

## **Associated Factors Of School-Going Adolescents' Injuries In Vietnam**

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### **Abstract**

This study aimed to explore the risk and protective factors associated with injuries among Vietnamese adolescents. Of the 770 respondents, 20.6 % reported an injury during the past 12 months. We found that there were differences between genders in injury status, causes and frequency. Common risk factors for injuries included mental health problems (depression), experienced violence, students' awareness of injury risks and participation in school-based prevention programs. An effective school-based injury prevention program that both consider individual factors, as well as other stakeholders (parents, teachers, school social workers and health workers), was recommended to mitigate the burden of injury among school-going adolescents in Vietnam.

**Keywords:** Adolescent; Vietnam; school; health; prevention; social work.

### **Introduction**

Injuries among school-going adolescents are an increasing public health concern due to the overall ageing of the population. Unintentional injuries are the largest source of

premature morbidity and mortality and the leading cause of death among adolescents (Alonso-Fernández et al., 2017). More than 2,000 children and adolescents die every day from traffic injuries, violence, drowning, poisoning, falls, burns, etc (Alonso-Fernández et al., 2017).

In Vietnam, child injury has been becoming a major public health problem, particularly since the Renovation (Doi Moi') in 1986 (Thanh et al., 2005). Among adolescent injuries, drowning was shown to be the leading cause of fatal injury among Vietnamese children when compared with other major causes such as road traffic crashes, falls, poisoning, burns and animal bites (Boufous et al., 2012). Vietnam's Global School-based Student Health Survey 2019 (GSHS 2019) which was conducted in 20 provinces and cities, with a sample size of 7,690 male and female students aged 13-17, found that the prevalence of violence and non-fatal injury was 14.5% and 21.4% respectively ( Le et al., 2022).

As in other countries, the male gender has consistently been identified as at risk of injuries (Mattila et al., 2004; Tang et al., 2019). There is, however, evidence that some social indicators are risk factors for injuries, e.g. low socio-economic status and further, a relationship between the behavioural characteristics of adolescents, and their injury rates have been shown significant (Thanh et al., 2005; Tang et al., 2019; Falavigna et al., 2012; de Looze et al., 2012). In Vietnam, a risky environment including open water, poorly designed roads, and inadequate infrastructure are one of the most significant contextual factors contributing to adolescents' injuries. Other risks are related to a lack of awareness about injury prevention and inappropriate safety devices and childcare (Boufous et al., 2012).

During the last decade, the Vietnamese government have made efforts to implement various injury prevention programmes responding to the increasing burden of child injury in Vietnam (Boufous et al., 2012). However, school-going adolescent unintentional injury is still becoming a serious issue. This paper aims to provide an overview of the situation of unintentional injuries among Vietnamese adolescents and the understanding of risk/protective factors related to their injuries. We hope that our study will contribute to the design of the most effective school-based injury prevention and intervention for adolescents in Vietnam.

## **Materials And Methods**

### ***Participants***

The study draws on data from a cross-sectional study conducted by the Faculty of Social Work, Hanoi National University of Education. This study took place in three public secondary schools locating three different areas in center Vietnam. We used data collected from adolescents aged 11 (6th grade) –15 (9th grade) because this age group is disproportionately affected by injuries (Gore et al., 2011).

This study focused on public schools because we aimed to investigate normal school-going adolescents. Three secondary schools were randomly selected in three different areas including the city centre, suburb and rural area. In each school, 04 classes from 6th to 9th grade were randomly selected. A total of 12 classes were selected. In each class, researchers

invited all students to participate in the study and reminded them that they were free to withdraw at any time if they were not happy to continue their participation. All students' names were autonomous. There was no refusal of participation in the study. Finally, there were 770 students agreed to fulfil the questionnaires (Table 1).

### **Data collections**

Data was collected by the trained research assistants and researcher groups. The research assistants provided clear instructions for students before giving them a self-completed questionnaire. In the classrooms, students completed the questionnaire voluntarily and quietly for 25 to 35 minutes.

### **Measurement of injuries**

The occurrence of unintentional injuries was assessed by asking students "During the past 12 months, what was the most serious injury that happened to you?". Participants were assigned "no" if they answered: "I was not seriously injured during the past 12 months" and "yes" if at least one injury was reported.

Injury frequency was categorised into four groups: "zero", "one time", "two to three times" and "four or more times" based on the question "During the past 12 months, how many times were you seriously injured?".

The cause of injury was also assessed with the question, "During the past 12 months, what was the major cause of the most serious injury that happened to you?". The responses were categorized as "traffic (e.g., motor vehicle accident/automobile crash)", "home" and "other" (Wu et al., 2019).

### ***Risk and protective factors***

Demographic characteristics were described by three variables: gender, grade and place of school. We also assessed the potential risk of unintentional injuries including traffic behaviour (frequency of driving bicycle), physical activities (participation in sports club sessions and other exercises), depression (blue or hopeless during the past month) and violence experienced during the past month. Adolescents were also asked to self-rate their injury awareness and participation in school-based prevention programs.

### **Data analysis**

We used Chi-square tests to assess differences between the injury frequency and cause of injury by gender among students (Mchugh, 2013). A single-factor logistic regression analysis with the occurrence of injuries as the dependent variable was performed to identify factors related to injuries. Subsequently, we assessed the above-mentioned factors by performing a multivariable logistic regression analysis. According to this analysis, gender, grade, depression, violence participation, self-perceived injury prevention skills and school-based injury were all factors in the patterns presented in Table 4

## Results

### *Demographic of participants*

Table 1 describes the characteristics of the study participants. Of all school-aged adolescents who responded to the questionnaires, 52.2% (402) were male students and 47.8% (368) were female students. Furthermore, 33.6% attended secondary schools in the city centre, 36.8% studied in a suburban area and 29.6% were in a rural area. The mean age of the students was 13.4 years old (SD = 1.10). Among participants, 26.1% were studying in the 6th grade, 26.2 % in the 7th grade, 24.4 in the 8th grade and 23.2 in the 9th grade.

**Table 1.** *Characteristics of participants*

Variables	Frequency	Percentage (%)
Mean age (SD)= 13.4 (1.10)		
<b>Gender</b>	(n=770)	
Male	402	52.2
Female	368	47.8
<b>Grade</b>	(n=770)	
6th	201	26.1
7th	202	26.2
8th	188	24.4
9th	179	23.2
<b>School location</b>		
City centre	259	33.6
Suburb area	283	36.8
Rural area	228	29.6

### *The prevalence, frequency and cause of injury*

Out of the 770 Vietnamese school-going adolescents aged 11–15, 159 (20.6%) reported an injury during the past 12 months. Among them, 68.6 % reported one injury, 28.9% two and 2.5 % had three or more injuries. Among participants who reported injury, 49.7% of them suffered serious home-related injuries, then followed by 23.2% who reported cause of traffic injuries (23.3%) and others accounted for 27.0%.

This injury rate was significantly higher in males than in females with 26.0% and 15.1%,  $p < 0.001$  respectively. In addition, both the cause and the frequency of injury were found to be statistically and significantly different between females and males. Table 2 presents the comparison of injury status, causes and frequencies between genders.

**Table 2** Associated factors of unintentional injuries occurrence among Vietnamese school-going adolescents

Variables	Frequency	Percentage (%)	Male (N, %)		Female (N, %)		P-value
<b>Injury Status</b>							<b>&lt; 0.001</b>
Yes	159	20.6	102	25.4	57	15.5	
No	611	79.4	300	74.6	311	84.5	
<b>Causes of Injury</b>							<b>&lt; 0.01</b>
Traffic	37	23.3	36	9.0	21	5.7	
Home	79	49.7	34	8.5	25	6.8	
Other	43	27.0	32	8.0	11	3.0	
<b>Injury Frequency</b>							<b>&lt; 0.001</b>
1 time	109	68.6	59	14.7	50	13.6	
Two to three times	46	28.9	39	9.7	7	1.9	
Four or more times	4	2.5	4	1.0	0	0.0	
<b>Violence</b>							0.229
Yes	104	13.5	60	14.9	44	12.0	
No	666	86.5	342	85.1	324	88.0	
<b>Depression</b>							0.820
Yes	642	83.4	68	16.9	60	16.3	
No	104	13.5	334	83.1	308	83.7	

### ***Risk factors and protective factors***

Table 3 shows the risks and protective factors of school-based adolescent injuries. It can be seen that there was a significant relationship between depression, violence experience and injury variables. More specifically, students who had depression (30.5%) and experienced violence during the past months were more likely to have injuries than others (depression: 30.5% vs. 18.7%  $p < 0.001$  and violence: 43.3% vs 17.1%,  $p < 0.001$ ). Among respondents, 28.2% perceived themselves as rather poor while just 11.9% reported that they had excellent skills in preventing injuries. In terms of participation at school, more than half of students (51%) attended more than two programs and just only 8.1% have never attended any educational programs in school. Similarly, there was also a significant relationship between self-perceived injury prevention ( $p < 0.001$ ) and participation in injury prevention programs with injury occurrence ( $p < 0.001$ ). However, we found no significant relationship between participating in sports clubs and riding a bicycle among adolescents with injury status ( $p = 0.431$  and  $p = 0.105$  respectively).

**Table 3** Risks and protective factors of school-based adolescents injuries

Variables	Frequency	Percentage (%)	Injury status (n=770)				P-value
			Yes (N, %)		No (N, %)		
<b>Violence</b>							<b>&lt;0.001</b>
Yes	104	13.5	45	28.3	59	9.7	
No	666	86.5	114	71.7	552	90.3	
<b>Depression</b>							<b>&lt;0.01</b>
Yes	128	16.6	39	24.5	89	14.6	
No	642	83.4	120	75.5	522	85.4	
<b>Self-perceived injury prevention skills</b>							<b>&lt;0.001</b>
Very poor	81	10.5	23	9.5	58	14.5	
Rather poor	217	28.2	77	48.4	140	22.9	
Average	203	26.4	42	26.4	161	26.4	
Quite good	177	23.0	12	7.5	165	27.0	
Excellent	92	11.9	5	3.1	87	14.2	
<b>Participation in injury prevention programs</b>							<b>&lt;0.001</b>
Never	62	8.1	26	16.4	36	5.9	
One program	223	29.0	78	49.1	145	23.7	
Two programs	393	51.0	47	29.6	346	56.6	
More than three programs	92	11.9	8	5.0	84	13.7	
<b>Sports in sport clubs</b>							<b>P=0.431</b>
Never	116	15.1	22	13.8	94	15.4	
Once a week or less	203	26.4	36	22.6	167	27.3	
2-5 times per week	221	28.7	46	28.9	175	79.2	
Approximately everyday	230	29.9	55	23.9	175	76.1	
<b>Frequency of riding a bicycle</b>							<b>P=0.105</b>
Never	186	24.2	30	16.1	156	25.5	
Once a week or less	174	22.6	31	19.5	143	23.4	
2-5 times per week	223	29.0	51	32.1	172	28.2	
Approximately everyday	187	24.3	47	29.6	140	22.9	

### Factors related to injuries

Table 4 shows the findings of the multivariable logistic model of factors associated with injuries among Vietnamese adolescents aged 12-15. In terms of gender, we found that male students had a higher likelihood of injury than female students (OR = 1.78, 95% CI: 1.78-1.15). Higher odds of injury were also found in students studying in lower grades (7th grade: OR = 2.88, 95% CI: 1.48-5.61; 6th grade: OR = 2.33, 95% CI: 1.20-4.55).

Violence and depression were important determinants of injury among Vietnamese adolescents. Attending violence during the last month increased the likelihood of an injury by more than 2.56 times (OR = 2.56, 95% CI: 1.50-4.39). Depression almost doubled the odds of an injury among respondents (OR = 1.87, 95% CI: 1.11-3.17). In terms of injury prevention,

the risk being higher among adolescents had very poor (OR =3.47, 95% CI: 1.02-11.7), rather poor and average self-rated awareness of injury risks compared to excellent adolescents. Higher odds of injury were also found in those who never or participated one time in school-based injury prevention programs compared to those participating more than three times.

**Table 4** *Multivariable logistic model of factors related to injuries among in-school adolescents in Vietnam*

Variables		Odds ratio	95% CI (Upper-Lower)		P-values
<b>Gender</b>	Female	1			Reference
	Male	1.78	<b>1.78</b>	<b>1.15</b>	<b>&lt;0.01</b>
<b>Grade</b>	9th	1			Reference
	8th	1.37	0.69	2.73	P=0.57
	7th	2.88	1.48	5.61	<0.001
	6th	2.33	1.20	4.55	<0.05
<b>Violence</b>	No	1			Reference
	Yes	2.56	1.50	4.39	<0.001
<b>Depression</b>	No	1			Reference
	Yes	1.87	1.11	3.17	<0.05
<b>Self-rated awareness of injury risks</b>	Excellent				
	Quite good	1			Reference
	Average	0.88	0.24	3.24	P=0.84
	Rather poor	3.47	1.02	11.78	<0.05
	Very poor	5.41	1.64	17.88	<0.01
		3.96	1.10	14.24	<0.05
<b>Participation of school-based injury prevention programs</b>	≥3	1			
	2	0.56	1.15	10.05	P=0.37
	1	1.90	0.70	4.91	<0.01
	0	3.40	0.20	1.50	<0.001

## Discussion

The study provided updated results on the overall prevalence of injuries and related factors of unintentional injuries in school-going adolescents in Hanoi, Vietnam. The proportion of sampled participants with injuries in the last 12 months was 20.6%.

Results indicate a lower annual prevalence of injury in Vietnam comparing other countries in previous studies. The highest prevalence of injury was found in the African region, with 48.1% (Han et al., 2019). Another study showed that the highest number of injury incidence among middle school students aged 13–15 years in 47 LMICs between 2003 and 2012 were found in Samoa (72.1%) and then followed by six countries in Sub-Saharan Africa (Street & Jacobsen, 2016). In 2020, 40.9% of school-going adolescents in Ghana were found to have injuries in the last 12 months (Kwaku Essien et al., 2020).

In comparison with published findings from other countries in Southeast Asia in 2015, our finding is lower than Malaysia (34.9%), Indonesia (29.6%), Philippines (49.3%),

and Thailand (39.6%) but higher than Laos (16.8%) (Peltzer & Pengpid, 2017). In the same study, 34.3% of male and 25.1% of female middle-school students were found to have at least one serious injury (Peltzer & Pengpid, 2017). Recently, the Vietnam GSHS 2019 showed that the prevalence of non-fatal injury among Vietnamese adolescents was 21.4% among 20 provinces and cities P. A. Le et al., 2022).

The lower rate of injuries among school-aged adolescents in Vietnam shows that multi-sectoral effort from the government has had great progress in injury prevention. Many injury prevention activities have been implemented in local schools and communities. These strategies focused on improving public awareness and building a safe environment for children and adolescents.

This finding indicates that boys rated suffer from violence and injury more than girls. These are consistent with other studies explaining that boys engage more actively in physical fighting, and physical activity and experience more injuries than girls (Berenson et al., 2001; de Looze et al., 2019; Le et al., 2022).

In terms of risk factors, depression and violence were found associated with school-going adolescent injuries. Notably, depression is one type of risk factor for injuries among Vietnamese school-going adolescents which is consistent with previous studies (Tang et al., 2019). Depressive symptoms might increase the risk of violence-related, transport-related and unintentional injury events among adolescents (Asbridge et al., 2014). And this is in keeping with what was found in a Vietnamese study (Peltzer & Pengpid, 2017; Le et al., 2022). Academic pressures and rapid access to social media through smartphones might increase the risk of mental health problems, especially depression issues (La et al., 2020; H. T. H. Le et al., 2016; Nguyen et al., 2020). Also, the findings are in line with other literature which found a significant relationship between school connectedness, violence risk-taking and injuries (Berenson et al., 2001; Chapman et al., 2011). According to the Viet Nam Global School-based Student Health Survey (GSHS) 2019, the rate of school violence among school-going adolescents was 14.5% and associated with smoking, alcohol use, mental health issues, and family engagement. (Le et al., 2022)

Our study did not find a significant relationship between residence and injuries. The result is not consistent with the last study in Vietnam showing that adolescents in suburban/rural schools reported injuries more frequently compared to urban students (Le et al., 2022).

Regarding protective factors, we observed that self-rated awareness of injury risks and participation in school-based injury prevention programs might also impact adolescents in preventing injury. While efforts have been made to some extent, the impact of most programmes on reducing the burden of adolescent injury in Vietnam is still unclear, especially in schools (Boufous et al., 2012). The lack of capacity to design and implement injury prevention in schools has led to a low understanding of injury risks. Capacity building for teachers, educational manager and parents are required at the school level. An effective school-based injury prevention program should consider the engagement of as different stakeholders like parents, teachers, school social workers and health workers in taking care of children. Additionally, policies for developing a safe school environment and injury prevention training curriculum need to be considered carefully.

## Conclusion

Despite the reduction in rates of school-going adolescent injuries, this issue is still high among Vietnamese adolescents. Risk factors for adolescents' injuries might be depression, violence and students' awareness of injury risks and participation in school-based prevention programs. Based on our findings, we highlight the need for the implementation of an effective school-based injury prevention program to decrease injury among school-going adolescents in Vietnam.

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