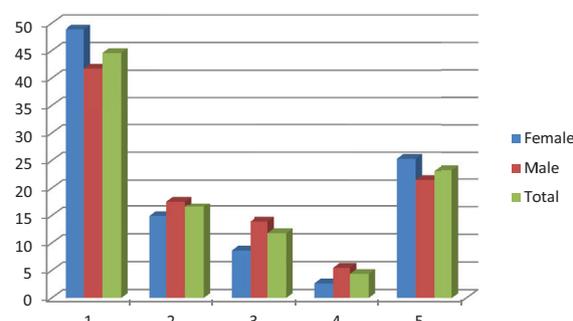
1: At home/in yard; 2: School, including school grounds; 3: At a sport facility or field (not at school); 4: In the street/road/parking lot; 5: At a commercial/business area; 6: Countryside (beach, forest, park, etc.); 7: Other.

**Figure 2.** Percentage of Injury by Activity Context



1: Biking/cycling; 2: Playing or training for sports/recreational activities; 3: Skating; 4: Walking/running; 5: Riding/driving a car; 6: Fighting; 7: Paid or unpaid work; 8: Other

**Figure 3.** Percentage of Injury According to Location of Medical Care



1: Doctor's office; 2: Clinic/health center; 3: Hospital (ER/admitted); 4: School health facility; 5: Other.

School absenteeism was reported as a consequence of injuries in 46% of students who had a history of injury in the past 12 months. Only 219 students remembered the number of days they were absent. In 64.4% of cases students were absent for 3 days or less, whereas the average days absent was 6.16 days. There was no significant correlation between age and school absenteeism attributed to injuries.

### 5. Discussion

A notably high percentage (44.2%) of adolescents who participated in this study reported at least one medically treated injury which was consistent with the findings of the multinational HBSC survey of 2001/2002 that reported an average of 45% (18). This might impose a high burden on adolescent health in Iran, especially when

considering the fact that the proportion of deaths due to injuries among Iranian youth has increased during 1971 to 2001-2006 (15). According to the analysis of participants' characteristics, rural students were less prone to medically attended injuries than their urban peers. This finding could be attributed to less access to medical care in rural areas than the impact of behavioral factors. Injuries among 0-14 year-old Iranians who received medical care in urban areas was higher than rural areas in a national study as well (15). It is evident that injury incidents increase by age in both boys and girls in many developed countries; the same general trend is insignificantly observed in some other developed countries (19). On the other hand, a study with exactly the same methodology conducted in a developing nation has shown a reverse trend that is consistent with our findings in Iran (20). This can be interpreted by the disparities between older adolescents in developed versus developing countries regarding their access to sport facilities and transportation means that are more likely to play the leading role in the incident of injuries. Even older teenagers in less affluent countries are not as involved in organized activities (such as sports) as their counterparts in the industrialized world and they are less likely to drive a car as well -both are examples of activities that have high potential for unintentional injuries. Instead, they are developmentally more capable of avoiding injuries in comparison with younger adolescents of their own communities. There is evidence showing that students living in low-income countries report low injury rates (8). As students who study in private schools are generally more likely to come from affluent families, the lower rate of injuries in private school adolescents should not be a surprise. Boys are more likely to become injured than girls in both developed and developing countries (19, 20). Iranian students are not an exception; however, there is a significant gender difference when we focus on the injury setting and the activity context in which injuries happen. Girls are more likely to experience a home injury, while school injuries are more common among male students. A study in China has shown a similar pattern for school injuries in male and female students (21).

The importance of home as the main location for injuries has been persistent over time and in other nations (22, 23). As girls are more likely to become the victim of home injuries, they must be considered as a priority target for health and safety education to prevent accidents and unintentional home injuries, whereas boys are better candidates for school injury prevention programs. Boys are more prone to injuries that may occur because of biking/cycling and playing or training for sports/recreational activities. In other words, organized activities are more important in incident of injuries among male students. Although the majority of injuries among both boys and girls are treated in private medical offices, the predominance of female students in this pattern is not statistically significant ( $P < 0.08$ ). On the other hand,

the noticeable amount of injury treated in unclassified types of care facilities may play a role in the rather high mortality rate that results from injuries in the younger population of Iran. School absenteeism as a result of injuries is quite common (46%) in Iranian adolescents and is also reported as a considerable incident in international HBSC (18). This study is the first experience of Iranian professionals with HBSC survey methodology. Further adjustments should be considered to make the tool an utterly reliable and valid surveillance measure, especially for younger adolescents. Injuries are quite common in school-aged adolescents of Pakdasht community. This not only imposes a high health burden but also generates negative consequences for education because of school absenteeism. Boys are generally more prone to injuries; however, home injuries are much more common in among girls. There are obvious disparities between students from urban versus rural areas and between private versus public school students. Better understanding of predisposing factors, medical consequences and responses to injuries can considerably improve adolescent health. The HBSC tool should be considered in the establishment of a school-based injury surveillance program to confront this major health issue in young people. It should be taken into account that this survey mainly relies on the memory of school-aged children and their recall of incidents in the 12 months prior to the time of the study. Therefore, recall may be an adverse consequence that places limitations on the actual picture.

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