Estimating the Economic Burden of Violence against Children in East Asia and the Pacific*

The estimated annual economic loss due to child maltreatment is US $206 billion, accounting for approximately 2% of the region’s GDP.

**Why should policy makers worry about violence against children?**

- Violence against children causes mental health and behavioral disorders, undermines physical and sexual health, increased risk taking behavior in adolescents and has long-term impacts on adult aggression, violence and criminality.

- In extreme situations, violence against children results in excess and chronic use of healthcare services and premature mortality. These health conditions lead to high societal costs for the region – public and private, direct and indirect.

- All Governments in the region have binding commitments to put in place measures to protect the child "...from all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse." (Convention on the Rights of the Child, Article 19)

- Despite these realities, however, most governments within the East Asia and Pacific region do not significantly invest in measures to prevent violence thus leaving one of the most vulnerable populations and a critical human resource for sustained productivity – children.

**What does violence against children in East Asia and the Pacific really cost?**

Until now, the costs of violence against children had only been calculated for a handful of countries, but were not yet available for most regions of the world, including East Asia and the Pacific. Thus economic and public health researchers commissioned by UNICEF have combined existing research on the prevalence of violence against children and its impacts in this region to develop estimates of the economic costs of child maltreatment. The study findings conclude that the estimated economic loss of child maltreatment in 2004 totaled US $160 billion, accounting for approximately 2% of the East Asia and Pacific region’s GDP. **Updated to 2012 dollars, the estimated economic loss would total US $206 billion.**

**What are the implications of these findings?**

This study adds important new results to gauge the burden of child maltreatment in this region relative to other parts of the world and in comparison to other public health concerns. Further, this approach for estimating regional economic burden can be utilized by other countries or regions as a tested model for replication.
Study overview

This study included data obtained from an existing UNICEF-commissioned systematic review (UNICEF, 2012) of the prevalence and incidence of violence against children. Because lifetime prevalence data were required for this study, there were not enough data in the systematic review to include all types of violence against children (for example, exploitation and peer-to-peer violence were excluded from these analyses) and not all papers in the systematic review were applicable. The following five types of violence and the corresponding number of articles available for each were included in this analysis: 1) physical abuse (n=40 studies), 2) sexual abuse (n=40), 3) emotional abuse (n=14), 4) neglect (n=12), and 5) witnessing family violence (n=16).

From each study in the review that was included in these analyses, enough data were available to collect information on the consequences of child maltreatment across three categories: 1) effects on mental health and behavior, 2) effects on physical and sexual health, and 3) effects on aggression, violence and criminality. There were not enough data to include effects on education and employment, nor on healthcare utilization. From each study we collected data on 1) the relative risk of the health consequence (e.g., depression) given exposure to a type of violence (e.g., physical abuse); and 2) an appropriate measure of the prevalence of violence from the affected study population.

Prevalence of violence and the contribution of violence to health consequences

Quantifying the contribution of risk factors to the Burden of Disease

Population Attributable Fraction (PAF) is the proportional reduction in population disease or mortality that would occur if exposure to a risk factor were reduced to an alternative ideal exposure scenario (World Health Organization).

To estimate the lifetime prevalence of violence against children at a population or region level, a standard epidiomorphicic formula was used to calculate population-attributable fractions. A population attributable fraction (or PAF) is a statistic used to estimate the proportion of cases that can be attributed to one or more specified risk factors. In this study, the risk factors are the types of violence exposure (e.g., physical abuse) and the cases are the resulting health consequences (e.g., depression). PAFs require information on 1) prevalence of child maltreatment and 2) the relative risks describing the relationships between each type of violence exposure and the subsequent health consequence. PAFs are scaled from 0.0-1.0, representing an estimated share from 0% to 100% responsible for the outcome.

In this example, a PAF of 0.25 would suggest that 25% of depression is attributable to exposure to childhood physical abuse.

When enough data were available, separate PAF estimates were calculated for males and females, by violence type and sub-region. Sub-regions were categorized using different schemas: 1) World Health Organization (WHO) sub-regions, including four regions specific to East Asia and the Pacific, and 2) the World Bank sub-regions classified as high income, upper middle income, lower middle income, and low income countries. In one approach, the median value of a set of prevalence estimates from within a country was used as the estimate for the entire country (unweighted). In another approach, the prevalence estimates were weighted using the sample size from each estimate as the basis for the weight (weighted). To combine prevalence estimates between countries within each sub-region, each country estimate was weighted by the population of that country. This meant that prevalence estimates from countries with large populations were given more weight in the final estimates. A combined estimate was obtained for each sub-region by calculating a weighted mean for males and females. For each sub-region, a PAF was calculated for each type of maltreatment and for each outcome selected.

Because prevalence data obtained from studies included in the systematic review varied in their strength of design, we considered adjustments for a number of possible variables that may have influenced the prevalence estimate in our PAF calculations, including: 1) type of survey sample (population-based or not; probability sampling or not; household versus school-based); 2) sample site (urban, rural, urban & rural); 3) type of survey respondent (parent, adult recall, young adult recall, child); 4) sample size; 5) response rate; 6) self-administered or not; 7) number of questions to assess violence; 8) definition of childhood; and, 9) sub-region.

However, the results presented here represent PAFs generated from median prevalence values (not weighted by sample size) and uncorrected for strength of the study design discussed above. The full report provides sensitivity analyses of the estimated costs that were estimated using the PAFs generated from inclusion of sample weighting and study design features.

Consequences of violence on DALY losses and economic burden

Quantifying the Burden of Disease from mortality and morbidity

Disability-Adjusted Life Year (DALY) can be thought of as one lost year of “healthy” life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability (World Health Organization).

From the link between the prevalence of violence and the impact on health consequences estimated from the PAF
calculations, one can then translate this into dollar terms in order to assess the economic benefits that are possible in the absence of violence. Following the work of WHO (2001) and Brown (2008), two steps were used to estimate the economic costs of violence against children: 1) Estimate the disability-adjusted life years (DALYs) lost due to deaths, diseases and health risk behaviors attributable to violence against children for each type of violence and for each gender and sub-region groups; and 2) Convert the DALY losses into a monetary value for each of the sub-groups, assuming one DALY is equal to the sub-region’s per-capita Gross Domestic Product (GDP).

After computing the PAFs that represent the contribution of child maltreatment to health consequences, the estimated burden of child maltreatment is found by multiplying these by an appropriate measure of DALYs estimated for the same consequences. DALYs formally capture this by adding together morbidity and mortality. Morbidity is defined in terms of years lived with “disability” (YLD)—reduced health—and mortality in terms of years of life lost (YLL) relative to the expected lifespan. One DALY represents the loss of one year of equivalent full health. DALYs are widely used in international health comparisons and therefore represent a common metric for computing burden.

DALY data were obtained from the WHO Global Burden of Disease (GBD) estimates for 2004 (WHO, 2009). We only used DALY data of those aged 15+ for the estimation of disease-induced DALY losses to avoid the possibility of diseases preceding the occurrence of child maltreatment. PAFs for each type of violence and each category of health consequence were multiplied by the most closely corresponding category from the GBD reports (see full report for explicit details on the mapping of PAFs to DALYs).

An additional data source required to estimate DALYs lost due to violence against children beyond the PAFs already estimated, is an estimate of DALYs lost from fatal cases of maltreatment. Data on the number of children who died from maltreatment are not readily available for most countries in the East Asia and Pacific region. However, the suicide and violence-related deaths among children aged 0-14 were available by gender from the GBD report (WHO, 2009). Previous studies have identified family history of child maltreatment as a risk factor for suicide. However, many other individual, relational, community, and societal factors (such as family history of suicide, mental illness and cultural factors) also contribute to the risk of suicide. Violence-related deaths among children are a more direct expression of child maltreatment. To be conservative, the present study approximated fatal cases of child maltreatment by only including violence-related deaths among children aged 0-14. Using WHO guidelines for age weighting and time preferences, this study applied 33 DALYs to each fatal case of child maltreatment.

The second step was to convert the DALY loss into a monetary value, assuming one DALY is equal to the sub-region’s per-capita GDP obtained from the World Bank and the United Nations. GDP by sub-region was derived as the sum of the country GDP in that specific sub-region. GDP per capita by sub-region was obtained by calculating a weighted mean of country GDP per capita in that specific sub-region using the country population as weights.

The final step was to calculate the economic value of DALYs lost due to each type of child maltreatment for specific health consequences. DALY losses were merged with GDP and GDP per capita into a single database by sub-region, health consequence and type of maltreatment. The estimated DALY loss in 2004 was multiplied by the 2004 GDP per capita for each sub-region to obtain the economic value of DALYs lost. In addition, the value of DALYs lost as a percentage of total GDP in 2004 was calculated for each type of child maltreatment and each sub-region.
Study results

Prevalence of violence and the contribution of violence to health consequences

Consistent with other research, we found that the prevalence of most forms of violence was higher in males than in females (Figure 1). This was particularly the case for physical abuse in the Southeast Asia Region, Group B, (which includes Indonesia and Thailand) where the median prevalence of physical abuse among men was 45% compared to 16% in women. However, for all regions classified by the WHO, the prevalence of sexual abuse was higher in females than in males.

There were sub-regional differences in the prevalence of violence against children as well. For sexual abuse, physical abuse, and neglect, the WPR_A sub-region (including Brunei, Darussalam, Japan, and Singapore) had a lower rate of child maltreatment than the other WHO sub-regions. Following the World Bank classifications, in general, the highest prevalence of violence against children was found in lower middle income countries while high income countries had the lowest prevalence. There were not enough data from low income countries to provide for meaningful results.

In terms of contributions of violence to health consequences (Figure 2), sexual abuse and emotional abuse had the greatest effect on mental disorders (highest PAFs). For example, it was estimated that 24.2% of mental disorders in men and 25.7% of mental disorders in women were attributable to sexual abuse for those located in the Western Pacific Region, Group B (which includes: Cambodia, China, Cook Islands, Fiji, Kiribati, Lao People’s Democratic Republic, Malaysia, Republic of Marshall Islands, Micronesia, Mongolia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Viet Nam). In the same region, it was estimated that 37% of all mental disorders in adult men and 30.5% of all mental disorders in adult females were attributable to emotional abuse. Physical abuse had the greatest effect on illicit drug use; whereas neglect had the greatest effect on self-harm. Witnessing IPV contributed most to both mental disorders and illicit drug use.

Consequences of violence on DALY losses and economic burden

The full report provides details on the number of child maltreatment deaths, DALYs lost and estimated economic value of DALYs lost due to child maltreatment deaths by sub-region. When using the WHO country classifications, the estimated economic value of DALYs lost to child maltreatment in East Asia and the Pacific in 2004 totaled US $150 billion (in constant 2000 US$). When using the World Bank classifications, the estimated economic loss of child maltreatment totaled US $160 billion in this region, accounting for ~2% of the region’s GDP. Updated to 2012 dollars, the estimated economic loss would total US $206 billion. Across all regions, emotional abuse and sexual abuse accounted for more than 50% of the economic burden, 27.9% and 32.4%, respectively (see chart on cover page).

The estimated economic value of DALYs lost to violence in 2004 as a percentage of GDP ranged from 1.22% to 3.46% across sub-regions. The Western Pacific Region, Group B, suffered the largest economic burden for all types of child maltreatment (except for neglect), although it also represents the largest in population size as well. For neglect, the Southeast Asia Region, Group B, (which includes Indonesia and Thailand) had the greatest economic loss. Overall, the aggregate costs of child maltreatment as

Figure 2: Population proportion of specific health outcomes attributable to violence by type, region, and gender
When using the World Bank classifications, the aggregate costs of child maltreatment in 2004 as a percentage of GDP are smallest in the high income group. Although data were scarce for most types of abuse for the low income group, for physical abuse where costs were available, the low income group had the greatest losses in GDP compared to other income groups. For neglect, the loss as a percentage of GDP for the low income group is comparable to the lower middle income and upper middle income groups.

In alternative analyses (available in the full report) where the aggregate costs of child maltreatment in 2004 as a percentage of GDP were calculated using PAFs generated from sample size weighting of the prevalence estimates and correction for the strength of the study design, the economic impact of violence against children in terms of percentage of GDP was similar.

**Conclusion**

The economic burden of violence against children in East Asia and the Pacific is substantial, and effects – directly or indirectly – everyone in the region. According to the results from this study, the estimated costs of child maltreatment in 2004 as a percentage of GDP ranged from 1.22% to 3.46% across the region. The total economic burden in US dollars was around $160 billion, or as high as $206 billion updated to 2012 dollars.

As with any research study, the analyses are subject to several limitations. First, the data available for this type of research were limited. In the violence against children field, there is a high degree of variation in reported rates of maltreatment, suggesting potential measurement and definitional problems. Surveys also use different types of samples, rendering comparative analysis difficult. Second, PAFs of health consequences were matched to the most appropriate burden measures from the 2004 GBD project. We maintained as close to a one-to-one correspondence as possible between PAFs and adverse outcomes. However, not all available child maltreatment consequences studies had matching GBD outcomes, and for those that did, some were limited by the definitions and levels of aggregation used in the GBD categories. Third, we were limited to the 2004 GBD/DALY estimates from WHO instead of 2008 or 2010 data, as country-specific data was available only for the year 2004.
There is another limitation that may lead to overestimation of the economic burden. The aggregate costs of child maltreatment were calculated by adding the PAFs as well as the economic value of DALY losses across different types of violence. However, many health consequences, such as mental disorders, are caused by a combination of risk factors or types of violence, and individual risk factors may interact in their impact on overall relative risk of disease. As a result, PAFs for individual risk factors, or exposures to violence in this case, often overlap and add up to more than 100 percent.

However, there are many sources of underestimation as well, for example, the exclusion for peer-to-peer violence and exploitation. Many of the serious effects of child maltreatment, like poor educational outcomes leading to current and future productivity losses and higher levels of healthcare utilization, are not included in these burden estimate because no studies exist. These two components are the main sources of data for other national economic burden of child maltreatment estimates available in the United States and in Australia, so the results of this study are not comparable. Other costs that are excluded from this analysis include: legal and justice system costs, welfare costs, and the value of pain and suffering. Another potential source for underestimating total costs of violence against children is the exclusion of violence-related deaths for 15-18 year olds in the estimation of DALYs lost from fatal cases of maltreatment, and suicide deaths among children aged 0-18. Thus, the total incidence of fatal child maltreatment as well as the economic burden of child maltreatment may be underestimated.

Despite these limitations, the costing model applied to the analysis of child maltreatment in East Asia and the Pacific provides a powerful tool for child protection advocates and policy makers. On one hand, this approach can be used for estimating the economic burden of violence against children at national level, contributing to in-country advocacy and improving a country-by-country understanding of economic impact. On the other, it helps situate national investment in child protection systems not only on moral/human rights grounds, but as a critical issue for human capital and economic development.

* This briefing note is based on a technical report produced for UNICEF by Xiangming Fang, Derek Brown, and Phaedra Corso (Fang et al., 2013).

**Updated to 2012 dollars using the gross domestic product (GDP) deflator (http://databank.worldbank.org/data/database.aspx)

References


