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Corporal punishment bans and physical fighting in adolescents in 88 countries and territories

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Corporal punishment bans and physical fighting in adolescents in 88 countries and territories

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Abstract

Introduction: Despite a growing consensus about the harmful consequences of corporal punishment for child health and development and its incompatibility with the United Nations Convention on the Rights of the Child, the practice remains legally sanctioned in many cultures. This article examines the association between corporal punishment bans and youth violence at an international level.

Methods: School-based health surveys were carried out in 88 countries and territories (N=403,604 adolescents). Crude and multivariate Poisson regression analyses were conducted to test the association between state laws on corporal punishment and age-adjusted prevalence estimates of frequent physical fighting (i.e., 4+ episodes in the previous year).

Results: Frequent fighting was more common in males (9.9%, 95% CI 9.1-10.7%) than females (2.8%, 95% CI 2.5-3.1%) and varied widely between states, from 0.9% (95% CI 0.8-0.9%) in Costa Rican females to 34.8% (95% CI 34.7-35.0) in Samoan males. Compared to 20 states with no ban, the group of 30 states with full bans (in schools and in the home) experienced 69% the rate of fighting in males and 42% in females. Thirty-eight states with partial bans (in schools but not in the home) experienced less fighting in females only (56% the rate found in states without bans).

Conclusions: State prohibition of corporal punishment is associated with less youth violence. Whether bans precipitated changes in child discipline or reflected a social milieu that inhibits youth violence remains unclear due to the study design and data limitations. However, these results support the hypothesis that societies that prohibit the use of corporal punishment are less violent for youth to grow up in than societies that have not.

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Strengths and limitations of this study

- The Health Behaviour in School-aged Children study and Global School-based Health Survey are well-established international surveys of adolescent physical fighting.
- Using data from 88 countries and territories, we found that state prohibition of corporal punishment in all settings was associated with a lower prevalence of frequent physical fighting.
- The prohibition of corporal punishment in schools but not in the home was associated with less violence in females but not in males.
- International differences in youth physical fighting relates more closely to corporal punishment bans than to country wealth or violence prevention programs.
- Due to data gaps and our study design, it remains unclear whether bans precipitated changes in child discipline or reflected a social milieu that inhibits youth violence.

Introduction

Corporal punishment is an adult's use of physical force that is intended to cause pain, but not injury, to correct or control a child's inappropriate behaviour.^{1,2} Although its use remains legally and socially sanctioned in many countries, UNICEF reported that estimated 17% of adolescents worldwide has experienced corporal punishment either at school or in the home during the past month.³ Proponents of corporal punishment argue that physical discipline is benign or even beneficial to the long-term health of the child.⁴ However, a persuasive body of evidence challenges this view. Independent investigations have found that a child's exposure to corporal punishment relates to aggressive behaviours, ^{5,6,7,8,9,10} mental health problems, ^{11,12,13,14,15} academic problems, and related cognitive deficits.^{16,17,18} Such outcomes have lifelong consequences for adult health and wellbeing. A meta-analysis of 75 studies found that childhood exposure to corporal punishment predicted 13 of 17 negative outcomes, including aggression, antisocial behaviour, mental health problems, low self-esteem, and physical abuse, and to antisocial behaviour and poor mental health in adulthood.¹⁵ A study of partner violence in six Asian and Pacific countries found that men's experience of harsh physical parenting during their childhood related to violence against women in adulthood.¹⁹

Psychological theories have been used to describe the possible underlying pathways in the association between corporal punishment and youth violence. According to social learning and social interaction theories, children and adolescents learn from corporal punishment that physical violence is an effective and sanctioned means of settling conflicts and influencing the behaviour of others.^{20,21} Script theory suggests that repeated corporal punishment constructs a stable set of

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beliefs (i.e., cognitive script) in the child's mind that becomes increasingly more salient and accessible depending on the frequency of punishment.²² Similarly, the general aggression model describes how repeated exposure to corporal punishment reinforces aggressive thoughts, emotions, and actions towards others.²³ These theories help to explain the intergenerational cycle of physical violence from early childhood experiences to later violent behaviour.

Moreover, a child's rights perspective recognises that corporal punishment violates children's rights to personal integrity, human dignity, and protection from all forms of violence as guaranteed under the United Nations Convention on the Rights of the Child.²⁴ The Convention states that the elimination of corporal punishment is "not only an obligation of States parties" but also a "key strategy for reducing and preventing all forms of violence."²⁴ The prohibition of corporal punishment might help protect children from harm and support their social development.^{18,25} However, while legal prohibition has led to decreased use in some countries,²⁶ the association between bans on corporal punishment and youth physical violence has not been examined at an international level. We had a unique opportunity to examine this association in a large group of countries and territories. Our goal was to investigate the association between states' prohibition of corporal punishment and prevalence of frequent physical fighting among adolescents.

Methods

Data sources

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Survey data. Two well-established school-based surveys have measured physical fighting in adolescents: the WHO Health Behaviour in School-aged Children (HBSC) study and the Global School-based Health Survey (GSHS). The HBSC surveys 11-, 13-, and 15-year-olds in Canada, USA, and most European countries every four years following a common protocol.²⁷ Its self-completion questionnaire measures physical fighting with the item: "In the past 12 months, how many times were you in a physical fight (0, 1, 2, 3, 4 or more)? We used data from 32 countries that participated in the most recent HBSC survey in 2014 (Albania, Armenia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Estonia, Finland, Germany, Great Britain, Iceland, Israel, Italy, Latvia, Lithuania, Macedonia, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, and Switzerland). We supplemented these records with data from Turkey and USA that were collected in the 2010 HBSC survey because they were missing from the 2014 cycle. Data collected in regional surveys in French and Flemish regions of Belgium were combined with equal weight, as were data from England, Scotland, and Wales in the UK.

The GSHS provides data on physical fighting among 13- to 17-year-olds in 55 low- and middleincome states. Its questionnaire includes a similar survey item on physical fighting: "In the past 12 months, how many times were you in a physical fight (0, 1, 2-3, 4-5, 6-7, 8-9, 10-11, 12 or more)?" We used data from 55 surveys that were carried out between 2003 and 2016 in Algeria, Belize, Benin, Bolivia, Botswana, Brunei, Cambodia, China, Colombia, Cook Islands, Costa Rica, Dominica, Ecuador, Egypt, El Salvador, Fiji, Ghana, Guyana, Honduras, Indonesia, Iraq, Jamaica, Jordan, Kenya, Kiribati, Kuwait, Malawi, Malaysia, Maldives, Mauritania, Mongolia, Morocco, Myanmar, Oman, Peru, Philippines, Qatar, Samoa, Solomon Islands, Swaziland,

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Tajikistan, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Tuvalu, Uganda, United Arab Emirates, Vanuatu, Vietnam, West Bank and Gaza, Yemen, Zambia, and Zimbabwe.

Comparable data from New Zealand were supplied by the Youth2012 survey, which used the following item on physical fighting in 8500 13- to 18-year-olds in 2012: "In the last 12 months, how many times were you in a serious physical fight (none, 1-2, 3, 4, 5 or more)?"²⁸ Finally, data from South African were supplied by the 2011 Youth Risk Behaviour Survey (YRBS) in which 10,707 12- to 25-year-olds were asked "During the past 6 months, how often were you in a physical fight (e.g. punching, hitting; never, rarely [1 time], sometimes [2 or 3 times], often [4 or 5 times] or very often [6 or more times])?"²⁹

Together, our study used 403,604 individual records from 8545 schools in 88 states, which represented approximately 45.7% of the world's population of adolescents. The research was approved by the Institutional Review Board of the Faculty of Medicine, McGill University. Student participation in these surveys was voluntary and active or passive consent was sought from school administrators, parents, and children as per national human participant requirements. Youth in private and special needs schools and street and incarcerated youth were excluded.

Country data. The Global Initiative to End All Corporal Punishment of Children provided data on states' prohibition of corporal punishment in the home, alternative care settings, day cares, schools, and penal institutions and as a sentence for a crime.³⁰ We categorised the 88 states in our sample as having either full prohibition (in schools and in the home, which was equivalent to

prohibition in all settings; n=30), partial prohibition (in schools but not in the home; n=38), or no prohibition (neither in schools nor in the home; n=20).

A 2014 World Health Organization report on violence supplied contemporary data on relevant country characteristics and anti-violence policies. We used these variables to try to control other determinants of youth violence and a varying cultural propensity for violence: homicides per 100,000 population, weapons bans in schools, home visitation programs to prevent child maltreatment, parent education programs that teach positive discipline techniques and child development, and bans on capital punishment.³¹ We also included World Bank estimates of gross national income per capita to statistically control differences in country wealth.^{32,33} Income data were adjusted for purchasing parity and reported in standardized current international dollars. The data are summarised in Supplementary Table 1.

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Data analysis

The first phase of our analysis involved estimating the adjusted prevalence of frequent physical fighting, separately in males and females, in each state. Given the slight age differences between surveys, we used all the available data to estimate an age-standardised prevalence of frequent physical fighting (4+ episodes in the past year) at age 13, separately in males and females. The criterion of 4+ episodes of physical fighting was consistent with previous studies of chronic violent behaviour.³³ The estimations were carried out using STATA v14.2 (StataCorp. LP, College Station, USA) by fitting a logistic regression model to the data and then estimating the predicted prevalence at age 13 using STATA's *margins* command. The analyses used sampling

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weights and standard errors were adjusted for school-level clustering. The intraclass correlation in frequent fighting at the school level was 0.12 (95% CI 0.11-0.12).

After compiling the national prevalence of frequent fighting and standard errors of the prevalence (Supplementary Table 1), we linked these statistics to other country-level characteristics (income per capita, homicides, weapons bans, home visits, and capital punishment bans). Income inequality was not included due to its collinearity with homicides (r = 0.52, P < 0.01). Homicides per 100,000 persons were scaled to homicides per 1 million to better show its associations in regression analyses. The significance of associations between full or partial bans and frequent physical fighting was tested using Poisson regression and reported as incidence rate ratios (IRR). Analytic weights were applied using DerSimonian and Laird's inverse-variance method ($1/SE^2$), which effectively shifts weight towards more precise prevalence estimates.³⁴ A dummy variable was applied to the models to control fixed effects of unmeasured differences in survey methods between the surveys (coded 0 [HBSC, Youth2012] or 1 [GSHS, South African YRBS).

The goodness-of-fit of the models to the data was evaluated using the Akaike Information Criterion (AIC)—a measure of model deviance (*d*) adjusted for the number of parameters (*q*) in the model (AIC = d + 2q), and the more conservative Bayesian Information Criterion (BIC), which also corrects for differences in the number of observations (*n*) in the model (BIC = $d + \log(n)*q$).³⁵ Smaller AIC and BIC values indicate better model fit. We also used the loglikelihood ratio test to determine whether adding variables to the model significantly improved its fit to the data.

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Results

Table 1 provides descriptive statistics on the main variables. Frequent physical fighting was more than three times as common in males (9.92%, 95% CI 9.09-10.74%) than in females (2.81%, 95% CI 2.48-3.13%) and varied widely between states, from 0.86 (95% CI 0.81-0.91) percent in Costa Rican females to 34.78 (95% CI 34.69-34.97) percent in Samoan males. Per capita incomes ranged from \$360 (Malawi) to \$105,810 (Norway). Homicides ranged from 0 (Iceland) to 8.55 (Honduras) per 1 million. Thirty (34.09%) states in our sample had prohibited the use of corporal punishment in all settings, 38 (43.18%) prohibited corporal punishment in schools but not in the home, and 20 (22.73%) had not prohibited corporal punishment in schools or in the home. Most states had banned weapons in schools (N=71, 80.68%) and used home visits (N=73, 82.95%) and parent education programs (N=81, 92.05%) to prevent child maltreatment. Capital punishment was banned in 41 (46.59%) of the states. The dot plot in Figure 1 shows the diversity of low-, middle-, and high-income states in the study and heterogeneity in the prevalence of frequent physical fighting.

Table 2 summarises our analysis of frequent fighting in males. We tested four nested models that were progressively more complex. Model 1 tested the crude association between corporal punishment bans and frequent physical fighting whereby the only control was a fixed effect of the school survey. Full bans on corporal punishment (i.e., school and home) corresponded with a rate ratio of 0.69 (95% CI 0.49-0.99), meaning that states with full bans had 69% the rate of frequent fighting found in states without a ban. Partial bans (i.e., schools only) did not

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significantly reduce the rate of fighting in males. In Model 2, the association with full bans held up to an added control for country wealth, however in Models 3 and 4 the association was no longer significant after taking other correlates into account (despite no significant associations found with homicides, weapons bans, home visits or parent education programs, and capital punishment). The non-significant changes in goodness-of-fit, as tested in a log-likelihood ratio test, indicated that these larger models were no more accurate than Model 1.

The same analysis applied to frequent physical fighting in females showed a closer association with corporal punishment bans. As shown in Table 3, states with either a full or partial ban on corporal punishment showed significantly lower rates of frequent fighting than in countries without such bans. This time, the associations held up to additional statistical controls in Models 2, 3 and 4. The fully adjusted Model 4 also indicated that homicides related to higher rates of fighting in females (IRR = 1.13 [95% CI = 1.01-1.26]), although the model's goodness-of-fit was not significantly improved over Model 1.

Using the Model 1 as the most parsimonious representation of the data, we then calculated the predicted prevalence of frequent physical fighting in males and females in each state and plotted these values in Figure 2. This chart—like the regression models—shows less frequent physical fighting in those states that prohibited the use of corporal punishment in the home. Specifically, states that enacted a total ban on corporal punishment in schools and in the home, compared with countries with no such bans, had 31% less fighting in males and 42% less fighting in females.

Discussion

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This study examined states' prohibition of corporal punishment and the prevalence of youth violence in a diverse sample of countries and regions. It was not an experimental evaluation of policy impact and therefore we are cautious not to infer a causal association between country characteristics and adolescent fighting. Rather, the results reveal a cross-sectional association between the prohibition of corporal punishment in the home and less frequent fighting. These associations did not diminish after differences in country wealth and other factors were statistically controlled. Furthermore, states that prohibit corporal punishment in schools but not in the home (including the USA, UK, and Canada), also had a lower prevalence of fighting compared to states with no bans, but only in females. Bans on corporal punishment in schools but not in the home did not appear to relate to the prevalence of fighting in adolescent males.

Limitations of the study should be noted. First, there was heterogeneity in time when the bans were enacted and enforced and when the youth surveys were carried out. In many states, laws that restrict or ban the use of corporal punishment were tabled, amended, and/or passed around the time that fighting was last measured. To investigate temporality in this association would require baseline data on fighting before prohibition and follow-up data afterwards. A second limitation of the study was the lack of information on the use of corporal punishment by parents, educators and other adults, and on adolescents' exposure to such treatment. We hypothesised that these constructs might explain an association between corporal punishment bans and youth fighting but, unfortunately, we could not test these pathways directly. It remains for further investigation whether states' prohibition of corporal punishment leads to positive changes in child discipline practices or are a simply characteristic of less violent societies. The strengths of

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the study include the large and diverse sample of countries and territories and independent ratings of fighting by adolescents. To our knowledge, it is one of the largest cross-national analyses of youth violence that has been carried out.

Beyond the association between corporal punishment bans and youth fighting, we found few other country characteristics that emerged as predictors. We expected to find less fighting in more affluent countries,³³ but instead found the lowest prevalence of fighting in males in Cambodia, Myanmar, and Malawi and a mix of low- and high-income countries at both ends of the spectrum (Figure 1). The lowest prevalence of fighting in females was found in Costa Rica, Tajikistan, and China where less than 1 percent of females engage in frequent fighting. Clearly, economic wealth alone does not differentiate societies where youths rarely engage in physical fighting. As well, no significant associations were found with home visitation programs for child maltreatment or parent education programs. This result might have been due to the small number of states that had neither corporal punishment bans nor a home visitation program (N=2), and neither corporal punishment bans nor a parent education program (N=4), making it difficult to test the association with any precision. Homicides and weapons bans in schools also did not relate to the prevalence fighting. We used these variables to control for the possibility that youth live in societies with varying propensities for violence, however they did not predict international differences in youth fighting. However, a large gender difference in fighting was apparent. Frequent fighting is more ubiquitous and perhaps culturally normative in male versus female adolescents, perhaps as aggression in females is often expressed in non-physical forms.

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These findings add to a growing body of evidence on links between corporal punishment and adolescent behaviour. A public health response to this issue involves two interrelated approaches – regulatory (legal reform) and educational (public and targeted).^{18,36} National strategies that adopt a combination of these approaches have proven most effective in reducing corporal punishment by parents.³⁶ A growing number of countries have prohibited physical punishment as an acceptable means of child discipline and this is an important step that should be encouraged, especially in countries like such as USA and Canada that have seen an effective lobby against such prohibitive approaches.³⁷ Other evidence from national studies shows that the prohibition of corporal punishment results in declining public support for and practice of corporal punishment.^{26,38} However, such legislation is unlikely to work in cultural settings that do not support such a ban. Rather, a ban reinforces and strengthens existing attitudes and in this way can precipitate its decline.²⁶ Where there is insufficient support to implement a full ban, Zolotor and Puzia recommended partial bans as a short-term solution.²⁶ A partial ban should be seen as an intermediate step because sanctioning corporal punishment in some settings and not in others sends conflicting and confusing messages. For instance, it puts health providers in a nonsensical position of having to educate parents about how to hit their children safely. An complementary approach may involve supporting and normalising positive approaches to child discipline that are based on warm, supportive relationships.^{26,39} Parenting that models self-regulation and non-violent approaches to stress management and conflict resolution has been found to predict positive health and social

stress management and conflict resolution has been found to predict positive health and social outcomes in children.^{20,20,39} Health providers are well positioned to offer practical and effective tools that support such approaches to child discipline.

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A cultural shift from punitive to positive discipline practices happens slowly.^{19,40} In the past, there was scant objective data available to understand the detrimental consequences of adults physically punishing children. This has changed as more evidence supports regulatory and educational public health approaches to protecting children and reducing violence. Moreover, public health messaging must be clear that repealing laws that allow physical punishment is not synonymous with an absence of child discipline. All children need discipline and guidance that do not endanger their wellbeing and that respect their right to exist.

Data sharing

Original microdata files can be requested from the HBSC Data Management Centre (<u>http://www.uib.no/en/hbscdata</u>) and Centers for Disease Control and Prevention (<u>www.cdc.gov/gshs</u>).

Competing interests

There are no competing interests for any author.

Statement of Authorship

FJE, PDD, and WP conceptualized and designed the study, wrote up the results, and revised the manuscript. FJE, GG, and KER cleaned and analysed the data and wrote sections of the manuscript. VM and SW reviewed the literature, interpreted the findings, and wrote sections of the manuscript. All authors critically reviewed edited early drafts of the manuscript, approved the final manuscript as submitted, and agree to be accountable for all aspects of the work.

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Table 1

Summary statistics on 88 countries and territories.

Variable	n(%)	range	mean	standard	95% CI
				deviation	
Frequent fighting, males (%)		1.82-34.78	9.92	6.63	9.09-10.74
Frequent fighting, females (%)		0.86-26.82	2.81	4.72	2.48-3.13
Income per capita (\$, thousands)		0.36-105.81	17.16	22.14	12.47-21.86
Homicides (per 1 million)		0.00-8.55	0.80	1.39	0.51-1.10
Corporal punishment ban					72.3-89.1
in schools and in the home	30 (34.09)				24.81-44.78
in schools, not in the home	38 (43.18)				33.08-53.89
neither schools nor home	20 (22.73)				15.03-32.84
Weapons ban at school	71 (80.68)				70.88-87.75
Home visits for child maltreatmen	t 73 (82.95)				73.41-89.56
Parent education program	81 (92.05)				92.05-96.22
Capital punishment ban	41 (46.59)				36.27-57.21

Note: Frequent fighting is weighted by the inverse variance of the prevalence.

Table 2

Rate ratio of frequent physical fighting in 13-year-old males.

variable	Model 1	Р	Model 2	Р	Model 3	Р	Model 4	Р
		value		value		value		value
Constant	14.81 (8.54-25.69)		14.48 (8.52-24.62)		14.35 (8.38-24.59)		16.05 (8.81-	
							29.26)	
Survey	0.85 (0.66-1.08)	0.19	0.76 (0.51-1.13)	0.18	0.77 (0.50-1.19)	0.24	0.71 (0.48-1.06)	0.09
Corporal punishment ban								
No ban (reference category)	1.00		1.00		1.00		1.00	
Partial ban (in schools)	0.84 (0.59-1.20)	0.33	0.85 (0.59-1.22)	0.37	0.86 (0.58-1.28)	0.47	0.93(0.60-1.44)	0.73
Full ban (schools and home)	0.69 (0.49-0.99)	0.04	0.68 (0.46-0.99)	0.04	0.69 (0.46-1.05)	0.08	0.74 (0.46-1.17)	0.19
Income per capita (\$, thousands)			1.00 (0.99-1.00)	0.36	1.00 (0.99-1.00)	0.33	1.00 (0.99-1.00)	0.44
Homicides (per 1 million)					0.98 (0.90-1.06)	0.58	0.98 (0.90-1.06)	0.57
Weapons ban at school							0.91 (0.73-1.15)	0.45
Home visits for child							0.94 (0.62-1.42)	0.75

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Parent education program	ns			1.13 (0.64-2.00)	0.66
Capital punishment ban				0.82 (0.59-1.15)	0.25
Goodness of fit:					
AIC	460.50	460.97	462.74	468.11	
BIC	470.41	473.36	477.60	492.88	
Deviance (-2 log likeli	hood) -226.25	-225.49	-225.37	-224.05	
Likelihood-ratio test (v	vs. Model	χ^2 (df=1) = 1.52 0.22	$\chi^2(df=2)=1.76$	0.41 $\chi^2(df=6) = 4.39$	0.63
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Note: 059/ confidence in	torreal above in porouth and				
Note: 95% confidence in	iterval snown in parentneses.				
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Table 3

Rate ratio of frequent physical fighting in 13-year-old females.

Variable	Model 1	Р	Model 2	Р	Model 3	Р	Model 4	Р
		value		value		value		value
Constant	5.35 (3.18-8.99)		5.94 (3.32-10.62)		6.12 (3.43-10.91)		6.10 (2.41-15.42)	
Survey	0.87 (0.57-1.33)	0.03	0.80 (0.51-1.28)	0.36	0.73 (0.44-1.21)	0.22	0.71 (0.43-1.20)	0.20
Corporal punishment ban								
No ban (reference category)	1.00		1.00		1.00		1.00	
Partial ban (in schools)	0.56 (0.33-0.95)	0.03	0.57 (0.33-0.96)	0.03	0.52 (0.30-0.90)	0.02	0.51(0.28-0.92)	0.03
Full ban (schools and home)	0.42 (0.25-0.70)	<0.01	0.41 (0.24-0.69)	<0.01	0.37 (0.21-0.65)	< 0.01	0.35 (0.19-0.67)	< 0.01
Income per capita (\$, thousands)			1.00 (0.99-1.00)	0.38	1.00 (0.99-1.00)	0.57	1.00 (0.99-1.00)	0.35
Homicides (per 1 million)					1.14 (1.01-1.28)	0.03	1.13 (1.01-1.26)	0.03
Weapons ban at school							1.05 (0.79-1.40)	0.73
Home visits for child							0.83 (0.52-1.32)	0.43
maltreatment								
Parent education programs							1.18 (0.57-2.46)	0.65
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Goodness of fit:				
AIC	300.81	302.49	302.42	309.60
BIC	310.72	314.87	317.28	334.37
Deviance (-2 log likelihood)	-146.41	-146.24	-145.21	-144.80
Likelihood-ratio test (vs. Model		χ^2 (df=1) = 0.33 0.5	7 $\chi^2(df=2)=2.40$ 0.30	$\chi^2(df=6) = 3.22$
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Figure Captions

Figure 1. Prevalence of frequent physical fighting in male and female adolescents in 88 countries and territories (sorted by prevalence in males). Details about states' probation laws are available at *http://www.endcorporalpunishment.org*.

Figure 2. Predicted prevalence of frequent physical fighting at age 13 in states with no prohibition (N=20), partial prohibition (in schools but not in the home; N=38), and full prohibition (banned in all settings; N=30). Shown are means and 95% confidence intervals adjusted for survey differences and school clustering.



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Figure 2. Predicted prevalence of frequent physical fighting at age 13 in states with no prohibition (N=20), partial prohibition (in schools but not in the home; N=38), and full prohibition (banned in all settings; N=30). Shown are means and 95% confidence intervals adjusted for survey differences and school clustering.

Page 31 of 30	6						BMJ Open		njopen-2 1 by copy		
1 2	Supplementa	ry table 1.							018-02 right, i		
3 4	Prevalence of										
5 6 7	Country	Frequ	ent	Frequ	ient	Income per	Prohibition	Weapons	Home vists o	Capital	Homicides
7 8 9		fighti	ng,	fighti	ng,	capita (\$	level ^a	ban at	for child set	punishment ^b	per 100,000
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15 16	Albania	3.38	0.00	14.24	0.01	4.45	Full	Yes	aded f and da	No	2.86
17 18	Algeria	5.61	0.01	17.90	0.02	5.49	Partial	Yes	ta min	Yes ^a	1.72
19 20	Armenia	2.28	0.00	27.40	0.01	4.02	Partial	Yes	ing,Yess ≥	Yes ^b	1.80
21 22 22	Austria	3.10	0.00	12.06	0.01	49.57	Full	Yes	njoger I trainir	No	0.40
23 24 25	Belgium	3.01	0.00	10.50	0.00	46.99	Partial	Yes	ig brain a Year	No	0.65
26 27	Belize	5.39	0.01	11.21	0.02	4.43	Partial	Yes		Yes	39.00
28 29	Benin	8.09	0.02	9.70	0.02	0.89	Full	Yes	ar tech	Yes ^a	6.30
30 31 32	Bolivia	5.12	0.01	11.32	0.02	2.87	Full	No	nologie	Yes ^b	33.00
33 34	Botswana	8.22	0.02	12.02	0.03	7.03	Partial	Yes	s. Net Net A	Yes	10.90
35 36	Brunei	3.33	0.01	7.90	0.01	37.32	Partial	Yes	genge Nige	Yes ^a	0.50
37 38 39 40	Bulgaria	3.47	0.00	10.28	0.01	7.61	Full	Yes	Bibliogra	No	1.30
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Cambodia	2.03	0.01	1.82	0.01	1.02	Partial	Yes	2018-02 Nyright,	No	1.9
Canada	3.66	0.00	10.45	0.01	51.77	Partial	Yes	in 1616 ncluyes di	No	1.3
China	0.95	0.00	6.77	0.01	7.40	Partial	Yes	ng for O	Yes	0.9
Colombia	3.64	0.01	7.48	0.01	7.97	Partial	Yes	ctober Ea≴ei uses r	No	34.0
Cook Islands	6.98	0.01	12.34	0.02	9.99	Partial	No	2018. Igneme elated	No	5.6
Costa Rica	0.86	0.00	4.50	0.01	10.12	Full	Yes	Doweni ent Sup to text	No	8.8
Croatia	4.04	0.01	13.49	0.01	13.00	Full	Yes	and d	No	1.1
Czech Republic	4.00	0.01	14.96	0.01	18.69	Partial	Yes	from r (Age ata mir	No	1.7
Dominica	3.80	0.01	10.44	0.02	6.96	None	Yes	S) S) Yeb	Yes	8.5
Ecuador	3.25	0.01	10.74	0.01	6.09	Partial	No	l traini	No	13.7
Egypt	5.40	0.01	21.00	0.03	3.21	None	Yes	ng, ar	Yes	4.3
El Salvador	3.47	0.01	6.65	0.01	3.89	Partial	Yes	d simil	Yes ^b	70.3
Estonia	1.51	0.00	6.77	0.01	18.98	Full	No	ar tect	Yes ^b	4.8
Fiji	8.49	0.02	18.60	0.03	4.87	Partial	Yes	nolog Weight	No	3.0
Finland	1.81	0.00	5.64	0.01	48.83	Full	Yes	Tes Yes	No	2.1
Germany	2.35	0.00	9.75	0.01	47.50	Full	Yes	Yez	No	0.8
Ghana	17.27	0.02	15.26	0.01	1.59	None	Yes	Ye	Yes ^a	1.7

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1 2	Guyana	4.29	0.01	14.00	0.02	4.03	None	No	vright, i	Yes	17.00
3 4	Honduras	3.59	0.01	5.71	0.01	2.27	Full	No	ncludir	No	85.50
5 6 7	Iceland	1.86	0.00	6.85	0.01	47.72	Full	Yes	n 1900 Tor t	No	0.03
7 8 9	Indonesia	4.32	0.01	10.36	0.02	3.63	None	Yes	uses re	Yes	0.60
10 11	Iraq	5.35	0.01	14.86	0.02	6.41	None	Yes	2018. I gneme slated t	Yes	8.79
12 13	Israel	2.21	0.00	9.48	0.01	35.34	Full	Yes	o fext	Yes ^b	1.90
14 15 16	Italy	2.02	0.00	7.03	0.01	34.54	Partial	Yes	and da	No	0.89
17 18	Jamaica	11.37	0.03	17.65	0.04	5.20	Partial	Yes	from h (ABES) Ita min	Yes	42.00
19 20	Jordan	7.85	0.02	21.45	0.03	4.59	Partial	No	ing, Al	Yes	2.10
21 22 22	Kenya	15.08	0.02	20.67	0.03	1.30	Full	Yes	njoger traini	Yes ^a	5.91
25 24 25	Kiribati	8.49	0.02	18.60	0.03	3.11	Partial	Yes	ng, and	No	7.15
26 27	Kuwait	5.35	0.01	21.05	0.03	49.30	Partial	Yes	d simila	Yes	4.00
28 29	Latvia	2.77	0.00	12.40	0.01	15.35	Full	Yes	ar têYene	No	9.64
30 31 32	Lithuania	1.99	0.00	9.18	0.01	15.93	Full	No	nologi	No	5.20
33 34	Macedonia	1.66	0.00	7.88	0.01	5.19	Full	Yes	ss Ye≇ ►	No	1.40
35 36	Malawi	3.57	0.01	3.30	0.01	0.36	Partial	Yes	Yez	Yes ^a	3.35
37 38 39 40 41 42	Malaysia	4.58	0.00	10.01	0.01	11.12	None	Yes	Bibliographique	Yes	1.93

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Maldives	6.12	0.02	16.75	0.03	6.47	None	Yes	2018-02 yright, i	Yes ^a	1.4
Mauritania	14.78	0.03	28.48	0.04	1.37	None	No	ncluy es o	Yes ^a	11.4
Moldova	2.70	0.01	11.64	0.02	2.56	Full	Yes	n 1990 for O	No	8.5
Mongolia	4.03	0.01	16.18	0.02	4.26	Full	Yes	Ensei uses r	Yes ^a	8.5
Morocco	3.21	0.01	13.96	0.03	3.08	None	Yes	2018. gngine elated	Yes ^a	1.3
Myanmar	1.03	0.01	2.82	0.01	1.28	None	Yes	to fext	Yes ^a	2.0
Netherlands	1.32	0.00	6.60	0.01	51.25	Full	No	and da	No	0.9
New Zealand	3.21	0.00	6.28	0.01	41.37	Full	Yes	ata mir	No	0.9
Norway	1.95	0.00	9.71	0.01	105.81	Full	Yes	S) North Ning, A	No	0.3
Oman	13.10	0.01	15.11	0.02	18.34	Partial	Yes		Yes	0.9
Peru	2.87	0.01	11.36	0.02	6.37	Full	No	ng, an	Yes ^b	6.5
Philippines	3.42	0.01	6.94	0.01	3.50	Partial	Yes	d simesoi	No	12.6
Poland	3.70	0.01	14.06	0.02	13.69	Full	Yes	ar tê Yeşe	No	0.8
Portugal	1.36	0.00	5.45	0.01	21.29	Full	Yes	10 Bologi Notice	No	1.4
Qatar	11.71	0.02	25.11	0.03	92.32	None	Yes	Yest	Yes	0.3
Romania	2.93	0.01	11.78	0.02	9.59	Full	Yes	Yez	No	2.0
Russia	4.31	0.01	12.26	0.01	14.33	Partial	Yes	N	Yes ^a	12.3

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Page 35 of 3	36						BMJ Open		njopen-⁄		
1 2	Samoa	26.82	0.03	34.78	0.04	4.05	Partial	Yes	2018-02 N yright, i	Yes	3.15
3 4	Slovakia	4.61	0.00	15.26	0.01	17.95	Partial	Yes	ncluyee o	No	1.72
5 6 7	Slovenia	3.26	0.00	10.26	0.01	23.56	Full	No	n 160 ng for	No	0.93
7 8 9	Solomon Islands	7.38	0.03	10.99	0.04	1.83	None	No	ctober Ensei uses re	No	3.70
10 11	South Africa	2.14	0.00	4.57	0.01	6.79	Partial	Yes	2018. I gneme lated t	No	31.10
12 13	Spain	2.97	0.00	6.12	0.01	29.38	Full	Yes	int Sup	No	0.70
14 15 16	Swaziland	2.71	0.01	6.60	0.01	3.55	None	No	and da	Yes ^a	9.30
17 18	Sweden	1.80	0.00	6.53	0.01	60.59	Full	Yes	ta min	No	0.85
19 20	Switzerland	1.76	0.00	6.86	0.01	86.00	Partial	Yes	ingy est	No	0.50
21 22 23	Tajikistan	0.93	0.00	4.11	0.01	1.35	Partial	Yes	njogen trainir	Yes ^a	1.50
24 25	Tanzania	4.99	0.01	10.74	0.02	0.92	None	Yes	lg, aYes	Yes	8.70
26 27	Thailand	4.99	0.01	11.57	0.01	5.78	Partial	Yes	simila on	Yes	4.50
28 29 30	Trinidad &	4.50	0.01	10.00	0.02	18.38	Partial	No	r teYese	Yes	28.60
31 32	Tobago								10, 202 hologie		
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35 36 27	Turkey	9.76	0.01	24.59	0.02	10.63	Partial	Yes	Yez	No	2.28
37 38 39	Tuvalu	19.02	0.01	26.90	0.02	5.72	None	Yes	Bibbi Netice	No	17.80
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Corporal punishment bans and physical fighting in adolescents: an ecological study of 88 countries

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Abstract

Objective: To examine the association between corporal punishment bans and youth violence at an international level.

Design: Ecological study of low to high-income 88 countries

Setting: School-based health surveys of students

Participants: 403,604 adolescents

Interventions: National corporal punishment bans

Primary outcome measure: Age-standardised prevalence of frequent physical fighting (i.e., 4+ episodes in the previous year) for male and female adolescents in each country Results: Frequent fighting was more common in males (9.9%, 95% CI 9.1-10.7%) than females (2.8%, 95% CI 2.5-3.1%) and varied widely between countries, from 0.9% (95% CI 0.8-0.9%) in Costa Rican females to 34.8% (95% CI 34.7-35.0) in Samoan males. Compared to 20 countries with no ban, the group of 30 countries with full bans (in schools and in the home) experienced 69% the rate of fighting in males and 42% in females. Thirty-eight countries with partial bans (in schools but not in the home) experienced less fighting in females only (56% the rate found in countries without bans).

Conclusions: Country prohibition of corporal punishment is associated with less youth violence. Whether bans precipitated changes in child discipline or reflected a social milieu that inhibits youth violence remains unclear due to the study design and data limitations. However, these results support the hypothesis that societies that prohibit the use of corporal punishment are less violent for youth to grow up in than societies that have not.

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Strengths and limitations of this study

- The Health Behaviour in School-aged Children study and Global School-based Health Survey are well-established international surveys of adolescent physical fighting.
- The study includes a diverse sample of countries and is one of the largest cross-national analyses of youth violence.
- Causal associations could not be inferred due to data gaps and the ecologic study design.
- It remains unclear whether bans precipitate change in child discipline or reflect a social milieu that inhibits youth violence.

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Introduction

Corporal punishment is an adult's use of physical force to correct or control a child's inappropriate behaviour.^{1,2} The punishment is intended to cause pain but does not physically injure the child. Its use remains legally and socially permitted in many countries. UNICEF reported that estimated 17% of adolescents worldwide has experienced corporal punishment either at school or in the home during the past month.³ Proponents of corporal punishment argue that physical discipline is benign or even beneficial to the long-term health of the child.⁴ However, a persuasive body of evidence challenges this view. Several independent investigations have found that a child's exposure to corporal punishment relates to aggressive behaviours, ^{5,6,7,8,9,10} mental health problems, ^{11,12,13,14,15} academic problems, and related cognitive deficits.^{16,17,18} Such outcomes have lifelong consequences for adult health and wellbeing. A meta-analysis of 75 studies found that childhood exposure to spanking, the most common form of corporal punishment, predicted 13 of 17 negative outcomes including aggression, antisocial behaviour, mental health problems, low self-esteem, and physical abuse, and to antisocial behaviour and poor mental health in adulthood.¹⁵ A study of partner violence in six Asian and Pacific countries found that men's experience of harsh physical parenting during their childhood related to violence against women in adulthood.¹⁹

Various psychological theories have been used to describe the possible underlying pathways in the association between corporal punishment and youth violence. According to social learning and social interaction theories, children and adolescents learn from corporal punishment that physical violence is an effective and permissible way of settling conflicts and influencing the

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behaviour of others.^{20,21} Script theory suggests that repeated corporal punishment constructs a stable set of beliefs (i.e., cognitive script) in the child's mind that becomes increasingly salient and accessible depending on the frequency of corporal punishment.²² Similarly, the general aggression model describes how repeated exposures to corporal punishment reinforces aggressive thoughts, emotions, and actions towards others.²³ These theories help to explain the intergenerational cycle of physical violence from early childhood experiences to later violent behaviour.

Moreover, a child's rights perspective recognises that corporal punishment violates children's rights to personal integrity, human dignity, and protection from all forms of violence as guaranteed under the United Nations Convention on the Rights of the Child.²⁴ The Convention states that the elimination of corporal punishment is "not only an obligation of States parties" but also a "key strategy for reducing and preventing all forms of violence."²⁴ The prohibition of corporal punishment might help protect children from harm and support their social development.^{18,25} However, while legal prohibition has led to decreased use and decreased public support for corporal punishment in some countries,²⁶ the association between bans on corporal punishment and youth physical violence has not been examined at an international level. The reason for this may be due to a lack of comparable data on youth violence from a large sample of legal jurisdictions. Investigating the association at the country level requires a large and diverse sample of countries so that other social and structural determinants of violence can be controlled with adequate statistical power.

We had an opportunity to examine this association in a large and diverse group of countries,

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territories and protectorate states (hereafter described collectively as 'countries') that carried out similar school-based surveys of adolescents. By harmonising their data in country-level prevalence estimates of frequent physical fighting, our goal was to investigate the association between the legal prohibition of corporal punishment and frequent fighting among adolescents. We hypothesised that national corporal punishment bans were associated with lower rates of fighting among adolescents.

Methods

Data sources

Survey data. Two well-established school-based surveys have measured physical fighting in adolescents: the WHO Health Behaviour in School-aged Children (HBSC) study and the Global School-based Health Survey (GSHS). The HBSC surveys 11-, 13-, and 15-year-olds in Canada, USA, and most European countries every four years following a common protocol.²⁷ Its selfcompletion questionnaire measures physical fighting with the item: "In the past 12 months, how many times were you in a physical fight (0, 1, 2, 3, 4 or more)? We used data from 32 countries that participated in the most recent HBSC survey in 2014 (Albania, Armenia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Estonia, Finland, Germany, Great Britain, Iceland, Israel, Italy, Latvia, Lithuania, Macedonia, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, and Switzerland). We supplemented these records with data from Turkey and USA that were collected in the 2010 HBSC survey because they were missing from the 2014 cycle. Data collected in regional surveys

in French and Flemish regions of Belgium were combined with equal weight, as were data from England, Scotland, and Wales in the UK.

The GSHS provides data on physical fighting among 13- to 17-year-olds in 55 low- and middleincome countries. Its questionnaire includes a similar survey item on physical fighting: "In the past 12 months, how many times were you in a physical fight (0, 1, 2-3, 4-5, 6-7, 8-9, 10-11, 12 or more)?" We used data from 55 surveys that were carried out between 2003 and 2016 in Algeria, Belize, Benin, Bolivia, Botswana, Brunei, Cambodia, China, Colombia, Cook Islands, Costa Rica, Dominica, Ecuador, Egypt, El Salvador, Fiji, Ghana, Guyana, Honduras, Indonesia, Iraq, Jamaica, Jordan, Kenya, Kiribati, Kuwait, Malawi, Malaysia, Maldives, Mauritania, Mongolia, Morocco, Myanmar, Oman, Peru, Philippines, Qatar, Samoa, Solomon Islands, Swaziland, Tajikistan, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Tuvalu, Uganda, United Arab Emirates, Vanuatu, Vietnam, West Bank and Gaza, Yemen, Zambia, and Zimbabwe.

Comparable data from New Zealand were supplied by the Youth2012 survey, which used the following item on physical fighting in 8500 13- to 18-year-olds in 2012: "In the last 12 months, how many times were you in a serious physical fight (none, 1-2, 3, 4, 5 or more)?"²⁸ Finally, data from South Africa were supplied by the 2011 Youth Risk Behaviour Survey (YRBS) in which 10,707 12- to 25-year-olds were asked "During the past 6 months, how often were you in a physical fight (e.g. punching, hitting; never, rarely [1 time], sometimes [2 or 3 times], often [4 or 5 times] or very often [6 or more times])?"²⁹ Together, our study used 403,604 individual records from 8,545 schools in 88 national surveys. Each national survey was weighted to be

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representative of the country's population of adolescents. At the time of our analysis, this group of 88 countries were home to approximately 45.7% of the world's population of adolescents.

Student participation in these surveys was voluntary and active or passive consent was sought from school administrators, parents, and children as per national human participant requirements. Youth in private and special needs schools and street and incarcerated youth were excluded. All national surveys used two-stage sampling of schools that represented the geographic and economic diversity in each country, and then classes within schools that provided their target age group. Teachers or trained interviewers administered the survey questionnaire in classroom settings. Each national survey was approved by a university-based ethics review board or equivalent regulatory body associated with the institution conducting each respective national survey. The secondary analysis described in this article was approved by the Institutional Review Board of the Faculty of Medicine, McGill University.

Country data. The Global Initiative to End All Corporal Punishment of Children provided data on national prohibition of corporal punishment in the home, alternative care settings, day cares, schools, and penal institutions and as a sentence for a crime.³⁰ We categorised the 88 countries in our sample as having either full prohibition (in schools and in the home, which was equivalent to prohibition in all settings; n=30), partial prohibition (in schools but not in the home; n=38), or no prohibition (neither in schools nor in the home; n=20).

A 2014 World Health Organization report on violence supplied contemporary data on relevant country characteristics and anti-violence policies. We used these variables to try to control other

determinants of youth violence and a varying cultural propensity for violence: homicides per 100,000 population, weapons bans in schools, home visitation programs to prevent child maltreatment, parent education programs that teach positive discipline techniques and child development, and bans on capital punishment.³¹ We also included World Bank estimates of gross national income per capita to statistically control differences in country wealth.^{32,33} Income data were adjusted for purchasing parity and reported in standardized current international dollars. The data are summarised in Supplementary Table 1.

Data analysis

The analysis was carried out in two phases. We first calculated a weighted, age-standardised prevalence of frequent physical fighting for males and females in each country. Second, these prevalence estimates were linked to other country characteristics in an ecologic regression analysis of country differences.

First, we analysed the individual records on all 403,604 cases combined and estimated the prevalence of frequent physical fighting (4+ episodes in the past year) separately in males and females in each country. Age standardisation was required given the slight age differences between the surveys. The cut-point criterion of 4+ episodes of physical fighting was consistent with previous studies of chronic violent behaviour.³³ The prevalence estimations were carried out using STATA v14.2 (StataCorp. LP, College Station, USA) by fitting a logistic regression model to the data and then estimating the predicted prevalence at age 13 using STATA's *margins* command. The analyses used sampling weights and standard errors were adjusted for school-

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level clustering. The intraclass correlation in frequent fighting at the school level was 0.12 (95% CI 0.11-0.12), which is indicative of a small clustering effect of school.

We then linked the national prevalence of frequent fighting and standard errors (SE) of the prevalence to other country-level characteristics (income per capita, homicides, weapons bans, home visits, and capital punishment bans; Supplementary Table 1). Income inequality was not included due to its collinearity with homicides (r = 0.52, P < 0.01). Homicides per 100,000 persons were scaled to homicides per 1 million to better show its associations in regression analyses. The significance of associations between full or partial bans and frequent physical fighting was tested using Poisson regression and reported as incidence rate ratios (IRR). Analytic weights were applied using DerSimonian and Laird's inverse-variance method ($1/SE^2$), which effectively shifts weight towards more precise prevalence estimates.³⁴ A dummy variable was applied to the models to control fixed effects of unmeasured differences in survey methods between the surveys (coded 0 [HBSC, Youth2012] or 1 [GSHS, South African YRBS). There were no missing data at the country-level.

Goodness of fit of the models to the data was evaluated using the Akaike Information Criterion (AIC)—a measure of model deviance (*d*) adjusted for the number of parameters (*q*) in the model (AIC = d + 2q), and the more conservative Bayesian Information Criterion (BIC), which also corrects for differences in the number of observations (*n*) in the model (BIC = $d + \log(n)*q$).³⁵ Smaller AIC and BIC values indicate better model fit. We also used the log-likelihood ratio test to determine whether adding variables to the model significantly improved its fit to the data.

Patient involvement

No patients were involved in developing the research question or the outcome measures, nor were they involved in planning the design, recruitment to, and conduct of the study. No patients were asked to advise on the interpretation or writing up of results. There are no plans to disseminate the results of the research to study participants.

Results

Table 1 provides descriptive statistics on the main variables. Frequent physical fighting was more than three times as common in males (9.92%, 95% CI 9.09-10.74%) than in females (2.81%, 95% CI 2.48-3.13%) and varied widely between countries, from 0.86 (95% CI 0.81-0.91) percent in Costa Rican females to 34.78 (95% CI 34.69-34.97) percent in Samoan males. Per capita incomes ranged from \$360 (Malawi) to \$105,810 (Norway). Homicides ranged from 0 (Iceland) to 8.55 (Honduras) per 1 million. Thirty (34.09%) countries in our sample had prohibited the use of corporal punishment in all settings, 38 (43.18%) prohibited corporal punishment in schools but not in the home, and 20 (22.73%) had not prohibited corporal punishment in schools or in the home. Most countries had banned weapons in schools (n=71, 80.68%) and used home visits (n=73, 82.95%) and parent education programs (n=81, 92.05%) to prevent child maltreatment. Capital punishment was banned in 41 (46.59%) of the countries. The dot plot in Figure 1 shows the diversity of low-, middle-, and high-income countries in the study and heterogeneity in the prevalence of frequent physical fighting. The figure also shows a

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consistent gender gap in fighting, with a higher prevalence in males than in females in all but two countries (Ghana and Zambia).

Table 2 summarises our regression analysis of frequent fighting in males. We tested four nested models that were progressively more complex. Model 1 tested the crude association between corporal punishment bans and frequent physical fighting whereby the only control was a fixed effect of the school survey. Full bans on corporal punishment (i.e., school and home) corresponded with a rate ratio of 0.69 (95% CI 0.49-0.99), meaning that countries with full bans had 69% the rate of frequent fighting found in countries without a ban. Partial bans (i.e., schools only) did not significantly reduce the rate of fighting in males. In Model 2, the association with full bans held up to an added control for country wealth, however in Models 3 and 4 the association was no longer significant after taking other correlates into account (despite no significant associations found with homicides, weapons bans, home visits or parent education programs, and capital punishment). The non-significant changes in goodness-of-fit, as tested in a log-likelihood ratio test, indicated that these larger models were no more accurate than Model 1.

The same analysis applied to frequent physical fighting in females showed a closer association with corporal punishment bans. As shown in Table 3, countries with either a full or partial ban on corporal punishment showed significantly lower rates of frequent fighting than in countries without such bans. This time, the associations held up to additional statistical controls in Models 2, 3 and 4. The fully adjusted Model 4 also indicated that homicides related to higher rates of fighting in females (IRR = 1.13 [95% CI = 1.01-1.26]), although the model's goodness-of-fit was not significantly improved over Model 1.

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Using Model 1 as the most parsimonious representation of the data, we then calculated the predicted prevalence of frequent physical fighting in males and females in each country and plotted these values in Figure 2. This chart—like the regression models—shows less frequent physical fighting in those countries that prohibited the use of corporal punishment in the home. Specifically, countries that enacted a total ban on corporal punishment in schools and in the home, compared with countries with no such bans, had 31% less fighting in males and 42% less fighting in females. Pee.

Discussion

This study examined the association between bans on corporal punishment and the prevalence of youth violence in a large and diverse sample of countries. It was not an experimental evaluation of policy impact and therefore we are cautious not to infer a causal association with adolescent fighting. Rather, these results reveal a cross-sectional association between national bans of corporal punishment in all settings and less frequent physical fighting in male and female adolescents. This associations did not diminish after differences in country wealth and other factors were statistically controlled, including violent crime (homicides) and social programs that support parent education and aim to reduce adolescents' exposure to violence at home and at school.

The results also indicate that countries that ban corporal punishment in schools but not in the home (including Canada, the United States, and the United Kingdom) also have a lower

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prevalence of fighting than countries with no bans, but only in females. Partial bans on corporal punishment did not relate to the prevalence of fighting in adolescent males. The reason for this gender difference is unclear. It could be that males, compared to females, experience more physical violence outside school settings or are affected differently by corporal punishment by teachers. Further investigation is needed to understand the nature of this gender difference. Overall, the results suggest a graded association between the breadth of corporal punishment bans and the prevalence of frequent physical fighting in 13-year-olds, with more comprehensive bans related to less fighting (Figure 2).

Limitations of the study should be noted. First, there was heterogeneity in time when the bans were enacted and enforced and when the youth surveys were carried out. In many countries, laws that restrict or ban the use of corporal punishment were tabled, amended, and/or passed around the time that fighting was last measured. To investigate temporality in this association would require baseline data on fighting before prohibition and follow-up data afterwards. A second limitation was the lack of information on the use of corporal punishment by parents, educators and other adults and on adolescents' exposures to such treatment. Further research on the experience of corporal punishment is worthy of further investigation as it may help explain the gender difference found in the association between corporal punishment bans and youth fighting but, unfortunately, could not test these pathways directly. It remains for further investigation whether national bans on corporal punishment lead to positive changes in child discipline practices or are a simply characteristic of less violent societies. Third, because of the ecologic design of the study, ecologic fallacy is a possibility and direction of causality cannot be inferred.

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The strengths of the study include the large and diverse sample of countries and independent ratings of fighting by adolescents. To our knowledge, it is one of the largest cross-national analyses of youth violence that has been carried out. Prevalence estimates of frequent fighting used multilevel regressions to account for the clustering effect of fighting within schools and multiple regression was used to control important country-level confounders in tests of the association between bans on corporal punishment and youth violence.

Beyond the association between corporal punishment, few other country characteristics emerged as predictors of youth fighting. We expected to find less fighting in more affluent countries,³³ but instead found the lowest prevalence of fighting in males in Cambodia, Myanmar, and Malawi and a mix of low- and high-income countries at both ends of the spectrum (Figure 1). The lowest prevalence of fighting in females was found in Costa Rica, Tajikistan, and China where less than 1 percent of females engage in frequent fighting. Clearly, economic wealth alone does not differentiate societies where youths rarely engage in physical fighting. As well, no significant associations were found with home visitation programs for child maltreatment or parent education programs. This result might have been due to the small number of countries that had neither corporal punishment bans nor a home visitation program (n=2), and neither corporal punishment bans nor a parent education program (n=4), making it difficult to test the association with any precision. Homicides and weapons bans in schools also did not relate to the prevalence fighting. We used these variables to control for the possibility that youth live in societies with varying propensities for violence but they did not predict international differences in youth fighting. However, a large gender difference in fighting was apparent. Frequent fighting is more

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ubiquitous and perhaps culturally normative in male versus female adolescents, while aggression in females is often expressed in non-physical forms.

These findings add to a growing body of evidence on links between corporal punishment and adolescent health and safety. A public health response to the evidence involves regulatory reform and educational campaigns.^{18,36} A growing number of countries have banned corporal punishment as an acceptable means of child discipline and this is an important step that should be encouraged, especially in countries that have seen an effective lobby against such prohibitive approaches.³⁷ Where there is insufficient public support for a full ban, Zolotor and Puzia recommended partial bans as an interim solution while also supporting positive and non-violent approaches to child discipline.^{20,26,38,39} However, partial bans can also send conflicting messages to parents and put health providers in a nonsensical position of having to educate parents about ways to hit their children safely. Furthermore, this study found no difference in fighting in males between countries with a partial ban and no ban.

Health providers are well positioned to offer practical and effective tools that support such approaches to child discipline. Cultural shifts from punitive to positive discipline happen slowly.^{19,40} In the past, there were scant data about the detrimental consequences of adults physically punishing children. This has changed as more evidence supports regulatory and educational public health approaches to protecting children and reducing violence. Moreover, public health messaging must be clear that repealing laws that permit corporal punishment is not synonymous with an absence of child discipline. All children have the right to that does not endanger their wellbeing and respects their right to exist.

Data sharing

Original microdata files can be requested from the HBSC Data Management Centre

(http://www.uib.no/en/hbscdata) and Centers for Disease Control and Prevention

(www.cdc.gov/gshs).

Competing interests

There are no competing interests for any author.

Statement of Authorship

FJE, PDD, and WP conceptualized and designed the study, wrote up the results, and revised the manuscript. FJE, GG, and KER cleaned and analysed the data and wrote sections of the manuscript. VM and SW reviewed the literature, interpreted the findings, and wrote sections of the manuscript. All authors critically reviewed edited early drafts of the manuscript, approved the final manuscript as submitted, and agree to be accountable for all aspects of the work.

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Belgium (D. Piette, C. Vereecken), Canada (William Pickett, Wendy Craig), Croatia (M. Kuzman), Czech Republic (M. Kalman), Denmark (M. Rasmussen) Estonia (K. Aasvee), Finland (J. Tynjälä), France (E. Godeau), Germany (P. Kolip), Greece (A. Kokkevi), Greenland (B. Niclasen), Hungary (Á. Németh), Iceland (Á. Arnarsson), Ireland (S. Nic Gabhainn), Israel (Y. Harel-Fisch), Italy (F. Cavallo), Latvia (I. Pudule), Lithuania (A. Zaborskis), Luxembourg (Y. Wagner), Macedonia (L. Kostarova Unkovska), Netherlands (W. Vollebergh), Norway (O. Samdal), Poland (J. Mazur), Portugal (M.G.D.M.), Russia (O. Churganov), Slovakia (A. Madarasova Geckova), Slovenia (H. Jericek), Spain (C. Moreno), Sweden (L. Augustine), Switzerland (E. Kuntsche), Turkey (O. Ercan), Ukraine (O. Balakireva), United Kingdom (F. Brooks; C. Roberts), and United States (R. Iannotti). The GSHS was coordinated and supported by the WHO and CDC in collaboration with UNICEF, UNESCO, and UNAIDS. The authors thank all the school principals and students involved these surveys for the use of their data.

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Table 1

Summary statistics on 88 countries.

Variable	n(%)	range	mean	standard	95% CI
				deviation	
Frequent fighting, males (%)		1.82-34.78	9.92	6.63	9.09-10.74
Frequent fighting, females (%)		0.86-26.82	2.81	4.72	2.48-3.13
Income per capita (\$, thousands)		0.36-105.81	17.16	22.14	12.47-21.86
Homicides (per 1 million)		0.00-8.55	0.80	1.39	0.51-1.10
Corporal punishment ban					72.3-89.1
in schools and in the home	30 (34.09)				24.81-44.78
in schools, not in the home	38 (43.18)				33.08-53.89
neither schools nor home	20 (22.73)				15.03-32.84
Weapons ban at school	71 (80.68)				70.88-87.75
Home visits for child maltreatment	73 (82.95)				73.41-89.56
Parent education program	81 (92.05)				92.05-96.22
Capital punishment ban	41 (46.59)				36.27-57.21

Note: Frequent fighting is weighted by the inverse variance of the prevalence.

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Table 2

Rate ratio of frequent physical fighting in 13-year-old males.

Variable	Model 1	Р	Model 2	Р	Model 3	Р	Model 4	Р
		value		value		value		value
Constant	14.81 (8.54-25.69))	14.48 (8.52-24.62)		14.35 (8.38-24.59))	16.05 (8.81-29.26)	
Survey	0.85 (0.66-1.08)	0.19	0.76 (0.51-1.13)	0.18	0.77 (0.50-1.19)	0.24	0.71 (0.48-1.06)	0.09
Corporal punishment ban								
No ban (reference category)	1.00		1.00		1.00		1.00	
Partial ban (in schools)	0.84 (0.59-1.20)	0.33	0.85 (0.59-1.22)	0.37	0.86 (0.58-1.28)	0.47	0.93(0.60-1.44)	0.73
Full ban (schools and home)	0.69 (0.49-0.99)	0.04	0.68 (0.46-0.99)	0.04	0.69 (0.46-1.05)	0.08	0.74 (0.46-1.17)	0.19
Income per capita (\$, thousands)			1.00 (0.99-1.00)	0.36	1.00 (0.99-1.00)	0.33	1.00 (0.99-1.00)	0.44
Homicides (per 1 million)					0.98 (0.90-1.06)	0.58	0.98 (0.90-1.06)	0.57
Weapons ban at school							0.91 (0.73-1.15)	0.45
Home visits for child							0.94 (0.62-1.42)	0.75
maltreatment								
Parent education programs							1.13 (0.64-2.00)	0.66
naltreatment							1.13 (0.64-2.00)	

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Capital punishment ban						0.82 (0.59-1.15)	0.25
Goodness of fit:							
AIC	460.50	460.97		462.74		468.11	
BIC	470.41	473.36		477.60		492.88	
Deviance (-2 log likelihood)	-226.25	-225.49		-225.37		-224.05	
Likelihood-ratio test (vs. Model		χ^2 (df=1) = 1.52	0.22	$\chi^2(df=2)=1.76$	0.41	χ^2 (df=6) =4.39	0.63
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Table 3

Rate ratio of frequent physical fighting in 13-year-old females.

Variable	Model 1	Р	Model 2	Р	Model 3	Р	Model 4	Р
		value		value		value		value
Constant	5.35 (3.18-8.99)		5.94 (3.32-10.62)		6.12 (3.43-10.91)		6.10 (2.41-15.42)	
Survey	0.87 (0.57-1.33)	0.03	0.80 (0.51-1.28)	0.36	0.73 (0.44-1.21)	0.22	0.71 (0.43-1.20)	0.20
Corporal punishment ban								
No ban (reference category)	1.00		1.00		1.00		1.00	
Partial ban (in schools)	0.56 (0.33-0.95)	0.03	0.57 (0.33-0.96)	0.03	0.52 (0.30-0.90)	0.02	0.51(0.28-0.92)	0.03
Full ban (schools and home)	0.42 (0.25-0.70)	< 0.01	0.41 (0.24-0.69)	<0.01	0.37 (0.21-0.65)	< 0.01	0.35 (0.19-0.67)	< 0.01
Income per capita (\$, thousands)			1.00 (0.99-1.00)	0.38	1.00 (0.99-1.00)	0.57	1.00 (0.99-1.00)	0.35
Homicides (per 1 million)					1.14 (1.01-1.28)	0.03	1.13 (1.01-1.26)	0.03
Weapons ban at school							1.05 (0.79-1.40)	0.73
Home visits for child							0.83 (0.52-1.32)	0.43
maltreatment								
Parent education programs							1.18 (0.57-2.46)	0.65
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Capital punishment ban				1.07 (0.74-1.55)
Goodness of fit:				
AIC	300.81	302.49	302.42	309.60
BIC	310.72	314.87	317.28	334.37
Deviance (-2 log likelihood)	-146.41	-146.24	-145.21	-144.80
Likelihood-ratio test (vs. Model		χ^2 (df=1) = 0.33 0.	57 $\chi^2(df=2) = 2.40 0$.30 $\chi^2(df=6) = 3.22$
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Figure Captions

Figure 1. Prevalence of frequent physical fighting in male and female adolescents in 88 countries and territories (sorted by prevalence in males). Details about country probation laws are available at *http://www.endcorporalpunishment.org*.

Figure 2. Predicted prevalence of frequent physical fighting at age 13 in countries with no prohibition (n=20), partial prohibition (in schools but not in the home; n=38), and full prohibition (banned in all settings; n=30). Shown are means and 95% confidence intervals adjusted for survey differences and school clustering.



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Prevalence of	f frequent phy	vsical fig	hting amo	ong 13-y	ear-olds in 88	countries and	regions.		ncludi	1616 o		
Country	Freq	Frequent fighting, females		Frequent	Sample size (students)	Income per capita (\$ thousands)	Prohibition level ^a	Weapons ban at school	for childes maltreatmate	n Capital 7 16 October Enseigner 2011	Homicides per 100,000	
	fight			ing,								
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Albania	3.38	0.00	14.24	0.01	5,024	4.45	Full	Yes	Yes and	No No	2.86	
Algeria	5.61	0.01	17.90	0.02	4,532	5.49	Partial	Yes	Yes ata	ed Yes ^a	1.72	
Armenia	2.28	0.00	27.40	0.01	3,679	4.02	Partial	Yes	Yes ning	Yes ^b	1.80	
Austria	3.10	0.00	12.06	0.01	3,458	49.57	Full	Yes	بي Yes ≱	No	0.40	
Belgium	3.01	0.00	10.50	0.00	10,285	46.99	Partial	Yes	Yes h	open No	0.65	
Belize	5.39	0.01	11.21	0.02	2,112	4.43	Partial	Yes	g, Yes and	Yes	39.00	
Benin	8.09	0.02	9.70	0.02	2,690	0.89	Full	Yes	Yes similar	Yes ^a	6.30	
Bolivia	5.12	0.01	11.32	0.02	3,696	2.87	Full	No	Yes tech	Yes ^b	33.00	
Botswana	8.22	0.02	12.02	0.03	2,197	7.03	Partial	Yes	No log	Jo Yes	10.90	
Brunei	3.33	0.01	7.90	0.01	2,599	37.32	Partial	Yes	No Sies.	oppose Yes ^a	0.50	
Bulgaria	3.47	0.00	10.28	0.01	4,796	7.61	Full	Yes	Yes	Agen No	1.30	
Cambodia	2.03	0.01	1.82	0.01	3,806	1.02	Partial	Yes	No	Ye Bib No	1.90	
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1 2	Canada	3.66	0.00	10.45	0.01	12,931	51.77	Partial	Yes	Yes t	2018-02 No	1.36
2 3 4	China	0.95	0.00	6.77	0.01	9,015	7.40	Partial	Yes	Yes u	Yes	0.92
5 6	Colombia	3.64	0.01	7.48	0.01	9,907	7.97	Partial	Yes	No fo	on 16 No	34.00
7 8	Cook Islands	6.98	0.01	12.34	0.02	1,274	9.99	Partial	No	Yes gr	No	5.60
9 10	Costa Rica	0.86	0.00	4.50	0.01	2,679	10.12	Full	Yes	No ate	er 201 No	8.80
11 12	Croatia	4.04	0.01	13.49	0.01	5,741	13.00	Full	Yes	Yes to the t	po No	1.17
13 14	Czech Republic	4.00	0.01	14.96	0.01	5,082	18.69	Partial	Yes	Yes an	No No	1.75
15 16	Dominica	3.80	0.01	10.44	0.02	1,642	6.96	None	Yes	d data	ted Yes	8.57
17 18	Ecuador	3.25	0.01	10.74	0.01	5,524	6.09	Partial	No	No nir	No	13.79
19 20 21	Egypt	5.40	0.01	21.00	0.03	2,568	3.21	None	Yes	ig. Yes ≱	Yes	4.36
22 23	El Salvador	3.47	0.01	6.65	0.01	1,915	3.89	Partial	Yes	Yes in	Yes ^b	70.30
24 25	Estonia	1.51	0.00	6.77	0.01	4,057	18.98	Full	No	ig, Yes and	Yes ^b	4.85
26 27	Fiji	8.49	0.02	18.60	0.03	1,673	4.87	Partial	Yes	Yes mi	No No	3.00
28 29	Finland	1.81	0.00	5.64	0.01	5,925	48.83	Full	Yes	Yes tec	n June No	2.11
30 31	Germany	2.35	0.00	9.75	0.01	5,961	47.50	Full	Yes	Yes of	10. No	0.80
32 33	Ghana	17.27	0.02	15.26	0.01	6,236	1.59	None	Yes	Yes yes	Yes^a	1.71
34 35	Guyana	4.29	0.01	14.00	0.02	2,392	4.03	None	No	Yes	Yes	17.00
36 37	Honduras	3.59	0.01	5.71	0.01	1,779	2.27	Full	No	Yes	ce Bu No	85.50
38 39 40 41 42 43 44 45 46					For p	eer review o	nly - http://bmjo	pen.bmj.com/s	ite/about/guic	lelines.xhtml	vliographique de l	

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Page 3	35 of 41						I	BMJ Open		d by cop		
1 2	Iceland	1.86	0.00	6.85	0.01	10,602	47.72	Full	Yes	Yes Yes	No	0.03
3	Indonesia	4.32	0.01	10.36	0.02	3,116	3.63	None	Yes	Yes ud	Yes	0.60
5 6	Iraq	5.35	0.01	14.86	0.02	2,038	6.41	None	Yes	Yes fo	Yes	8.79
7 8	Israel	2.21	0.00	9.48	0.01	6,193	35.34	Full	Yes	Yes Seg	Yes ^b	1.90
9 10	Italy	2.02	0.00	7.03	0.01	4,072	34.54	Partial	Yes	Yes late	e No	0.89
11 12	Jamaica	11.37	0.03	17.65	0.04	1,623	5.20	Partial	Yes	Yes to t	∞ D Yes	42.00
13 14	Jordan	7.85	0.02	21.45	0.03	2,197	4.59	Partial	No	No an	Yes	2.10
15 16	Kenya	15.08	0.02	20.67	0.03	3,691	1.30	Full	Yes	Yes data	Yes ^a	5.91
17 18	Kiribati	8.49	0.02	18.60	0.03	1,673	3.11	Partial	Yes	Yes minir	No	7.15
19 20 21	Kuwait	5.35	0.01	21.05	0.03	2,672	49.30	Partial	Yes	. פָּד אס No אס	Yes	4.00
21 22 23	Latvia	2.77	0.00	12.40	0.01	5,557	15.35	Full	Yes	Yes in	No	9.64
24 25	Lithuania	1.99	0.00	9.18	0.01	5,730	15.93	Full	No	içi Yes an	No	5.20
26 27	Macedonia	1.66	0.00	7.88	0.01	4,218	5.19	Full	Yes	Yes mi	No	1.40
28 29	Malawi	3.57	0.01	3.30	0.01	2,359	0.36	Partial	Yes	Yes tec	Yes ^a	3.35
30 31	Malaysia	4.58	0.00	10.01	0.01	25,507	11.12	None	Yes	Yes log	Yes	1.93
32 33	Maldives	6.12	0.02	16.75	0.03	3,227	6.47	None	Yes	Yes .	Yes ^a	1.40
34 35	Mauritania	14.78	0.03	28.48	0.04	2,063	1.37	None	No	Yes	Yes ^a	11.40
36 37 38	Moldova	2.70	0.01	11.64	0.02	4,648	2.56	Full	Yes	Yes	B No	8.50
39 40 41 42 43 44 45 46					For	peer review or	ıly - http://bmjo	open.bmj.com/s	ite/about/guio	delines.xhtml		

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1 2	Mongolia	4.03	0.01	16.18	0.02	5,393	4.26	Full	Yes	Yes t,	2018-02 Yes ^a	8.56
2 3 4	Morocco	3.21	0.01	13.96	0.03	2,924	3.08	None	Yes	Yes u	1616 Yes ^a	1.30
5	Myanmar	1.03	0.01	2.82	0.01	2,806	1.28	None	Yes	Yes fo	on 16 Yes ^a	2.06
7 8	Netherlands	1.32	0.00	6.60	0.01	4,301	51.25	Full	No	Yes Seg	No	0.90
9 10	New Zealand	3.21	0.00	6.28	0.01	8,500	41.37	Full	Yes	Yes the seigne	er 201 No	0.98
11 12	Norway	1.95	0.00	9.71	0.01	3,422	105.81	Full	Yes	No to t	® Do No	0.30
13 14	Oman	13.10	0.01	15.11	0.02	2,979	18.34	Partial	Yes	Yes Auper	Yes	0.90
15 16	Peru	2.87	0.01	11.36	0.02	2,882	6.37	Full	No	ieur (A Yes	ded Yes ^b	6.50
17 18	Philippines	3.42	0.01	6.94	0.01	5,290	3.50	Partial	Yes	Yes ninii	No	12.60
19 20 21	Poland	3.70	0.01	14.06	0.02	4,545	13.69	Full	Yes	ng Yes ≱	No	0.80
21 22 23	Portugal	1.36	0.00	5.45	0.01	4,989	21.29	Full	Yes	Yes hir	No	1.40
23 24 25	Qatar	11.71	0.02	25.11	0.03	2,021	92.32	None	Yes	Yes an	Yes	0.30
26 27	Romania	2.93	0.01	11.78	0.02	3,980	9.59	Full	Yes	Yes m i	No No	2.09
28 29	Russia	4.31	0.01	12.26	0.01	4,716	14.33	Partial	Yes	No tec	n Yes ^a	12.32
30 31	Samoa	26.82	0.03	34.78	0.04	2,418	4.05	Partial	Yes	No lo	• 10. Yes	3.15
32 33	Slovakia	4.61	0.00	15.26	0.01	6,099	17.95	Partial	Yes	Yes Service Yes	No	1.72
34 35	Slovenia	3.26	0.00	10.26	0.01	4,997	23.56	Full	No	No	Age No	0.93
36 37	Solomon Islands	7.38	0.03	10.99	0.04	1,421	1.83	None	No	Yes	Ce Bil No	3.70
38 39 40 41 42 43 44 45 46					For p	eer review c	only - http://bmjc	ppen.bmj.com/s	ite/about/gui	delines.xhtml	bliographique de l	

Page 3	37 of 41						E	3MJ Open		njopen-2 I by cop			
1 2	South Africa	2.14	0.00	4.57	0.01	10,997	6.79	Partial	Yes	Yright, Yes	No	31.10	
2 3 4	Spain	2.97	0.00	6.12	0.01	11,136	29.38	Full	Yes	Yes ud	No	0.70	
5 6	Swaziland	2.71	0.01	6.60	0.01	7,341	3.55	None	No	Yes fo	Yes ^a	9.30	
7 8	Sweden	1.80	0.00	6.53	0.01	7,700	60.59	Full	Yes	Yes Eng	No	0.85	
9 10	Switzerland	1.76	0.00	6.86	0.01	6,634	86.00	Partial	Yes	Yes Yes	No	0.50	
11 12	Tajikistan	0.93	0.00	4.11	0.01	9,714	1.35	Partial	Yes	Yes to the	Yes ^a	1.50	
13 14	Tanzania	4.99	0.01	10.74	0.02	2,176	0.92	None	Yes	Yes Yes	Yes	8.70	
15 16	Thailand	4.99	0.01	11.57	0.01	2,767	5.78	Partial	Yes	d data	Yes	4.50	
17 18 10	Trinidad &	4.50	0.01	10.00	0.02	2,811	18.38	Partial	No	Yes ning	Yes	28.60	
20 21	Tobago									Al t	i		
22 23	Tunisia	4.89	0.01	30.02	0.02	2,870	4.16	Full	Yes	Yes in per	Yes ^a	3.10	
24 25	Turkey	9.76	0.01	24.59	0.02	5,639	10.63	Partial	Yes	Yes and	No	2.28	
26 27	Tuvalu	19.02	0.01	26.90	0.02	943	5.72	None	Yes	No limit	No	17.80	
28 29	Uganda	11.60	0.02	14.05	0.02	3,215	0.67	Partial	Yes	Yes tech	Yes	11.80	
30 31	United Arab	6.80	0.01	19.37	0.01	15,790	44.64	Partial	Yes	Yes Ves	Yes	2.60	
32 33	Emirates									jies.			
34 35 26	United	3.07	0.01	8.35	0.01	16,421	43.35	Partial	Yes	Yes Age	No	1.03	
37 38 39 40 41 42 43 44	Kingdom				For	peer review or	nly - http://bmjc	open.bmj.com/si	ite/about/guid	ce Bibliographique de elines.xhtml e			
45													

						I	BMJ Open		njopen- I by cop		
United States	3.88	0.00	8.21	0.01	6,274	54.40	Partial	Yes	Yright, Yes	Yes	5.30
Vanuatu	11.73	0.02	14.44	0.02	1,119	3.16	Partial	No	No lud	No	8.87
Viet Nam	2.15	0.01	6.27	0.01	3,331	1.90	Partial	Yes	Yes fo	Yes	1.56
West Bank &	5.28	0.01	19.96	0.02	4,585	3.09	None	No	Yes See	Yes	3.00
Gaza ^c									er zun eigne relate		
Yemen	9.09	0.03	21.95	0.03	1,175	1.30	Partial	Yes	No to t	Yes	7.45
Zambia	21.61	0.03	17.40	0.03	2,257	1.74	Partial	Yes	Yes Yes	Yes ^a	6.22
Zimbabwe	5.32	0.01	7.55	0.02	5,665	0.84	None	Yes	Yes Yes	Yes	7.50
^b Capital punish	ment bans	represer	nt total bar	ns excludii	ng those cour	ntries with exc	eptions during	wartime or ar	e abolitionist in	oractice.	
^b Capital punish ^c The HBSC sur	ment bans vey in Isra	represer	nt total ban ded Palest	ns excludii	ng those cour tories (West	ntries with exc Bank and Gaz	eptions during a) that were sur	wartime or ar	re abolitionium on June IV, ZVZ3 at Agence Bibliog HS.	practice.	
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STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1	Revised title
		(b) Provide in the abstract an informative and balanced summary of what was done and what was	2	
		found		
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7	
Objectives	3	State specific objectives, including any prespecified hypotheses	7	
Methods		O_{α}		
Study design	4	Present key elements of study design early in the paper	6-7	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure,	6-9	
		follow-up, and data collection		
Participants	6	(a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of		
		participants. Describe methods of follow-up		
		Case-control study-Give the eligibility criteria, and the sources and methods of case		
		ascertainment and control selection. Give the rationale for the choice of cases and controls		
		Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of	7-9	
		participants		
		(b) Cohort study—For matched studies, give matching criteria and number of exposed and		
		unexposed		
		Case-control study—For matched studies, give matching criteria and the number of controls per		
		case		
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers.	9-11	
		Give diagnostic criteria, if applicable		
Data sources/	8*	For each variable of interest, give sources of data and details of methods of assessment	7-11	
measurement		(measurement). Describe comparability of assessment methods if there is more than one group		
Bias	9	Describe any efforts to address potential sources of bias	9	
a. 1	10	Explain how the study size was arrived at	8-9	
Study size				

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Quantitative	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which	10-11	
variables	10	(a) Describe all statistical methods, including these used to control for confounding	10.11	
mathada	12	(<i>a</i>) Describe an statistical methods, including those used to control for comounding	10-11	
methous		(c) Explain how missing data were addressed	10	There were no missing data at the country-level.
		(<i>d</i>) Cohort study—If applicable, explain how loss to follow-up was addressed Case-control study—If applicable, explain how matching of cases and controls was addressed Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	9	The analyses used sampling weights and standard errors were adjusted for school-level clusterin
		(<u>e</u>) Describe any sensitivity analyses	NA	
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	10	
		(b) Give reasons for non-participation at each stage	NA	
		(c) Consider use of a flow diagram	NA	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7-9	
		(b) Indicate number of participants with missing data for each variable of interest	NA	
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)		
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time		
		<i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure		
		<i>Cross-sectional study</i> —Report numbers of outcome events or summary measures	12, Table 1	
Main results	16	(<i>a</i>) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	12-13	
		(b) Report category boundaries when continuous variables were categorized	NA	
		(<i>c</i>) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA	
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Discussion			
Key results	18	Summarise key results with reference to study objectives	14
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss	15
		both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of	14
		analyses, results from similar studies, and other relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	15
Other informati	on		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the	4
		original study on which the present article is based	
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