



## Research Paper

# Global variation in the prevalence of bullying victimisation amongst adolescents: Role of peer and parental supports

Tuhin Biswas<sup>a,b,\*</sup>, James G. Scott<sup>c,d,e,f</sup>, Kerim Munir<sup>g</sup>, Hannah J. Thomas<sup>c,d,f,h</sup>,  
M. Mamun Huda<sup>a,b</sup>, Md. Mehedi Hasan<sup>a,b</sup>, Tim David de Vries<sup>i</sup>, Janeen Baxter<sup>a,b</sup>,  
Abdullah A. Mamun<sup>a,b</sup>

<sup>a</sup> Institute for Social Science Research, The University of Queensland, Brisbane, Australia

<sup>b</sup> ARC Centre of Excellence for Children and Families over the Life Course, The University of Queensland, Brisbane, Australia

<sup>c</sup> QIMR Berghofer Medical Research Institute, Herston, Qld, 4006

<sup>d</sup> Centre for Clinical Research, Faculty of Medicine, The University of Queensland, Herston, QLD, Australia

<sup>e</sup> Metro North Mental Health, Royal Brisbane and Women's Hospital, Herston, Brisbane, QLD, Australia

<sup>f</sup> Queensland Centre for Mental Health Research, Wacol, Brisbane, QLD, Australia

<sup>g</sup> Developmental Medicine Center, Boston Children's Hospital, Harvard Medical School, Boston, MA, United States

<sup>h</sup> School of Public Health, Faculty of Medicine, The University of Queensland, Herston, QLD, Australia

<sup>i</sup> Utrecht University, Netherlands

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## SUMMARY

**Background:** Bullying victimisation is a global public health problem that has been predominantly studied in high income countries. This study aimed to estimate the population level prevalence of bullying victimisation and its association with peer and parental supports amongst adolescents across low and middle income to high income countries (LMIC—HICs).

**Methods:** Data were drawn from the Global School-based Student Health Survey of school children aged 12–17 years, between 2003 and 2015, in 83 LMIC—HICs in the six World Health Organization (WHO) regions. We estimated the weighted prevalence of bullying victimisation at country, region and global level. We used multiple binary logistic regression models to estimate the adjusted association of age, gender, socio-economic status, and parental support and peer support, and country level variables (GDP and government expenditure on education) with adolescent bullying victimisation.

**Findings:** Of the 317,869 adolescents studied, 151,036 (48%) were males, and 166,833 (52%) females. The pooled prevalence of bullying victimisation on one or more days in the past 30 days amongst adolescents aged 12–17 years was 30.5% (95% CI: 30.2–31.0%). The highest prevalence was observed in the Eastern Mediterranean Region (45.1%, 44.3–46.0%) and African region (43.5%, 43.0–44.3%), and the lowest in Europe (8.4%, 8.0–9.0%). Bullying victimisation was associated with male gender (OR: 1.21; 1.11–1.32), below average socio-economic status (OR: 1.47, 1.35–1.61), and younger age (OR: 1.11, 1.0–1.24). Higher levels of peer support (0.51, 0.46–0.57), higher levels of parental support (e.g., understanding children's problems (OR: 0.85, 0.77–0.95), and knowing the importance of free time spent with children (OR: 0.77, 0.70–0.85)), were significantly associated with a reduced risk of bullying victimisation.

**Interpretations:** Bullying victimisation is prevalent amongst adolescents globally, particularly in the Eastern Mediterranean and African regions. Parental and peer supports are protective factors against bullying victimisation. A reduction in bullying victimisation may be facilitated by family and peer based interventions aimed at increasing social connectedness of adolescents.

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## Introduction

Adolescence is a critical phase of development during which the foundations for future health and wellbeing are laid [1]. An environment characterised by supportive family and peer relationships plays a key role in supporting healthy cognitive, emotional, sexual, and

\* Corresponding author: Tuhin Biswas, Institute for Social Science Research, The University of Queensland, 80 Meiers Road, Indooroopilly, Queensland 4068, Australia.

E-mail address: [t.biswas@uqconnect.edu.au](mailto:t.biswas@uqconnect.edu.au) (T. Biswas).

## Research in context

### *Evidence before this study*

We systematically searched PubMed, EMBASE, PsycNIFO with a combination of MeSH heading terms and keywords. The key words used in the search (“bullying” OR “bullying victimisation”) and (“adolescents” OR “child” OR “teenager” OR “youth”) and (“developing country” OR “low socioeconomic status” OR “low income country” OR “middle income country” OR “low- and middle-income country” OR “high income country” OR “developed country” OR “high socioeconomic status” OR “low and middle income to high income countries” OR “LMIC—HICs” OR “LMICs”). The literature search was conducted up to June 25, 2019. We identified only three publications, the first study conducted in 2001/2 used the Health Behaviour in School-aged Children survey (HBSC) and the Global School-based Students Health Survey (GSHS) data from 66 countries. The second study used the Global School-based Student Health Survey (GSHS) focusing on South East Asia, and provided an overview of the prevalence of bullying victimisation experiences amongst the adolescents in South East Asia.

### *Added value of this study*

This is the first study to comprehensively estimate the population prevalence of bullying victimisation and its relationship with peer and parental support amongst adolescents across LMIC—HICs. We used data from the GSHS of adolescents, ages 12–17 years (2003–2015), in 83 LMIC—HICs in the six WHO regions to show the geographic variation in prevalence of bullying victimisation in 83 LMIC—HICs. We demonstrated that parental support and peer support were strongly associated with reduced levels of bullying victimisation.

### *Implications of all the available evidence*

This study shows that although there is a high variation in the prevalence of bullying victimisation, a large proportion of adolescents in all countries irrespective of income status are exposed. In every country, those adolescents with lower levels of peer support and parental support were more likely to report experiencing bullying victimisation. There is an urgent need to develop culturally appropriate interventions that increase parental support and foster development of peer supports to reduce the global prevalence of bullying. The findings of this study can help to inform such prevention programmes.

Student Health Survey (GSHS) reported that greater parental understanding and monitoring was associated with a reduced risk of bullying victimisation [12]. In addition, Hong et al. (2012) suggest that interventions to address school bullying behaviour need to incorporate the support of peers [13], which can function as a protective factor to promote psychological well-being of adolescent school students under adverse conditions [14,15]. However, the research underlying advocacy for peer support is largely derived from research into bullying victimisation conducted in higher income countries (HICs).

There are a paucity of reports on adolescent bullying in low and middle income countries (LMICs). A study of countries in the South-East Asia region reported high rates of bullying victimisation with 20.7% of students in Indonesia, and at least half of students in Myanmar and Nepal reporting experiencing one or more episodes of bullying in the previous 30 days [16]. To date, there has not been a comprehensive comparative study of the prevalence of bullying victimisation amongst adolescents across both high income countries (HIC) and low and middle income countries (LMIC). No study has evaluated the association between bullying victimisation and peer and parental supports across a wide distribution of countries with varying income levels and cultures. This study aimed to address these gaps by providing a comprehensive overview of the global prevalence of bullying victimisation in schools and to examine the association of bullying victimisation with parental and peer support in HIC and LMIC.

## Methods

### *Data sources*

This study used data from the Global School-based Student Health Survey (GSHS), which commenced in 2003. The GSHS was jointly developed by the WHO and the United States Centre for Disease Control and Prevention (CDC) in collaboration with The United Nations International Children's Fund (UNICEF), The United Nations Educational, Scientific and Cultural Organisation (UNESCO), and The Joint United Nations Programme on HIV and AIDS (UNAIDS). GSHS is administered to adolescents aged 12–17 years to capture information on a wide range of health indicators using validated items from ten core modules including: nutrition, physical activity, hygiene, mental health, alcohol use, tobacco use, drug use, sexual behaviors, violence/injury, and protective factors [17]. In collecting this information, GSHS employed a two-stage cluster sampling technique. In the first stage, the schools were selected randomly. Classes that provided a representative sample of the general population aged 12–17 years were identified within the selected schools at the second stage of sampling [18]. The study design and selection procedure of participants were similar across the GSHS countries. For this study we included data from 83 LMIC—HICs from inception to 2015. For those countries with repeated time point data in this study, we used data from the most recent survey.

### *Ethics statement*

In each of the participating countries, the GSHS received ethics approval from the Ministry of Education or a relevant institutional ethics review committee, or both. Only those adolescents and their parents or guardians who provided written or verbal consent participated. As the current study used retrospective publicly available data, we did not require ethics approval.

### *Measurements*

#### *Bullying victimization*

Respondents were asked to read a short definition of bullying which incorporated power imbalance and the intent to harm and distinguished the behaviour from teasing. They were then asked on how

psychological development for adolescents [2]. Bullying victimisation during school years is a serious global health problem with those adolescents experiencing bullying having an increased risk of physical, cognitive, and mental health issues [3], specifically higher rates of depression, anxiety, and suicidality [4]. Victimised adolescents are also more likely to experience difficulties in their academic performance [5,6] which leads to an increased risk of longstanding economic consequences for both the individual and their family [7,8].

Bullying victimisation in schools has predominantly received attention in high income countries. For example, in Australia a meta-analysis of 46 studies reported that nearly one of every seven adolescents were victimised by the 12-month bullying and approximately one in four students reported life time bullying [9]. A recent study in England reported that 36% of females and 24% of males experienced regular bullying victimisation [10]. Another study from the United Kingdom reported that 21% of students aged 9–16 years were bullied [11]. Risk factors associated with bullying victimisation are wide ranging and include family dynamics, school factors, and peer supports. A study in Vietnam using data from the Global School-based

many days were they bullied in the past 30 days. Possible responses ranged from '0 days', '1–2 days', following in increments through to 'all 30 days' (Supplementary Table 1). Consistent with previous GSHS bullying victimization research [12], responses were dichotomized with those who reported bullying experiences on 'one or more days' included as being exposed to bullying victimisation.

#### Parental support and peer support

Parental support was assessed using a proxy variable based on two questions: i) parental understanding of student's problems ("During the past 30 days, how often did your parents or guardians understand your problems and worries?") and parental knowledge of student's activities during their free time ("During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?"). Possible response options to each of these questions were 'never', 'rarely', 'sometimes', 'most of the times' and 'always'. These variables were recoded and classified as never/rarely, sometimes, most of the time and always.

Peer support was also assessed using a proxy variable based on the question "During the past 30 days, how often were most of the students in your school kind and helpful?" to which students could respond "never, rarely, sometimes, most of the time or always". Responses were recoded as never/rarely, sometimes, most of the time and always.

#### Socio-demographic factors

The gender and age of the participants were included in the survey. Participants were categorized into three age groups: 12–13 years, 14–15 years, and 16–17 years. Socioeconomic status (SES) was measured by the variable, "During the past 30 days, how often did you go hungry because there was not enough food in your home?" Responses of "never to rarely" were recoded as 'average', and "sometimes to always" as 'below average' SES. We included country gross domestic product (GDP) and government expenditure on education, measured in total percentage of GDP in our adjusted model. Countries' GDP correspond to the survey year as reported by the World Bank. For a few countries, Index Mundi data were used where GDP and Government expenditure on education were not listed in the World Bank list [19].

#### Statistical analysis

The data were weighted to allow the samples to be nationally representative. This included using strata and primary sampling units at the country level. We used sample weights to calculate weighted

prevalence or mean estimates (with corresponding 95% confidence intervals, CIs). Weighted prevalence estimates were calculated for individual countries to allow cross-country comparisons, and by gender across countries to understand gender disparities within countries. Bivariate analysis was performed to calculate the prevalence of bullying victimization over background characteristics at the global and regional level. We conducted binary logistic regression analysis to examine the factors associated with bullying victimisation. In binary logistic regression models, we considered bullying victimization (a binary variable coded as 0 if not victimized and 1 if victimized) as a dependant variable. We considered a set of independent variables in the regression model. These included survey year, age, gender, socioeconomic status, peer and parental support, GDP per capita and expenditure on education. First we conducted a simple logistic regression analysis (Model 1) by only adjusting for survey year in order to select variables which had a bivariate association with bullying. We then fitted a two multiple regression models i) one by including all the population level variables (Model 2) and ii) another by including population as well as country level variables (GDP and government expenditure on education) in Model 3 to explore independent factors associated with bullying victimisation. Variations in errors due to complex sample design were controlled in all the analysis by using "svy" command in STATA (version 14).

## Results

Of the 317,869 adolescents aged 12–17 years, the mean age was 14.6 (SD 1.18) years. 151,036 (48%) were males and 166,833 (52%) were females. Response rates ranged from 60% in Chile to 99.8% in Jordan (see Supplementary Table 2). Of the 83 participating countries, 20.8% of the data came from low-income countries, 40.4% from lower-middle-income countries, 19.1% from upper-middle-income countries, i.e., 80.3% LMICs and 19.7% from high-income countries, according to World Bank classification.

The pooled prevalence of bullying victimisation was 30.5% (95% CI: 30.2–31.0%) in LMICs-HICs. The highest pooled prevalence was observed in the Eastern Mediterranean Region (45.1%, 44.3–46.0%) and the lowest was in the European region with 8.4% (8.0–9.0%; Fig. 1). The country-specific prevalence ranged from 7.0% in Tajikistan to 75.0% in Samoa (Supplementary Table 3). According to the country income classification, pooled prevalence amongst the adolescents was lower in HICs (20.0%, 19.0–20.4%) and the highest in the upper-middle-income group of LMICs (40.4%, 40.0–41.1%; Fig. 1). Nearly one-third (33.0%, 32.2–33.2%) of male adolescents were bullied at least once at school within the past 30 days prior to the survey,

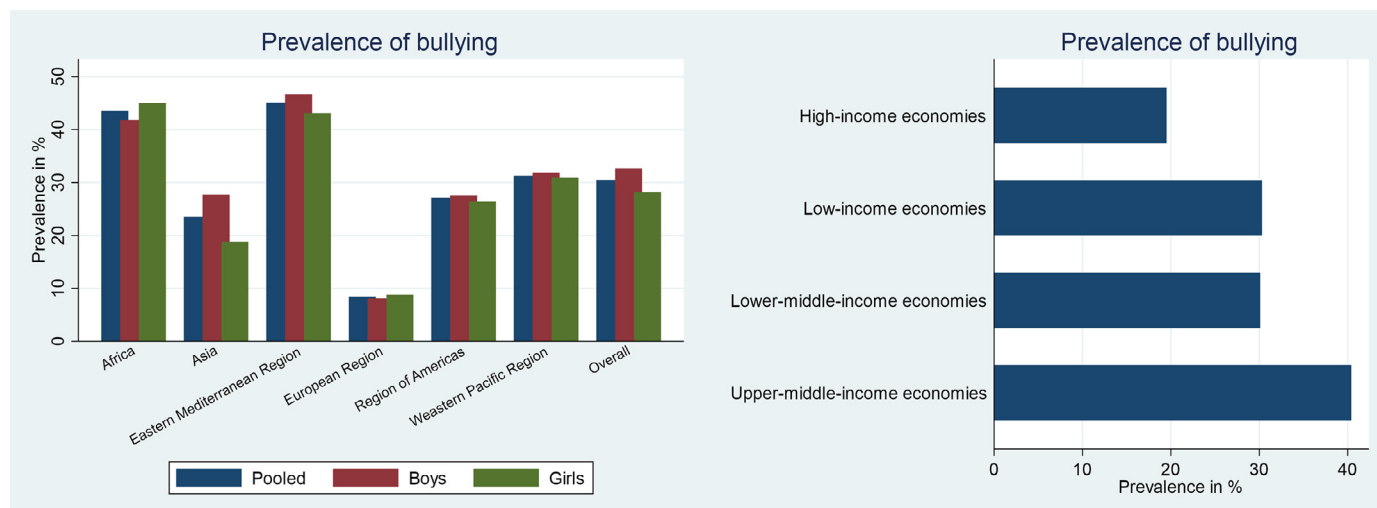
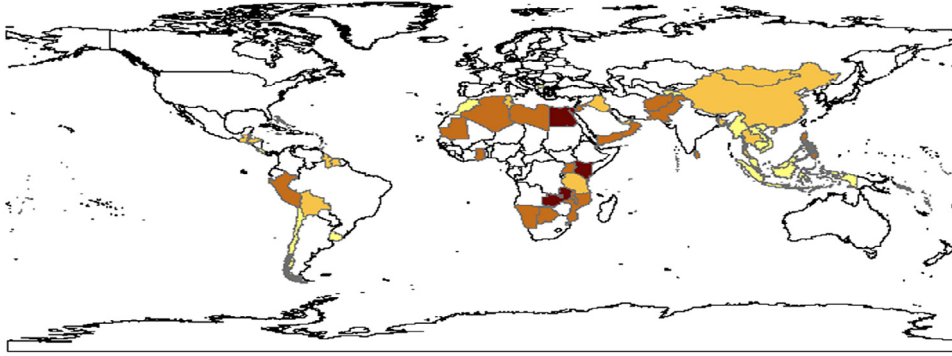
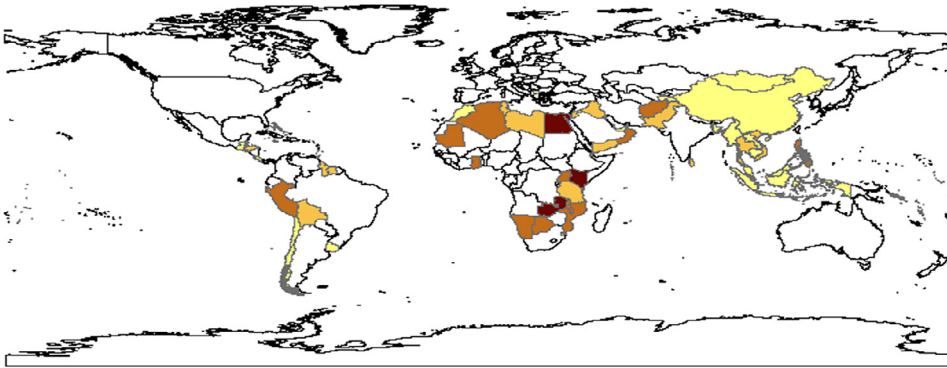


Fig. 1. Overall burden of bullying by global, regions, gender and economic positions.

Male



Female



Total

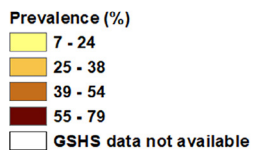
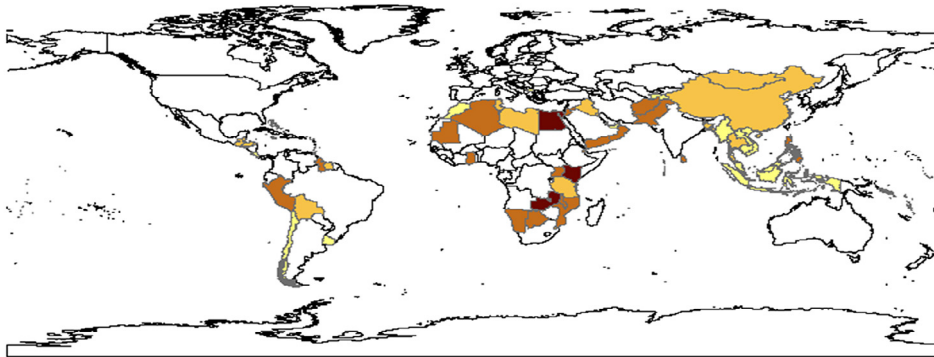


Fig. 2. Prevalence of bullying in the 30 days preceding survey completion amongst adolescents aged 12–17 years for 83 low-to-high income countries, 2003–15.



whereas the prevalence was lower (28.2%; 28.0–29.0%) amongst female adolescents. A large variation in prevalence amongst both male and female adolescents was observed (Fig. 2). The highest prevalence of bullying was observed in Samoa for both males (79.0%) and females (70.0%). The lowest prevalence was observed in Tajikistan for males (7.0%) and females (8.0%) (see Supplementary Table 3).

Table 1 shows the prevalence of bullying victimization by age group, socioeconomic status, peer support and parental support. In almost all regions, the prevalence was higher amongst the younger ages and those who had a below average SES. Almost without exception, there was a lower prevalence of bullying victimisation amongst adolescents who reported higher levels of peer support and parental support (Table 1). The country-specific prevalence of bullying victimisation by peer support and parental support reported in supplementary Table 4 and 5.

Table 2 shows the mutually adjusted independent associations (Models 1 to 3) of bullying victimization at global and regional levels. At the global level, the odds of being bullied were comparatively higher amongst males (OR: 1.27, 95% CI 1.18–1.37) (Model 1). These associations did not substantially change upon adjustments for survey year, gender, age, socioeconomic status, peer support, parental support, GDP and government expenditure on education (Model 3). Overall (see Model 3), being male (OR: 1.21, 1.11–1.32), younger in age (OR: 1.11, 1.0–1.24), and having a below average socioeconomic status (OR: 1.47, 1.35–1.61) were associated with a greater risk of bullying victimisation. However, there was a significant reduction in bullying victimisation reported by those students who responded “always” to questions on experiencing peer support (OR: 0.51, 0.46–0.57) and parental support (understand their problem, OR: 0.85, 0.77–0.95; and knew about the free time of their children, OR: 0.77, 0.70–0.86) (Table 2 and Supplementary Figure 1).

## Discussion

The present study based on the GSHS data provides the most comprehensive summary to-date of the prevalence of bullying victimisation amongst adolescents across 83 LMIC–HICs and is the first study to examine the relationship of bullying victimisation with peer

support and parental support in a wide range of countries. There are three major findings: first, there was a high prevalence of bullying observed in most of the 83 countries, irrespective of income classification. Second, there was a wide variation between countries in the prevalence of bullying victimisation. This suggests that social and cultural factors may influence the national prevalence of bullying. Third, in all countries, increased peer support and parental support was associated with lower risk of bullying victimisation.

A previous study published in 2008 using GSHS data reported that the prevalence of bullying was 37.4% [20]. A similar study in low-income and middle-income countries reported the prevalence of bullying was 34.4% [21]. However, this study was conducted in 2008 and did not include Europe and the South-East Asia regions. In the current study, we captured data from LMIC–HICs across the six WHO regions, including South-East Asia. Our reported prevalence of 31% is consistent with previous studies and a large study using HBSC data which was also found that 30% of adolescents reported bullying victimisation in the past two months [22].

Consistent with a study using the HBSC and GSHS data [20], we found there is a wide variation in bullying victimisation prevalence between countries. The variation in prevalence amongst males and females by both region and country provides an important opportunity to examine the cultural and social determinants of bullying. For example, in Africa, the bullying victimization prevalence was 45% amongst the females and 42% amongst males, compared to 19% amongst females vs. 28% amongst males in South-East Asia. Such variations may reflect important regional differences in the implementation of national policies and preventive intervention programs to reduce bullying, beyond sociocultural influences. This study found that most of the countries did not have available prospective follow up data on bullying. Monitoring the trends in the prevalence of bullying victimisation in adolescents, through the implementation of surveys at regular intervals could inform national policies. Recently, the Lancet commission on adolescent health and wellbeing reported that over 50% of adolescents grow up in multi-burden countries, characterised by high levels of adolescent health problems, including violence [23], with a particular need for maintaining data monitoring in those countries.

**Table 1**  
Regional Prevalence of bullying victimization by age group, socioeconomic status, school environment and parental support.

Variables	Southeast Asia (%)	African Region (%)	Eastern Mediterranean Region (%)	Region of the Americas (%)	Western Pacific Region (%)	European Region (%)
<b>Gender</b>						
Male	28	42	47	28	33	8
Female	19	45	43	27	31	9
<b>Age group</b>						
12–13 years	23	41	50	27	44	10
14–15 years	24	41	45	29	36	8
16–17 years	22	42	34	23	25	8
<b>Socioeconomic status</b>						
Average	21	36	43	24	28	9
Below average	27	55	52	44	44	23
<b>Peers were supportive</b>						
Never/rarely	33	33	44	37	43	13
Sometimes	24	43	46	37	35	9
Most of the times	21	27	34	29	27	8
Always	17	30	27	20	24	5
<b>Parents or guardians understood problem</b>						
Never/rarely	28	34	41	36	36	14
Sometimes	22	43	46	37	35	10
Most of the times	22	27	36	30	29	12
Always	20	32	28	22	28	7
<b>Parents or guardians know about free time</b>						
Never/rarely	28	33	42	38	38	13
Sometimes	24	41	41	38	36	10
Most of the times	21	28	35	31	27	12
Always	19	34	34	22	26	7

**Table 2**  
Factors associated with bullying amongst the adolescent, per WHO region.

Model-1	Overall		Asia region		Africa region		Eastern Mediterranean region		Region of Americas		Western Pacific Region		European Region	
	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value	OR (95% CI)	p value
<b>Boys</b>	1.27 (1.18-1.37)	<0.001	1.65 (1.47-1.85)	<0.001	0.87 (0.79-0.96)	0.004	1.28 (1.04-1.57)	0.018	1.05 (0.98-1.13)	0.167	1.08 (1.1-1.17)	0.063	0.92 (0.69-1.24)	0.598
14-15 years	1.14 (1.04-1.26)	0.007	1.09 (0.9-1.33)	0.375	1.05 (0.93-1.18)	0.472	1.15 (1.1-1.32)	0.056	1.14 (1.03-1.26)	0.009	1.45 (1.23-1.72)	<0.001	0.99 (0.74-1.33)	0.946
11-13 years	1.09 (0.95-1.25)	0.229	1.08 (0.86-1.36)	0.521	1.1 (0.94-1.3)	0.238	1.19 (0.97-1.47)	0.103	1.18 (1.04-1.33)	0.009	1.62 (1.4-1.86)	<0.001	1.2 (0.82-1.74)	0.343
SES (Below average)	1.56 (1.45-1.68)	<0.001	1.48 (1.27-1.73)	<0.001	1.89 (1.73-2.07)	<0.001	1.67 (1.41-1.97)	<0.001	2.23 (2.03-2.45)	<0.001	0.82 (0.71-0.94)	0.006	0.66 (0.5-0.87)	0.003
<b>Peers supportive</b>	0.71 (0.66-0.76)	<0.001												
Sometimes	0.57 (0.5-0.64)	<0.001	0.65 (0.58-0.72)	<0.001	1.11 (0.94-1.3)	0.222	1.14 (0.99-1.31)	0.072	0.94 (0.85-1.03)	0.182	0.61 (0.53-0.72)	<0.001	0.55 (0.32-0.97)	0.037
Most of the times	0.46 (0.42-0.51)	<0.001	0.52 (0.43-0.65)	<0.001	0.76 (0.63-0.91)	0.003	0.78 (0.63-0.97)	0.025	0.68 (0.61-0.76)	<0.001	0.53 (0.43-0.65)	<0.001	0.36 (0.2-0.64)	<0.001
Always	0.81 (0.74-0.88)	<0.001	0.41 (0.35-0.49)	<0.001	0.64 (0.55-0.74)	<0.001	0.61 (0.53-0.71)	<0.001	0.45 (0.39-0.51)	<0.001	0.9 (0.81-1)	0.055	0.95 (0.62-1.48)	0.835
<b>Parents or guardians understood problem</b>														
Sometimes	0.80 (0.744-0.87)	<0.001	0.74 (0.63-0.86)	<0.001	1.2 (1.06-1.36)	0.005	1.01 (0.83-1.22)	0.925	0.98 (0.89-1.07)	0.636	0.79 (0.68-0.9)	<0.001	0.88 (0.55-1.41)	0.587
Most of the times	0.74 (0.67-0.81)	<0.001	0.71 (0.6-0.85)	<0.001	0.73 (0.62-0.86)	<0.001	0.91 (0.76-1.09)	0.317	0.75 (0.68-0.82)	<0.001	0.67 (0.57-0.79)	<0.001	0.49 (0.37-0.66)	<0.001
Always	0.63 (0.58-0.69)	<0.001	0.65 (0.54-0.77)	<0.001	0.69 (0.6-0.81)	<0.001	0.66 (0.59-0.74)	<0.001	0.53 (0.48-0.58)	<0.001	0.91 (0.81-1.03)	0.139	0.73 (0.52-1.03)	0.069
<b>Parents or guardians knew about free time</b>														
Sometimes	0.83 (0.74-0.92)	0.001	0.82 (0.68-0.99)	0.039	1.16 (1.03-1.31)	0.014	1.03 (0.87-1.22)	0.741	0.98 (0.88-1.1)	0.735	0.7 (0.6-0.81)	<0.001	0.87 (0.54-1.41)	0.580
Most of the times	0.69 (0.63-0.76)	<0.001	0.68 (0.58-0.79)	<0.001	0.83 (0.73-0.94)	0.003	1.01 (0.8-1.27)	0.935	0.78 (0.7-0.85)	<0.001	0.61 (0.52-0.72)	<0.001	0.51 (0.34-0.75)	<0.001
Always	0.59 (0.54-0.64)	<0.001	0.6 (0.52-0.69)	<0.001	0.77 (0.64-0.92)	0.004	0.75 (0.65-0.85)	<0.001	0.52 (0.48-0.56)	<0.001	1.74 (1.6-1.89)	<0.001	2.88 (1.66-5)	<0.001
<b>Model-2</b>														
Boys	1.24 (1.14-1.35)	<0.001	1.51 (1.34-1.72)	<0.001	0.99 (0.86-1.15)	0.944	1.24 (1.02-1.49)	0.029	0.91 (0.85-0.98)	0.013	1.05 (0.96-1.14)	0.322	0.93 (0.63-1.38)	0.734
14-15 years	1.15 (1.04-1.26)	0.006	1.05 (0.88-1.27)	0.544	1.18 (1.01-1.39)	0.042	1.17 (1.1-1.37)	0.047	1.08 (0.97-1.19)	0.163	1.5 (1.27-1.77)	<0.001	0.92 (0.7-1.23)	0.586
11-13 years	1.09 (0.95-1.26)	0.216	1.055 (0.85-1.3)	0.620	1.28 (1.02-1.61)	0.034	1.25 (1.1-1.57)	0.054	1.15 (1.1-1.32)	0.055	1.74 (1.49-2.02)	<0.001	0.8 (0.49-1.31)	0.376
SES (Below average)	1.5 (1.38-1.63)	<0.001	1.44 (1.24-1.7)	<0.001	1.97 (1.69-2.29)	<0.001	1.55 (1.31-1.84)	<0.001	1.98 (1.78-2.19)	<0.001	1.69 (1.55-1.84)	<0.001	2.66 (1.54-4.58)	<0.001
<b>Peers were supportive</b>														
Sometimes	0.73 (0.68-0.78)	<0.001	0.68 (0.61-0.77)	<0.001	1.1 (0.93-1.3)	0.256	1.15 (1.1-1.32)	0.057	0.93 (0.85-1.03)	0.186	0.83 (0.73-0.95)	0.008	0.45 (0.25-0.79)	0.005
Most of the times	0.62 (0.54-0.7)	<0.001	0.58 (0.47-0.74)	<0.001	0.81 (0.67-0.99)	0.036	0.79 (0.62-1.01)	0.062	0.74 (0.66-0.82)	<0.001	0.67 (0.58-0.77)	<0.001	0.72 (0.54-0.96)	0.023
Always	0.52 (0.48-0.58)	<0.001	0.46 (0.39-0.56)	<0.001	0.74 (0.63-0.87)	<0.001	0.7 (0.61-0.8)	<0.001	0.53 (0.47-0.6)	<0.001	0.58 (0.48-0.7)	<0.001	0.62 (0.34-1.14)	0.124
<b>Parents or guardians understood problem</b>														
Sometimes	0.89 (0.8-0.99)	0.028	0.82 (0.67-1.02)	0.077	1.19 (1.04-1.36)	0.010	0.96 (0.79-1.16)	0.637	1.04 (0.94-1.14)	0.426	1.05 (0.94-1.18)	0.361	0.84 (0.5-1.4)	0.500
Most of the times	0.9 (0.81-1.01)	0.069	0.88 (0.71-1.1)	0.277	0.77 (0.65-0.92)	0.003	0.95 (0.8-1.13)	0.545	0.92 (0.84-1.01)	0.095	0.97 (0.84-1.12)	0.701	0.92 (0.52-1.63)	0.773
Always	0.84 (0.75-0.94)	0.002	0.87 (0.69-1.11)	0.263	0.82 (0.68-0.98)	0.032	0.76 (0.68-0.85)	<0.001	0.76 (0.68-0.84)	<0.001	0.9 (0.77-1.05)	0.173	0.77 (0.54-1.09)	0.144
<b>Parents or guardians knew about free time</b>														
Sometimes	0.92 (0.81-1.04)	0.179	0.96 (0.77-1.22)	0.786	1.16 (1.01-1.33)	0.033	1.05 (0.89-1.25)	0.535	1.03 (0.92-1.16)	0.632	0.95 (0.85-1.07)	0.416	0.77 (0.49-1.2)	0.245
Most of the times	0.85 (0.77-0.93)	0.001	0.90 (0.76-1.07)	0.245	0.95 (0.81-1.1)	0.494	1.11 (0.89-1.38)	0.362	0.92 (0.83-1.03)	0.132	0.79 (0.69-0.91)	<0.001	1.04 (0.59-1.83)	0.895
Always	0.77 (0.7-0.85)	<0.001	0.84 (0.7-1.03)	0.095	0.92 (0.76-1.12)	0.411	0.94 (0.83-1.07)	0.368	0.68 (0.62-0.75)	<0.001	0.73 (0.62-0.85)	<0.001	0.66 (0.41-1.09)	0.105
<b>Model-3</b>														
Boys	1.21 (1.11-1.32)	<0.001	1.52 (1.33-1.75)	<0.001	0.99 (0.86-1.15)	0.944	1.24 (1.02-1.49)	0.029	0.91 (0.85-0.98)	0.011	1.05 (0.96-1.15)	0.283	0.93 (0.63-1.38)	0.734
14-15 years	1.11 (1.1-1.24)	0.057	1.00 (0.81-1.25)	0.950	1.18 (1.1-1.39)	0.044	1.17 (1.1-1.37)	0.049	1.07 (0.96-1.18)	0.229	1.46 (1.24-1.73)	<0.001	0.92 (0.7-1.23)	0.586
11-13 years	1.03 (0.89-1.21)	0.679	0.98 (0.78-1.24)	0.887	1.28 (1.02-1.61)	0.036	1.25 (0.99-1.57)	0.055	1.12 (0.98-1.29)	0.1	1.61 (1.39-1.87)	<0.001	0.8 (0.49-1.31)	0.376
Socioeconomic status (Below average)	1.47 (1.35-1.61)	<0.001	1.43 (1.2-1.73)	<0.001	1.97 (1.69-2.29)	<0.001	1.54 (1.3-1.83)	<0.001	2 (1.81-2.21)	<0.001	1.69 (1.55-1.85)	<0.001	2.66 (1.54-4.58)	<0.001
<b>Peers were supportive</b>														
Sometimes	0.74 (0.69-0.79)	<0.001	0.73 (0.64-0.85)	<0.001	1.1 (0.93-1.3)	0.256	1.14 (0.99-1.31)	0.068	0.94 (0.85-1.04)	0.263	0.85 (0.74-0.97)	0.016	0.72 (0.54-0.96)	0.023
Most of the times	0.61 (0.53-0.7)	<0.001	0.59 (0.46-0.77)	<0.001	0.81 (0.67-0.99)	0.036	0.78 (0.61-1)	0.048	0.74 (0.66-0.82)	<0.001	0.67 (0.58-0.78)	<0.001	0.62 (0.34-1.14)	0.124
Always	0.51 (0.46-0.57)	<0.001	0.46 (0.37-0.58)	<0.001	0.74 (0.63-0.88)	<0.001	0.69 (0.6-0.79)	<0.001	0.52 (0.46-0.6)	<0.001	0.59 (0.49-0.71)	<0.001	0.45 (0.25-0.79)	0.005
<b>Parents or guardians understood problem</b>														
Sometimes	0.89 (0.79-0.99)	0.040	0.85 (0.66-1.1)	0.215	1.19 (1.04-1.35)	0.010	0.95 (0.79-1.15)	0.604	1.05 (0.96-1.16)	0.304	1.05 (0.94-1.17)	0.382	0.84 (0.5-1.4)	0.500
Most of the times	0.91 (0.81-1.02)	0.107	0.933 (0.72-1.2)	0.590	0.77 (0.65-0.92)	0.003	0.94 (0.79-1.12)	0.489	0.93 (0.85-1.02)	0.116	0.96 (0.83-1.11)	0.597	0.92 (0.52-1.63)	0.773
Always	0.85 (0.77-0.95)	0.005	0.95 (0.74-1.24)	0.713	0.82 (0.68-0.98)	0.034	0.75 (0.67-0.84)	<0.001	0.77 (0.69-0.85)	<0.001	0.89 (0.76-1.03)	0.127	0.77 (0.54-1.09)	0.144
<b>Parents or guardians knew about free time</b>														
Sometimes	0.92 (0.81-1.04)	0.163	0.98 (0.77-1.27)	0.899	1.16 (1.01-1.33)	0.034	1.05 (0.89-1.24)	0.557	1.04 (0.92-1.17)	0.556	0.97 (0.86-1.08)	0.531	0.77 (0.49-1.2)	0.245
Most of the times	0.86 (0.78-0.95)	0.002	0.94 (0.78-1.13)	0.515	0.95 (0.81-1.1)	0.485	1.1 (0.88-1.37)	0.407	0.92 (0.83-1.03)	0.152	0.8 (0.69-0.92)	0.002	1.04 (0.59-1.83)	0.895
Always	0.77 (0.7-0.85)	<0.001	0.86 (0.71-1.07)	0.178	0.92 (0.76-1.12)	0.407	0.94 (0.83-1.07)	0.326	0.68 (0.62-0.75)	<0.001	0.73 (0.62-0.85)	<0.001	0.66 (0.41-1.09)	0.105

We found both greater peer and parental support were associated with a lower risk of bullying victimisation. This finding is consistent with studies from HICs showing family and parental support are associated with lower levels of bullying [24,25]. In our study we found that higher prevalence of bullying victimisation amongst adolescents living in LMICs who reported lower levels of peer support and parental support even though there is significant cultural and demographic diversity between countries. Other studies have identified that parental monitoring can reduce engagement in high risk behaviours (including substance use) amongst adolescents [26,27]. Increased parental involvement and support for adolescents may facilitate early detection of problematic peer relationships which enables opportunities to for parents to assist adolescents with problem solving, appropriate assertive peer interactions and parental intervention if required which may prevent bullying victimisation. Culturally appropriate skills training for parents of adolescents may assist in reducing bullying as well as reduce other mental health and high-risk behaviours in adolescents in all countries, irrespective of income level [28]. This may be an effective intervention to address the relative increase in the global burden of mental disorders amongst adolescents.

The present study has limitations. First, there is a risk of selection bias because school attendance is low in some counties and only children that attend school participated. Further, some students were absent from school on the day of data collection. Students who are exposed to bullying victimisation have higher rates of absenteeism from school and are more likely to exit education early [3]. Therefore, the prevalence of bullying victimisation may be underestimated due to those students who are absent or out of education being more likely to be victimised by their peers. This may also lead to differential bias in prevalence in comparing LMIC—HICs with variation in school attendance by gender (females less likely to attend school in later ages in LMICs) and age (older adolescents less likely to attend). Second, the GSHS measurement of bullying victimisation was self-reported. While self-report is an accepted method of measuring bullying victimisation in adolescents, there is a limitation of possible shared method variance [29]. The measure for peer support overlaps with the construct of bullying. An item which assessed peer support in a manner which was more independent of bullying would have been preferable. Another limitation is the measure of socioeconomic status, which was based on a proxy derived from one variable and the study findings to the wider population; given that some regions (European and African) were not well represented in the study. The study design was cross-sectional, therefore the establishment of causality was not possible. Finally, data were collected between 2003 and 2015 presents differential significant period effects on prevalence of bullying. However, our multivariable estimates were adjusted for period effects.

Nonetheless, the study has a number of strengths that help uniquely estimate the global prevalence of adolescents bullying victimisation. First, the GSHS methodology represents a collaborative standardized questionnaire. Data collection was standardized and always occurred during a regular class period. The questionnaire did not allow skip patterns in questions enabling consistency and uniformity of comparison across participant sites. Another strength is the use of survey data with large random sample sizes taken from a wide variety of international geographical and cultural settings. Finally, the analyses were inclusive of data from 83 countries.

The findings of the study confirm that nearly one-third of the world's adolescents had experienced bullying victimisation over the previous 30 days. The variation between countries and regions and the findings that peer and parental support reduces the risk of bullying can inform interventions which may reduce the prevalence of bullying. Given that bullying victimisation of adolescents in schools is a causal risk factor of anxiety and depression [30], a meaningful reduction in the prevalence of bullying offers an opportunity to reduce the global burden of disease associated with mental illness in adolescents.

## Contributors

All authors critically reviewed earlier versions of the draft and approved the final manuscript. TB and AAM conceived the paper. TB, JGS, MMH and MMH developed the analysis plan. TB did the analysis and wrote the initial draft. TB, MMH, and MMH contributed to the analysis. TDV, KM, HJT and JB contributed to the write up and editing.

## Declaration of Competing Interest

All other authors declare no competing interests.

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## Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.eclinm.2020.100276.

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