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The costs and impacts of gender-based violence in developing countries:

Methodological considerations and new evidence

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Executive Summary

Gender-based violence (GBV) is undoubtedly one of the most common forms of violence in the world. GBV includes physical violence, emotional violence, sexual violence and economic violence. Recent multi-country studies, using a common methodology and definitions, have found high prevalence of physical and sexual violence against women by intimate male partners.

GBV has devastating consequences not only for victims but also for society as a whole. A growing body of research has focused on documenting and dimensioning these consequences either by estimating the impacts of GBV on a set of outcomes or by measuring the monetary costs of GBV. Studies for developing countries conclude that the health impact of GBV on women can be as high as some of the leading causes of injury; consequences are especially serious in the area of reproductive health. Previous studies estimating the socioeconomic costs of GBV have documented the impact of GBV on earnings due to death and lost productivity, job loss, lost productivity of the abuser due to incarceration, and loss of tax revenues due to death and incarceration.

This paper has three goals. First, it synthesizes the research on estimating the costs and impacts of GBV, presenting and evaluating the methodologies used to produce cost and impact estimates. While estimates are presented for both developed and developing countries, the focus is on methodologies which are potentially most relevant to developing countries. A second goal of this paper is to use a relatively new methodology—propensity score matching—to generate comparable, cross-country estimates of some of the impacts of GBV in Haiti, Peru and Zambia. This methodology has not previously been used on a cross-country basis to estimate the impacts of GBV. Finally, the paper identifies priority areas for future research.

Evaluation of methodologies to estimate costs and impacts of GBV. All the methodologies presented in this paper have advantages and disadvantages. Accounting approaches to estimating the costs of GBV are straightforward to carry out, but may seriously underestimate the true social costs of violence and may be especially problematic in a developing country context. Indirect cost estimates of the impact of GBV on women's labor force participation and earnings have been successful in highlighting the productivity impacts of gender-based violence and have helped establish that GBV is an important to both economic development and gender equality; at the same time, indirect cost estimates have suffered from econometric weaknesses that have yet to be definitively resolved. DALY measures of the health impacts of GBV have proved indispensable for firmly placing the issue of GBV on the public health agenda, yet they have not been particularly useful in terms of formulating policy responses to violence and seem to have had a limited impact beyond the health sector. Naïve comparison of mean outcomes between women who have suffered violence and those who have not have contributed to identifying the specific health impacts on women and their children, but have been criticized for being less than rigorous in their formation of control groups of non-victims. Finally, propensity score matching adds rigor in the specification of control

groups, but does not solve simultaneity issues. In sum, there is no perfect methodology with which to gauge the costs and impacts of GBV. All methodologies have strengths and weaknesses, and the challenge is to choose the appropriate methodology given both data constraints and the potential consumers of the estimates.

Estimates of health, employment, and education impacts of GBV in Haiti, Peru and Zambia. We find strong impacts of GBV on women's health outcomes, especially on reproductive health. GBV also increases—not surprisingly—women's usage of health services. Lifetime physical violence by intimate partner increases the probability of working in a paid job in all three countries. This result, of course, may be the result of simultaneity between earnings and violence which is not resolved by PSM: women who work outside the home threaten male supremacy and hence are more frequent victims of violence. The study finds strong evidence that GBV may lead to the inter-generational transmission of violence. Women who are victimized by physical violence—whether at the hands of intimate partners or relatives—are more likely to use violence in disciplining their children. Much scientific evidence has documented that children exposed to such violence are themselves more likely to engage in violent and delinquent behaviors. The study also finds an impact of GBV on children's health outcomes, with the specific manifestations varying by type of GBV and by country. Where impacts are found on children's educational performance, they are of an unexpected direction, with children of women victims more likely to attend school and less likely to be behind in age/grade progression.

Future research on the costs and impacts of GBV. Future research on the costs and impacts of GBV has many promising fronts to explore. First, it would be useful to employ the PSM methodology on richer data sets that include more information on women's labor force participation and earnings, as well as household consumption patterns. This would allow the indirect costs of GBV to be explored in a methodologically rigorous way. Second, more work needs to be done on the relationship between income, wealth and violence. Any research has to deal with simultaneity issue, which PSM does not resolve. Third, the results from this paper suggest that GBV is more prevalent in urban areas—which is exactly opposite the conclusion emerging from the WHO's multi-country study. Studies on this issue will need to address under-reporting of violence, which is frequently assumed—without evidence—to be a larger problem in rural areas; these studies necessarily will be qualitative in nature. Finally, there is a need for more studies on the economic costs of regionally-specific types of GBV such as female genital mutilation, violence generated by dowry systems, and incest. These studies on economic costs of gender-based violence are essential to position the issue as what it is: not only a woman's issue, a public health issue, and a human rights issue, but also as an issue affecting poverty, development and economic growth.

1. Introduction

Gender-based violence (GBV) is undoubtedly one of the most common form of violence in the world. GBV includes physical violence, emotional violence, sexual violence and economic violence. Recent multi-country studies, using a common methodology and definitions, have found high prevalence of physical and sexual violence against women by intimate male partners, whether measured in the past 12 months or over women's lifetimes. Other forms of GBV such as rape, trafficking, dowry-related violence and female genital mutilation are also important and have been recently documented.[2]

An expanding body of research has attempted to document the impact that GBV has on women and societies. There have been two strands of research. One has focused on estimating the impact of GBV without imputing a monetary value to this impact. This research has focused on the impact of GBV on women's reproductive health (unwanted pregnancies, sexually-transmitted infections, and HIV/AIDS infection), mental health (drug and alcohol abuse, depression, low self-esteem, and post-traumatic stress disorder) and physical well-being (mortality and morbidity)—as well as on children's developmental outcomes (low birth weight, diminished school performance, and violent and delinquent behaviors).[3] A second strand has attempted to estimate the costs to society of GBV, using various methodological approaches.

This paper has three goals. First, it will synthesize the research on estimating the costs and impacts of GBV, presenting and evaluating the methodologies used to produce cost and impact estimates. While estimates will be presented for both developed and developing countries, the focus will be on methodologies which are potentially most relevant to developing countries. A common problem of some costing methodologies is the difficulty of disentangling the impacts of GBV on health, employment, and education outcomes from that of factors that increase the risk of GBV but also have a direct impact on the outcomes of interest. Thus, a second goal of this paper is to use a relatively new methodology—propensity score matching—that allows one to control for most differences between women who have been abused and those who have not, except for the occurrence of violence. Using this methodology, we generate comparable, cross-country estimates of some of the impacts of GBV. This methodology has not previously been used on a cross-country basis to estimate the impacts of GBV. Finally, the paper will identify areas of priority research in the area of gender-based violence.

The following section provides a definition of gender-based violence, along with recent estimates of its prevalence. Section 3 contains an analytical review of methodologies to generate estimates of the socio-economic costs of GBV. Section 4 presents our estimates of the health, employment, and education impacts of GBV on abused women and their children using propensity score matching. Finally, Section 5 offers some conclusions and suggestions for future research.

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[2] See Bloch and Rao (2002) for a study of dowry violence in rural India.
[3] See Heise, Ellsberg and Gottemoeller (1999) for a detailed discussion of the health consequences of gender-based violence.

2. Gender-based Violence: Definitions and Prevalence

The United Nations adopted the first internationally-accepted definition of violence against women in 1993, defining such violence to be "any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women…whether occurring in public or private life (United Nations, 1993)." This definition hints that gender-based violence is a broader category than violence against women, and that gender-based violence—at least theoretically—could also include violence that affects men, as long as it is conditioned upon or affected by men's gender roles.

In practice, however, gender-based violence (GBV) has come to be almost synonymous with violence against women. The adjective "gender-based" is frequently used to highlight the role that women's subordinate status in society plays in increasing the risk that they will be impacted by violence (Heise et al., 1999; IPPF, 2000). Even if this rough equivalence between violence against women and GBV is accepted, it is necessary to more precisely define what types of violence should be included within GBV. A comprehensive list of the types of GBV would include domestic violence, sexual abuse and rape, trafficking of women, female genital mutilation, dowry violence, and other forms of violence against women.[4]

Figure 1 presents data on physical abuse of women by intima`te partners. Data come from the WHO multi-country study, which uses a standard methodology and identical survey instruments across a number of developed and developing countries, thus producing for the first time prevalence numbers which are comparable across countries.[5] In urban areas rates of victimization in the last 12 months range from a low of 3% in Serbia and Japan, to a high of 25 and 29% in provincial Peru and Ethiopia, respectively. In terms of lifetime violence, victimization rates range from a low of 13% in Japan to highs of 50 and 62% in Lima and provincial Peru, respectively. For countries in which data are available for both the capital city and provincial areas, victimization rates are almost invariably higher in provincial areas—both for violence in the last 12 months and lifetime violence.[6]

Table 1 reports the percentage of women who reported suffering sexual violence at the hands of a male intimate partner, either in the 12 months prior to the survey or at any time in their life. Some of these data (Brazil, Japan, Peru and Thailand) come from the WHO multi-country study on violence against women and are thus comparable across these countries;[7] the remaining data come from surveys using varying methodologies and

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[4] This paper will provide data on the most widespread forms of gender-based violence: physical and sexual violence by intimate partners, and sexual assault regardless of the identity of the aggressor.

[5] Japan was the sole developed country included in the multi-country study.

[6] Bangladesh is the sole exception, where violence over the last 12 months was higher in urban than in provincial areas.

[7] Preliminary results on sexual violence by intimate partners from the WHO multi-country study are available for only four of the ten countries for which data on physical violence by intimate partners are currently available.

thus cross-country comparisons are risky. Among the countries participating in the WHO study, between 1.3% (Yokohama, Japan) and 22.9% (Cusco, Peru) of women reported that male intimate partners had attempted or completed sexual violence in the preceding 12 months. The simple average for cities in the three developing countries (Brazil, Peru and Thailand) is 11.85%.

Table 2 reports rates of victimization from sexual assault in the previous five years, whether by intimate partners or others. Rates range from highs of 8% (Rio de Janeiro) and 6% (Tirana) to 0.8% (Gaborone) and 0.3% (Manila).[8] Given that the surveys did not explicitly ask about sexual assault by intimate partners and that women frequently will not classify sexual coercion by intimate partners as sexual assault, these numbers are almost certainly underestimates. While strict comparisons with the data in Table 1 on sexual victimization by intimate partners are not possible because there is little overlap in terms of countries covered and no overlap in terms of cities covered, the rates of sexual victimization *by intimate partner in the last year* in Table 1 are generally significantly higher than the rates of sexual assault *by any person over the previous past five years* reported in Table 2, lending credence to the assertion that the rates reported in Table 2 are biased downward.

3. Methodological approaches to estimating the costs and impacts of GBV

This section will present methodologies for estimating the socio-economic costs and impacts of GBV. Two types of methodologies are discussed: those that attempt to attach a monetary value to the effects of GBV, and those that concentrate on estimating its impacts on health, education, labor force participation and other outcomes of interest, without attaching a monetary value. Table 3 summarizes the advantages and disadvantages of the methodologies that will be discussed in the following subsections.

A. Methodologies for the establishing the monetary costs of GBV

Before presenting the methodological options for producing cost estimates, a more fundamental question must be addressed: why produce cost estimates at all? There are two principle motivations. First, cost estimates can quantify the impact of GBV on society and consequently influence the decisions of those who form public policy and allocate funds; cost estimates, in other words, facilitate the "dimensioning" of the issue: how important is GBV among the panoply of pressing development issues? Second, cost estimates can help establish the potential benefits of violence prevention strategies or programs (CDC, 2003; Miller, Cohen and Wiersema, 1996; Snively, 1994; Haddix et al, 1996; Teutcsch, 1992).

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[8] Note that sexual assault includes both sexual assault by intimate partners and assault by non-partners.

An accounting methodology for estimating direct costs

The most common approach used to calculate the costs of GBV has been an "accounting methodology", in which costs are calculated for specific categories of costs, and total cost to society is simply the sum of all distinct categories of costs. Typical of this approach is CDC (2003), which specifies two types of costs:

- *Direct costs* are actual expenditures related to GBV, including health care services, judicial services and social services.
- *Indirect costs* represent the value of lost productivity from both paid work and unpaid work, as well as the foregone value of lifetime earnings for women who have died as a result of GBV.

Direct costs are typically calculated by establishing the unit cost of a specific service and multiplying this unit cost by the number of time the service was utilized. Information on women's use of medical and mental health services is usually gathered from population-based surveys, and health care costs via a survey of medical service providers. (See Box 1 for the steps typically followed in estimating direct costs.)

Similar methodologies have been employed by to generate estimates for a number of developed countries and states or provinces within these countries.[9] There have been, however, very few studies that have attempted to estimate the direct costs of GBV in developing countries; to the best of our knowledge, there are only two such direct cost studies for GBV in developing countries. Mansingh and Ramphal (1993) estimated that the direct costs of treating victims of intimate partner violence in Kingston Public Hospital (Jamaica) totaled US $454,000 in 1991 (in 2001 dollars). Sánchez et al. (2004) find that the Colombian national government spent approximately 184 billion pesos (US $73.7 million) in 2003 to prevent, detect and offer services to survivors of intimate partner violence—an amount equal to approximately 0.6% of the total national budget.[10]

Direct cost estimates are problematic, especially in a developing country context. A long-accepted tenet of public finance economics is that the optimal level of public goods provision occurs when the sum of the marginal willingness to pay for these services is equal to the marginal cost of their provision. Actual expenditures may be a particularly poor indicator as to whether the optimal amount of the public good is being provided. A priori, there is a strong suspicion that services for victims of GBV are under-provided in

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[9] Countries and states for which this type of analysis has been performed inlcude the U.S. (Laurence and Spalter-Roth, 1995), Canada (Greaves et al., 1995; Health Canada, 2002), Australia (Australian Institute of Criminology, 2002), British Columbia (Kerr and McLean, 1996), Holland (Korf et al.,1997), Northern Territory (Office of Women´s Policy, 1996), Queensland (Blumel et al., 1993), Switzerland (Godenzi and Yodanis, 1998) and the U.K. (Stanko et al., 1998). These studies are reviewed in Yodanis et al. (2000) and WHO (2004).

[10] These represent expenditures of the following institutions: Colombian Social Welfare Insitute (Instituto Colombiano de Bienestar Social), Sub-secretariat for Security and Peaceful Coexistence (Subsecretaria para Asuntos de Seguridad y Convivencia Ciudadana), Attorney General´s Office (Fiscalía General de la Nación) and the National Medical-Legal Institute (Instituto Nacional de Medicina Legal).

Box 1. Steps in estimating the direct costs of intimate partner violence (IPV): the CDC's approach for the U.S.

Step 1. Determine usage of medical services by women who were injured as a result of IPV. Usage was calculated separately for rape and for physical assault. According to data from the National Violence against Women Survey (NVAWS), 322,230 IPV rapes occur in the U.S. each year. Of these, 36.2% result in physical injuries, of which 31% require medical care. Also using NVAWS data, 4,450,807 IPV physical assaults occur annually, of which 41.5% cause physical injuries. Medical care is sought in 28.1% of these cases

Step 2. Determine usage of mental health services by all women victimized by IPV, whether or not physical injuries present. According to NVAWS data, 33% of all IPV rapes result in usage of mental health services.

Step 3. Establish the unit cost of services used. Services whose costs were calculated include: ambulance transport, paramedic care, emergency room care, physician visit, physical therapy, dental visits, inpatient hospitalizations, outpatient clinic visits. The unit costs were established by using the Medical Expenditure Panel Survey and the Medicare 5% Sample Beneficiary Standard Analytic Files, and these unit costs were then multiplied by service usage as revealed in the NVAWS.

The mean medical care costs per incident (including those incidents in which women did not seek treatment) were:

- $516 per IPV rape
- $548 per IPV assault

The mean mental health care costs per incident (including those incidents in which women did not seek treatment) were:
- $323 per IPV rape
- $269 per IPV physical assault
- $294 per IPV stalking

Step 4. Calculate total direct costs as the product of unit costs times the number of times a service was used. Sum over all types of services and over rape, assault and stalking.

Total direct costs from intimate partner violence against adult women in the U.S. were over 4 billion dollars in 1995, including both mental health and medical care costs. Note that this cost estimate does not include direct costs associated with the police and judicial system.

Source: CDC (2003).

developing (and quite possibly developed countries as well), since GBV (and especially intimate partner violence) may hinder women's participation in political and social movements that would lobby for the provision of services (i.e., express the marginal willingness to pay to politicians and policymakers). In addition, social norms may inhibit women from acknowledging that violence has taken place and seeking help, in essence artificially depressing their willingness to pay for (or at least use) services. Even abstracting from these issues, direct cost estimates cannot be interpreted without a base of reference such as GDP or cost estimates for other social issues.

If estimates of direct costs of GBV are not particularly useful in a developing country context, what options are left to document the socioeconomic costs of GBV? One option is to concentrate on estimating indirect costs, as is discussed in the following subsection.

Indirect cost estimates: accounting, econometric and other approaches

Indirect cost estimates tend to highlight the impact of GBV on productivity and earnings of women and – occasionally – of male perpetrators. Studies have focused on foregone earnings due to death and lost productivity (CDC, 2003), job loss, lost productivity of the women, lost productivity of the abuser due to incarceration, and mortality (Laurence and Spalter-Roth, 1995), loss of tax revenues due to death and incarceration (Greaves et al., 1995), and decrease in women's earnings (Morrison and Orlando, 1999; Sánchez et al. 2004; CDC, 2003).

Three approaches have been used to-date to produce indirect cost estimates. The first, quite similar in spirit to the direct cost estimates above, is based on an accounting approach. The total number of days of paid work or household chores lost due to GBV (which is identified by responses to a survey question) is multiplied by the mean daily earnings to yield a monetary estimate of lost earnings, whether this incapacitation is temporary (due to injury) or permanent (due to death or incapacitating injury).[11]

In the case of recent estimates produced by CDC (2003), mean daily earnings are calculated for the mean age of women affected by the various types of intimate partner violence (rape, physical assault or stalking). In the case of non-paid household chores, an imputed wage is used. Women in the U.S lost 10.1, 8.1 and 7.2 days of paid work, respectively, from IPV stalking, rape and physical assault. The number of days of household chores lost from these three types of IPV was even greater, at 12.7, 13.5 and 8.4 days. Multiplying these days lost by market or imputed wages yields a wage loss of U.S. $1.7 billion in 1995; wages and productivity lost due to premature death alone were U.S. $892 million (CDC, 2003).

One of the weaknesses of the accounting approach—whether used to estimate direct or indirect costs—is that any list of categories is essentially arbitrary and alternative categorizations can always be devised (Buvinic and Morrison, 1999). A more serious weakness is that key categories of costs can be left out of the calculations. For example,

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[11] Some estimates of the productivity impact include the reduction in earnings of male perpetrators due to their incarceration (Laurence and Spalter-Roth, 1996).

most direct cost estimates of the impact of intimate partner violence measure increased use of health, judicial and social services by women, but do not include measures of the impact that witnessing or being a victim of family violence may have on children.[12]

A second approach to calculating indirect costs of GBV has been to econometrically estimate the impact of GBV on women's labor force participation and earnings. This approach, employed by Lloyd (1999) and Farmer and Tiefenthaler (1999) for the U.S. and Morrison and Orlando (1999) for Chile and Nicaragua, requires micro data sets that contain standard labor force information on women's participation, hours worked and earnings, as well as detailed information on women's experience with GBV. A reduced form earnings equation for women is estimated, including a selectivity correction for labor force participation. Using this approach, Lloyd and Morrison and Orlando all find that intimate partner violence has no impact on women's labor force participation after controlling for standard factors such as age, education, marital status, and number of children in the household.[13] Famer and Tiefenthaler, on the other hand, find that labor force participation is higher for women who suffer abuse.

After estimating labor force participation equations, Morrison and Orlando (1999) estimate earnings equations with standard explanatory variables and various variables that measure the presence of intimate partner violence. The presence of any kind of intimate partner violence—whether sexual, physical or psychological—is associated with between a 34 and 46% reduction in earnings. Morrison and Orlando attempt to address potential simultaneity between earnings and violence by using an instrumental variables approach to instrument for violence; this econometric approach—while an innovative method to allow estimation of the productivity impacts of intimate partner violence—has several weaknesses.[14]

One approach that avoids the econometric complications of instrumental variables estimation is propensity score matching. (See Box 2 and Section 4 for a description of this methodology and an application to Colombia). Sanchez et al. (2004) recently used

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[12] These impacts may include: poorer performance in school (Larraín et al., 1997); increased probability of delinquency, both as a juvenile and as an adult (Windom, 1989; Dahlberg, 1998; Thornberry et al., 2001); children leaving abusive homes to live on the street (Hernández Rosete, 1998); substance abuse (Molnar et al., 2001); attempted suicide (Dube et al., 2001); and higher probability of committing family violence as an adult (Strauss, et al 1980).

[13] This result is open to various interpretations. Lloyd suggests that two countervailing behavioral responses to violence cancel one another out: some women who suffer abuse may be less likely to participate in the labor market, but others may be induced to seek employment to acquire the resources needed to negotiate a violence-free relationship or to exit the relationship altogether (Lloyd, 1999: 386). Other candidates for countervailing factors include some women having lower labor force participation rates because violence is used instrumentally by male aggressors to control women, while other women who participate in the labor force trigger violence against them for this same control reason. This simultaneity between violence and participation may offset the expected negative relationship between violence and labor force participation. More research is needed, probably of a qualitative nature, to disentangle the relationship between violence and labor force participation.

[14] The instruments for violence include physical abuse in the women's childhood and the number of times per month the husband arrives home drunk. Both of these factors, however, may also have a direct impact on earnings by affecting self-esteem and thus effort and ability. Also, the use of IV techniques in relatively small samples can be problematic. (These observations were contributed by Vijayendra Rao.)

propensity score matching to gauge the impact of intimate partner violence in Colombia on a range of health and labor market outcomes. Based on a sample survey of over 2,000 women aged 15 to 49 in the cities of Bogota, Barrancabermeja and Barranquilla, Sanchez et al. found that women who experienced moderate violence would have earned approximately $60 more per month had they not been so victimized, and that women who suffered severed violence would have earned more than $100 per month more—this compared to mean monthly earnings for the entire sample of U.S. $142.

Box 2. A non-parametric approach to estimating the wage impacts of intimate partner violence: the case of Colombia

Step 1. Estimate probit equation of risk factors of intimate partner violence. Explanatory variables include: age, education of women and man, household wealth, consumption of alcohol, consumption of drugs, intimate partner violence in woman's origin household, proportion of women and children among household members, measure of household density (over-crowding), and labor force participation of man and woman.

Step 2. Use propensity score matching—in this case 5-to-1 matching—to pair women who were victimized by violence to those who—although not victimized—have similar estimated a-priori probabilities of being victimized. The methodology requires that the range of a priori probabilities be similar for treatment and control groups, i.e., that there is an area of common support.

Step 3. Compare means of matched "treatment" and "control" groups for the variables of interest. In this context, the treatment group is composed of women who suffered intimate partner violence; the control group is composed or their "matches" with similar a priori probability of suffering violence.

Among the key results from this study were that women who were victims of intimate partner violence had:

- Significantly lower earnings (see text for description)
- Slightly lower rates of labor force participation (for some types of violence)
- A higher probability of suffering miscarriages or problems in childbirth
- Children more likely to have negative health outcomes such as recurrent coughing, severe respiratory infections, severe diarrhea, and high fever.
- Little or no impact on children's educational outcomes
- No impact on children's nutritional status

Source: Sanchez et al., 2004

Beyond direct and indirect costs: global measures of social costs associated with GBV

An option for estimating the socioeconomic costs associated with GBV—and one frequently employed by economists to establish the market value of non-market goods—is to estimate the willingness of individuals (and by extension society) to pay for lives free of GBV, using contingent valuation methodology. This methodology, to our knowledge, has been used only once to estimate the willingness to pay for the reduction of gender-based violence—and then to measure willingness to pay for violence prevention services (see Sorenson, 2003). One can only speculate as to why this methodology has not been more frequently used. First, as the CEDAW and Belém do Pará conventions make explicit, living lives free of violence is a fundamental human right; estimating the willingness to pay for a fundamental right, while demonstrating the importance society attaches to an issue, may in itself be controversial. A second unattractive feature of willingness to pay estimates is that they are sensitive to income levels and income distribution.

B. Methodologies for estimating the non-monetary impact of GBV

Several different methodologies have been employed to gauge the impacts of GBV, without attempting to establish the monetary value of these impacts. They include: estimating the disability-adjusted life years (DALYs) lost due to violence, "naïve" comparisons of the mean values of outcome variables of interest between women who have suffered violence and those who have not; and an emerging literature that uses propensity score matching to improve the quality of the control group of women non-victims before performing comparisons of means.

Disability-adjusted life years

The disability-adjusted life years (DALY) methodology has the great advantage of including years lost due not only to premature mortality, but also due to disability or illness. The first estimates of the DALY cost of gender-based violence were produced by Heise et al. (1994), who estimated that more than nine million disability-adjusted years of life are lost each year worldwide as a result of rape and family violence, more than that from all types of cancer and more than twice that lost by women in motor vehicle accidents. More recently, Lozano (1999) estimated that rape and intimate partner violence against women were the third most important cause of DALYs lost in Mexico City—behind diabetes and perinatal conditions, but ahead of auto accidents, congenital anomalies, rheumatoid and osteo-arthritis, cardiovascular disease, stroke and pneumonia. (See Box 3 for more details on this study.)

DALY estimates produce a number—x number of years lost—but as can be seen from the previous examples it is necessary to compare this number to DALY estimates for other conditions in order to make some sense of the number. If this comparative exercise

is undertaken, DALY estimates are useful for dimensioning the importance of GBV relative to other public health problems. The weakness of this approach is that outcomes which do not result in mortality or morbidity, such as lost productivity, increased future criminality or more street children, are not captured in the DALY estimates; moreover, DALY calculations are methodologically complex and data-intensive.

Box 3. Estimating the disability-adjusted life year cost of violence against women: evidence from Mexico City

Step 1. Estimate the DALYs due to *premature death* due to violence against women.

- Obtain number of female homicide victims in Mexico City.
- Based on police statistics on identity of killer, establish the percentage of homicides which were committed by male partners (whether common law or formally married). In Mexico City, 28% of killers were male spouses, 30% were relatives or known to the victim, and 42% had unknown identities.
- Based on the age profile of victims and data on life expectancy, establish the total number of life years lost due to premature death at the hands of a male partner.
- Undertake a similar calculation for deaths of women attributable to sexual violence by non-partners, and for suicide victims whose suicide was a result of intimate partner violence or rape.

Step 2. Establish the DALY due to years lived with disability

- Estimate DALY consequences of physical injuries. The study documented that 50% of women seen in emergency rooms were presenting injuries that resulted from intimate partner violence. Also include those seen due to injuries associated with rape or suicide (if related to rape or IPV).
- Estimate DALY due to the psychological secuelae of IPV and rape, as well as the impact on reproductive health.

Step 3. Sum the DALYs due to premature death (42% of the total) and those due to disability (57% of the total) to get the global DALY figure due to violence against women. Another breakdown of the DALYs lost is 53% due to physical secualae (death, physical injury, etc.) and 47% due to non-physical secuelae. Total disability-adjusted life years lost for 1995 were 27,200—the third most important source of DALYs lost for women in Mexico City.

Source: Lozano, 1999.

Naïve comparisons of means

In both developed and developing countries, there is a growing literature that documents the negative health outcomes associated with GBV. Studies have examined the impact on women's well-being, including: reproductive health (unwanted pregnancies,

contraceptive use high-risk sexual behavior, exposure to HIV/AIDS, high-risk pregnancies, and other gynecological problems); physical well-being (injuries and deaths); mental health (depression, post-traumatic stress disorder, suicide, and alcohol and drug abuse); and participation in community activities. Impacts on children's mental and physical health, as well as their educational performance, have also been documented (Heise, Ellsberg and Gottemoeller,1999).

The most methodologically rigorous of these studies compare abused women against a control group of women who did not suffer GBV, and use standard statistical tests to identify statistically significant differences in health outcomes (Campbell, 2002a; Campbell et al., 2002b; Coker et al., 2002, 2000a and 2000b; Jewkes, 2000; Kishor and Johnson, 2004; Rao, 1998). A few studies (such as Ellsberg et al.,2001) combine this comparison with in-depth interviews with women to aid in the interpretation of the quantitative data.

The conclusions of these studies are only as strong as the control groups are rigorously selected. At the lax end of rigor are studies are based on random surveys of women in a certain geographical area and simply compare mean values of outcome variables between women who reveal having been victimized by violence and those who respond that they were not victimized. The obvious concern is that women who respond that they were not victimized are not really similar to those who were victimized, either in terms of observable variables (such as age, marital status, personal history of witnessing violence when young, or other well-established risk factors for violence). More rigorous are studies which match women on the basis of observable variables, thus ensuring rough comparability between victimized women and the control group—although these studies are still open to the criticism that unobservable factors account for the differences observed between the two groups of women.

Propensity score matching

Propensity score matching (PSM) deals with the limitations of naïve comparisons of means by constructing treatment and control groups not on the basis of values of observable variables, but rather on the estimated probability of suffering intimate partner violence.[15]

PSM offers several benefits vis-à-vis other methodologies. First, if the impact of intimate partner violence on health and labor force outcomes are heterogeneous across individuals, matching may produce very different results than methodologies which do not drop observations for which there are not common values in both control and "treatment" groups (Smith, 2000). In PSM, this is known as the "common support condition", and it requires that the range of estimated propensity scores be similar in treatment and control

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[15] PSM was initially used almost exclusively for program evaluation, and the terminology that has grown up around the technique reflects this. Thus, treatment groups are participants in the program, and the control group is of non-participants. In the case of intimate partner violence, the control group is of women who did no suffer intimate partner violence, while the "treatment" group is of women who did.

groups. Heckman et al. (1999) have shown that failure to compare the treatment and control groups within this region of common support is the single most important source of bias—one that overshadows the "classic econometric problem of selection bias due to differences in unobservables (Jalan and Ravallion, 2003: 21)."

Second, as compared to regression analyses (see the section on indirect costing methodologies for a summary of regression analyses that have been used to gauge the impacts of intimate partner violence), PSM is non-parametric. Consequently, it avoids the sensitivity to functional form choice that can plague regression models.[16] Some evidence suggests that avoiding functional form restrictions can significantly reduce bias (Dehejia and Whaba, 1998; Smith and Todd, 2000; Smith, 2000).

Of course, PSM has its own set of econometric complications, including the need for quite large sample sizes, not offering advances over traditional regression analysis in the treatment of unobserved heterogeneity, and not explicitly dealing with issues of simultaneity between earnings and violence. In addition, the quality of PSM estimates depends on conditional independence, namely that the error term in the probability model used to estimate the propensity score is uncorrelated with the outcomes of interest. PSM is also very sensitive to omitted variable bias.

We use PSM in the next section of this paper to estimate the impact of GBV on women's health outcomes, use of health services and labor force participation, as well as the impact on children's health outcomes and educational performance.

4. Estimating the Impacts of GBV on Women and their Children: An Approximation using Propensity Score Matching

A. Prevalence of GBV in Peru, Haiti, and Zambia

The data

We use data from National Demographic and Health Surveys (DHS) which collect information at the individual and household level. The main respondents are women aged 15 to 49 years. These surveys typically have large sample sizes (between 5,000 and 30,000) and take place periodically every 5 years. Some of the aspects covered regularly in a DHS are: fertility, family planning, reproductive health, young children's health, nutritional status, sex of each household member, age, education, marital status, area of residence, and a variety of household characteristics. The data is collected by National

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[16] While the use of PSM relieves the researcher from needing to make difficult choices about functional form, it does not relieve him/her from deciding which set of variables to include in the logit or probit specification. Heckman et al. (1999) document that the estimates that emerge from the matching procedure can be quite sensitive to the specific vector of explanatory variables included (Smith, 2000).

Statistics Institutes in collaboration with the Measure DHS+ program developed and implemented by ORC Macro (Macro International Incorporated) [17]. ORC Macro also creates codes and processes data files to guarantee consistency and comparability across countries.

Recently, the Measure DHS+ program has begun to include a domestic violence module in some countries. The objective of this initiative is to study the linkages between domestic violence, health , and demographic outcomes.[18] We selected Peru, Haiti, and Zambia from a group of 11 countries that have data on domestic violence. The choice of these countries was driven in part by a desire to choose countries in which the health impacts of intimate partner violence have not been examined, and in part by a desire to have representation of both Latin American and African countries.[19]

In Peru and Haiti a domestic violence module was added to the questionnaire of the 2000 DHS. In Zambia, the DHS module was added to the questionnaire for the 2002 DHS. In Haiti and Zambia a randomly selected woman in the household answered the domestic violence module. In Peru, all women 15-49 in the household answered the domestic violence module. This explains, in part, the large sample size of the data set corresponding to Peru.

The most accepted method of measurement of GBV in a survey is the Conflict Tactic Scale (CTS).[20] In the Measure DHS+ program some countries decided to use a modified CTS, while some countries measure GBV by first asking whether the respondent has experienced violence and proceed with more detailed questions if the answer is affirmative.[21] The Haiti DHS 2000 used a modified CTS, while the Peru (2000) and Zambia (2002) surveys used initial questions to determine victimization.

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[17] This program is part of United States Agency for International Development's (USAID) initiatives to help developing countries collect and use data to monitor and evaluate population, health, and nutrition programs. For more information on DHS and available data sets see : www.measuredhs.com

[18] See Kishor and Johnson (2004) Chapter 1 for a detailed description of the domestic violence module in DHS. The chapter includes a discussion of sampling methods, ways to ensure the ethical collection of violence data, and attempts to minimize the underreporting of violence.

[19] Three DHS countries were not analyzed—Nicaragua, India and Colombia—because of the existence of high-quality, existing work on the health impacts of gender-based violence. For Nicaragua, see Ellsberg et al. (2001). For India, see Duvvury et al. (2000) and Rao (2002). For Colombia, Sanchez et al. (2004) have produced the only other study that to our knowledge uses PSM to examine the health impacts of intimate partner violence.

[20] The CTS method consists of a set of questions about specific acts of violence, ranging from mild psychological abuse to life -threatening acts of violence. This method reduces the self censoring that occurs when a violence victim is asked directly if she has been hurt by her partner. It also allows to collect data on "mild" acts of violence for some women who may choose not to answer questions regarding brutal acts of physical violence or sexual violence by their partners or relatives. According to Kishor and Johnson (2004), the CTS avoids report inconsistencies due to subjective and cultural perceptions about what constitutes violence.

[21] See Kishor and Johnson (2004) for details on measurement of GBV in the Measure DHS+. Questionnaires and complete descriptions of the DHS including the Violence Module are available at www.measuredhs.com

The type of GBV variables available vary from country to country. While the violence questions in DHS generally focus on domestic violence by partners and relatives, the Haiti (2000) and Zambia (2000) surveys include some questions about violence perpetrated by strangers, professors, and employers. Sexual violence was not included in the Peru (2000) DHS. Similarly, the Peru (2000) DHS did not include questions about the timing of violence episodes.

Even though all three countries included some variables regarding psychological violence or emotional violence, we decided not to use them as they varied significantly across countries. Except for the Haiti (2000) survey, which used a modified CTS, the proxy variables for psychological violence were insufficient to characterize the phenomenon.[22]

In all countries, we select a sub-sample of women who are currently married or living with a partner. This is consistent with the vast majority of work on GBV in developing countries. This population group is of particular public policy interest because they face a higher risk of intimate partner violence than women who do not live with a partner. In addition, this group is more homogeneous than the whole sample in terms of how GBV is experienced, age range, fertility, and other risk factors; thus, facilitating the implementation of PSM estimation. Unfortunately, the selection of women who are currently living with a partner implies that our study does not include women who currently do not live with a partner but were living with a violent partner in the past and were able to leave him.[23]

Using DHS data has two main advantages. First and foremost is the availability of reasonably comparable data across countries not only on women´s experiences with gender-based violence, but also on a series of outcomes of interest such as health status of women and their children, and some basic data on labor force participation. A second advantage of DHS data is that they have been cleaned and made publicly available.

DHS data do have some disadvantages, though. Research in Nicaragua and Colombia has documented that DHS tends to underestimate gender-based violence, when compared to stand-alone violence surveys such as the Conflict Tactics Scale or WHO´s multi-country survey on gender-based violence. Ellsberg et al. (2001) find that DHS data leads to prevalence estimates in Nicaragua which are about *half* those generated by specialized violence surveys (28% versus 52%). Second, DHS surveys do not universally distinguish between current and lifetime violence (some surveys do, but others do not), and DHS modules contain little information about the aggressor and triggers of violence (such as employment status of the aggressor).

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[22] In the case of Peru, the questions on psychological violence by partner included yelling, limiting contact with friends and family, attacking the woman's self esteem, and threats of abandoning the house. In the case of Zambia, there were no questions on psychological violence in the survey.

[23] This particular group of women could provide invaluable information regarding factors that allow women to escape a violent situation. Despite significant obstacles, many women do eventually leave violent partners, although this departure may take many years. A study for Leon, Nicaragua , found that 70% of abused women eventually left an abusive partner (Heise et al., 1999).

Prevalence of GBV for currently married or co-habitating women

Table 4 summarizes indicators on prevalence of GBV for currently married (or co-habitating) women in Peru, Haiti, and Zambia.[24] In Zambia, almost 42% of women had experienced physical violence at the hands of an intimate partner sometime in their lives; in Peru, this figure was almost 40%, while in Haiti less than 15% of women had been so victimized. Data on current violence (occurring in the 12 months prior to the survey) inflicted by intimate partners are available only for Haiti and Zambia, where 12.5% and 22% of women were affected, respectively.

Lifetime sexual violence at the hands of an intimate partner is significantly more common in Haiti than in Zambia—18.9% versus 5.5%. 17.4% of Haitian women reported current sexual violence by intimate partners. In Zambia—as in the case of physical violence by intimate partners—the sample size drops significantly for current sexual violence. 6.6 % of married or cohabiting women report being affected by this type of violence.

Physical violence by relatives or other members of the household is high in Peru and Zambia (26.6 and 22.0%, respectively); in Haiti, the corresponding figure is 2.9%. Physical violence by strangers (available only for Haiti) is quite uncommon. Finally, sexual violence by a male other than the intimate partner (available only for Zambia) affected 13% of women at some point of their lives.

B. Logit estimation of risk factors for GBV

GBV is a complex phenomenon that is shaped by forces that operate at different levels.[25] An ecological framework that includes factors which operate at the individual, relationship, community and societal levels consequently is an appropriate model with which to examine the risk factors for GBV.[26]

The most appropriate way to identify risk factors for GBV is in a multivariate framework rather than through bivariate correlations. A multivariate framework allows one to control for the presence of potentially confounding factors and to establish the relative importance of different factors. Most analyses of risk factors have been undertaken in the United States and Europe, although there are some recent findings from South Africa,

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[24] For prevalence data for the overall DHS sample see Kishor and Johnson (2004) or www.measuredhs.com for country reports.

[25] The first three paragraphs of this section are based upon Morrison, Ellsberg and Bott (2004).

[26] The term "risk factors" is used instead of the more common term "determinants". The term determinants implies a mechanistic relationship between variables: if a man abuses alcohol, for example, intimate partner violence will result. This is clearly not the case; alcohol abuse increases the likelihood of intimate partner violence, but does not mechanistically indicate the presence of violence (Morrison, Ellsberg and Bott, 2004).

Bangladesh, Uganda, Chile and Nicaragua (Jewkes, 2002; Koenig et al. 2003, Larrain, 1994; Ellsberg et al. 1999).

It is also important to build econometric models that are specific to the different manifestations of GBV. As can be seen below, while some of the risk factors that emerge as statistically significant in the logit regressions are common across the different types of violence, there is much variation in the significance of particular variables across different types of violence..

Table 5, taken from Morrison, Ellsberg and Bott (2004), identifies risk factors for intimate partner violence that have been found to be significant in recent empirical studies.[27] Unfortunately, not all the variables identified as potentially important are available in the DHS surveys; we identify with italics those variables which are available—albeit imperfectly specified in some cases—in at least one of our countries of interest. Two additional variables, household size and structure (nuclear versus non-nuclear) and urban versus rural residence are also included in our logit specification despite not being present in Table 5.[28]

We estimate a separate logit model for each of the different types of GBV we will examine: physical violence by intimate partner; physical violence by relative; and sexual violence by intimate partner.[29] For each type of violence, we estimate the determinants of current violence (experienced in the 12 months prior to the survey) and lifetime violence.

In general, the equations for physical violence against women by intimate partners show a reasonably good fit. The equations for sexual violence by intimate partners have lower overall significance than those predicting physical violence. As expected, the relevance of each risk factor varies greatly by type of violence and whether the violence has occurred in the past or is currently occurring (in the last 12 months).

Lifetime physical violence by intimate partners

Table 6 contains the logit estimation results for risk factors for physical violence that occurred at any point in the lifetime. Age of the women has the expected negative sign

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[27] Factors that increase the probability of experiencing intimate partner violence have a positive sign next to them and factors that diminish the probability of experiencing violence have a negative sign next to them. Some factors can have a positive or negative sign depending on the specific context.

[28] Our logit model is similar to the logit model estimated by Kishor and Johnson, who also use DHS data. They, however, do not use these logit results as inputs to propensity score matching.

[29] The DHS survey also contains information on sexual violence suffered at the hands of relatives and physical and sexual violence suffered at the hands of strangers for some of the countries. Logit equations for these types of violence are not reported for the following reasons: i) the sample of women who answered questions on sexual violence by relatives was much smaller than the original sample size; ii) the ecological model of risk factors of domestic violence was not relevant to predict physical or sexual violence by strangers; iii) DHS data sets do not contain variables that are risk factors for these types of violence.

only in Haiti for women over 45. Surprisingly, in Peru older women experience a higher risk of violence—which may be due to cohort effects, i.e., a generational transition towards lower physical violence levels. In the case of Zambia, age is never statistically significant. Women's age at marriage (or first intercourse age) is significant in all countries and an older age at marriage uniformly reduces the probability of experiencing violence. Women who have been in more than one union have a lower probability of having suffered physical violence in their lifetime in Peru and Zambia, but the variable is not significant in Haiti. The protective effect of having had more than one union may be illusory; it may in fact be picking up the fact that women left a relationship where physical violence was imminent.

In Peru, the risk of violence increases monotonically with the number of children, but in Zambia women with one or two children have higher risk, while those with more children have the same risk level as those without children; this result is difficult to interpret. In Peru and Haiti women who were victims of physical violence as children have a significantly higher probability of experiencing intimate partner violence as adults; unfortunately, this variable was not available for Zambia. Alcohol abuse by the partner significantly raises the probability of violence in the two countries—Peru and Haiti— where this variable is available; in Peru, it increases the probability of violence more than nine times.

Having an older male partner is generally associated with a lower probability of violence. In Peru and Zambia this effect is generally monotonic, but in Haiti violence does not decrease until a woman is older than 45. In Peru, the male partner having more education than the female partner is associated with lower violence; in Haiti, the opposite effect prevails. Marital duration is significant only in Zambia, but it has an unexpected sign: longer marriages are associated with more violence, not less. Control by the husband increases the probability of violence, while participation of the woman in economic decision making in the household reduces it. In Zambia, women living in nuclear households have a higher probability of suffering of physical violence which may be due to higher isolation of the woman from her relatives and the relatives of her partner. Wealth is statistically significant only in Peru, where it has a non-linear impact on violence: households in the third quintile register the highest probability of violence, followed by second quintile households.[30] Fourth and first quintile households have equal probabilities, and the richest quintile registers the lowest probability of physical violence by a male partner.

Finally, at the community level, urban households register a higher probability of violence than rural households in all three countries.

The model is globally significant at the one percent level in all countries. It correctly predicts between 59 percent (Zambia) and 84 percent (Haiti) of all cases of physical violence by partner. The model improves the forecast of physical violence by male

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[30] We use wealth to proxy for economic hardship (see Table 5). The wealth index, in the DHS data set, is based on house conditions, location, access to water and sanitation, and availability of certain household goods (bicycle, refrigerator, etc.).

partner over the predictions of a "naïve" model—based simply on the frequency of violence—in the three countries, but the improvement over the naïve model is quite modest in Haiti and Zambia.

Current physical violence by intimate partners

Table 7 shows the result of the estimation of a logit model predicting the probability of current (last 12 months) physical violence by a male intimate partner. Data on the timing of violence are not available in the case of Peru; thus, results are reported only for Haiti and Zambia. The most relevant risk factors behind current physical violence are: age of the woman (older women facing lower probabilities of experiencing current violence), number of unions, experiencing violence as a child, male partner's alcohol abuse, marital duration (in Haiti longer duration increases the risk of violence, while in Zambia it reduces the risk of violence), family structure and area of residence (urban areas face a higher probability of violence).

For Haiti, the results for current violence are very similar to those for lifetime violence; in the case of Zambia, the results look quite different.[31]   The model is globally significant at one percent. It correctly predicts more than 65 percent of all cases of current physical violence by partner. The model improves on the forecast of a "naïve" model in both countries—quite significantly in the case of Zambia and modestly in the case of Haiti.

Current and lifetime sexual violence by intimate partners

Tables 8 and 9 summarize the results from estimating a logit model to predict lifetime and current sexual violence by partner in Haiti and Zambia; data on sexual violence are not available for Peru. The risk of ever experiencing this type of violence diminishes considerably with age for women in Haiti. In Zambia, chronological age is not significant but women who were older at the moment of first sexual intercourse have a lower probability of experiencing sexual violence by a partner. Women with children also experience less risk of sexual violence in Zambia. Completing primary education reduces the risk of experiencing sexual violence for women in Zambia. Alcohol consumption by the partner increases the risk of sexual violence in Haiti, but only up to a certain extent (perhaps due to the fact that alcohol abuse may have a negative impact on sexual performance in males). Large age differences between partners reduce the probability of sexual violence when the male partner is older than the female (in Haiti). Control by the male partner more than doubles the odds of experiencing this type of violence for women

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[31] Age of the woman is statistically significant for current violence, but not for lifetime violence. Women's age at marriage matters for lifetime violence, but not for current violence. Number of unions and duration of marriage are significant for both lifetime and current violence, but the direction of the impact differs. These results are driven by the fact that the question on current violence in the Zambia DHS was not well-worded, and many women did not answer the question. Thus, the sample size for the current violence logit is less than half as large as in the case of lifetime violence.

in Haiti. Women in urban and middle income households face higher risks of sexual violence by partner than their counterparts in rural areas or poor or wealthy quintiles.

In spite of being globally significant at 1 percent in Haiti and 10 percent in Zambia, the models of sexual violence are not very impressive. In the case of lifetime violence, they offer little improvement in predictive power over the naïve model in Haiti, and perform marginally worse than the naïve model in Zambia.

The risk of experiencing sexual violence by partner in the last 12 months (see Table 9) could only be estimated in the case of Haiti due to the large number of missing values in the dependent variable for Zambia. Results are similar to the results obtained in the model predicting the probability of ever experiencing sexual violence by a male partner.

Lifetime physical violence by relatives

Table 10 summarizes the results of the logit model predicting physical violence inflicted on women by relatives or other household members (aside from their male partner). The risk of experiencing this type of domestic violence diminishes with age in the three countries. Women who are in their second –or higher- union have a higher risk of experiencing violence by relatives (perhaps the relatives of her new partner). The odds are reduced significantly for women with children—especially large numbers of children—in Haiti and Zambia. In Zambia, women who have secondary education paradoxically face a higher probability of physical violence from their relatives than less educated women. In Peru, alcohol abuse by the male partner increases physical violence of relatives towards his female partner. This form of violence is more likely in urban households and, in the case of Peru, in less wealthy households.

This model is globally significant for Peru and Zambia, but not for Haiti. Even though the model correctly predicts a large percentage of cases, it does not improve on a naïve model in any of the three countries.

C. Propensity score matching results: Effects of violence on health , education, and employment outcomes

Using the estimated probabilities from the logit models above, we estimate propensity scores for each type of violence. The propensity scores are used, in turn, to construct a "propensity" matched control group: women who have not experienced violence but have a similar a priori probability of experiencing violence and similar values of the risk factors as victims (i.e., both the common support condition and balancing property are met). We employ one-to-one matching in which each woman who suffered violence is matched to one woman in the control group with the closest predicted value from the relevant logit equation.[32]Once the groups are constructed we estimate average treatment

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[32] We employ the Nearest Neighbor Matching algorithm for STATA (pscore), recently created by Becker and Ichino, to estimate average treatment effects.

effects of the occurrence of violence. The significance of differences between the two groups is tested using bootstrapped standard errors.

The tables presenting the results of the PSM that follow are organized into six panels that summarize the effect of each type of GBV on: i) women's health; ii) women's use of health services; iii) women's employment; iv) health of children aged 0-5; v) educational achievement of children older than 7; and vi) mother's use of violence to discipline children. It is crucially important to separate women's health outcomes from women's use of health services, since the impact of GBV on women's health outcomes is unambiguously negative, while its impact on the use of health services is much less so. The use of health services and victimization by violence in fact may be positively correlated, since violence may compel women to seek medical care, at which time other health services are provided. In all the tables, the average treatment effects are presented as the mean value of women who suffered GBV (or the mean value for their children) minus the mean value of the control group of women unaffected by GBV (or the mean for their children). Table 11 contains descriptive statistics for each outcome variable.

Lifetime physical violence by intimate partners

Table 12 reports the difference in outcomes of interest for women (and their children) who have experienced physical violence at the hands of intimate partners and a control group of women unaffected by physical violence by their partners.

In general, the health outcomes of women who suffered physical violence are markedly worse than that of their matched peers. They are far more likely to have:

- complications during delivery: in Peru, the percentage of women who had complications was 7 percentage points higher among women victims of physical violence.
- terminated their pregnancy before term: in Peru, women victims of physical violence on average terminated more pregnancies than non-victims.
- contracted sexually transmitted diseases: in Peru and Zambia, the percentage of women who contracted STDs was 4.0 and 1.9 percentage points higher (respectively) among women victims of physical violence.
- suffer from genital sores or ulcers: in Haiti and Zambia, the percentage of women who contracted genital sores or ulcers was 4.3 and 2.8 percentage points higher (respectively) among women victims of physical violence
- anemia: in Haiti, women who suffered physical violence had on average, more severe anemia than non-victims. In Peru, however, women who suffered physical violence had ,on average, less severe anemia.

In fact, the only health outcome measure for which there is not evidence of the pernicious impact of physical violence is women's nutritional status, as measured by weight for height. On this measure, there is no statistically significant difference between victims and non-victims.

The usage of health services is another issue. In general, women affected by physical violence tend to use health services more intensively, although the evidence for this assertion is not overwhelming. In one out of the three countries, women victims of physical violence were more likely to visit a health facility, have births assisted by a health care professional, and use contraceptives.[33] On the other hand, in Haiti, women victims were significantly less likely to receive prenatal care.

Total fertility shows no clear relationship to physical violence. Nor are family planning needs or outcomes clearly linked to physical violence: in Peru, women victims are less likely to have unmet family planning needs and more likely to describe their last child as "wanted", but in Zambia victims are more likely to have unmet family planning needs.

There is strong evidence that women affected by physical violence are more likely to be in paid employment (ranging from 2.2% more likely in Haiti to 6.0 and 6.2% more likely in Zambia and Peru, respectively.

With relation to children's health outcomes, children of women who suffer physical violence at the hands of intimate partners are more likely to suffer diarrhea (6.7 percentage points more likely in Peru), suffer anemia (19.2 percentage points more likely in Haiti), and trail children of unaffected women in height for age (Peru). On the other hand, children of women victims are more likely to be immunized in Peru. Other child health outcomes such as under-five mortality and chronic coughing show no relation to physical violence against the mother.

In general, children's educational outcomes are unaffected by physical violence against their mothers, with the exception of Peru where children of women victims are more likely to attend school and less likely to be behind in school.

Finally, there is evidence from Peru that women who suffer physical violence are more likely to use violence to discipline their children. This leads to an inter-generational transmission of violence, since children who are victims of violence are likely to reproduce violence later in their lives.[34]

Current physical violence by intimate partners

Table 13 presents the limited evidence on the impact of current physical violence by intimate partners, based on results from Haiti.[35] The negative impact on women's health

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[33] As suggested above, this may simply be the result of women seeking treatment for injuries sustained because of physical violence by intimate partners, and then being referred to other health services. In the other two countries, the differences between the two groups were not statistically significant.

[34] Note that there is scientific evidence also documenting the inter-generational transmission of violence if children merely witness family violence—even if they are not direct victims.

[35] The evidence is limited because the Peru DHS survey does not allow identification of the time period in which violence occurred. The Zambia question was badly worded, leading to a loss of more than half the sample because of missing values. In addition, when we attempted to implement PSM with the smaller

outcomes is supported by the fact that women in the victims group have more terminated pregnancies and genital sores and ulcers. They are significantly more likely (17.6 percentage points) to have visited a health facility.

There is no measurable impact on women's labor force participation, and the effects on children's health outcomes are modest: the only statistically significant difference is a slightly higher rate of anemia among children of women victims.

The impact on children's educational attainment is large and statistically significant; children of women victims, on average, have accumulated approximately one-half a year less of education than school-aged children of women in the control group.

Lifetime and current sexual violence by intimate partners

Tables 14 and 15 report the impacts of lifetime and current sexual violence by intimate partners in Haiti.[36] The impact on women's reproductive health is similar to that of current physical violence: women victims are more likely to have terminated pregnancies (lifetime sexual violence), to have a sexually transmitted disease (current sexual violence) and to have genital sores and ulcers (current *and* lifetime sexual violence). Women victims seem to be better nourished and experience obesity more frequently, as measured by weight for height. As is the case for current physical violence in Haiti, victims of lifetime sexual violence are more likely to have visited a health facility. Impacts on children—whether measured by health or educational outcomes—are not significant for either current or lifetime sexual violence.

Lifetime physical violence by relatives

Table 16 reports results for this type of violence for Peru.[37] In spite of having a higher contraceptive use, women victims register a higher number of terminated pregnancies, unwanted children, and delivery complications—the latter perhaps because these women are also less likely to give birth assisted by a health care professional. Women victims have higher weight for height than women in the control group. Finally, women victims have a higher probability of working and earning cash than women in the control group.

Zambian sample, most of the variables of the logit model violated the "common support condition" required by PSM. Thus, we do not report PSM results for Zambia.

[36] In the case of Peru, data on sexual violence are not available. In the case of Zambia, the results of the logit model for lifetime violence did not predict violence well enough to constitute the base of the PSM. In the case of current sexual violence in Zambia, missing values reduced the sample size precipitously, preventing the estimation of a propensity score.

[37] In the case of Zambia, the base logit model was not robust enough for the PSM estimation. In the case of Haiti, none of the effects were statistically significant and consequently are not reported in Table 15.

Child health outcomes are noticeably poorer for women victims, as measured by height-for-age, weight-for-height and suffering from diarrhea. At the same time, educational outcomes are stronger for children of women victims. One wonders if women may remain in violent situations in exchange for economic support that allows their children to attend school—as has been documented in the case of sexual violence against women and girls in the African context (Leach, 2003). Finally, women who are victims of physical violence by relatives are more likely to use violence to discipline their children than women in the control group.

Overview of results

In general, we find strong impacts of GBV on women's health outcomes, especially on reproductive health; GBV also increases—not surprisingly—women's usage of health services.[38] The fact that women who are victims of GBV have a more intensive use of health services points out the high costs to society of GBV in terms of resource use.[39]

The impacts of GBV on paid work are strong: lifetime physical violence by intimate partner increases the probability of paid work in all three countries. This result, of course, may be the result of simultaneity between earnings and violence which is not resolved by PSM. On the one hand, women who are victims of GBV may have lower levels of productivity on the job and earn less. On the other hand, women who work outside the home threaten male supremacy and hence may be more frequent victims of violence.[40]

The study finds strong evidence that GBV may lead to the inter-generational transmission of violence.[41] Women who are victimized by physical violence—whether at the hands of intimate partners or relatives—are more likely to use violence in disciplining their children; much scientific evidence has documented that children exposed to such violence are more likely to engage in violent and delinquent behaviors.

The study also finds an impact of GBV on children's health outcomes, with the specific manifestations varying by type of GBV and by country. Where impacts are found on children's educational performance, they are of an unexpected direction, with children of women victims more likely to attend school and less likely to be behind in age/grade

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[38] Note that this is after controlling for urban or rural residence, household wealth and other variables which would be present in a demand function for health services, so we are able to argue strongly that this finding is attributable to GBV.

[39] Of course, this cost will and should increase as more women make use of services and as services to survivors are expanded. Service use can be interpreted as a positive development: women are cognizant of available services and willing to seek help.

[40] Note that the assumption made in estimating the logit equation for GBV was that labor force participation was not a determinant of GBV; this assumption was necessary in order to use PSM to examine the impact of GBV on labor force participation. The result of the PSM exercise—that women who suffer GBV are more likely to engage in paid work—calls the validity of this assumption into question.

[41] Evidence on this link is particularly strong given the fact that it is less affected by reverse causality issues.

progression.[42]A possible explanation for this result is that women who suffer violence at home try to keep their children outside of the home for as long as possible to protect them from abuse.

5. Conclusions

This paper has described the various methodologies available for estimating the impact of gender-based violence, whether a monetary value is attached to these impacts or not. It is clear that the field has grown enormously since the first direct cost estimates were produced more than ten years ago. It is also clear that these estimates have had a key role in the public policy debate about gender-based violence.

Not surprisingly, all the methodologies in this paper have advantages and disadvantages (as summarized in Table 3). Accounting approaches to estimating the costs of GBV are straightforward to carry out, but may seriously underestimate the true social costs of violence and may be especially problematic in a developing country context. Indirect cost estimates of the impact of GBV on women's labor force participation and earnings have been successful in highlighting the productivity impacts of gender-based violence and have helped establish that GBV is an important to both economic development and gender equality; at the same time, indirect cost estimates have suffered from econometric weaknesses that have yet to be definitively resolved.

DALY measures of the health impacts of GBV have proved indispensable for firmly placing the issue of GBV on the public health agenda, yet they have not been particularly useful in terms of formulating policy responses to violence and seem to have had a somewhat limited impact beyond the health sector. Naïve comparison of mean outcomes between women who have suffered violence and those who have not have contributed to identifying the specific health impacts on women and their children, but have been criticized for being less than rigorous in their formation of control groups of non-victims. Finally, propensity score matching adds rigor in the specification of control groups, but does not solve simultaneity issues.

In sum, there is no perfect methodology with which to gauge the costs and impacts of GBV. All methodologies have strengths and weaknesses, and the challenge is to choose

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[42] It is interesting to compare our results using PSM to those obtained by Kishor and Johnson (2004), who also used DHS surveys from these countries but who simply compared mean values for victims and non-victims. Of course, the results are not strictly comparable, since Kishor and Johnson did not distinguish between different types of violence and since their sample sizes are larger (we include in our sample only *currently married* women and loose observations due to missing values in some variables in the logit regressions). Kishor and Johnson found effects of GBV on number of children in Peru and Zambia which are not present in our PSM results. (Interestingly, Heise, Ellsberg and Gottemoeller (1999), citing evidence from Nicaragua, argue that the causality goes in the other direction: women who are victims of violence are less able to control their fertility, and consequently have more children.) Kishor and Johnson also find that GBV increases under-five mortality in all three countries, while we find no such effect. There are other, more nuanced differences between the impacts detected by the two studies.

the appropriate methodology given both data constraints and the potential consumers of the estimates.

Future research on the costs and impacts of GBV has many promising fronts to explore. First, it would be useful to employ the PSM methodology on richer data sets that include more information on the women's labor force participation and earnings, as well as household consumption patterns. This would allow the indirect costs of GBV to be explored in a methodologically rigorous way. Second, more work needs to be done on the relationship between income, wealth and violence. Any research has to deal with simultaneity issues, which PSM does not resolve. Third, the results from this paper suggest that GBV is more prevalent in urban areas—which is exactly opposite the conclusion emerging from the WHO's multi-country study. Studies on this issue will need to address under-reporting of violence, which is frequently assumed—without evidence—to be a larger problem in rural areas; these studies necessarily will be qualitative in nature. Finally, there is a need for more studies on the economic costs of regionally-specific types of GBV such as female genital mutilation, dowry violence and incest, in order to position this issue as what it is: not only a woman's issue, a public health issue and a human rights issue, but also as an issue affecting poverty, development and economic growth.

Figure 1: Percentage of women who reported physical violence by an intimate partner in past 12 months and over lifetime
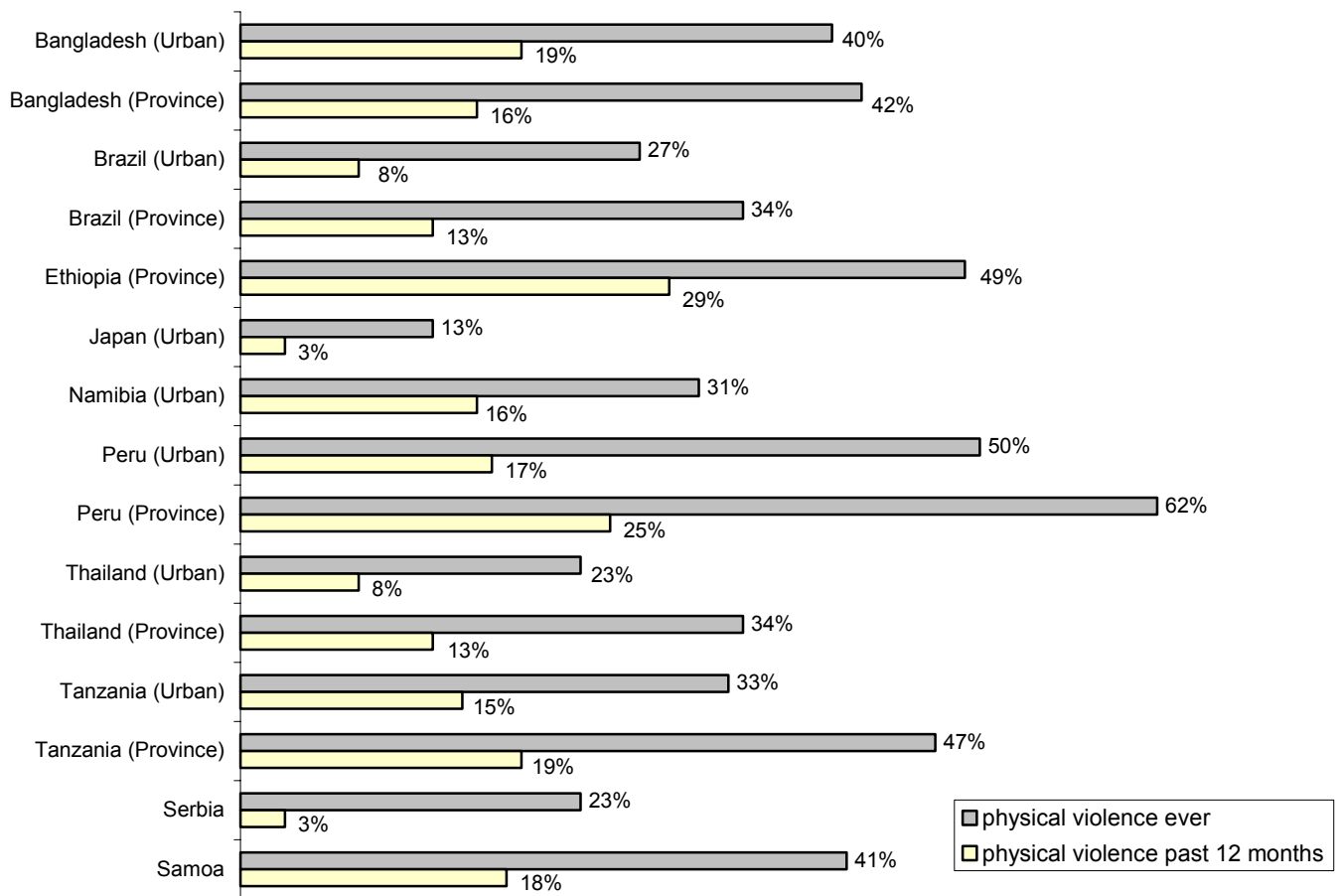
Source: Unpublished data from the WHO Multi-country study on Women's Health and Domestic Violence Against Women. The final published comparative report is forthcoming. Cited with permission.

Table 1: Percentage of adult women reporting sexual victimization by an intimate partner: population-based surveys

Country	Study population	Year	Sample size	Assaulted (attempted or completed) *in last 12 months* %)	Percentage *ever* assaulted	
					Attempted or completed forced sex (%)	Completed forced sex (%)
Brazil	Sao Paulo [a]	2000	941	2.8	10.1	
	Pernambuco [a]	2000	1188	5.6	14.3	
Canada	National	1993	12,300		8.0	
	Toronto	1991-1992	420		15.3 [b]	
Chile	Santiago	1997	310	9.1		
Finland	National	1997-1998	7,051	2.5	5.9	
Japan	Yokohama [a]	2000	1,287	1.3	6.2	
Indonesia	Central Java	1999-2000	765	13.0		
México	Durango	1996	384		42.0	
	Guadalajara	1996	650	15.0	23.0	
Nicaragua	León	1993	360		21.7	
	Managua	1997	378	17.7		
Peru	Lima [a]	2000	1,086	7.1	22.5	
	Cusco [a]	2000	1,534	22.9	46.7	
Puerto Rico	National	1993-1996	7,079			5.7 [b]
Sweden	Teg, Umea	1991	251		7.5 [c]	
Switzerland	National	1994-1995	1,500		11.6	
Thailand	Bangkok [a]	2000	1,051	17.1	29.9	
	Nakornsawan [a]	2000	1,027	15.6	28.9	
Turkey	East and southeast Anatolia	1998	599			51.9 [b]
United Kingdom	England, Scotland and Wales	1989	1,007			14.2 [d]
	North London	1993	430	6.0 [b]	23.0 [b]	
United States	National	1995-1996	8,000	0.2 [b]	7.7 [b]	
West Bank and Gaza Strip	Palestinians	1995	2,410	27.0		
Zimbabwe	Midlands Province	1996	966		25.0	

[a] Preliminary results from WHO multi-country study on women´s health and domestic violence. Geneva: WHO. Sample size reported is denominator for the prevalence rate and not the total sample size of the study.

[b] Sample group included women who had never been in a relationship and therefore were not at risk of being assaulted by an intimate partner.

[c] offenders reported to be husbands, boyfriends and acquaintances.

[d] weighted estimate; unweighted prevalence rate was 13.9%

Source: WHO, World Report on Violence and Health.

Table 2: Percentage of women aged 16 years and older who report having been sexually assaulted in previous 5 years: selected cities, 1992-1997

Country	Study population	Year	Sample Size	Percentage of women sexually assaulted in previous 5 years (%)
Africa				
Botswana	Gaborone	1997	644	0.8
Egypt	Cairo	1992	1,000	3.1
South Africa	Johannesburg	1996	1,006	2.3
Tunisia	Grand-Tunis	1993	1,087	1.9
Uganda	Kampala	1996	1,197	4.5
Zimbabwe	Harare	1996	1,006	2.2
Latin America				
Argentina	Buenos Aires	1996	1,000	5.8
Bolivia	La Paz	1996	999	1.4
Brazil	Rio de Janeiro	1996	1,000	8.0
Colombia	Bogotá	1997	1,000	5.0
Costa Rica	San José	1996	1,000	4.3
Paraguay	Asunción	1996	587	2.7
Asia				
China	Beijing	1994	2,000	1.6
India	Bombay	1996	1,200	1.9
Indonesia	Jakarta and Surabaya	1996	1,400	2.7
Mongolia	Ulaanbaatar, Zuunmod	1996	1,201	3.1
Philippines	Manila	1996	1,500	0.3
Eastern Europe				
Albania	Tirana	1996	1,200	6.0
Hungary	Budapest	1996	756	2.0
Lithuania	Diauliai, Kaunas, Klaipeda, Panevezys, Vilnius	1996	1,201	3.1

Source: International crime victimization survey (UNICRI), cited in WHO World Report on Violence and Health.

Table 3: Comparison of advantages and disadvantages of GBV costing and impact estimation methodologies

	Issues using methodology	Properties of results
Monetary costing:		
Accounting (direct costs)	- Social norms may inhibit the use of medical, mental health, police, and justice services by women victims of GBV - Information on usage of medical, mental health, police, and justice services by victims is rarely available or accurate - Information on the unit cost of medical, mental health, police, and justice services is rarely available or subject to severe distortion - Willingness to pay for a life free of GBV may not be reflected by government's allocation of public funds - Cost categories are essentially arbitrary	- Allow dimensioning of GBV relative to other issues - Can be used to determine cost effectiveness of preventing GBV - Inform allocation of public funds - Tend to *underestimate* the cost of GBV (inhibited demand, productivity losses, and intergenerational transmission of violence are not included)
Estimation of indirect costs (productivity and earnings losses of victims and perpetrators)	- Special large sample surveys that include both GBV data and labor data are expensive - GBV data gathering requires extensive training of survey personnel and safeguards for the privacy and safety of the respondent - Special violence surveys, violence modules in DHS, and victimization surveys have been recently conducted in many countries. Some surveys contain data on labor force participation and earnings - Methodologies can be complex - Econometric problems yet to be resolved (simultaneity)	- Allow dimensioning of GBV relative to other issues. However, indirect costs estimates for other epidemics may not be available for some countries - Can be used to determine cost effectiveness of preventing GBV - Inform allocation of public funds - Hard to know if they *underestimate or overestimate* the cost of GBV

Non-monetary costing:		
Disability adjusted life years lost (DALYs)	- Information on premature death, physical injuries, and mental secuelae caused by GBV may be hard to obtain or estimate - Public health data to estimate DALYs for conditions listed above may not be available	- Allow dimensioning of GBV relative to other issues. However, e DALYs estimates for other epidemics may not be available - Can be used to determine cost effectiveness of preventing GBV - Inform allocation of public funds - Estimation of the health impact of GBV is very *accurate*, but does not include other costs (use of judicial system and productivity losses)
Impact on health and education outcomes –Naïve comparisons	- Both large and small sample surveys can be used - GBV data gathering requires extensive training of survey personnel and safeguards for the privacy and safety of the respondent - Special violence surveys, violence modules in DHS, and victimization surveys have been recently conducted in many countries. Generally, these surveys contain data on health and education outcomes for all household members - Simple to calculate - Control group differs from victims group in more aspects than the experience of violence - Econometric problems (simultaneity)	- Allow dimensioning of GBV relative to other issues. However, impact estimates for other epidemics may not be available - Hard to know if they *underestimate or overestimate* the cost of GBV

| Impact on health and education outcomes –Propensity Score Matching | - Special large sample surveys that include GBV data are expensive
- GBV data gathering requires extensive training of survey personnel and safeguards for the privacy and safety of the respondent
- Special violence surveys, violence modules in DHS, and victimization surveys have been recently conducted in many countries. Generally, these surveys contain data on health and education outcomes for all household members
- Complex estimation methodologies
- Econometric problems yet to be resolved (simultaneity) | - Allow dimensioning of GBV relative to other issues. However, impact estimates for other epidemics may not be available
- Hard to know if they *underestimate or overestimate* the cost of GBV |

Table 4: Prevalence of gender based violence in Peru (2000), Haiti (2000), and Zambia (2002) – Currently married or co-habitating women

Gender Based Violence Type	Peru		Haiti		Zambia	
	N*	%	N	%	N	%
Ever experienced physical violence by partner	12,522	39.80	2,260	14.47	3,487	41.76
Currently experiencing physical violence by partner**	n.a.	n.a.	2,210	12.53	1,456	23.03
Ever experienced sexual violence by partner	n.a.	n.a.	2,260	18.89	3,485	5.5
Currently experiencing sexual violence by partner	n.a.	n.a.	2,232	17.43	452	6.6
Ever experienced physical violence by relatives (other than husband in the household)	12,495	26.63	2,256	2.93	3,479	21.96
Ever experienced physical violence by strangers	n.a.	n.a.	2,256	0.58	n.a.	n.a.
Ever experienced sexual violence by other than husband	n.a.	n.a.	n.a.	n.a.	3,490	13.00

Notes: * N= Number of women who answered questions regarding each type of gender based violence

   **Current* = in the last 12 months

Table 5: Risk factors for intimate partner violence

Individual-level[43]	Relationship-level[44]	Community-level[45]	Societal level[46]
Socialization and learning			
witnessing intimate partner violence as a child (+)[47]		Neighborhood crime rates (+)	cultural norms that support violence as an accepted way to resolve conflicts or to punish transgressions(+)
suffering abuse as a child (+)	Association with gang, delinquent or patriarchal peers (+)	Absent or maladaptive teaching of alternatives to violence (+)	
Power relations and patriarchal gender norms			
absent or rejecting father (+)	*male control of household decision-making and wealth (+)*	Norms that support male dominance over women and that require women's obedience and sexual availability (+)	norms that support male dominance over women and that require women's obedience and sexual availability (+)
	Controlling behavior on the part of the husband (+)	Policies and laws that discriminate against women in social, economic and political spheres	Policies and laws that discriminate against women in social, economic and political spheres
	Multiple partners/wives for the husband (+)		
	Differences in spousal age and education (+)		
	Household structure (nuclear versus non-nuclear) (+/ -) [48]	*Area of residence (region, urban, rural, large cities, small cities)[49]*	

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[43] Individual level: biological and personal history factors among both victims and perpetrators

[44] Relationship level: proximal social relationships, including relations with friends, peers and family.

[45] Community level: community context in which social relationships are embedded, including schools, workplaces and neighborhoods

[46] Societal level: larger societal factors that "create an acceptable climate for violence, reduce inhibitions against violence, create an sustain gaps between segments of society (WHO, 2002: 13)."

[47] For boys, witnessing violence increases the risk of becoming an abuser, whereas for girls it increases the risk for future victimization.

[48] Kishor and Johnson (2004) find that women in nuclear households experience a higher probability of violence.

[49] Kishor and Johnson (2004) find that women in rural areas have a lower probability of experiencing violence compared to women living in rural areas.

Human capital and employment			
female educational level (-)	*economic hardship (+)*	Lack of economic opportunities for men (+)	
Male educational level (-)			access and control over economic resources for women (+/-)
Women engaged in income generation activities (+/-)			
Life cycle			
age of woman (-)	*length of relationship (-)*		
Triggers			
HIV status of man or woman (+)	*alcohol* and substance *abuse by male (+)*		

Source: Morrison, Ellsberg and Bott (2004)
Note: Signs in parenthesis indicate the sign of the correlation between the risk factor and the probability of experiencing intimate partner violence.

Table 6: Logit estimates (odds ratios) of risk factors of ever experiencing physical violence by intimate partner

Explanatory Variable	Peru	Haiti	Zambia
Individual Characteristics			
Age group (ref: age group 15-19)			
20-24	1.2154	-	1.15223
25-29	1.7405***	0.5692	1.31837
30-34	1.9305***	0.5237	1.05689
35-39	1.9000***	0.5949	0.98928
40-44	2.1057***	0.6074	1.12497
45-49	2.3565***	0.2427**	0.85898
Woman's age at marriage (ref: less than 15 years old)			
15-19	0.8125***	-	0.80417**
20-24	0.5673***	-	0.76903*
25+	0.3778***	-	0.60192*
Age at first intercourse	-	0.9065**	-
Number of unions (ref: one)			
More than one union	0.8894*	0.8024	0.59074***
Number of children ever born (ref: no children)			
1-2	1.6734***	-	1.34279*
3-4	1.8973***	-	1.22302
5+	2.1348***	1.0720	1.36924
Woman's education level (ref: none)			
Primary	1.0898	-	1.16239
Secondary or higher	1.0557	-	0.90155
Woman was hurt by father or punished physically as a child	1.5114***	2.2599**	n.a.
Partner's Characteristics			
Partner's education level (ref:none)			
Primary	1.2062	0.8028	0.92185
Secondary or higher	1.3137	1.1896	0.98975
Husband's drunkenness (ref: does not drink)			
Never comes home drunk	Ref	1.1323	n.a.
Sometimes comes home drunk	2.0344***	2.8432***	n.a.
Frequently comes home drunk	9.2491***	3.9657***	n.a.
Relationship-level			
Spousal age difference (ref: husband is younger)			
Husband is 0-4 years older	0.8628**	0.7773	0.79712
Husband is 5-9 years older	0.8602**	0.4559**	0.65368*
Husband is 10-14 years older	0.6861***	0.6960	0.68508
Husband is 15+ years older	0.6634***	0.5577	0.54586**

Spousal education difference (ref: husband has less education)			
Both have no education	-	-	0.85540
Both have same level of education	0.7222***	-	1.04217
Husband has more education	0.7835***	1.5768*	0.97305
Marital duration (ref: 0-4 years)	1.1315		
5-9 years	-	1.7118	1.70546***
10-14 years	-	1.2287	1.7422***
15 + years	Ref	1.7263	2.0125***
Control by partner (ref: non-controlling partner)	-	1.9035***	n.a.
Decision making participation (ref: does not participate in economic decisions)	0.9206*	-	0.8986
Family structure (ref:nonnuclear)			
Nuclear	1.0582	1.6436	1.2471**
Household wealth status (ref: poorest quintile)			
Second quintile	1.1838**	1.3066	-
Middle quintile	1.2222***	0.9467	-
Fourth quintile	1.0164	1.1531	-
Richest quintile	0.7104***	0.8072	-
Community-level			
Area of residence (ref: rural)			
Urban	1.3042***	1.9499**	1.3831***
- Log likelihood	7107.63	345.40	2277.59
Number of Women	11539	877	3450
LR chi squared (29)	1347***	79.32***	134.26***
Pseudo R squared	0.0866	0.1030	0.0286
Percentage predicted correctly	65.53%	84.61%	59.94%
Percentage predicted correctly naïve model	59.67%	84.0%	58.20%

Notes: ref= omitted category ; n.a.= not available in this dataset ; - = dropped due to collinearity or an alternative proxy variable that performed better; * significant at 10%; **significant at 5%; *** significant at 1%

Table 7: Logit estimates (odds ratios) of risk factors of currently experiencing physical violence by intimate partner

Explanatory Variable	Haiti	Zambia
Individual Characteristics		
Age group (ref: age group 15-19)		
20-24	0.4151*	0.71582
25-29	0.2094***	0.52332*
30-34	0.1896***	0.57384
35-39	0.1969**	0.42564*
40-44	0.1809**	0.63226*
45-49	0.0888***	0.27863**
Woman's age at marriage (ref: less than 15 years old)		
15-19	-	0.97139
20-24	-	0.96351
25+	-	0.91454
Age at first intercourse	0.9311	-
Number of unions (ref: one)		
More than one union	0.7290	2.71248***
Number of children ever born		
1-2	-	0.66643
3-4	-	0.62293
5+	0.8899	0.51987*
Woman's education level (ref: none)		
Primary	-	0.77232
Secondary or higher	-	0.77858
Woman was hurt by father or punished physically as a child	2.3301***	n.a.
Partner's Characteristics		
Partner's education level (ref:none)		
Primary	0.7545	0.62608
Secondary or higher	1.4673	0.60409
Husband's drunkenness (ref: does not drink)		
Never comes home drunk	1.1800	n.a.
Sometimes comes home drunk	3.2994***	n.a.
Frequently comes home drunk	5.3399***	n.a.
Relationship-level characteristics		
Spousal age difference (ref: husband is younger)		
Husband is 0-4 years older	0.7527	0.70673
Husband is 5-9 years older	0.4255**	0.75732
Husband is 10-14 years older	0.5938	0.61200
Husband is 15+ years older	0.5743	0.73365

Spousal education difference (ref: husband has less education)		
Both have no education	-	0.52037
Both have same level of education	-	1.15421
Husband has more education	1.4180	0.88489
Marital duration (ref: 0-4 years)		
5-9 years	2.3576**	0.57037***
10-14 years	2.4616	0.34302***
15 + years	2.8136*	0.31774***
Control by partner (ref : non-controlling partner)	1.8870***	n.a.
Decision making participation (ref: does not participate in economic decisions)	-	0.87148
Family structure (ref:nonnuclear)		
Nuclear	1.9318*	0.95762
Household wealth status (ref: poorest quintile)		
Second quintile	1.2325	-
Middle quintile	0.7018	-
Fourth quintile	1.0038	-
Richest quintile	0.6340	-
Community-level		
Area of residence (ref: rural)		
Urban	2.3357***	1.13419
- Log likelihood	307.78	895.99
Number of Women	859	1442
LR chi squared (29)	86.45***	192.66***
Pseudo R squared	0.1232	0.0971
Percentage predicted correctly	86.26%	65.33%
Percentage predicted naïve model	85.80%	54.99%

Note: ref= omitted category ; n.a.= not available in this dataset ; - = dropped due to collinearity or an alternative proxy variable that performed better; * significant at 10%; **significant at 5%; *** significant at 1%

Table 8: Logit estimates (odds ratios) of risk factors of ever experiencing sexual violence by intimate partner

Explanatory Variable	Haiti	Zambia
Individual Characteristics		
Age group (ref: age group 15-19)		
20-24	-	1.1068
25-29	0.1961***	0.9382
30-34	0.4534	1.3034
35-39	0.4523	1.3357
40-44	0.1941**	1.0060
45-49	0.2507*	0.8478
Woman's age at marriage (ref: less than 15 years old)		
15-19	-	-
20-24	-	-
25+	-	-
First intercourse age	0.9379	0.8810***
Number of unions (ref: one)		
More than one union	0.5616**	0.8698
Number of children ever born		
1-2	-	0.5678*
3-4	-	0.6350
5+	0.7409	0.3649**
Woman's education level (ref: none)		
Primary	1.3262	0.5813*
Secondary or higher	-	0.8981
Woman was hurt by father	1.4133	n.a.
Partner's Characteristics		
Partner's education level (ref:none)		
Primary	0.6255	1.2925
Secondary or higher	0.6236	0.9284
Husband's drunkenness (ref: does not drink)		
Never comes home drunk	1.4644	n.a.
Sometimes comes home drunk	2.6995***	n.a.
Frequently comes home drunk	0.7993	n.a.
Relationship-level		
Spousal age difference (ref: husband is younger)		
Husband is 0-4 years older	0.5749	2.5719
Husband is 5-9 years older	0.4351**	2.4575
Husband is 10-14 years older	0.7494	2.7036
Husband is 15+ years older	0.4509*	1.7344

Spousal education difference (ref: husband has less education)		
Both have no education	-	0.9929
Both have same level of education	-	0.8146
Husband has more education	1.0283	0.9646
Marital duration (ref: 0-4 years)		
5-9 years	0.4611	0.8957
10-14 years	0.7104	0.8602
15 + years	0.8795	1.1689
Control by partner (ref: non-controlling partner)	2.1580***	n.a.
Decision making participation (ref: does not participate in economic decisions)	-	0.9621
Family structure (ref:nonnuclear)		
Nuclear	2.8441	1.1055
Household wealth status (ref: poorest quintile)		
Second quintile	0.8133	-
Middle quintile	2.2735**	-
Fourth quintile	0.8389	-
Richest quintile	0.7253	-
Community-level		
Area of residence (ref: rural)		
Urban	1.9024*	1.8285***
- Log likelihood	226.157	488.44
Number of Women	516	2299
LR chi squared (29)	60.76***	39.34*
Pseudo R squared	0.1184	0.0387
Percentage predicted correctly	80.62%	94.21%
Percentage predicted correctly naïve model	80.23%	94.215%

Note: ref= omitted category ; n.a.= not available in this dataset ; - = dropped due to collinearity or an alternative proxy variable that performed better; * significant at 10%; **significant at 5%; *** significant at 1%

Table 9: Logit estimates (odds ratios) of risk factors of currently experiencing sexual violence by intimate partner

Explanatory Variable	Haiti
Individual Characteristics	
Age group (ref: age group 15-19)	
20-24	6.9351**
25-29	1.1960
30-34	2.9784**
35-39	2.9181**
40-44	1.0127
45-49	-
Woman's age at marriage (ref: less than 15 years old)	
15-19	-
20-24	-
25+	-
First intercourse age	0.9558
Number of unions (ref: one)	
More than one union	0.6347
Number of children ever born	
1-2	-
3-4	1.5953
5+	-
Woman's education level (ref: none)	
Primary	1.2670
Secondary or higher	-
Woman was hurt by father	0.9045
Partner's Characteristics	
Partner's education level (ref:none)	
Primary	0.7071
Secondary or higher	0.8136
Husband's drunkenness (ref: does not drink)	
Never comes home drunk	1.4531
Sometimes comes home drunk	3.0503***
Frequently comes home drunk	1.0443
Relationship-level	
Spousal age difference (ref: husband is younger)	
Husband is 0-4 years older	0.5772
Husband is 5-9 years older	0.4507**
Husband is 10-14 years older	0.7300
Husband is 15+ years older	0.4288*

Spousal education difference (ref: husband has less education)	
Both have no education	-
Both have same level of education	-
Husband has more education	1.0150
Marital duration (ref: 0-4 years)	
5-9 years	0.5522
10-14 years	0.8502
15 + years	1.1429
Control by partner (ref: non-controlling partner)	2.2035
Family structure (ref:nonnuclear)	
Nuclear	3.1156**
Household wealth status (ref: poorest quintile)	
Second quintile	0.9217
Middle quintile	2.1432**
Fourth quintile	0.6973
Richest quintile	0.5543
Community level	
Area of residence (ref: rural)	
Urban	2.2994**
- Log likelihood	208.87
Number of Women	509
LR chi squared (29)	63.27***
Pseudo R squared	0.1315
Percentage predicted correctly	82.32%
Percentage predicted correctly Naïve model	81.93%

Note: ref= omitted category ; n.a.= not available in this dataset ; - = dropped due to collinearity or an alternative proxy variable that performed better; * significant at 10%; **significant at 5%; *** significant at 1%

Table 10: Logit estimates (odds ratios) of risk factors of ever experiencing physical violence by relatives

Explanatory Variable	Peru	Haiti	Zambia
Individual Characteristics			
Age group (ref: age group 15-19)			
20-24	0.7698**	0.2976*	0.74093*
25-29	0.8378	0.1839*	0.84268
30-34	0.7635**	0.1426*	0.91493
35-39	0.7187**	0.2437	0.65262
40-44	0.7444**	-	0.56197
45-49	0.6593***	0.2474	0.61558
Woman's age at marriage (ref: less than 15 years old)			
15-19	-	-	1.0268
20-24	-	-	1.0795
25+	-	-	1.4341
First intercourse age	-	0.9678	-
Number of unions (ref: one)			
More than one union	2.3239***	0.9104	1.7389***
Number of children ever born			
1-2	1.0073	-	0.7998
3-4	0.9742	-	0.6431**
5+	1.0535	0.3482*	0.6184**
Woman's education level (ref: none)			
Primary	1.0389	-	1.1440
Secondary or higher	1.0864	3.1595	1.5516**
Woman was hurt by father	-	1.0579	n.a.
Partner's characteristics			
Partner's education level (ref:none)			
Primary	0.8810	1.3258	0.9469
Secondary or higher	0.8829	1.6684	0.9394
Husband's drunkenness (ref: does not drink)			
Never comes home drunk	-	2.8400*	n.a.
Sometimes comes home drunk	1.1206**	1.0194	n.a.
Frequently comes home drunk	1.7536***	-	n.a.
Relationship-level			
Spousal age difference (ref: husband is younger)			
Husband is 0-4 years older	-	0.6939	0.7378
Husband is 5-9 years older	-	0.9461	0.6547
Husband is 10-14 years older	-	0.4594	0.6493
Husband is 15+ years older	-	0.4596	0.8797
Spousal education difference (ref: husband has less education)			
Both have no education	-	-	0.8807
Both have same level of education	-	-	0.9351
Husband has more education	-	1.0633	1.1013

	Model 1	Model 2	Model 3
Marital duration (ref: 0-4 years)			
5-9 years	-	2.7755	0.8880
10-14 years	-	3.8295	0.8143
15 + years	-	3.4557	0.8594
Control by partner (ref: non-controlling partner)	-	1.3055	n.a.
Decision making participation (ref: does not participate in economic decisions)	-	-	1.1153
Family structure (ref:nonnuclear)			
Nuclear	-	0.4416	0.9237
Household wealth status (ref: poorest quintile)			
Second quintile	0.6797***	0.6222	-
Middle quintile	0.8869*	2.2189	-
Fourth quintile	0.5208***	1.9779	-
Richest quintile	0.7966***	2.7587	-
Community -level			
Area of residence (ref: rural)			
Urban	1.1604**	0.8482	1.2800**
- Log likelihood	6535.28	122.67	1761.97
Number of Women	11558	767	3442
LR chi squared (29)	368.76***	33.03	105.21***
Pseudo R squared	0.0274	0.1187	0.029
Percentage predicted correctly	73.15%	95.6%	77.89%
Percentage predicted correctly naïve model	73.19%	95.6%	77.98%

Note: ref= omitted category ; n.a.= not available in this dataset ; - = dropped due to collinearity or an alternative proxy variable that performed better; * significant at 10%; **significant at 5%; *** significant at 1%

Table 11 : Mean and standard deviation– education, health , and employment outcomes - currently married or cohabitating women

Outcome	Peru	Haiti	Zambia
Women's health			
Weight for Height (centimeters x kilograms)	12810.72 (7036.39)	9462.33 (1754.58)	8934.56 (1407.93)
Anemia (severity degree)	0.747 (0.82)	3.24 (0.80)	n.a.
Number of Children	3.31 (2.40)	3.88 (2.91)	3.49 (2.40)
Terminated Pregnancies	0.207 (0.405)	0.174 (0.38)	0.2187 (0.413)
Last Child Wanted (index 1 =wanted – 3=did not want more children)	1.87 (0.87)	1.94 (0.86)	1.58 (0.78)
Sexually Transmitted Disease (%)	20.65 (40.48)	3.4 (18.0)	2.5 (15.56)
Genital Sore /Ulcers (%)	n.a.	4.36 (20.0)	3.17 (17.54)
Delivery Complications (% of women)	36.41 (48.12)	n.a.	n.a.
Women's use of health services			
Visited Health Facility (%)	47.65 (50.0)	41.0 (49)	73.85 (44)
Antenatal Care (%)	97.63 (15.21)	79.0 (40)	93.66 (24.4)
Births Assisted by Health Care Professional (%)	53.11 (49.91)	56.0 (50)	40.88 (49.17)
Contraceptive Use (%)	87.56 (33.01)	42.5 (49.0)	50.8 (50.0)
Unmet Family Planning Needs (%)	14.58 (35.30)	60.1 (49.0)	47.13 (49.93)
Women's employment			
Employed and Earning Cash (probability)	0.4624 0.4599	0.5948 (0.4568)	0.5712 (0.4950)
Children's health (ages 0-5)			
Diarrhea (%)	16.20 (0.34)	26 (40.0)	21.9 (37.0)
Coughing (%)	n.a.	67 (44.0)	39.3 (45.0)

Anemia (%)	54.77 (49.80)	93 (79.5)	n.a.
Height for Age (centimeters x age in months)	2244.8 (2506.53)	2760.61 (2669.78)	1721.13 (2529.94)
Weight for Height (centimeters x kilograms)	6132.54 (2755.175)	4297.37 (2716.66)	4524.99 (2698.82)
Immunization (%)	36.68 (48.21)	61 (47.0)	8.48 (17.0)
Under 5 mortality (per 1000 births) [1]	68.46 (232.12)	75.27 (221.22)	108.15 (259.93)
Children's educational achievement (ages 7 and older)			
Education Years	0.59 (1.16)	2.28 (2.33)	2.48 (2.15)
Education Gap	0.865 (0.28)	2.44 (2.30)	1.64 (2.19)
School Attendance (%)	47.8 (50.50)	49 (43.0)	55 (40.0)
% Mothers using violence to discipline children	42.87 (50.21)	n.a.	n.a.

Note: Standard deviations in parenthesis

Table 12: Average effects of lifetime physical violence by intimate partner

Outcome	Peru	Haiti	Zambia
Women's health			
Weight for Height (centimeters x kilograms)	158.317	-186.427	29.874
Anemia (severity degree)	-0.048**	0.384 *	n.a.
Number of Children	0.030	-0.221	0.081
Terminated Pregnancies	0.101***	0.057	0.009
Last Child Wanted (index 1 =wanted – 3=did not want more children)	0.090 points***	0.109	-0.034
Sexually Transmitted Disease (%)	4.0 percentage points ***	1.4 percentage points	1.9 percentage points***
Genital Sore /Ulcers (%)	n.a.	4.3 percentage points*	2.8 percentage points***
Delivery Complications (% of women)	7.0 percentage points***	n.a.	n.a.
Women's use of health services			
Visited Health Facility (%)	1.4 percentage points	7.9 percentage points	3.5 percentage points**
Antenatal Care (%)	-0.1 percentage points	-13.9 percentage** points	-1.3 percentage points
Births Assisted by Health Care Professional (%)	5.2 percentage points***	1 percentage point	-0.3 percentage points
Unmet Family Planning Needs (%)	-2.9 percentage points***	3.5 percentage points	0.4 percentage points*
Contraceptive Use (%)	3.6 percentage points***	13.6 percentage points	1.6 percentage points
Women's employment			
Employed and Earning Cash (probability)	0.062***	0.022*	0.060**
Children's health (ages 0-5)			
Diarrhea (%)	6.7 percentage points***	6.2 percentage points	1.6 percentage points
Coughing (%)	n.a.	9.4 percentage points	0.6 percentage points
Anemia (%)	-2.7 percentage points	19.2 percentage* points	n.a.
Height for Age	-111.225 *	- 150.061	36.384

(centimeters x age in months)			
Weight for Height (centimeters x kilograms)	-124.695	-143.67	-69.323
Immunization (%)	12.9 percentage points***	-8.3 percentage points	-0.5 percentage points
Under 5 mortality (per 1000 births) [1]	-6.852	13.79	10.646
Children's educational achievement (ages 7 and older)			
Education Years	n.a	-0.254 of a year	0.062 of a year
Education Gap	-0.043 of a year*	0.182 of a year	0.033 of a year
School Attendance (%)	2.2 percentage points***	-1.9 percentage points	-2.7 percentage points
% Mothers using violence to discipline children	7.0 percentage points***	n.a.	n.a.

* significance at 10% ** significance at 5% *** significance at 1%

[1] This is not a population child mortality rate. This variable is the sample *average* the number of children under 5 who died divided by each woman's total number of births per 1000. In this case both rates are similar since there is no significant difference in the total number of children between the victims group and the control group.

Table 13: Average effects of current physical violence by intimate partner

Outcome	Haiti
Women's health	
Weight for Height (centimeters x kilograms)	-205.576
Anemia (severity degree)	0.157
Number of Children	0.180
Terminated Pregnancies	0.107 **
Last Child Wanted (index 1 =wanted –3=did not want more children)	- 0.001
Sexually Transmitted Disease (%)	2.4 percentage points
Genital Sore /Ulcers (%)	5.8 percentage points**
Women's use of health services	
Visited Health Facility (%)	17.6 percentage points**
Antenatal Care (%)	- 4.8 percentage points
Births Assisted by Health Care Professional (%)	11.4 percentage points
Unmet Family Planning Needs (%)	8.0 percentage points
Contraceptive Use (%)	4.1 percentage points
Women's employment	
Employed and Earning Cash (probability)	0.013
Children's health (ages 0-5)	
Diarrhea (%)	-6.3 percentage points
Coughing (%)	-3.2 percentage points
Anemia (%)	2.24 percentage points*
Height for Age (centimeters x age in months)	322.29
Weight for Height (centimeters x kilograms)	-114.734
Immunization (%)	-0.7 percentage points
Under 5 mortality (per 1000 births)[1]	39.279
Children's educational achievement (ages 7 and older)	
Education Years	-0.518 of a year*
Education Gap	0.120 of a year
School Attendance (%)	3.2 percentage points
% Mothers using violence to discipline children	n.a.

* significance at 10%   ** significance at 5%   *** significance at 1%

Table 14: Average effects of lifetime sexual violence by intimate partner

Outcome	Haiti
Women's health	
Weight for Height (centimeters x kilograms)	351.941 **
Anemia (severity degree)	-0.025
Number of Children	0.251
Terminated Pregnancies	0.097**
Last Child Wanted (index 1 =wanted – 3=did not want more children)	0.133
Sexually Transmitted Disease (%)	2.2 percentage points
Genital Sore /Ulcers (%)	4.9 percentage points*
Women's use of health services	
Visited Health Facility (%)	13.9 percentage points***
Antenatal Care (%)	3.8 percentage points
Births Assisted by Health Care Professional (%)	8.6 percentage points
Unmet Family Planning Needs (%)	-5.2 percentage points
Contraceptive Use (%)	18.8 percentage points
Women's employment	
Employed and Earning Cash (probability)	0.067**
Children's health (ages 0-5)	
Diarrhea (%)	- 2.4 percentage points
Coughing (%)	- 7.0 percentage points
Anemia (%)	6.5 percentage points
Height for Age (centimeters x age in months)	188.943 points
Weight for Height (centimeters x kilograms)	335.127
Immunization (%)	- 8.3 percentage points
Under 5 mortality (per 1000 births) [1]	27.864
Children's educational achievement (ages 7 and older)	
Education Years	0.157 of a year
Education Gap	-0.109 of a year
School Attendance (%)	1.7 percentage points
% Mothers using violence to discipline children	n.a.

* significance at 10%   ** significance at 5%   *** significance at 1%

Table 15: Average effects of currently experiencing sexual violence by intimate partner

Outcome	Haiti
Women's health	
Weight for Height (centimeters x kilograms)	308.229
Anemia (severity degree)	0.267
Number of Children	-0.351
Terminated Pregnancies	-0.01
Last Child Wanted (index 1 =wanted –3=did not want more children)	0.312**
Sexually Transmitted Disease (%)	6.3 percentage points***
Genital Sore /Ulcers (%)	5.2 percentage points*
Women's use of health services	
Visited Health Facility (%)	7.2 percentage points
Antenatal Care (%)	-9.5 percentage points
Births Assisted by Health Care Professional (%)	-6.6 percentage points
Unmet Family Planning Needs (%)	-3.6 percentage points
Contraceptive Use (%)	- 2.1 percentage points
Women's Employment	
Employed and Earning Cash (probability)	0.000
Children's health (aged 0-5)	
Diarrhea (%)	1 percentage point
Coughing (%)	- 4.7 percentage points
Anemia (%)	17.3 percentage points
Height for Age (centimeters x age in months)	-560.38
Weight for Height (centimeters x kilograms)	-426.927
Immunization (%)	6.1 percentage points
Under 5 mortality (per 1000 births) [1]	- 4.843
Children's educational achievement (ages 7 and older)	
Education Years	0.122 of a year
Education Gap	0.020 of a year
School Attendance (%)	1.9 percentage points
% Mothers using violence to discipline children	n.a.

* significance at 10%   ** significance at 5%   *** significance at 1%

Table 16: Average effects of lifetime physical violence by relatives

Outcome	Peru
Women's health	
Weight for Height (centimeters x kilograms)	447.497**
Anemia (severity degree)	-0.018
Number of Children	0.062**
Terminated Pregnancies	0.021**
Last Child Wanted (index 1 =wanted –3=did not want more children)	0.138 points***
Sexually Transmitted Disease (%)	1.4 percentage points
Genital Sore /Ulcers (%)	n.a.
Delivery Complications (% of women)	9.5 percentage points***
Women's use of health services	
Visited Health Facility (%)	1.5 percentage points
Antenatal Care (%)	-0.3 percentage points
Births Assisted by Health Care Professional (%)	-3.4 percentage points**
Unmet Family Planning Needs (%)	-0.2 percentage points
Contraceptive Use (%)	2.5 percentage points***
Women's employment	
Employed and Earning Cash (probability)	0.042***
Children's health (0-5)	
Diarrhea (%)	2.8 percentage points**
Coughing (%)	n.a.
Anemia (%)	- 1.5 percentage points
Height for Age (centimeters x age in months)	-136.61 *
Weight for Height (centimeters x kilograms) [1]	-179.517 *
Immunization (%)	-2.4 percentage points
Under 5 mortality (per 1000 births) [2]	7.913
Children's educational achievement (ages 7 and older)	
Education Years	n.a.
Education Gap	-0.038 of a year*
School Attendance (%)	2.4 percentage points**
% Mothers using violence to discipline children	9.8 percentage points***

* significance at 10%   ** significance at 5%   *** significance at 1%

1 In the case of Peru , this variable measures the weight for height of the youngest child

2 This is not a population child mortality rate. This variable is the sample *average* the number of children under 5 who died divided by each woman's total number of births per 1000. In this case both rates are similar since there is no significant difference in the total number of children between the victims group and the control group.

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