What are the costs of violence?

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June 2017

Forthcoming in Politics, Philosophy & Economics

Much of this material is based on joint work with James Fearon. I would also like to thank Giles Dickenson-Jones, Institute for Economics and Peace (IEP) for help with the data. Jonathon Quong, Howard Friedman, Zahra Siddique and participants at the PPE workshop in New Orleans (March 2015) provided useful suggestions. All remaining errors are my own. I acknowledge financial support from the Copenhagen Consensus Center and the Murphy Institute.

Abstract

This paper presents estimates of the global cost of collective and interpersonal violence. This includes war, terrorism, homicides, assaults and domestic violence against women and children. The cost of conventionally defined interpersonal violence, i.e. homicides and assault, are about 7.5 times higher than the cost due to war and terrorism. I also estimate the costs of non-fatal domestic violence against children and women and suggest that these costs are much higher than the combined costs of homicide, assault, terrorism and war. The main reason is that the prevalence of these types of violence is very high: possibly as many as 16 per cent of all children are punished using violent methods and about 12 per cent of all women experience intimate partner violence. Richer societies have lower levels of violence and there is evidence that prevalence rates have been declining over time. However, it is often unclear why this is the case. Much of the evidence from violence reducing interventions comes from high income countries and it is uncertain whether these programs would be similarly effective in low and middle income countries. Currently almost no aid is spent on programs explicitly focused on reducing violent crime and attendant problems. While further research is needed to examine the effectiveness of violence reducing interventions, it appears likely that some interventions would constitute a very effective use of resources.

1 Introduction

Violence causes enormous human suffering and the cost estimates presented in this paper provide some idea of how large and important the problem is. But can and should a social phenomenon, such as violence, be quantified? After all, every person affected by violence can suffer from a number of different consequences, e.g. pain, suffering, costs of medical treatment, loss in education and productivity, trauma and fear. By finding a common metric one can assess the total cost of violence and compare the costs of violence in a number of different ways. Which societies have high costs of violence? Which type of violence is most costly? Who is most affected by violence? Men, women or children? The answers to these questions presented in this paper suggest an important development and gender dimension: Poorer countries are more affected by violence, as are women and children.

This paper provides a systematic comparison of the impact of the different forms of violence. It compares and contrasts the welfare and economic costs arising from armed conflict, terrorism, homicides and domestic violence across the world for the period of one year. The total cost estimate is about $9.4 trillion, equivalent to 11 per cent of World GDP. Relatively little of these costs (less than two per cent) is due to wars. While wars and terrorism receive a lot of attention, they are relatively rare events. People are more at risk from other forms of violence. The data analysis suggests that violence hidden from public view is more much more prevalent than other types of violence. This is in particular the case for domestic violence against women and children, approximately 12 per cent of all women are assaulted by their husbands or boyfriends and almost 16 per cent of all children are subjected to harsh physical punishment.

The analysis is organised in the following way. In Section 2 I discuss some key definitions and concepts, namely define what violence is and how the resulting costs can be monetized. Section 3 presents the estimated prevalence rates for different types of violence and applies some unit costs for each type of violence in order to derive the total costs of violence. Section 4 offers some conclusions.

2 Definitions and Concept

The main purpose of this paper is to present some estimates for the costs of violence. I start by defining violence and categorizing different forms of violence before moving on to a discussion of how the costs of violence can be measured.

2.1 Violence

A minimalist definition of violence includes *any action that uses force, intended to cause harm.* Social science researchers need to apply judgement if they want to collect data on violence. 'Force' can include bombs, gunshots and slaps. It includes using force in the case of self-defence and it can also be self-directed. How severe 'force' has to be in order to be included in this violence definition is unclear and in this minimalist definition it is also left open whether the threat of force constitutes violence. It may also be impossible to determine the intentionality of the action. Often, one has to infer intentions from observed actions. However, even if we can ask the perpetrators, they may be dishonest about their intent. 'Harm' is also a complex phenomenon and can be understood as a moral and a legal concept. 'Harm' can include pain, death, disability, loss of ability or freedom, loss of pleasure (Gert, 2004) or can be defined as a setback to interests which includes fundamental rights such as the integrity and normal functioning of one's body (Feinberg, 1984). However, what constitutes acceptable harm is culturally influenced, where I understand 'culture' as a society's shared beliefs and norms that guide their members' actions. Some societies prohibit any violence against children (e.g. Sweden), some permit it under certain circumstances and others encourage specific types of violence (e.g. Female Genital Mutilation in a number of African countries: Somalia, Eritrea, Mali and others).

Given the difficulties to come up with a workable definition of violence I rely on a definition from the World Health Organisation (WHO). It has the additional advantage that this definition is used by the WHO statisticians to provide estimates of the prevalence of violence. These numbers are publicly available and cover all countries. The WHO (2002) defines violence as follows:

"The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation."

Based on this definition the WHO provides data for the following three broad categories: (1) self-directed (2) collective and (3) interpersonal violence. The emphasis in the recorded data is on fatal violence. For the purpose of this study, I exclude self-directed violence and only focus on the harm that is directed at others. Collective violence includes violence perpetrated by (organised) groups, for example states, rebel organisations, terrorists, street mobs or criminal organisations. The aim of this violence may be the advancement of a particular social cause or economic gain, but violent actions committed by groups can have multiple and overlapping motives. Interpersonal violence is perpetrated by an individual and depending on the perpetrator-victim relationship the distinction is made between (1) family and intimate partner violence and (2) community violence. Acts of community violence are perpetrated outside the home and the victim may or may not be known to the perpetrator. Although violence can take many forms (physical, sexual, psychological, abuse and neglect), the focus in the WHO statistics is on physical harm.

2.2 Measurement Issues

Measuring the cost of violence enables social science researchers to pursue a number of questions. First, it gives some sense of how big the problem is. Second, it makes it possible to compare the costliness of different categories of violence. Third, one can evaluate policy interventions by applying cost benefit analysis (CBA). In order to address these questions, monetary values to death, disability and injury have to be assigned. Some will argue that human lives and the quality of life should not be valued in monetary terms. It is immoral to put a price on someone's life, because an individual's life is 'invaluable'. It is also appears impossible to assign a price to life, since there is no market in which lives can be bought. In this sense, lives are 'priceless'. I would therefore like to stress that the monetization of lives in this study is for calculation purposes only and not to imply that another person can be bought for this price.[1]

The cost of violence can be understood as the sum of the cost to (1) the individual victim (2) to their family (3) their immediate community and (4) to society at large. To take the cost of a violent assault as an example, the individual suffers pain and psychological distress. This causes a decreased quality of life that may be long lasting. The individual also incurs medical care costs and lost earnings. Family and community members may also incur costs by caring for the assault victim, they may also feel psychological distress and their fear of violence may increase. Society at large faces the costs of police protection, legal services and correction

[1] For more discussion and references of monetizing life and health see Hansson (2013).

programs. Local communities and society at large may also incur economic costs because violence reduces legal and productive activities.

Welfare and Economic Costs

Some of the costs of violence are easier to express in monetary terms than others. The medical care, lost income and criminal justice system cost are relatively straightforward to measure and are termed 'tangible' costs. The 'intangible' costs of pain, suffering, decreased quality of life and psychological distress are more difficult to monetize. However, there is a literature on the cost of crime where tangible as well as intangible costs for individual crimes, such as homicide, assault, rape and robbery are estimated (for a recent review see Chalfin, 2015). This cost of crime literature pertains to interpersonal violence and the focus is on 'unit' costs, i.e. what the cost of one murder or assault is. Estimates of intangible costs per crime are much larger than tangible costs, for homicide this tends to be in the region of 9:1. Thus, most of the cost of crime is in terms of welfare loss, because the intangible costs refer to pain, suffering and loss of quality of life. This welfare loss should be distinguished from economic loss. If the person had not experienced an assault, he or she would be better off. The intangible costs of the assault would not have been incurred, i.e. the person's welfare would have remained the same. On the other hand, economic costs are the sum of the tangible costs and decreased legal economic activity. It can therefore be confusing to express the cost of violence as a percentage of gross domestic product (GDP). Since much of the cost of interpersonal violence is in terms of welfare loss, we should only understand it as an indication of the size of the welfare loss. Welfare loss does not reduce GDP, since GDP is the sum of economic activity, not the sum of welfare. However, violence does have an impact on GDP, without the assault, the victim and society would not have incurred the economic costs of medical and justice costs plus foregone earnings and reduced economic activity.

In social science a number of different approaches to the measurement of the cost of violence exist. Typically researchers concentrate their attention on one type of violence and their methods to estimate the costs are not directly comparable. While economists tend to focus on the cost of armed conflict, criminologists focus on the cost of crime. There are also a number of public health experts that consider collective as well as interpersonal violence but use methods that are different to those used in economics and criminology. There is a small economic literature on the cost of armed conflict that considers welfare losses as well as economic losses (Besley et al 2015; Bozzoli et al, 2010; Collier and Hoeffler, 2004; Chauvet

et al, 2008; Dunne 2012; Enders and Sandler, 2011). Typically in these studies, the impact of violence on the reduction in economic activity is assessed by applying regression analysis. This provides the average effect of a particular type of violence, e.g. it establishes that civil wars reduce economic output by about two per cent per year when compared with the average peaceful country. The economic costs resulting from armed conflict tend to be much larger than the welfare losses.

The cost of crime literature focuses on the 'tangible' and 'intangible' cost of each crime and produces a 'unit cost of crime', i.e. the cost of one homicide, assault, rape. The economic costs are typically restricted to the 'tangible' costs (policing, apprehension, correction) and are much smaller than the welfare losses. Only very few studies consider the wider economic cost of crime due to reduced legal economic activity (Londono and Guerrero, 1999; The British Home Office, 2000&2005; Acevedo, 2008).

In public health studies the use of quality adjusted life years (QALYs) is commonly applied. In this concept weights are assigned to years of life, with a value of one equivalent to full health and zero for death. Each disease or injury is associated with a specific loss of QALYs. Since violence results in injuries it is possible to specify a loss of QALYs and this method makes it possible to compare different types of violence in terms of seriousness. However, it is not obvious how one QALY should be priced which is the reason why I decided not to use this method.[2]

Measuring the Welfare Losses

Intangible costs make up a large proportion of the cost of crime estimates and it is important to give some indication of how they are derived. These intangible costs are welfare losses to society and measuring these losses can be thought of as establishing what the maximum payment is to avoid these losses. This hypothetical payment is the value of a life or health. As discussed above there is no market price for life and different methods have been developed to assign a price to life and injury. A commonly used concept is the 'value of a statistical life' (Shelling, 1968). This concept is useful for a number of reasons. If people are asked to value a particular life, the values of lives vary widely and this valuation is influenced by sentiment. For example, in a public appeal to save a person from the consequences of a terrible disease, a pretty little girl would receive more donations than an average looking middle aged man.

[2] For further discussion see Czabański (2008:44-46).

However, it is unclear whether her life is worth more than his. In order to assess the value of a life we should therefore consider a 'statistical' and not a particular life. Another reason to use this concept is that statisticians can calculate the value of a life (or health) by using information on risk assessments and willingness to pay. For example, many people spend, or would spend, $10 to insure against a one in one million risk of death. Statistically this is equivalent to spending $10 million to prevent certain death. However, the latter payment is not observed while there are a number of market observations that provide information of how much individuals pay when faced with small risks.

There are different methods to establish the 'value of a statistical life' (VSL), for a discussion see Viscusi (1986). The value of a life has to be inferred from either market data or from non-market valuations. A number of economic choices provide implicit information on the trade-off between money and risk to life and health. Life insurance data could give an indication of how people value their lives. However, this decision appears to be more often about leaving an optimal bequest than a valuation of life. Labour market economics may provide a better source of data. Regression analysis of the labour market estimates the wage premium individuals demand to carry out hazardous jobs. This provides an industry or occupational specific level of wage premiums that can be used to calculate the VSL and the value of certain types of injuries. Another approach to value lives and injuries is to use non-market data such as compensation payments and product liability data from courts and companies. A further non-market method to establish the value of life is to ask people directly how much they would be willing to pay to reduce risks to life and health. Unlike in the market based approach, people state their willingness to pay rather than reveal it. This is also referred to as contingent valuation. Based on these interview methods the value of life is considerably higher than the labour market based methods, indicating that either individuals overestimate the risk to their lives and/or that they understand this as a hypothetical question and ignore their wealth constraints.

Unit Cost Estimates

Unit cost estimates for a number of violent crimes such as homicides, assaults and rapes are reported in McCollister et al (2010). Their underlying data were derived from labour market regressions (loss of life) and compensation payments (injuries). Their homicide estimates are about the average in this literature (c.f. Chalfin, 2015). In 2008 prices they estimate the costs of a homicide as $8.98 million, where the intangible costs make up almost 94 per cent of the

total cost. These values are for the U.S. and in the absence of detailed calculations for most countries in the world I use these cost estimates to approximate the cost of violence globally. I scale this 'unit cost' of homicide for other countries in the following way: First, I calculate the ratios of the country's GDP to U.S. GDP, then I multiply the U.S. cost of homicide by this ratio. This shortcut allows me to approximate the value of life across the world in proportion to their national income. However, objective risks and attitudes to risk are different across countries and using country specific estimates of the VSL would be preferable, but in the absence of data this is a pragmatic solution.[3]

3 Estimates of Prevalence Rates and Cost of Violence

Following on from the more general discussion of definitions and concepts in the previous section I now turn to the description of how prevalent the different forms of violence are and provide cost estimates for the year 2013. This section provides estimates for collective violence (war and terrorism) and interpersonal violence (homicide, assault and domestic violence against women and children). These cost estimates build on the data collection effort by the Institute for Economics and Peace, IEP (2014).

3.1 Collective Violence

War and terrorism feature prominently in news reporting and there is a considerable academic literature on the causes and consequences of collective violence. Since the end of WWII, war between countries has been rare, most organised armed conflict has taken place within states (Pettersson and Wallensteen, 2015; Gleditsch et al., 2002). The most recent year for which detailed and comparable data on civil war fatalities are available is 2008. Lacina and Gleditsch (2005) estimate that about 49,000 people died in battles, this number includes military as well as civilian victims. Please note that these numbers only include deaths from the use of direct force, deaths due to hunger and disease are not counted in this estimate. The estimates of other deaths resulting from civil war in Lacina and Gleditsch (2005) suggest that battle deaths only make up a small fraction of the total war deaths (in many conflicts battle are only about ten per cent of the total fatalities). In addition to the battle and war deaths, many are injured and maimed in violent conflicts (Ghobara et al 2003). However, the armed conflict literature has

[3] Viscusi and Aldy (2003) provide an international comparison of VSL estimates and show that there are virtually no estimates from low income countries, mainly due to missing labour market data.

an almost exclusive emphasis on battle deaths, there is no global data set that provides high quality estimates of the (1) deaths due to hunger and disease and (2) injuries and disabilities. This emphasis on battle deaths has been criticised by Fazal (2014), suggesting that armed conflicts may now result in fewer war dead but in more war wounded than in the past. Data for the wars in Iraq and Afghanistan (2001-12) show that the ratio of war deaths to war wounded was 1:10 for the American forces, in other words ten per cent of the casualties died. In contrast, about one third of the Russian casualties died during the 1994-96 war in Chechnya (Gabriel, 2013). This ratio crucially depends on body armour, how soldiers can be kept alive on the battlefield and during transport. Although some statistics exist, they are mainly for high income countries and their interventions in civil wars. Almost no information is available on the number of war wounded in low income countries and I therefore restrict my analysis to battle deaths and exclude the wounded.

The cost of the lives lost in civil wars are calculated by multiplying the number of fatalities by the cost of homicide. These estimates are obtained for each country that experienced a violent conflict. The intangible cost of homicide is assumed to be $8.44 million (McCollister et al, 2010) and as described above, this value is inflated to 2013 prices and scaled by the relative GDP ratio to approximate the cost of homicide across different countries. As Table 1 shows, the global cost of the loss of life in civil wars is just below $23bn (column 1). If the ratio of war deaths to wounded is about 1:3 these costs would increase by another $773 million. In comparison to the war dead this is a relatively small sum and in order to arrive at this estimate a number assumptions have to be made. Since there is relatively little information regarding the war wounded, I only mention a possible figure but do not add them to the cost of war. [4] The costs resulting from the loss of life in international wars is determined in a similar manner, but since these conflicts are much rarer, these costs are much lower ($0.7 bn). One of the resulting costs of any war is the displacement of people, IEP (2014) adds all of the UN expenditure on refugees and internally displaced persons to approximate these costs. Worldwide this cost was about $2bn. Another negative externality resulting from war is the reduction of output. IEP (2014) builds on Collier and Hoeffler (2004) and assumes a loss of

[4] The cost of homicide is assumed to be $8.44 million and if the cost of war wounding is the same as the cost of an assault about $0.95 million. The ratio of these costs is 0.011 and the cost of the war wounded is the sum of the loss of life ($22.89bn) times 0.011 times 3. If the ratio of war dead to wounded is 1:5 this estimate would increase to $1.29bn.

two per cent of GDP per year of war. The total cost of this is estimated at about $130bn (column 4).

The costs of terrorism are calculated in a similar manner. The number of deaths and injuries were multiplied by the cost of life and injuries. Estimates for the amount of physical distraction and ransom payments are also added (IEP, 2014). The global cost of terrorism is calculated at about $11bn.

--- Table 1 about here ---

This approximation of the costs of collective violence leaves out a number of costs, for example the widespread destruction of infrastructure in a war and the dynamic consequences of war. Post-war countries are often unstable, experience the recurrence of the armed conflict and their economies take a long time to recover. After a war security tends to be low and there may be increased levels of violence even once the organised political violence has ceased. Homicides, assaults, rapes and domestic violence are likely to be more common.

The estimates in Table 1 do not include such (dynamic) costs and are therefore likely to be an underestimate of the total costs of collective violence.

These cost estimates exhibit considerable regional differences. In order to compare the regions I divide the cost of collective violence by the region's GDP.[5] High income countries experience little collective violence when compared to the poorer regions of the world. Countries in the Middle East and North Africa have the highest cost of collective violence, estimated at about 1.5 per cent of their GDP. However, we should keep in mind that for other years this comparison would yield different results. Currently, there are too few time series data to compare regions across years. Globally, the estimated costs of collective violence add up to $167 bn, or about 0.2 per cent of World GDP.

3.2 Interpersonal Violence

The estimates of interpersonal violence are presented in Table 2. I consider the costs arising from homicides, assaults, incarceration and the fear of violence, as before the data were obtained from IEP (2014). The total cost of interpersonal violence is estimated at about $1,240 bn.

[5] These are unweighted averages, weighting by population provides only slightly different estimates, they are available upon request. Regions are defined as in the World Bank classification.

--- Table 2 about here ---

The largest proportion of these costs of interpersonal violence is due to homicide. According to the United Nations Office on Drugs and Crime (UNDOC) there were about 418,000 homicides in 2008. Data for high income countries appear to be fairly accurate but for lower income countries the data quality is more doubtful. Obviously, homicide is only one form of violent crime but data for other violent crimes are even more difficult to come by. IEP (2014) uses UNDOC data on violent assault, of which there were about 4.11 million violent assaults worldwide. McCollister (2010) estimate the intangible cost of such an assault at $95,023 for the US. Scaling these costs by country GDP, the total costs of assaults are $325 bn. This estimate is most likely an underestimate of the cost of non-fatal violence. Many such violent assaults are not reported and this definition of violent crime only includes physical attack against the body of another person resulting in serious bodily injury, it excludes indecent/sexual assault, threats and slapping/punching.

Homicide and assault rates vary considerably across the world. Homicide rates are generally seen as the most reliable and internationally comparable violent crime statistics. Per 100,000 population Jamaica had a homicide rate of nearly 60, Malawi of 36, the US of over 5 and Germany just under 1. Akin to the war dead and wounded discussion above, there is a concern that homicide rates may not accurately reflect the level of violence in a society. It may be that the homicide rate is higher in low income countries because more victims of violent assaults are dying due to the lower standards of trauma care and limited access to medical facilities. High income countries may simply record fewer homicides because more victims are likely to survive violent assaults. However, I am not aware of a systematic survey of survival rates of violent assault across countries and simply highlight this issue without being able to suggest a solution.

Incarceration costs are also reported in Table 2 as are the cost of fear, an estimate based on interviews conducted in different countries. If people indicate that they are worried about walking home at night, this is priced at about $30, for further details please refer to IEP (2014).

Again, there are considerable differences across the world. High income countries have high absolute costs of interpersonal violence, this is mainly due to the high dollar values attached to lives, injuries and incarceration. Latin America and the Caribbean also have high absolute costs, this is due to the comparably high homicide rate in the region. Expressed in terms of

GDP the region has the highest relative cost of interpersonal violence, followed by Sub-Saharan Africa.

Many plausible costs of interpersonal violence are not included in these estimates, in particular the negative dynamic effects on legal economic activity, pain and suffering of family members and friends and an undervaluation of welfare losses due behaviour modification to avoid violence. Thus, the estimates in Table 2 are arguably quite conservative.

These IEP estimates of interpersonal violence do not include non-fatal domestic violence against women and children. I now turn to the estimates for these types of violence.

3.3 Violence against Women

So far I have not considered the sex of the perpetrator or the victim. Among the victims of the fatal and non-fatal violence discussed so far are men, women and children. As will be discussed in more detail below, it is likely that the above cost estimates of non-fatal violence are underestimates because they do not consider assaults from intimate partners. Here I consider only violence perpetrated by male partners against their former or current female partners. So far there is very little data available on violence perpetrated by women against their male partners and data on violence in homosexual relationships.

The WHO provides data on deaths due to interpersonal violence disaggregated by age and sex. The overwhelming majority of victims are men (77 per cent), followed by women (16 per cent) and children of both sexes aged 14 years and younger (7 per cent). This suggests that homicide is predominantly a male issue. However, there is another strong gender dimension: about 43 per cent of all female victims were killed by a current or former intimate partner (Stöckl et al, 2013). Data from 59 countries exhibit a large variation, the highest prevalence of intimate partner homicides is in high income countries (56 per cent). It may be that women are more at risk from their intimate partners in high income countries, but it is perhaps more likely that there is considerable underreporting of intimate partner homicides in many low and middle income countries. For example, in South Asia many fatal accidents while cooking (“the sari caught fire”) may actually be murder.

The UN defines violence against women as "any act of gender-based violence that results in, or is likely to result in, physical, sexual or mental harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life." (1994 UN ‘Declaration on the Elimination of Violence against Women’). Based

on these femicide statistics and interview evidence it appears that the most common form of violence experienced by women globally is intimate partner violence (UN, 2006, WHO 2013). About 30 per cent of all women experience some form of intimate partner violence (IPV) during their lifetime (Devries et al, 2013).

The consequences of such violence are diverse: some victims die, many suffer physical and mental pain and it instills fear. Some of the specific consequences of IPV are well documented. Women who suffered IPV report significantly poorer health when compared to non-abused women. The have difficulty walking, struggle with daily activities, suffer from pain, memory loss, dizziness and vaginal discharge. They also report significantly higher levels of emotional distress, suicidal thoughts and suicidal attempts (Ellsberg *et al* 2008). Based on country studies the WHO (2013) also concludes that women who suffer IPV are 16 per cent more likely to have a low birth weight baby and in some regions they are 1.5 times more likely to acquire HIV and 1.6 times more likely to have syphilis when compared to women who do not suffer partner violence. In addition there are long term consequences for the next generation that witnessed the violence. Daughters are more likely to be abused by their partners and their sons are more likely to become abusers themselves (Hindin *et al*, 2008; WDR 2012: 152). In addition to this personal pain and suffering there are socio-economic externalities for the wider society. Violence stops women from fulfilling their potential, consequently it restricts economic growth and undermines development. Violence against women can be understood as discrimination, a violation of human rights, a development problem and a public health issue. The UN and the WHO have published a number of reports on violence against women (e.g. WHO 2013 and UN, 2006).

Across the world there are many harmful traditional practices that constitute violence against women. Examples include: Female infanticide and prenatal sex selection, early marriage, dowry-related violence, female genital mutilation (FGM), crimes against women committed in the name of "honour", and maltreatment of widows, including inciting widows to commit suicide (UN, 2006).

The above cost estimates of homicide already include female victims. Here I just briefly report some estimates of the share of the costs due to femicide. Globally the cost of homicide was estimated to be $706bn and $105bn are due to female victims. $40bn of these costs, or about six per cent of the total costs of homicide are due to IPV.

The cost estimates of violent assault include assaults against women, but cannot be broken down according to the sex of the victim because UNDOC does not provide this information. As discussed above these crimes are likely to be underreported and women are particularly likely to underreport violence perpetrated by their intimate partner. In order to obtain prevalence rates of IP violence it is therefore not sufficient to rely on reported data but use victimisation surveys. Palermo et al (2014) provide some estimates to assess the degree of underreporting. Using Demographic and Health Surveys (DHS) they examine the reporting of gender-based violence in low and middle income countries and suggest that only one in nine women reported the assault. The most common reasons cited for not reporting physical or sexual violence was embarrassment, a belief that there was no use reporting and that violence is a normal part of life that women must bear.

Based on survey evidence from a large number of cross-country studies Devries et al (2013) compile self-reported evidence of violence perpetrated by an intimate partner during the past year. IPV is defined as any kind of physical and sexual violence perpetrated by a partner and also includes emotional abuse, e.g. being humiliated, insulted, intimidated or threatened. Examples of IPV include: being slapped, pushed, shoved, kicked, choked, burnt on purpose, threatened with a weapon, physically forced to have sexual intercourse, having sexual intercourse because of fear what a partner might do and being forced to do something sexual that is perceived as humiliating or degrading (WHO, 2013).

However, Devries *et al* (2013) focus on physical and sexual violence in their analysis and do not consider emotional abuse. Prevalence rates of this violence vary considerably across regions (Figure 1). Only four per cent of women in High Income countries experienced IPV during the past year, compared to about 28 per cent of women in Sub-Saharan Africa.

--- Figure 1 about here ---

In order to estimate the costs of IP assault the appropriate unit costs of such an assault have to be chosen. McCollister *et al* (2010) offer an estimate of the intangible cost of rape and sexual assault of $199,642 and about half of that figure for aggravated assault, $95,023. Since I have no information of how many of the IP assaults are sexual and how many physical, I use the lower figure of assault ($95,023). Based on the prevalence rates, about 269 million women worldwide were subjected to IPV, thus the total cost of IPV are thus estimated at $4.4 trillion, corresponding to 5.2 per cent of global GDP. It should be kept in mind that this estimate is likely to underestimate the violence against women, it does not include physical and sexual

violence against women in the community, the heightened sexual violence during civil war and specific harmful traditional practices such as female genital mutilation.

3.4 Violence against Children

Violence against children takes many different forms (for overviews see Krug et al 2002; Pinheiro 2006; UNICEF, 2010). Maltreatment of children includes neglect, physical, sexual and emotional abuse and happens at home, in school, in care institutions, prisons, at work and in the community. In 1989 the United Nations Convention on the Rights of the Child set out legally binding standards for the civil, political, economic, social, health and cultural rights of children. The convention defines a child as persons under the age of 18. It is the most widely accepted human rights treaty and it has been ratified by all UN member states, except Somalia, South Sudan and the US.

Despite the worldwide recognition that children should benefit from safeguarding measures, there is no universally accepted definition of what constitutes child abuse and neglect. There are large cultural differences in attitudes towards violating children's rights. For example in 1979 Sweden passed a law prohibiting any corporal punishment, including in the home, but in 168 countries the corporal punishment of children remains legal (UNICEF, 2010:64). Physical punishment of children is common throughout the world and what is regarded as excessive is a cultural issue. In some societies, the rights of girls are routinely violated by undergoing FGM. Persistent social acceptance is a major determinant in the perpetuation of violence against children (Pinheiro, 2006: 10).

Little is known about the global prevalence of violence against children. This is due to the difference in definition across societies but also because child abuse and neglect is massively underreported. In many cases the victims never report the abuse or neglect. This may be for a number of reasons, for example because they are too young to report the violence, they have a limited understanding what constitutes abuse and neglect, they feel ashamed, they think nobody will believe them and many abusers are able to use their power to intimidate their victims into keeping silent about the abuse, alternative care situations are difficult or impossible to arrange, thus children feel they have to put up with their violent environment.

Although some violence against children receives considerable media attention (e.g. FGM, forced early marriages, child prostitution, child pornography, child soldiers), most of the violence happens in the home (Pinheiro, 2006). There are few nationwide surveys available for

middle and low income countries. However, evidence from high income countries provide empirical evidence support the hypothesis that the overwhelming majority of the perpetrators are the child's parents. In the U.S. 80.3 per cent of all perpetrators of child abuse (this includes neglect, physical, psychological and sexual abuse) are the child's parents (USDHHS, 2012:63).

The estimate of the cost of homicides presented above includes child victims. According to WHO data about seven per cent of all of the victims are children under 14 years of age. I would have liked to obtain information on under 18 year olds in order to stick to the UN definition of children but the WHO does not present the data in this format. The WHO does not provide information about the perpetrators of the crime but crime statistics from high income countries suggest that the main group of perpetrators are the victim's parents. In the UK 60 per cent of all child homicides are perpetrated by the parents and a further 9 per cent are committed by other family members, friends or acquaintances. Only 12 per cent were committed by strangers and in 19 per cent of the cases there was no information on the suspect.[6] Thus, child homicide appears to be predominantly a domestic crime. Further evidence comes from the WHO by providing information on deaths by causes and age. Very young children are most at risk of homicide and these are predominantly cared for by their parents and immediate family. Figure 2 presents the deaths due to interpersonal violence per 100,000 of the population, the figures are based on using the total population of the relevant age group. Newborns (under one month) are much more likely to be killed than older children and newborn girls are at the highest risk. During the first month of their life 18 girls per 100,000 are killed (darker column). This corresponds to a rate of 14 boys per 100,000. This is mainly due to high homicide rates for newborn girls in the East Asia and Pacific region (46 per 100,000). The causes, consequences and trends of the "missing girls and women" have been analysed in detail for a number of countries, for example China, India and Korea (Bhaskar and Gupta, 2007; Das Gupta et al 2009; Doo-Sub 2004; Ebenstein, 2010; Ebenstein and Sharygin, 2009).

For older children the homicide rates are much lower. For boys aged 1 month to 5 years the rate is about 2 per 100,000 and for girls 1.8. These rates are very similar for children aged five to 14 years.

--- Figure 2 about here ---

[6] UK Office for National Statistics, http://www.ons.gov.uk/ons/ appendix Table 2.07 for the year 2012/13.

Data on child homicide, in particular neo-natal homicide, are difficult to collect. If no signs of physical violence are present, is it difficult to attribute the death to neglect rather than illness. For most countries detailed studies of child homicides are not available and it is therefore difficult to establish whether the WHO figures represent an accurate estimate of the magnitude of the problem. However, for South Africa the figures can be compared to a detailed data collection effort by Mathews *et al* (2013). They conducted a retrospective, national mortuary-based study of child homicide cases and their child homicide rates compare well to the WHO statistics for Sub-Saharan Africa where the homicide rate is about 5 per 100,000 for 5-14yr old boys and 4.6 per 100,000 for 5-14 year old girls.

Using the same costs for child homicides as for the average homicide, we assume that the cost of child homicide is $8.44 million, corresponding to the intangible cost of homicide (McCollister et al, 2010).[7] As before I inflate this 2008 value and scale this unit cost according to country level GDP. Multiplying the unit costs with the number of child homicides, I estimate a total cost of $37.7 billion corresponding to 0.044 per cent of World GDP.

Child Abuse - Violent Disciplinary Practices

There are no internationally comparable statistics on child abuse and I approximate the rate of non-fatal child abuse by using information from internationally representative surveys on child disciplinary practices. Survey evidence from UNICEF (2010, 2014) shows that many parents use violent methods to discipline their children.[8] These data were collected through the representative Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS). The surveys were conducted during the period 2005-12 and cover one high income country and 33 low and middle income countries. While this is an impressive compilation of data, it is important to keep in mind that this only represents about ten percent of children in developing countries and that the one high income country (Trinidad and Tobago) may not be representative for this group of countries.

In these surveys primary care givers were asked about their child disciplinary practices at home, whereby discipline was assessed according to the Parent-Child Conflict Tactics Scale (CTSPC) (see Straus *et al* 1989). Mothers (or the primary caregiver) were asked whether they, or any

[7] Viscusi and Aldy (2007) suggest that the VSL should be highest for children and should decline over a lifetime. If this is correct, the total cost estimates of child homicide are conservative.
[8] Runyan et al (2010) also provide a cross-cultural study of child abuse, but their data only cover six countries and the surveys are not nationally representative.

other member in the household, had used one of the following disciplining methods during past month:

- Non-violent discipline (e.g. gave him/her something else to do, explaining why behaviour was wrong, taking away privileges)
- Psychological aggression (e.g. shouted at him/her, called him/her dumb or lazy)
- Physical punishment (e.g. shook him/her, spanked, hit with bare hand on the bottom or other parts of the body, hit with a belt, stick or other hard object on the bottom/other parts of the body)
- Severe physical punishment (e.g. hit or slapped him/her on the face, head or ears, beat him/her with an implement repeatedly)

The survey evidence suggests that aggressive and violent punishment is common, 73 per cent of all those surveyed used it for child discipline. What is excessive punishment and thus unacceptable discipline of children varies across societies. Here I only define severe physical punishment as violence against children and exclude less severe physical punishment and psychological aggression from the analysis. I limit the definition to severe physical punishment because I want to provide a definition that is more likely to be accepted across societies and cultures. I believe that most people would consider this severe form of violence as child abuse while they might not agree that slapping constitutes child abuse. Psychological aggression is also excluded, because it is difficult to measure the extent of the psychological damage. Psychological aggression as a disciplinary practice does damage children and can impede their development, but I have no way of measuring the cost of the damage based on the data available.

Figure 3 shows the averages from the MICS and DHS studies. Severe physical punishment is most common in the Middle East and North Africa region, 28 per cent of primary care givers use severe physical punishment, followed by Sub-Saharan Africa at 24 per cent. In the wealthiest regions, High Income and Europe and Central Asia extreme physical punishment is not as common, the rates are 5.5 and 8.8 per cent, respectively.

--- Figure 3 about here ---

Based on UN population statistics I assume that globally there are 1.88 billion children, about 27 per cent of the global population. If I restrict child abuse to be defined as severe physical punishment and using the regional averages for countries with missing data and the overall

sample average rate for countries in South Asia (UNICEF, 2014 did not include a country from this region), I can calculate the number of abused children per country and region. A total of about 290 million children received severe physical punishment, this corresponds to about 15.5 per cent of all children.

Having established an estimate of the prevalence rate of domestic violence against children I have to apply an appropriate unit cost in order to calculate the total cost of this abuse. Few studies provide unit costs of child abuse. Fang *et al* (2012) estimate the lifetime cost per victim of non-fatal child abuse in the US at around $98,000 to $210,000.[9] In contrast to the cost estimates of violence used in this study, their estimate is mainly based on tangible costs, e.g. court costs, child welfare costs and discounted future earnings. However, as discussed above, the intangible costs tend to be much higher than the tangible costs. While specific estimates of child abuse are difficult to come by, estimates for the unit cost of assault are more readily available. My definition of child abuse includes slapping on the face, head or ears, and/or beaten repeatedly with an implement. If someone outside the family received such treatment this would be classified as assault. Thus, I suggest that figures for the unit cost of assault can be used to approximate the cost of child abuse. In order to make this estimate comparable to the previous analysis of the cost of interpersonal and collective violence I use the unit cost of assault ($95,023), based on McCollister *et al* (2010). Since this estimate is close to the median cost of assault in the literature (Chalfin, 2015), I feel reasonably confident in using this figure as a unit cost estimate.

Based on the above primary care interviews, I estimate that about 290 million children worldwide received severe physical punishment. As for the calculation of the child homicide costs I scale the abuse costs by the average GDP per capita for the country and apply these scaled unit costs in order to derive the total cost of domestic child abuse. The cost estimates are presented in Table 4. The resulting total cost of child abuse is in the region of $3.6 trillion, corresponding to 4.2 per cent of World GDP. However, this estimate is based on survey data representing less than ten percent of the world's children and that I have used this evidence to approximate the global cost of non-fatal domestic child abuse.

--- insert Table 4 about here ---

[9] The lower bound is derived by applying a discount rate of seven per cent, the upper bound assumes a discount rate of ten per cent.

In this section I concentrated on violence against children in the home, because it is considered to be the most important aspect of child abuse and neglect. However, neglect, physical, sexual and emotional abuse of children also happens in school, in care institutions, prisons, at work and in the community. Pinheiro (2006) provides a comprehensive overview of the violence against children in different settings. UNDOC provides statistics on child sexual assaults but these numbers are very small, probably because these offences are severely underreported and the resulting cost of child sexual abuse based on these numbers are negligible. I could not obtain sufficiently detailed data on the prevalence of violence against children in schools, care institutions, prisons, in the workplace, in armed groups and in the community. Thus, I did not consider these forms of violence against children. The global estimates by Pereznieto et al (2014) suggest that this may result in a significant underestimate; they provide some estimates for the annual costs of the worst forms of child labour ($97bn) and of children's association with armed groups ($144 mil). Thus, my estimate of the cost of violence against children should be regarded as a conservative estimate.

3.5 Comparison

All of the prevalence and cost estimates are presented in Table 5. The total cost of violence is calculated as $9.4 trillion and this corresponds to about 11 per cent of global GDP. I have not calculated confidence intervals for this number, but due to the uncertainties underlying this total cost estimate, a confidence interval would be large. However, as discussed above this estimate should be understood as conservative because there are a number of violent acts that have not been included, e.g. non-fatal war injuries and rape and sexual assault by strangers. The IEP calculations are based on mainly two strands of literature. In the cost of armed conflict literature, the economic costs of violence, i.e. the reduction in economic activity in the country and the region, dwarf the welfare costs resulting from the loss of life. The cost of crime literature on the other hand focuses on the welfare costs of homicide and assault and the associated tangible costs of policing and correction. The wider economic costs, i.e. the reduction in economic activity due to interpersonal violence has not been considered. There are also certain types of violence that I was unable to include, due to a lack of data. One serious omission is elder abuse. When making choices as to which unit costs to use, I veered towards using lower estimates. However, the one highly influential component of the estimates is the value of life based on the VSL approach and scaling this for middle and low income countries by the ratio of GDP per capita to the US GDP per capita. At higher income levels people may

put a proportionally higher value on their lives. Live expectancy also varies across countries and this is also not taken into account.

When comparing the components of the total estimate, one observation is that the total cost of interpersonal violence are 7.5 times higher than cost from collective violence (about $1,240 bn). Although wars kill, maim and displace a large number of people, devastate the physical infrastructure and decrease economic activity, only few countries experience such levels of organised violence. Since 2000 on average six countries have experienced large scaled armed conflict and 34 countries have experienced minor armed conflict each year. In the large majority of these cases the conflict directly affects only part of the country. By contrast, interpersonal violence is a far more prevalent problem, almost all countries experience homicides each year. According to the prevalence rates worldwide 8.5 times more people were killed in interpersonal violence than in civil wars. While the majority of countries do not experience civil war, about one in three countries had a homicide rate greater than 10 per 100,000, which the WHO considers to be an epidemic level.

So far the costs of domestic violence have been neglected in global studies on violence.[10] However, the prevalence rates of domestic violence are very high. Based on household surveys, not on police statistics, the prevalence rate of IP assault is estimated at 12 per cent and the violent discipline of children by their primary care givers is estimated at 15.5 per cent. Using unit costs for assault the total cost of this child abuse is about $ 3.6 trillion, corresponding to 4.2 per cent of global GDP. Similarly, I estimate IP assault at $4.4 trillion, corresponding to 5.2 per cent of global GDP. This is 26 times higher than the cost estimate of collective violence (war and terrorism).

4 Conclusion

The estimate of the annual costs of violence discussed in this paper is around $9.4 trillion, which is about 11 per cent of World GDP. This includes the costs from different forms of violence: civil wars, international wars, terrorism, homicides, assault and domestic violence against women and children. While wars receive a lot of media attention, they are relatively rare events. People are more at risk from other forms of violence, approximately 12 per cent of

[10] Skaperdas et al (2009) discuss different types of violence, including IPV, but provide no overall comparison of the resulting costs.

all women suffer IP assaults and almost 16 per cent of all children are subjected to harsh physical punishment.

The high prevalence rates of violence against women and children make it the most costly type of violence; about 85 per cent of the total cost estimate is due to violence against women and children. The main abuse of women and children occurs in the home and this form of violence is vastly underreported. The estimated prevalence rates are based on representative household surveys that are comparable across countries, they are not based on police records. Intimate partner assault is based on self-reported evidence provided by women and follows the internationally recognised definition in the 1994 UN 'Declaration on the Elimination of Violence against Women'. In the absence of an international definition of violence against children I use self-reported evidence by primary caregivers on disciplining practices. I define severe physical punishment, such as repeated hitting with an implement, as violence against children. This definition and measurement of violence against children is open to debate. In many societies harsh physical discipline is regarded as normal and thus unlikely to be recognized as child abuse. It is thus doubtful that this can be interpreted as a universal definition. Many primary care givers see it as their right and duty to discipline children in their charge in such a manner. It is also unclear how truthful the responses to the questions of disciplining methods are. In some societies parents are ashamed of using such violent methods and might thus underreport the practice. In other societies parents and other primary caregivers may see these harsh disciplining methods as part of a child's upbringing and thus overstate the use of such methods. The existing surveys are also only representative for about ten per cent of all children globally. Clearly, more work needs to be done to provide a universally acceptable definition of child abuse and to measure such abuse.

In order to calculate the total costs of violence, one needs not only prevalence rates but also unit costs per category of violence. Many will find it immoral to monetize lives, disabilities and injuries. However, it has the advantage of comparing different categories of violence and to assess whether certain violence reduction programs are effective, i.e. whether the benefits outweigh their costs. In order to attach a monetary value to a human life I use the "value of a statistical life" (VSL). The value of a life is established by observing how much of a premium workers attach to carrying out risky jobs. Based on these labour market data statisticians then calculate the cost of a life. In this sense this is not the value of a life but of a livelihood (Shelling, 1968). Although this method of estimating the value of a life is widely used, it is of course open to a number of criticisms. One fundamental issue is whether labour market data on risky

jobs should be used to approximate the pain and suffering caused by violence. In most cases employment constitutes a choice whereas violence is not. Individuals dread certain risks more than others and it appears that people attach different premiums to the risks arising from accidents or force (Chilton et al 2006). Consequently, the VSL estimates for murder should be higher than for work place accidents.

Violence causes a number of costs, some costs are more 'tangible', i.e. the costs to the health system, the judiciary and the police. However, these tangible costs of violent crime are much smaller than the 'intangible' costs of pain and suffering. For the purpose of this exercise these 'tangible' costs have been excluded, thus the cost of crime is the sum of the individual welfare losses. Violence also generates externalities, e.g. it reduces legal economic activity, this results in a loss of GDP. In the absence of internationally comparable data I have excluded these economic costs of crime. This is left for future research. However, the (civil) war literature suggests some estimates of the economic losses due to war and these losses are much larger than the welfare losses.

The estimates presented here should be understood as rough approximations. However, it allows for a comparison between the different forms of violence. Unless a common metric is used it is difficult to provide guidance to policy makers. Violence is a human rights, development and public health issue and violence reduction is part of the United Nation's 2030 Agenda for Sustainable Development[11]. Research on violence is receiving more attention and the outstanding work by Pinker (2012) provides us with an in-depth historical account and psychological analysis. Using new insights from evolutionary biology and neuro-science he suggests explanations of why violence has declined historically. Given Pinker's interest in evolutionary biology and history, his focus is mainly on high income countries for which longer time series data are available and I attempt to extend some of the analysis by considering low and middle income countries. However, my focus is on the current cross-national comparison with the aim to contrast different prevalence rates by type of violence and assessing the costliness of violence. Thus, providing suggestions where policy makers could achieve the greatest welfare and economic gains. So far the development community has had a near-exclusive focus on civil war violence and by recognizing that the costs of interpersonal violence are much larger, I urge policy makers to adjust future development programming accordingly.

[11] https://sustainabledevelopment.un.org/?menu=1300, see in particular SDG 16.

Tables

Table 1: Cost of Collective Violence

Region	Deaths from Civil War $ bn	Deaths from Intern. War $ bn	IDPs& Refugees $ bn	GDP Losses from War $ bn	Terrorism $ bn	Total $ bn	Total % of GDP
East Asia&Pacific	0.31	0.00	0.06	0.00	0.65	1.03	0.01
Europe&Central Asia	0.93	0.01	0.10	51.15	1.27	53.47	0.98
Latin America&Caribb.	3.47	0.00	0.05	36.90	0.43	40.86	0.54
Middle East&N. Africa	16.39	0.00	0.53	18.14	5.14	40.20	1.48
South Asia	0.66	0.01	0.20	12.19	2.55	15.61	0.26
Sub-Saharan Africa	0.81	0.00	0.99	11.85	0.95	14.60	0.63
High Income	0.31	0.68	0.07	0.00	0.34	1.41	0.00
World	22.89	0.71	2.00	130.24	11.34	167.18	0.20

Source: IEP (2014)

Table 2: Cost of Interpersonal Violence

Region	Homicides $bn	Assault $bn	Incarcer-ation $bn	Fear $bn	Total $bn	Total % of GDP
East Asia&Pacific	41.54	1.29	19.01	3.13	64.97	0.38
Europe&Central Asia	60.94	7.90	15.50	2.37	86.70	1.58
Latin America&Caribb.	277.92	38.08	14.76	3.76	334.52	4.42
Middle East&N. Africa	19.37	1.42	4.14	0.68	25.62	0.95
South Asia	40.87	2.99	1.75	1.79	47.40	0.78
Sub-Saharan Africa	80.78	1.19	2.66	0.92	85.55	3.68
High Income	184.47	272.39	125.24	10.76	592.87	1.34
World	705.89	325.27	183.05	23.41	1237.63	1.45

Source: IEP (2014)

Table 3: Cost of Intimate Partner Assault

Region	Total $ bn	Total % of GDP
High Income	1,360	3.06
East Asia&Pacific	894	5.29
Europe&Central Asia	333	6.08
Latin America&Caribbean	605	8.01
Middle East&North Africa	286	10.55
South Asia	600	9.87
Sub-Saharan Africa	345	14.94
World	4,423	5.18

Table 4: Cost of Non-Fatal Domestic Child Abuse

Region	Total $ bn	Total % of GDP
High Income	829	1.87
East Asia&Pacific	608	3.60
Europe&Central Asia	173	3.16
L.America&Caribbean	512	6.78
Middle East&NAfrica	437	16.13
South Asia	604	9.93
Sub-Saharan Africa	431	18.66
World	3,594	4.21

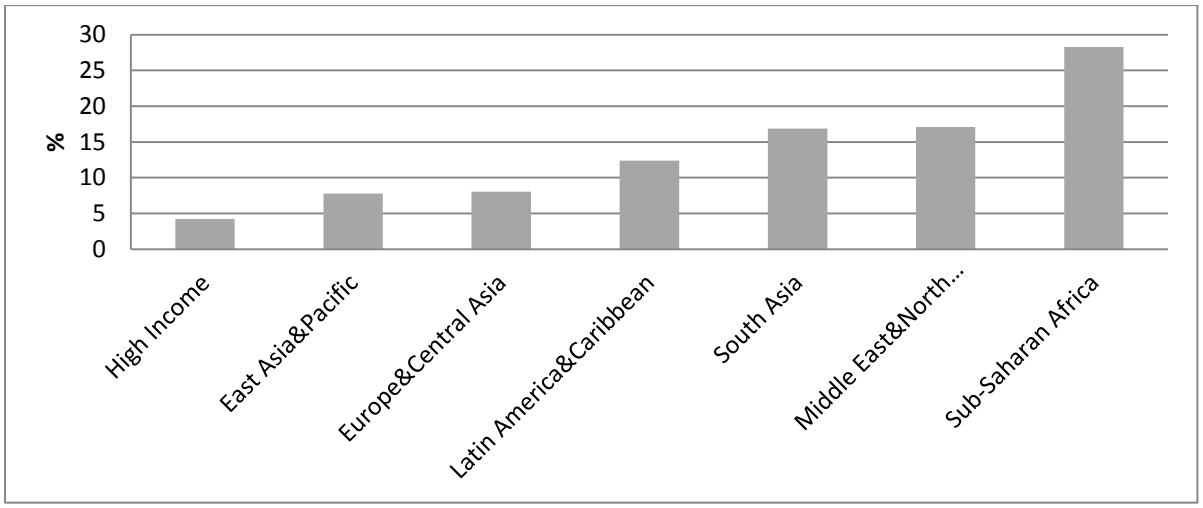
Table 5: Summary of Prevalence and Cost Estimates

Type of Violence	Prevalence	Cost $ bn	Cost % of World GDP
Collective Violence		167	0.19
Deaths Civil War	49,000[a]		
Deaths International War			
Death Terrorist Attacks	8,176[b]		
Interpersonal Violence		1,238	1.45
Homicides - Total	418,000[c]		
Men	325,040 [d]		
Women	63,700 [d]		
Female Homicides, IP	24,260 [d]		
Children	29,260 [d]		
Assaults	4,110,000[c]		
Intimate Partner Assault	769,000,000[d]	4,423	5.18
Child Severe Physical Discipline	275,000,000[d]	3,594	4.21
Total	n.a.	9,422	11.02

Note: [a] Lacina&Gleditsch (2005, v4), figure for 2008 [b] Global Terrorism Database figure for 2011, [c] UNDOC, figure for 2008, [d] own calculations. Collective violence includes deaths from external and internal conflicts and terrorism, fear, IDP&refugee costs and economic costs. Interpersonal violence includes homicides and violent crime (violent assault but excludes sexual assault).

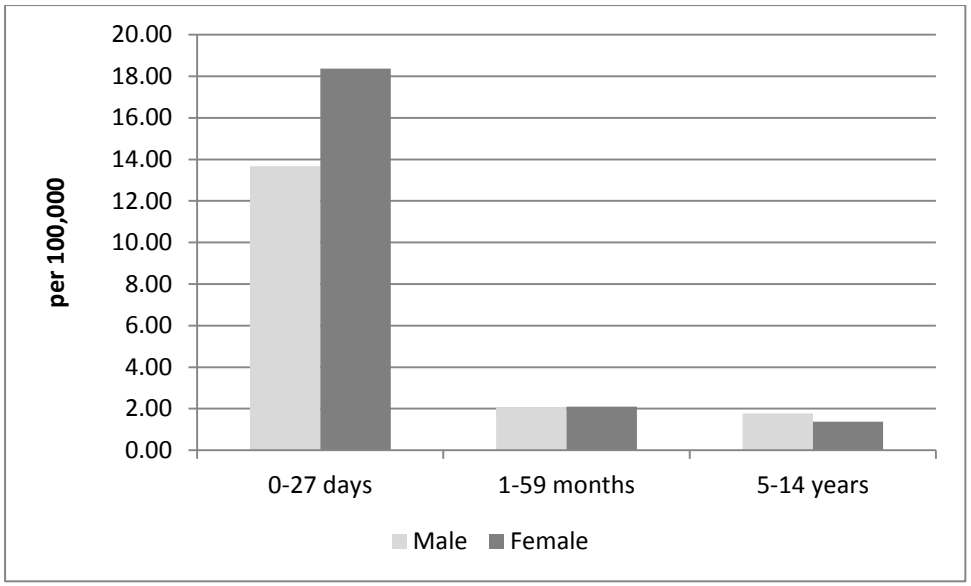
Figures

Figure 1: Prevalence Rates of IP Assault



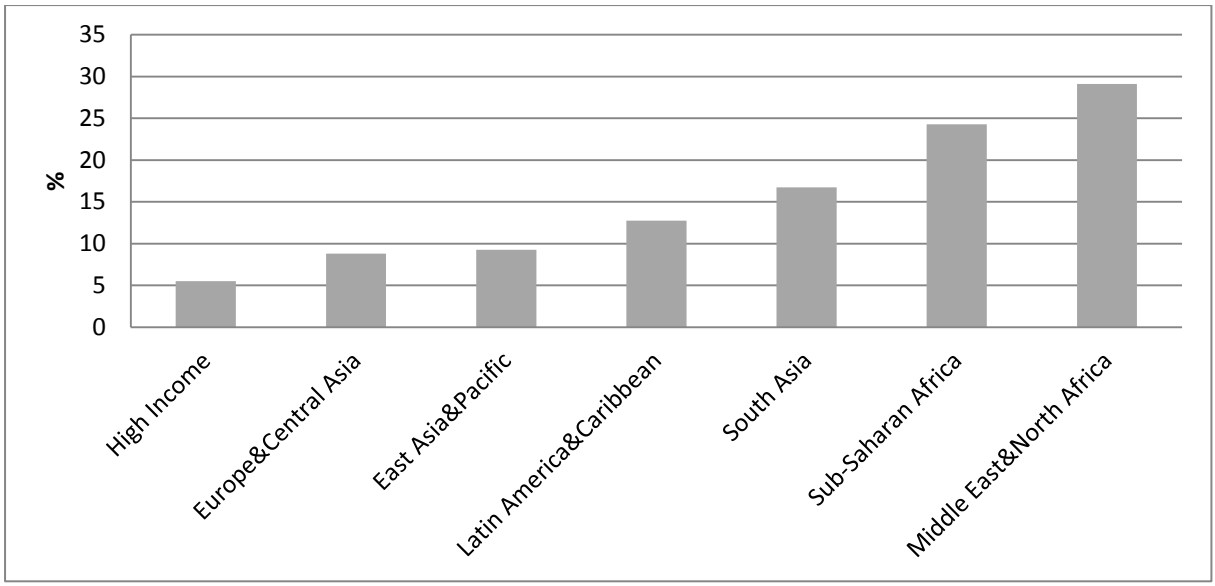
Source: Devries et al (2013).

Figure 2: Global Child Homicide Rates



Source: WHO Global Health Estimates (GHE) 2013

Figure 3: Percent of Primary Care Givers Using Severe Physical Punishment



Data Source: UNICEF (2014), no data available for South Asia (using sample average). Trinidad and Tobago is the only high income country.

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