



**Queensland University of Technology**  
Brisbane Australia

This may be the author's version of a work that was submitted/accepted for publication in the following source:

[Senanayake, Sameera Jayan](#), Gunawardena, Shanthi, Wickramasinghe, Sashimali, Wickramasinghe, Champika, Gunawardena, Nalika Sepali, Lokubalasooriya, Ayesha, Peiris, Renuka, Agarval, Naveen, & Rani, Manju (2019)

Prevalence and correlates of interpersonal violence among in-school adolescents in Sri Lanka: Results from the 2016 Sri Lankan Global School-Based Health Survey.

*Asia-Pacific Journal of Public Health*, 31(2), pp. 147-156.

This file was downloaded from: <https://eprints.qut.edu.au/204902/>

© 2019 APJPH

This work is covered by copyright. Unless the document is being made available under a Creative Commons Licence, you must assume that re-use is limited to personal use and that permission from the copyright owner must be obtained for all other uses. If the document is available under a Creative Commons License (or other specified license) then refer to the Licence for details of permitted re-use. It is a condition of access that users recognise and abide by the legal requirements associated with these rights. If you believe that this work infringes copyright please provide details by email to [qut.copyright@qut.edu.au](mailto:qut.copyright@qut.edu.au)

**License:** Creative Commons: Attribution-Noncommercial 4.0

**Notice:** *Please note that this document may not be the Version of Record (i.e. published version) of the work. Author manuscript versions (as Submitted for peer review or as Accepted for publication after peer review) can be identified by an absence of publisher branding and/or typeset appearance. If there is any doubt, please refer to the published source.*

<https://doi.org/10.1177/1010539519825600>

**Prevalence and correlates of interpersonal violence among in-school adolescents in Sri Lanka: results from the 2016 Sri Lankan Global School-Based Health Survey**

**Authors:**

S J Senanayake	Ministry of Health, Sri Lanka	sam197902@gmail.com
S Gunawardena	Non-Communicable Diseases Unit, Ministry of Health, Sri Lanka	shanthi_gunawardana@yahoo.com
S Wickramasinghe	Ministry of Health, Sri Lanka	sashimali2004@yahoo.com
C Wickramasinghe	Ministry of Health, Sri Lanka	scwickrama@gmail.com
N S Gunawardena	World Health Organization, Sri Lanka	gunawardenan@who.int
A Lokubalasooriya	Family Health Bureau, Ministry of Health, Sri Lanka	ravi.ceb@gmail.com
R Peiris	Ministry of Education, Sri Lanka	renukacha2002@yahoo.com
N Agarwal	South East Asia Regional Office World Health Organization	agarwaln@who.int
M Rani	South East Asia Regional Office World Health Organization	ranim@who.int

**Corresponding Author**

Sameera Senanayake  
No. 40, Kottawa 1<sup>st</sup> lane, Ambuldeniya, Nugegoda, Sri Lanka  
+94772928226  
sam197902@gmail.com

**Declarations of interest:** None

**Funding Source:** World Health Organization

## **Abstract**

Interpersonal violence among adolescents is an issue of global public health concern, leading to adverse physical and psychological outcomes among children and young people under the age of 18 years. This paper discusses the prevalence of interpersonal violence and identifies their associated factors among school going adolescents of ages 13-17 years using the data from the Sri Lankan Global School-Based Health Survey conducted in 2016. Of the 3,262 students who participated, 35.1% (95% CI- 31.0%-39.5%) were physically attacked and 44.2% (95% CI- 39.2%-49.4%) were in a fight with peers, one or more times during the 12 months prior to the survey,. Being bullied by peers, male sex, 13-15 year age group, smoking and alcohol use, considering or attempting suicide, missing classes without permission and parents not being aware of students' activities were associated with violence. The study highlights the need for violence prevention programmes to address the risk factors among schooling adolescents.

### *Key words*

Global School Health Survey, GSHS, violence, injuries, school going adolescents

## **Introduction**

Interpersonal violence is a major public health concern, which is associated with many adverse outcomes including high mortality. It is estimated that in year 2016, 5.2 homicides per 100,000 population have taken place globally, with the highest rate been reported for the 15-29 years age group<sup>(1)</sup>. Interpersonal violence is also associated with many non-fatal injuries, seen commonly among young adults <sup>(2)</sup>.

Adolescence, which is the 10-19 year age group, marks the transition from childhood to adulthood through complex physiological, psychological and social changes. These changes make the adolescent highly vulnerable to engage in violence<sup>(3)</sup>. Violence among adolescents has escalated to an issue of global public health concern <sup>(4, 5)</sup>. In year 2015, interpersonal violence has led to 51,000 deaths among adolescents worldwide, and it is the second most common cause of death among males of 15 to 19 years of age<sup>(5)</sup>. In addition to deaths, they are also associated with adverse physical and psychological outcomes <sup>(4)</sup>. Among school going adolescents, these effects may ultimately lead to a deterioration of school performance <sup>(5, 6)</sup>.

In 2001, World Health Organization (WHO), in collaboration with The United Nations Joint Programme on HIV/AIDS (UNAIDS), The United Nations Educational, Scientific and Cultural Organization (UNESCO), and United Nations Children's Fund (UNICEF), and with technical assistance from the US Centres for Disease Control and Prevention (CDC), developed the Global School-based Student Health Survey (GSHS) to provide data on health and social behaviours among school going adolescents.

Adolescents consist of 16.1% of the total population in Sri Lanka. Of them 70% belong to the school going population<sup>(7)</sup>. Since 2003, Ministries of Health and Education in Sri Lanka have been using the GSHS to periodically monitor the prevalence of important health risk behaviours in this population. The GSHS conducted in 2008 revealed that among the students of 13-15 year age group, 47.3% (95% CI- 42.9-51.6) had been physically attacked while 47.1% (95% CI-43.2-51.1) was involved in a fight. In order to address the issue effectively, it is required to assess the magnitude and trend of interpersonal violence and also to gain a thorough understanding on the factors that influence interpersonal violence among adolescents in Sri Lanka.

Thus, the aim of this paper is to estimate the prevalence of violence s and their correlates among school going adolescents of ages 13-17 using the data of the most recent GSHS done in Sri Lanka, which was conducted in 2016.

## **Methods**

This study involved secondary analysis of existing data from the Sri Lankan Global School-Based Health Survey conducted in 2016. The GSHS intends to provide data on health behaviours and associated risk and protective factors among school going adolescents. Students of grades 8, 9, 10, 11 and 12 in government schools of Sri Lanka were recruited for the survey. Data collection was done during the period of 1st of October to 31st of November 2016.

### **Sample size and sampling.**

The estimated sample size was 3125 based on a desired precision of  $\pm 5$  percent and an expected response rate of 80%. A two-stage cluster sample design was employed to produce a representative sample of students in grades 8 to 12 in Sri Lanka. In the first stage, the sampling frame consisted of all schools containing grades 8-12 in the country. Out of them, 40 schools were selected by probability proportional to school enrollment size. All 40 schools consented to participate in the study. Systematic equal probability sampling with a random start was used to select classes from each selected school in the next step. All students in the selected classes were eligible to participate in the survey.

### **The questionnaire.**

Data were collected via a self-administered, standard GSHS questionnaire which was adopted to the Sri Lankan culture and translated to Sinhala and Tamil. Two questions were included in the questionnaire to obtain information relevant to violence. They inquired about the number of times the respondent was actively engaged in a fight and the number of times the respondent was physically attacked by peers, where the he or she was not actively engaged in the fight, during the 12 months prior to the survey. Each question had eight responses,

ranging from 0 times to 12 or more times. In addition, questions related to socio demographic data, students' feelings and friendships, substance use and parental engagement in students' life were used for the assessment of associations.

### **Data analysis.**

Data were analyzed using SPSS version 21.0 software. A weight was associated with each questionnaire to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non-response. The weight used for estimation is given by:

$$W = W1 * W2 * f1 * f2 * f3$$

W1 = the inverse of the probability of selecting the school;

W2 = the inverse of the probability of selecting the classroom within the school;

f1 = a school-level non-response adjustment factor calculated by school size category (small, medium, large). The factor was calculated in terms of school enrollment instead of number of schools.

f2 = a student-level non-response adjustment factor calculated by class.

f3 = a post-stratification adjustment factor calculated by grade.

Prevalence of being physically attacked and being engaged in a fight are reported using frequencies with 95% confidence intervals.

Correlates of interpersonal violence were identified by conducting bivariate analyses followed by multivariate analyses. Separate analyses were carried out for the two dependent variables: engaging in physical fights and being physically attacked. The independent variables selected for the analyses were all categorical in type and included: age (13-15 years and 16-17 years), sex, being bullied, feeling lonely most of the time, considering suicide,

attempting suicide at least once, having at least one close friend, having attended anger management teaching sessions in school, parents not understanding students' problems, parents knowing what students did during the free time, current use of cigarette smoking, alcohol or recreational drugs. Unadjusted odds ratios with 95% confidence intervals were obtained through bivariate analyses following which a backward logistic regression was carried out using variables which had a p value of 0.05 or less in bivariate analysis. The adjusted odds ratios with 95% confidence intervals were obtained for variables retained in the final model.

#### **Administrative requirements and Ethical clearance.**

The approval of the study protocol was obtained from the Ministry of Education and relevant zonal education directors and principals. Ethical clearance was obtained from ethical review committee of Colombo Medical Faculty.



## Results

Of the selected 3650 sampled students, 3263 completed questionnaires and 3262 questionnaires were usable after data editing, giving a response rate of 89%.

### **Description of the study sample.**

Most of the students who responded belonged to the 13-15 age group (66.5%). The study group consisted of a slightly higher proportion of females (51.1%) than males. The characteristics of the study sample are given in table 1.

Interpersonal violence was a common occurrence among the study group. Nearly half of the study group (44.2%) reported being in a physical fight with other students (95% CI- 39.2%-49.4%), while one third of the students admitted that they were physically attacked at least once (35.1%, 95% CI- 31.0%-39.5%) during the 12 months prior to the survey.

Physical fights were significantly more common among boys (55.4%, 95% CI-50.5-60.1)) than in girls (33.5%, 95% CI-27.4-40.1). Further, students in 13-15 age groups were more involved in fights (46.3%, 95% CI-40.9-51.8) compared to students in 16-17 years age group (38.3%, 95% CI-32.0-45.0), which was statistically significant.

Similarly, a significantly higher proportion of boys (43.3%, 95% CI-39.1-47.6) had been physically attacked, compared to girls (26.7%, 95% CI-22.4-31.6), while a significantly higher proportion of students in the 13-15 years age group were physically attacked (38.2%, 95% CI-33.3-43.3) compared to 16-17 years age group (28.2%, 95% CI-22.9-34.1).

### **Factors associated with violence and injury.**

Bivariate analysis depicted that male sex, 13-15 age group, being bullied, feeling lonely most of the time, considering or attempting suicide, substance use, missing classes without permission, parents not understanding students' problems and not knowing what they did during their free time were significantly associated with being in a physical fight (Table 3). The same factors were associated with being a victim of physical attacks (Table 4).

However multivariate analysis revealed that only a number of these factors were associated with engaging in fights. Being bullied by peers was an important correlate, where students who were bullied were 2.9 times more likely to engage in physical fights than those who were not bullied [aOR (95%CI): 2.9 (2.5-3.5)]. Smoking [2.5 (1.2-5.1)], consuming alcohol [2.0 (1.1-3.9)], male sex [2.0 (1.7-2.4)], 13-15 year age group [1.5 (1.3-1.8)], considering suicide [1.6 (1.2-2.1)], missing classes without permission [1.3 (1.1-1.6)], parents not knowing about students' free time activities [1.3 (1.1-1.5)] were the other correlates (Table 3).

Table 4 gives the variables that were significantly associated with physical attacks in the logistic regression model. Being bullied had the strongest positive association, where bullied students were 4 times more likely to be attacked by peers [4.1 (3.4-4.8)]. Other variables included in the final logistic regression model were, male sex [1.7 (1.4-2.0)], 13-15 year age group [1.6 (1.3-1.9)], attempting suicide [1.5 (1.0-2.1)], missing classes without permission [1.4 (1.1-1.7)] and parents not knowing what the students did during their free time [1.6 (1.4-2.0)].

## Discussion

Adolescents are more prone to be involved in physical assaults and fights. This survey indicated a high prevalence of interpersonal violence in the form of physical assaults and fights among school going adolescents. Approximately one-third of the students were physically assaulted at least once in the past year, and almost one out of two students reported being in a physical fight. Similar proportions of physical violence have been reported by national level as well as local studies conducted in Sri Lanka. Global School Health survey conducted in year 2008 reported that close to 50% of students were involved in some form of physical violence <sup>(8)</sup>. A study carried out in year 2003 among 630 school children in Kaluthara district has reported that the prevalence of physical violence was over 50% <sup>(9)</sup>. This finding has been re-confirmed in 2010, by a study conducted among grade 10 students in Colombo district <sup>(10)</sup>. A study conducted among 1,700 school children aged 13-15 years in Gampaha district has revealed that while 77.6% of the students were victims of violence, a further 60% were perpetrators of physical violence <sup>(11)</sup>. Evidence from these studies suggests that physical violence among adolescents is an emerging public health concern in Sri Lanka.

This trend has been observed throughout the world, and analysis of GSHS data in 27 countries has reported a prevalence of physical fighting varying from 58% in Djibouti to 16% in Myanmar <sup>(12)</sup>. Many other studies carried out in different parts of the world support these findings <sup>(13-15)</sup>. Therefore, interpersonal violence in school is common and is said to be accepted by students as a component of the school 'culture' <sup>(6)</sup>.

The grave nature of violence has also been shown by the National Youth Survey conducted in Sri Lanka in 2013, which revealed that 3.7% (95% CI 2.7- 4.9) of male and 1.5% (95% CI 0.9-2.3) of female youth aged 15-19 years were involved with a fight during the 12 months

prior to the survey which needed medical treatment. Furthermore, 1.3% (95% CI 0.8-2.1) of males and 0.6% (95% CI 0.3-1.2) of female youth aged 15-19 years were not able to engage in routine work due to the last incidence of violence <sup>(16)</sup>.

Interpersonal violence has adverse consequences on students' overall health and school performances and should be addressed promptly. Implementation of remedial actions requires knowledge on factors associated with these incidences. Current study has revealed several such important factors, such as 13-15 year age group, male sex, being bullied, smoking and alcohol use, suicidal ideations or attempts, missing school without permission, lack of parental supervision in terms of parents not being aware of how their children spend their free time. Some of these factors, such as male sex, being a victim of bullying, alcohol use and smoking, lack of parental support are recognized risk factors of interpersonal violence among adolescents <sup>(2, 17)</sup>.

Being bullied by peers was the most significant correlate of both physical fights and assaults identified by the current study. The adverse relationship between being bullied and engaging in interpersonal violence has been established repeatedly <sup>(13-15, 18)</sup>. The students who are bullied have reported poor psychosocial health and are prone to much anti-social behaviour. They are also known to carry weapons to schools in order to protect themselves <sup>(18)</sup>. Therefore, they may be at an increased risk of being perpetrators of violence. In Beijing, Hazemba et al has established a dose response relationship between bullying and physical fights where increasing frequency of being a victim of bullying was associated with increased odds of engaging in a fight <sup>(19)</sup>.

The current study demonstrated that boys were more likely to be involved in physical assaults and fights than girls, and this trend has been observed in similar studies carried out in Sri Lanka as well as in other countries (4, 5, 11, 15, 20). A number of theories exist to explain this, the most prominent ones being that boys have impulsive and active behaviours and are more prone to engage in risk taking activities. Also during adolescent period both sexes tend to adjust their behaviours to according to the gender stereotypes, where males are perceived to be strong, powerful and aggressive, increasing the risk of boys engaging in violence and obtaining injuries (12, 21).

Studies have found that parental supervision was negatively associated with physical fights (13). Similarly, the current study has demonstrated that students whose parents did not know what they did during their free time were more prone to engage in interpersonal violence and sustain injuries. However, the variable “parents not understanding their problems” was not identified as a significant correlate. It must also be noted that, parental involvement in the child’s life can affect the violent behavior of the child in either way. Studies have revealed that while children avoided interpersonal violence if they perceived that their parents disapproved it, corporal punishment by parents increased the child’s risk of engaging in violent acts (22). However, this issue was not assessed in depth by the GSHS.

Adverse social behaviours such missing classes without permission and substance use were positively associated with interpersonal violence and injury. Students with suicidal ideations also showed high odds of being involved in interpersonal violence. These correlates have been elicited by many other similar studies (13-15, 20, 23). However, as the current study is a cross sectional analysis, the temporal relationship of these associations could not be established. Positive relationships between factors such as substance use and suicidal

ideations, and physical violence has been demonstrated by Brown et al, who suggests that these behaviours are coping mechanisms for violence<sup>(24)</sup>. These behaviours could become habitual, which may lead to long-term health implications, adding to the burden of violence and injuries. Therefore, determination of temporality of the associations and implementation of appropriate interventions would be beneficial for the individual child as well as the health system as a whole.

Among the participants, 62.5% have stated that they were taught anger management at school. School based programs for violence prevention has been recommended by the WHO as a remedial measure for school based inter personal violence<sup>(2)</sup>. Though school based anger management programmes have reported significant improvements in the behavior of the students,<sup>(25,26)</sup> current study did not find an association between anger management teaching and violent activities. However, the methods and the extent of the teaching were not analyzed by the study, which may significantly affect the effectiveness of such programmes. The need for the school based preventive programmes in Sri Lanka to be more comprehensive has been addressed by earlier studies as well. These programmes should be effective in addressing identified risk factors and should also include all relevant stakeholders such as parents/ guardians, teachers and health staff<sup>(11)</sup>.

### **Conclusion & Recommendations**

The proportion of students who reported being physically attacked and being involved in a physical fight were found to be unacceptably high and similar to the situation as found in GSHS 2008. Male sex, 13-15 year age group, being bullied, use of cigarettes and alcohol, suicidal ideations and attempts, missing school without permission, parents not being aware of how their children spend their free time are some of the factors associated with violence

and serious injuries. Therefore, preventive interventions should be developed focusing mainly the male students and young adolescents, and they should also address the modifiable risk factors found in the current study. Interventions to address the risk factors should be incorporated into the school curricula. The currently available school-based violence prevention programmes should be evaluated for their effectiveness and necessary improvements should be done. As the importance of parental involvement in students' life has been shown by this study as well as other studies, the interventions should also include parents as a target group.

### **Limitations of the study**

Our study had following limitations. Firstly, it was conducted only among school going adolescents, limiting the ability to generalize the findings to entire adolescent population. The non- school going adolescents may be exposed to many adverse circumstances, which may give rise to findings that differ significantly from current findings. Secondly, as a cross sectional analysis was conducted, temporal direction between associations could not be established. As the incidences during the last 12 months were assessed, participants may have had difficulties in recalling the information, leading to underestimation or overestimation of results. Finally, a self-administered questionnaire was used for data collection, where the answers depend on the participants' interpretation of the question.

**Table 1: Description of the variables used to assess the correlates of violence in the study sample**

	<b>Characteristic (N)</b>	<b>Number*</b>	<b>Percentage**</b>
<b>Sex (3262)</b>	<b>Male</b>	1437	48.9
	<b>Female</b>	1805	51.1
<b>Age (3261)</b>	<b>&lt;13 years</b>	66	2.1
	<b>13-15 years</b>	2196	66.5
	<b>16-17 years</b>	977	30.7
	<b>&gt;17 years</b>	22	0.7
<b>Was Bullied (3196)</b>	<b>Yes</b>	1208	38.6
	<b>No</b>	1988	61.4
<b>Felt lonely most of the time (3250)</b>	<b>Yes</b>	294	9.1
	<b>No</b>	2956	91.0
<b>Considered suicide (3221)</b>	<b>Yes</b>	298	9.4
	<b>No</b>	2923	90.6
<b>Attempted suicide (3220)</b>	<b>Yes</b>	214	6.9
	<b>No</b>	3006	93.2
<b>Current smoking (3244)</b>	<b>Yes</b>	107	3.6
	<b>No</b>	3137	96.4
<b>Current use of alcohol (3191)</b>	<b>Yes</b>	103	3.3
	<b>No</b>	3088	96.6
<b>Current use of recreational drugs (3217)</b>	<b>Yes</b>	79	2.7
	<b>No</b>	3138	97.3
<b>Had close friends (3245)</b>	<b>No</b>	180	5.6
	<b>Yes</b>	3065	94.4
<b>Missed classes without permission (3238)</b>	<b>Yes</b>	1080	33.6
	<b>No</b>	2158	66.4
<b>Lacked parental support (3245)</b>	<b>Yes</b>	1214	37.7
	<b>No</b>	2031	62.2
<b>Lacked parental supervision (3233)</b>	<b>Yes</b>	987	30.8
	<b>No</b>	2246	69.2
<b>Taught anger management in school (3221)</b>	<b>No/ do not know</b>	1192	37.5
	<b>Yes</b>	2029	62.5

\*unweighted frequency \*\*weighted percentage



**Table 2: Prevalence of engaging in fights or being physically attacked at least once in the 12 months prior to survey among study participants**

	<b>Physically attacked (N=3239)</b>		<b>Engaged in a fight (N=3258)</b>	
	<b>n*</b>	<b>%** (95% CI)</b>	<b>n*</b>	<b>%** (95% CI)</b>
<b>Total</b>	1119	35.1 (31.0-39.5)	1420	44.2 (39.2-49.4)
<b>Sex</b>				
<b>Males</b>	620	43.3 (39.1-47.6)	802	55.4 (50.5-60.1)
<b>Females</b>	484	26.7 (22.4-31.6)	601	33.5 (27.4-40.1)
<b>Age</b>				
<b>13-15 years</b>	807	38.2(33.3-43.3)	988	46.3 (40.9-51.8)
<b>16-17 years</b>	278	28.2 (22.9-34.1)	378	38.3 (32.0-45.0)

\*unweighted frequency \*\*weighted percentage

**Table 3: Factors associated with being physically attacked (results of bivariate and multivariate analysis)**

Characteristic		Bivariate analysis OR (95%CI)	Multivariate analysis aOR (95%CI)
Age	13-15 yrs	1.5 (1.2-1.7)	1.6 (1.3-1.9)
	16-17 yrs	1	1
Sex	Male	2.1 (1.8-2.4)	1.7 (1.4-2.0)
	Female	1	1
Was Bullied	Yes	4.9 (4.2-5.8)	4.1 (3.4-4.8)
	No	1	1
Felt lonely	Yes	2.0 (1.6-2.6)	‡
	No	1	
Considered suicide	Yes	1.9 (1.5-2.5)	‡
	No	1	
Attempted suicide	Yes	2.4 (1.8-3.2)	1.5 (1.1-2.1)
	No	1	1
Current smoking	Yes	2.3 (1.5-3.4)	‡
	No	1	
Current use of alcohol	Yes	2.5 (1.7-3.7)	‡
	No	1	
Current use of recreational drugs	Yes	3.2 (1.5-3.5)	‡
	No	1	
Had close friends	No	1.3 (0.9-1.7)*	‡
	Yes	1	
Missed classes without permission	Yes	1.7 (1.4-1.9)	1.4 (1.1-1.7)
	No	1	1
Lacked parental support	Yes	1.7 (1.5-2.0)	‡
	No	1	
Lacked parental supervision	Yes	2.5 (2.1-2.9)	1.6 (1.4-2.0)
	No	1	1
Taught anger management in school	No	1.1 (0.9-1.3)*	‡
	Yes	1	

\*Not significant at  $p=0.05$  level

‡ Not included in the final model

**Table 4: Factors associated with engaging in physical fights (results of bivariate and multivariate analysis)**

Characteristic		Bivariate analysis OR (95%CI)	Multivariate analysis aOR (95%CI)
Age	13-15 yrs	1.3 (1.1-1.1)	1.5 (1.3-1.8)
	16-17 yrs	1	1
Sex	Male	2.5 (2.2-2.9)	2.0 (1.7-2.4)
	Female	1	1
Was Bullied	Yes	3.9 (3.3-4.5)	2.9 (2.5-3.5)
	No	1	1
Felt lonely	Yes	1.5 (1.2-1.9)	‡
	No	1	
Considered suicide	Yes	2.1 (1.7-2.1)	1.6 (1.2-2.1)
	No	1	1
Attempted suicide	Yes	1.6 (1.2-2.1)	‡
	No	1	
Current smoking	Yes	5.2 (3.2-8.4)	2.5 (1.2-5.1)
	No	1	1
Current use of alcohol	Yes	4.3 (2.7-6.8)	2.0 (1.1-3.9)
	No	1	1
Current use of recreational drugs	Yes	5.0 (2.9-8.6)	‡
	No	1	
Had close friends	No	0.9 (0.7-1.3)*	‡
	Yes	1	
Missed classes without permission	Yes	1.7 (1.4-1.9)	1.3 (1.1-1.6)
	No	1	1
Lacked parental support	Yes	1.6 (1.4-1.9)	‡
	No	1	
Lacked parental supervision	Yes	1.9 (1.6-2.2)	1.3 (1.1-1.5)
	No	1	1
Taught anger management in school	No	1.0 (0.9-1.2)*	‡
	Yes	1	

\*Not significant at  $p=0.05$  level

‡ Not included in the final model

## References

1. Max Roser. Homicides: OurWorldInData.org; 2018 [cited 2018 December 12th]. Available from: <https://ourworldindata.org/homicides>.
2. World Health Organization. Youth violence: World Health Organization; 2016 [Available from: <http://www.who.int/news-room/fact-sheets/detail/youth-violence>].
3. World Health Organization. Adolescent development: World Health Organization; 2018 [Available from: [http://www.who.int/maternal\\_child\\_adolescent/topics/adolescence/development/en/](http://www.who.int/maternal_child_adolescent/topics/adolescence/development/en/)].
4. UNESCO. School violence and bullying: Global status report. United Nations Educational, Scientific and Cultural Organization Paris; 2017.
5. UNICEF. A Familiar Face: Violence in the lives of children and adolescents. New York; 2017.
6. UNICEF. World report on violence against children. New York: UNICEF. 2006.
7. Department of Census Statistics. Sri Lanka Census of Population and Housing 2012. Department of Census and Statistics Colombo; 2012.
8. Ministry of Health - Sri Lanka. Global School-based Student Health Survey Sri Lanka - 2008. Ministry of Health, Sri Lanka; 2008.
9. Wijesekera KL. Selected factors associated with physical violence and immediate consequences of violent incidents among advanced level students in Kaluthara Educational Division: University of Colombo, Sri Lanka; 2003.
10. Hewamalage AP. School violence among grade 10 students in Kesbewa educational division: Self reported perspectives: University of Colombo; 2010.
11. Wijeratne MP, Seneviratne R, Gunawardena N, Lynch C, Sandøy IF, Ostbye T. Correlates of Peer Violence Among 13-to 15-Year-Olds in Gampaha District Schools in Sri Lanka: Findings From a Comparison Between Violent and Non-Violent Adolescents. *SAGE Open*. 2014;4(3):2158244014550616.
12. Swahn MH, Gressard L, Palmier JB, Yao H, Haberlen M. The prevalence of very frequent physical fighting among boys and girls in 27 countries and cities: regional and gender differences. *Journal of environmental and public health*. 2013;2013.
13. Rudatsikira E, Siziya S, Kazembe LN, Muula AS. Prevalence and associated factors of physical fighting among school-going adolescents in Namibia. *Annals of General Psychiatry*. 2007;6(1):18.
14. Rudatsikira E, Muula AS, Siziya S. Prevalence and correlates of physical fighting among school-going adolescents in Santiago, Chile. *Revista Brasileira de Psiquiatria*. 2008;30(3):197-202.
15. Bala MO, Chehab MA, Al-Dahshan A, Saadeh S, Al Khenji A. Violence among Adolescents in Qatar: Results from the Global School-based Student Health Survey, 2011. *Cureus*. 2018;10(7).
16. Family Health Bureau - Sri Lanka. National Youth Health Survey 2012/2013 Sri Lanka. Sri Lanka; 2015.
17. American Academy of Child and Adolescent Psychiatry. Violent behavior in children and adolescents: American Academy of Child and Adolescent Psychiatry; 2015 [Available from: [https://www.aacap.org/aacap/families\\_and\\_youth/facts\\_for\\_families/fff-guide/Understanding-Violent-Behavior-In-Children-and-Adolescents-055.aspx](https://www.aacap.org/aacap/families_and_youth/facts_for_families/fff-guide/Understanding-Violent-Behavior-In-Children-and-Adolescents-055.aspx)].
18. Stein JA, Dukes RL, Warren JI. Adolescent male bullies, victims, and bully-victims: A comparison of psychosocial and behavioral characteristics. *Journal of pediatric psychology*. 2006;32(3):273-82.
19. Hazemba A, Siziya S, Muula AS, Rudatsikira E. Prevalence and correlates of being bullied among in-school adolescents in Beijing: results from the 2003 Beijing Global School-Based Health Survey. *Annals of General Psychiatry*. 2008;7(1):6.

20. Işıktekin Atalay B, Ünal E, Önsüz MF, Işıklı B, Yenilmez Ç, Metintaş S. Violence and related factors among high school students in semirural areas of Eskisehir.
21. Ronald D, editor Beyond raging hormones: The tinderbox in the teenage brain. Cerebrum: The Dana forum on brain science; 2003.
22. Ohene S-A, Ireland M, McNeely C, Borowsky IW. Parental expectations, physical punishment, and violence among adolescents who score positive on a psychosocial screening test in primary care. *Pediatrics*. 2006;117(2):441-7.
23. Otwombe KN, Dietrich J, Sikkema KJ, Coetzee J, Hopkins KL, Laher F, et al. Exposure to and experiences of violence among adolescents in lower socio-economic groups in Johannesburg, South Africa. *BMC public health*. 2015;15(1):450.
24. Brown DW, Riley L, Butchart A, Meddings DR, Kann L, Harvey AP. Exposure to physical and sexual violence and adverse health behaviours in African children: results from the Global School-based Student Health Survey. *Bulletin of the World Health Organization*. 2009;87:447-55.
25. Twemlow SW, Fonagy P, Sacco FC, Gies ML, Evans R, Ewbank R. Creating a peaceful school learning environment: A controlled study of an elementary school intervention to reduce violence. *American Journal of Psychiatry*. 2001;158(5):808-10.
26. Mytton JA, DiGiuseppi C, Gough DA, Taylor RS, Logan S. School-based violence prevention programs: systematic review of secondary prevention trials. *Archives of Pediatrics & Adolescent Medicine*. 2002;156(8):752-62.