The Impact of Intimate Partner Violence against Women in Peru: Estimates using Matching Techniques

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1. Introduction

Violence against women was until recently a topic decidedly off the radar screens of researchers and policymakers. This has begun to change. On the policy side, several governments have developed national plans to address violence against women and, in the region of the Americas, there is an international convention (the Inter-American Convention on the Prevention, Punishment and Eradication of Violence against Women, also known as the Convention of Belem do Para), which commits regional governments to combat violence against women. Globally, the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) has been interpreted by its oversight committee as including the responsibility of governments to to work toward the elimination of violence against women (Recommendations 12 and 19 from 1989 and 1992, respectively).

On the research side, a 2005 report by the World Health Organization, discussed in more detail below, provides the first comparable, cross-country estimates of the prevalence of intimate partner violence against women. Serious scholarship is also beginning to examine the consequences of violence against women for the women themselves, their children, and even society at large. Work has detailed, for example: the deleterious impact of intimate partner violence on women's ability to: i) control their fertility (Ellsberg et al., 1999; Bawah et al., 1999; Heise et al., 2002; Pallito, 2004; United Nations, 2006); ii) engage in safe sexual practices, including protecting themselves from HIV/AIDS (Hirschmann, 1998; United Nations, 2006); or iii) seek prenatal care (Curry et al., 1998; Dietz et al., 1997).

In general, women affected by intimate partner violence have higher probabilities of: i) adverse pregnancy outcomes such as miscarriages and abortions (Jejeebhoy, 1998; Martin et al., 1998; Heise et al., 2002); ii) premature labor and fetal distress (Cokkinides, V.E. et al., 1999); iii) low birth weight babies (Campbell et al., 1999; Cokkinides, V.E. et al., 1999; Curry et al, 1998); iv) chronic pain or recurring central nervous system symptoms including fainting and seizures (Campbell, 2002); v) gastro-intestinal symptoms (Campbell, 2002) vi) hypertension and chest pain (Campbell, 2002) and vii) post traumatic stress disorder, suicide, and alcohol and drug use (Heise et al., 1999; Golding, 1999; Campbell, 2002). Intimate partner violence against women is a major cause of injuries to women (Heise et al., 1999; United Nations, 2006). In its extreme form, this violence leads to death: it is estimated that between 40 and 70 percent of homicides of women worldwide are committed by intimate partners (Bailey et al., 1997 and Gilbert, 1996, cited in Heise et al., 1999; Campbell, 2002).[1]

This paper uses recent data from a Demographic and Health Survey (DHS) in Peru to test the robustness of some of these impacts using two quasi-experimental methods: propensity score matching and one-to-one matching. The fundamental contribution of the paper is to use methodologies heretofore under-utilized in the social science literature

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[1] Many of the references prior to 1999 in this paragraph were originally cited in Heise (1999).

on violence against women to carefully gauge the impact of intimate partner violence on women and their children. Given available data in the DHS survey, we limit the scope of the paper to estimating the micro impacts of physical intimate partner violence on: (i) women victims; (ii) children of women victims; and (iii) the inter-generational transmission of violence.

The paper proceeds as follows. Section 2 defines intimate partner violence against women and distinguishes it from other types of gender-based violence; it also presents recent prevalence estimates from the World Health Organization for a set of countries. Section 2 also includes a summary of different methods used to estimate the impacts of violence against women. Section 3 describes the Peruvian data used in this paper and provides descriptive statistics for the data set. Section 4 presents the statistical methodologies—one-to-one matching and propensity score matching—that will be employed, and then proceeds to present the estimates of the effect of intimate partner violence against women and their children, including the inter-generation transmission of violence. Finally, Section 5 concludes by putting the results of the paper in the context of existing research on the impacts of intimate partner violence and suggests an agenda for future work.

2. Intimate partner violence against women: definitions, prevalence and impacts

Definitions and prevalence

It is important at the outset to define what we mean by intimate partner violence against women, since a host of terms have been and are used to describe different types of violence against women. Intimate partner violence refers to "any behavior within an intimate relationship that causes physical, psychological or sexual harm to those in the relationship" (WHO, World Report on Violence).[2]" Thus, the most common desegregation of intimate partner violence is into physical, psychological and sexual violence. Another frequent distinction is between "lifetime violence" (i.e., intimate partner violence that a woman may have suffered at any point in her life) and current violence (usually operationalized as intimate partner violence that occurred in the last 12 months).

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[2] "The term 'intimate partner violence' is now used in preference to the term 'domestic violence', which is not specific and could refer to child abuse, intimate partner violence and/or abuse of the elderly (WHO Multi-country Study on Women's Health and Domestic Violence, 2005. Violence against women, another commonly used term, refers to a much broader concept. 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. 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.

A recent study by the World Health Organization generated the first prevalence estimates of IPVAW that are comparable across countries. Figure 1 presents data on the physical abuse of women by intimate partners in the 10 countries covered in the WHO study. Rates of victimization in the last 12 months range from a low of 3% in Serbia and Japan (the sole developed country in the survey), 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.[3]

Some Demographic and Health Surveys contain a module that collects information on violence against women, including violence inflicted by an intimate partner (both during pregnancy and at other times) and violence inflicted by some other person. While not employed in all DHS surveys, 33 surveys in 24 countries have included (or are including, in the case of surveys under design or being fielded) a violence against women module.[4]

DHS uses two very different approaches to identifying women who have been victimized. The first, called the "single question threshold approach" (Kishor and Johnson, 2004), asks a survey respondent one question to determine if she has ever been victimized by violence. Only if she responds affirmatively to this question are more detailed questions about violence asked.[5] A second approach administers a full module to all female respondents to elicit information about violence.

Table 1 contains prevalence data from the DHS surveys. Clearly, the data are not completely comparable across countries because of the two different approaches used. Countries in which the single question threshold approach will tend to underestimate the true prevalence of violence, since women are given only one opportunity (instead of multiple opportunities) to disclose violence, and because different women may have different understandings about what constitutes violence (Kishor and Johnson, 2004).

How consistent are the prevalence estimates generated by the WHO and DHS data? Unfortunately, there is only one country for which surveys were undertaken both by the WHO multi-centric study and by DHS. Fortunately, however, that one country is the case study for this paper, Peru. The WHO study found a lifetime prevalence rate for physical violence by an intimate partner of 50% in urban areas and 62% in rural areas. The DHS found a lifetime prevalence rate of intimate partner violence at the national level of 42.4%.[6]

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

[4] Macro International website-see http://www.measuredhs.com/aboutsurveys/search/listmodules_main.cfm

[5] The more detailed questions are a modified version of the Conflicts Tactics Scale. The original conflict tactics scale had 19 items (Straus, 1979), but the modified list used by DHS includes on 15 forms of physical and sexual violence (Kishor and Johnson, 2004).

[6] Note that the DHS survey for Peru used a full VAW module, rather than a single question threshold approach. There is one other country for which prevalence rates are available both from a DHS survey and from a stand-alone survey on intimate partner violence. Ellsberg et al. (2001) finds that in Nicaragua DHS

It is not surprising that the DHS survey provides a lower estimate of the prevalence of IPVAW than does the WHO survey. The WHO survey asks substantially more questions about violence than does the DHS and is a stand-alone survey focusing only on intimate partner violence against women. This points to an important tradeoff between using WHO and DHS data: the WHO survey does a better job in detecting violence, but the DHS survey—being a survey focusing on population, health and nutrition—provides much more detail on the possible consequences of IPVAW on women's health, children's health, and other outcomes.

Measuring impacts of IPVAW

Two different quantitative approaches have been used to estimate the impacts of IPVAW on victims, the household, and society at large. A first approach attaches a monetary value to these impacts, through costing methodologies. A second approach, concentrates on estimating IPVAW impacts on health, education, labor force participation and other outcomes of interest, without attaching a monetary value.

Monetary or cost estimates can quantify the impact of IPVAW 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).

Direct cost estimates are problematic, though—and especially so 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 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.

A second approach to calculating indirect monetary costs of GBV has been to econometrically estimate the impact of GBV on women's labor force participation and

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data generates prevalence estimates which are about half those generated by a specialized violence survey (28% versus 52%).

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.[7] Famer and Tiefenthaler, on the other hand, find that labor force participation is higher for women who suffer abuse. Parametric econometric methodologies to estimate the costs/impacts of IPVAW share difficulties of dealing with simultaneous causality – for instance in the case of income level and victimization likelihood – as well as lack of robustness to model specification due to the multifaceted nature of IPVAW.

In the public health field, a preferred methodology focuses on direct impacts by estimating the disability-adjusted life years (DALYs) lost by victims. The 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 impacts 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. A significant disadvantage of DALYs is that they rely on registry data (homicide data provided by health services and by police, and morbidity data provided by health services), which—as noted above—can severely underestimate IPVAW prevalence.

Qualitative approaches to assess the impacts of IPVAW

Quantitative approaches have come to dominate the measurement of intimate partner violence. Qualitative research, however, also has a role to play. Qualitative research is essential for examining issues around the under-reporting of violence. It can examine the reasons why men and women within a relationship may have different propensities to

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[7] 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.

identifying the occurrence of intimate partner violence (Armstrong et al., 2001); it can also be used to pinpoint the reasons for not reporting (or conversely, for reporting) IPV to health providers or survey takers who screen for such violence.

Qualitative analysis can also be used to determine whether IPV is viewed as so "normal" that it should not be reported to authorities or survey takers (Ilika, 2005). Finally, qualitative methods can be used to identify the context surrounding or facilitating IPV in households, i.e., specific risk factors associated with IPV in specific locales (Hindin and Adair, 2002; Copel, 2006).

3. Peru DHS Data and Violence Module

Data Description

We use data from the DHS for Peru (2000), which collects information at the individual and household levels.[8] The survey has national coverage and it is representative of the total population.

The Demographic and Health Surveys in Peru are available since 1986 and take place every 5 years. The survey regularly gathers information about fertility, family planning, reproductive health, young children's health, nutritional status, age, education, marital status, area of residence, and a variety of household characteristics. In recent years, the Measure DHS+ program[9] decided to include, in several countries, a violence module in order to study the linkages between violence, health, and demographic outcomes. In the case of Peru, a violence module has been included since the year 2000. The questionnaire is answered by all women between 15 and 49 years old present in the household.

The most internationally accepted and validated method of measurement of gender violence in a survey is the Conflict Tactic Scale (CTS).[10] In the case of Peru, the DHS survey focused on domestic violence by partners and relatives and did not include questions about sexual violence. Since the survey did not ask about the timing of the episodes of violence, we are unable to distinguish current (past 12 month) violence from lifetime violence; consequently, we use the concept of lifetime violence.

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

[9] The Measure DHS+ 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

[10] 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 collecting 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.

Consistent with the literature on intimate partner violence in developing countries, we restrict our analysis to women that are currently married or living with a partner. This population group faces a higher risk of intimate partner violence than women who do not live with a partner and is of particular interest for public policy. In addition, this group is more homogeneous than the whole sample in terms of how intimate partner violence is experienced, age range, fertility, and other risk factors. 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. This is a potentially important selection bias which has no obvious solution.

Prevalence of Domestic Violence in Peru

Table 2 shows the prevalence rate of intimate partner violence for currently married (or co-habitating) women between 15 and 49 years old in Peru.[11] Almost 40% of women have experienced physical violence by an intimate partner sometime in their lives.

Not surprisingly given the cumulative nature of lifetime violence, this prevalence rate increases with women's age. While 28% of women between 15 and 19 years old have been victims of physical violence, this percentage increases to 43% for women aged 45 to 49 years old. By educational level, we observed a higher prevalence of domestic violence among less educated women. An important risk factor or trigger for intimate partner violence is alcohol abuse by the male partner. As shown in Table 2, the prevalence of domestic violence is 25% when the husband or partner never gets drunk. When the partner gets drunk frequently, the prevalence is more than three times higher (76.8%). Another frequently cited risk factor is the presence of violence in the woman's origin household—whether such violence is intimate partner violence or child abuse. In this sample, the prevalence rate for intimate partner violence is 67.7% when the woman was punished or hurt by her father when she was a child—much higher than the prevalence rate for the sample as a whole. This high prevalence rate indicates the presence of an intergenerational transmission of violence. In this case, the transmission is not via the male abuser, but rather through the female victim who is socialized into thinking that violence is a normal part of inter-personal relationships.[12]

Characteristics of victims and non-victims

Table 3 presents descriptive statistics for the sub-sample of women who have suffered physical violence at the hands of an intimate partner and those who have not. Victims of IPV are on average slightly older and have almost one year less education than non-

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[11] The Peru DHS (2000) also gather information about physical violence by relatives or other household members. Although our study is restricted to women that are victim of violence by intimate partner, physical violence by relatives is also high in Peru (26.36% of women ever experienced physical violence by relatives), see Morrison and Orlando (2004) for further details.

[12] Men in the sample are not asked about their experience with violence as children, so this vector for the inter-generational transmission of violence cannot be examined.

victims. On average, victims of IPV are much more likely to have been punished or hurt as a child—76.5% versus 62.6%.

The average number of children is higher for women that are victims of IPV (3.27 versus 2.74 children) than for women that are not victims of physical violence. While almost half of non-victims (48.9%) wanted to have their last child, among women victims this percentage was only 38.8%. A much higher percentage of women victims reported not having wanted to have the last child (38.8% versus 28.3%). This points to the fact that women who are victims of IPV are less likely to be able to control their fertility, although the direction of causality is far from clear.

In general, health indicators of women that experienced physical violence by intimate partners indicate worse outcomes than for non-victims. The percentage of women who had a terminated pregnancy is higher among women that are victims of violence (26% vs. 17% for non-victims). Also the percentage of women that have a sexually-transmitted disease (STD) or have complications with the delivery of their child is higher for women that experienced physical violence by an intimate partner. Again, the direction of causality is not clear here.

Less than half of the women that suffer from physical violence by intimate partner visited a health facility (47%). This percentage is similar to the one observed for non-victims (48.5%). Morrison and Orlando (1998), in a study for Chile and Nicaragua, also found little evidence of more intensive use of health facilities by woman victim of violence in comparison to non-victims. The percentage of women that take antenatal care is similar for women that experienced physical violence by intimate partner and the ones that not (97% and 98%, respectively). While 52% of women that suffer from physical violence had their births assisted by a health care professional, this percentage increases slightly to 54% for non-victims. The use of a contraceptive method (traditional or modern) is most frequent among women with physical violence by intimate partner (90% of these women use a contraceptive method) while 86% of non-victims do so. Again, causality is not clear here: violence may affect contraceptive use, but use of a contraceptive may also trigger violence.

There is ample evidence from a plethora of studies (see the introduction for a partial list) that IPVAW has a negative impact on children who witness the violence. These negative effects range from impacts on educational performance to impacts on health outcomes. Table 3 documents some of these differences. While there appear to be no impacts on children's educational performance (in fact, children of women who suffer IPV seem to do slightly better), the impacts on health outcomes is strong. Children of women victims have higher rates of diarrhea and anemia, and have lower height-for-age and weight-for height (long- and short-run measures of nutritional status, respectively.) Surprisingly, immunization rates for children of women victims are higher than that for children of non-victims.

With regard to the method used to discipline child, 50% of the women that experienced physical violence by an intimate partner used violence to discipline child, while only 37% of the women that were not victims of violence used violence.

The age difference with the male partner is higher for women that are not victims of physical violence. In other words, having an older partner is in generally associated with a lower probability of violence.

Finally, as showed before, alcohol abuse is an important risk factor of physical violence. A high percentage women that suffer from physical violence reported that their husband or partner got drunk frequently (99%). In the case of non-victims, 74% of their partners abuse alcohol.

4. Impacts of intimate partner violence against women in Peru: methodology and results

Methodology

In Section 2 we discussed advantages and disadvantages of using several quantitative and qualitative methods to estimate the impacts of IPVAW. In this section, we use two non-parametric statistical methodologies—propensity score matching (PSM) and matching decomposition technique (MDT)—to gauge the impacts of IPVAW. Non-parametric methods are used in the program impact evaluation literature with great success.[13]

Non-parametric methods offer several benefits vis-à-vis other methodologies. First, if the impacts 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 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 non observables (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 and MDT are non-parametric. Consequently,

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[13] The analogy between "program participation" and violence victimization is not perfect, as program participation involves a higher degree of choice or selection through program design. Programs such as conditional cash transfer programs tend to use an exogenously determined index score to select participant households. The use of this index score allows for the use of regression discontinuity models, which cannot be applied to the impacts of violence due to the endogenous nature of victimization. For more on regression discontinuity see Skoufias (2005).

they avoid the sensitivity to functional form that can plague regression models.[14] Some evidence suggests that avoiding functional form restrictions can significantly reduce bias (Dehejia and Whaba, 1998; Smith and Todd, 2000; Smith, 2000).

Of course, non-parametric approaches have their 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.

Sanchez et al. (2004) recently used 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 severe violence would have earned more than $100 per month more -this compared to mean monthly earnings for the entire sample of U.S. $142.

Propensity score matching (PSM)

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. Our estimation for Peru followed these steps:

Step 1: Estimate a logit equation of the risk factors of intimate partner violence. Based on the extensive literature on risk factors for gender based violence in developing countries, we selected a set of explanatory variables that 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.[15]

Step 2: Use propensity score 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.

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[14] 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).
[15] Heise-Ellsberg (1999), Secretary General UN (2006), Ellsbergh, Kishor and Johnson (2004)

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.

Matching Decomposition Technique (MDT)

Using this technique, women who experienced violence are matched to those who did not on the basis of their observable characteristics. The resulting matched females have exactly the same observable characteristics—i.e., the difference in violence outcomes between these women cannot be explained by observable characteristics.

The difference between women who experienced physical violence and women who did not can be decomposed into four additive elements that take into account not only the differences in observable characteristics of these women but also differences in the supports for the distribution of those characteristics. These four elements are:

Delta V: reflects the fact that some women who are victims of physical violence have a combination of observable characteristics than women who do not experience physical violence do not have.

Delta NV: captures the fact that some females who are not victims of physical violence have combinations of observable characteristics that females who experience violence do not have.

Delta X: Accounts for differences in the distributions of observable characteristics among females with and without experienced physical violence with the same observable characteristics.

Delta 0: is the component of the gap that cannot be explained by differences in observable characteristics.

This methodology produces a more precise measurement of the explained and unexplained components of the differences between women who experienced physical violence and those who did not. For more details on this methodology, see Ñopo (2004).

Results for Peru

Results from Propensity Score Matching Estimations

Annex 1 contains the *Logit* estimation results-marginal effects- for risk factors for lifetime physical violence. Not surprisingly, older women experience a higher risk of violence; this may be due to the effective of increasing cumulative risk over the life cycle, or due to cohort effects (i.e., younger generations of women have lower rates of

victimization than older generations). Women's age at marriage (or first intercourse age) is significant; 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. 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.

The risk of violence increases monotonically with the number of children. Women who were victims of physical violence as children have a significantly higher probability of experiencing intimate partner violence as adults. Alcohol abuse by the partner raises the probability of violence more than nine times.

Having an older male partner is associated with a lower probability of violence. If the male partner has more education than the female partner, the risk of violence is reduced. Control by the partner-in other words when a male partner exhibits controlling behaviors regarding a woman's schedule or freedom to visit places- increases the probability of violence, while participation of the woman in economic decision-making in the household reduces it. Wealth has a non-linear impact on violence: households in the third quintile register the highest probability of violence, followed by second quintile households.[16] 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.

The model is globally significant at the one percent level. The model improves the forecast of physical violence by male partner over the predictions of a "naïve" model-based simply on the frequency of violence.

Table 8 (first column) reports the absolute value of differences in outcomes of interest for women (and their children) that 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 worse than those of their matched peers. Women victims were:

- Almost 60% more likely to have terminated a pregnancy before term
- More likely to have had an unwanted last child
- 19.6% more likely to have suffered a sexually transmitted disease
- 21.3% more likely to have complications during delivery
- 14.8% less likely to suffer from anemia

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[16] We use wealth to proxy for economic hardship. 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.).

In fact, the only health outcome measure for which there is no 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. Women victims of physical violence were more likely to visit a health facility, have births assisted by a health care professional, and use contraceptives.[17]

In terms of children's health outcomes, children of women who suffer physical violence at the hands of intimate partners are more likely to suffer diarrhea (49% more likely), and trail children of unaffected women in height for age. On the other hand, children of women victims are 3.8% more likely to be immunized. 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 seem to be 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 18.7% 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.[18]

Results from the Matching Decomposition Technique

In *Table 4* we present the set of variables used to construct a total of seven possible matching control groups. The first one includes women's age, number of children ever born, and the frequency that the husband gets drunk. The second set used women's age, number of children ever born and if the woman was hurt by her father or punished as a child. The third group combined the previous variables, while in the fourth we include as a control variable the income quintile in which the household is placed in the income distribution. In the control set number 6 we add women's years of education and in the control set 7 differences in educational level between the spouses.

Note that the probability of finding a matching between women who experienced physical violence and women who do not experienced physical violence decreases with

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[17] 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.

[18] 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.

the number of matching characteristics as well as the number of possible values that each variable can take (for example a continuous variable such as years of education shrinks the common support group significantly). *Table 5* presents the percentage of women victims of physical violence by intimate partner and non victims who were successfully matched for each control group of variables.

In Table 6 we report some average characteristics of the women in and out of the common support of each matching characteristics. Some interesting results can be highlighted:

▪ For all the specified sets of controls, the matched women are younger; while the unmatched women that were or are victims of physical violence are older.

▪ The average number of children ever born is small for the females in the common support; while is higher for the unmatched females that experienced physical violence.

▪ The frequency that the husband gets drunk is smaller for the unmatched females who did not experienced physical violence and is higher for those unmatched that are victims of violence.

▪ The same pattern is observed when considering if the woman was hurt or punished as a child by her father.

▪ The unmatched women that experienced violence have on average 6.91 yeas of education. This average is less than that of the unmatched women who are not victims (8 years) and less that the matched women 7.91.

▪ The matched females have on average more years of education than their partners

These results confirm the importance of some of these variables as risk factors for violence victimization by intimate partner.

Although we perform difference decompositions for all seven sets of control groups, we present in the text results from the third set and the seventh set, because both offer fairly large common support groups and control for risk factors of violence that are relevant in the literature and consistent with our Logit risk factor estimation for Peru (in the previous section on PSM). *Table 7* shows gap decomposition results for these two control groups and Annex 2 shows gap decomposition results for other control groups. Following the decomposition methodology described in the previous subsection, Delta X is the best estimate for the net impact of IPVAW because it accounts for differences in outcomes among females with and without the experience of physical violence who have almost the same observable characteristics.

The impact of IPVAW (Delta X) is consistent in direction and significant for sets of controls 3 and 7 in the case of some reproductive health outcomes and service usage,

children health outcomes (weight for height reduction for children of victims and increased immunization), children education outcomes (paradoxically violence improves school attendance and reduces educational gap), and inter-generational transmission of violence. However, in most cases impact is not robust to the specification of control groups. Moreover, the portion of observed outcome differences (Delta) between victims and non victims that can be attributed to the impact of violence is –for several outcomes- smaller than the portion of observed outcome differences due to non-observables (Delta 0). The use of matching decomposition allows restricting the comparison of differences in outcomes among women that are victims of physical violence and non victim's women to observable characteristics, that is to say we can separate the effect of unobservable factors that affect the selected outcomes. This implies a more accurate measure of the differences and to explore the differences explain by the fact that females with violence and female no violence have characteristics that are distributed differently in their common support (Delta X).[19]

The portion of differences due to differences in observed characteristics for women victims (Delta V) and non victims (Delta NV) is also statistically significant and, in some cases, responsible for more than half of observed differentials in outcomes. Both effects are opposite in sign as expected.

5. Conclusions

Table 8 shows both results from PSM and MD methods. In general, results are not robust to the use of different methods, with the exception of immunization for children and increased school attendance. Paradoxically, children of women who are victims of IPVAW receive more immunization and are more likely to be in school. Another consistent result across different methodologies is the strong evidence of intergenerational transmission of violence (use violence to discipline child) for women who are victims to their children.

This result implies that intuitive differences in means do not necessarily withstand more rigorous analysis of the sources of variation. Unobservables and covariates matter when it comes to the observed difference between women victims of IPVAW and non-victims. One reason for the modest estimated *net* impacts may be that DHS underestimates the true prevalence of violence vis-a-vis stand-alone violence surveys.

The use of matching decomposition allows restricting the comparison of differences in outcomes among women that are victims of physical violence and non victim's women to observable characteristics, that is to say we can separate the effect of unobservable factors that affect the selected outcomes. This implies a more accurate measure of the

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[19] In the case of some of these outcomes, other socio economic factors such as income level and access to health care may explain a larger percentage of the observed differences. In Annex 4, estimations using control groups that included income level improve results for terminated pregnancies and delivery complications by reducing percentage of variation explained by non-observables and finding a small but positive impact of violence.

differences and to explore the differences explain by the fact that females with violence and female no violence have characteristics that are distributed differently in their common support (Delta X). Thus, the MD technique is our preferred methodology leading to more sound results.

Based on the MD techniques IPVAW has a strong negative impact on victim's reproductive health (reduced likelihood of last child wanted and reduction of contraceptive use), employment, and children's health (weight for height).

A promising area of future research is the use of non-parametric techniques to assess the impact of IPVAW. Emphasis should be put on capturing ameliorating factors as well as context specific factors expanding the impact of IPVAW, as well as constructing appropriate control groups for comparisons.

Table 1
Percentage of women age 15-49 that have experienced any violence by anyone since the age of 15 years, by marital status and type of question used to estimate violence. Selected Countries

Country	Percentage of women of ever beaten by anyone	Ever-married women		Definition of having experienced violence: a "yes" on one or more
		Percentage ever beaten by a spouse/partner	Percentage beaten by a spouse/partner in the past 12 months	
Cambodia[1]	23.4 *(n=2,403)*	17.5 (n=2,403)	15.4 (n=2,403)	Items on the modified CTS and questions on being hit, slapped, kicked, or physically hurt by someone ever and/or during pregnancy.
Cambodia	41 (n=11,536)	44.1 (n=7,602)	u	Items on the modified CTS and questions on being hit, slapped, kicked, or physically hurt by someone ever and/or during pregnancy
Dominican Republic	23.9 (n=8,746)	22.3 (n=6,807)	11 (n=6,807)	Items on the modified CTS and questions on being hit, slapped, kicked, or physically hurt by someone ever and/or during pregnancy
Egypt[1]	35 (n=7,123)	34.4 (n=7,123)	12.5 (n=7,123)	Questions on having ever been beaten since first married and during any pregnancy
Haiti	35.2 (n=3,389)	28.8 (n=2,347)	21 (n=2,347)	Items on the modified CTS and questions on being hit, slapped, kicked, or physically hurt by someone ever and/or during pregnancy
India	21 (n=90,303)	18.9 (n-90,303)	10.3 (n=90,303)	Question on having been beaten or mistreated physically since age 15
Nicaragua	32.6 (n=8,507)	30.2 (n=8,507)	13.2 (n=8,507)	Items on the modified CTS and questions on being hit, slapped, kicked, or physically hurt by someone ever and/or during pregnancy
Peru	47.4 (n=27,259)	42.4 (n=17,369)	u	Questions on being pushed, hit, attacked physically by spouse/partner and/or hit, slapped, kicked or hurt physically by anyone
Zambia	58.7 (n=5,029)	48.4 (n=3,792)	26.5 (n=3,792)	Questions on having been beaten by husband, beaten by anyone, forced to have sex by anyone including the husband, or forced to have sex with a third party.

[1] Sample includes only ever-married women
Source: Kishor and Johnson (2004)

Table 2

Prevalence of domestic violence in Peru (2000): Women aged 15-49 currently married or living with a partner

Domestic violence	Prevalence (%)
Ever experienced physical violence by partner	39.8
By age groups (years)	
15-19	28.36
20-24	32.52
25-29	39.49
30-34	41.79
35-39	42.24
40-44	41.92
45-49	43.65
By educational level	
No education	42.04
Primary school	42.80
High school	41.21
Tertiary, College or more	28.93
Frequency of Husband getting drunk	
Never	24.59
Sometimes	41.08
Frequently	76.84
Punished or hurt by father as a child	67.72

Source: DHS, Peru 2000.

Table 3

Demographic characteristics of women victims and non-victims of physical violence

Characteristics	Women	
	Victims of Pyisical Violence	Non victims of Physical Violence
Women's characteristics		
Age (years)	33.89	32.65
Years of Education (years)	7.26	8.09
Was punish and hurt as a child (%)	76.58	62.62
Women's Health		
Weight *Height (centimeters* kilograms)	12328	12274
Amenia (severity degree)	29.88	32.50
Number of Children	3.27	2.74
Number of children ever born	3.70	3.02
Last child wanted (%)		
Wanted them	39.94	48.85
Wanted but later	21.31	22.81
Wanted no more children	38.76	28.34
Terminated Pregnancies (%)	26.57	16.99
STD (%)	21.54	20.39
Delivey Complications (%)	42.75	32.86
Women's use of health facilities		
Visit health facility (%)	47.01	48.53
Antenatal care (%)	97.80	97.45
Births assisted by health Care Professional (%)	52.20	54.20
Unmet family plans (%)	13.16	15.32
Contraceptive use (%)	90.21	86.00
Women's Employment		
Employed (%)	70.35	64.05
Children's health		
Diarrhea (%)	20.17	13.69
Anemia (%)	75.06	73.50
Height*age	2009	2384
Weight* height	6024	6216
Inmunization (%)	40.96	33.73
Under 5 year mortality (per 1000 bitrths)	0.66	0.70
Children's educational achievement		
Educational Gap (%)	54.89	61.32
Schooll attendance (%)	88.23	85.46
Mother's using violence to discipline Child		
Use violence to discipline child (%)	50.13	37.26
Partner's characteristics		
Partner employed (%)	99.54	99.39
Age difference with partner (years)	4.00	4.29
Education difference with partner (years)	2.31	2.30
Husband drunk (%)	99.25	73.84

Source: DHS, Peru 2000.

Table 4

Variables included in control groups used in the matching decomposition

Variable	Control						
	1	2	3	4	5	6	7
Age	x	x	x	x	x	x	x
Number of Children	x	x	x	x	x	x	x
Husband Drunk	x		x	x	x	x	x
Was hurt by father or punished as child		x	x		x	x	x
Income level				x	x	x	
Years of education (women)						x	
Spousal Education Difference							x

Table 5
Percentage of women in and out the common support

	Controlling by						
	1	2	3	4	5	6	7
In of the common Support							
No experienced physical violence	93.8	96.5	87.4	82.0	70.8	28.2	76.8
Experienced physical violence	95.6	96.8	88.8	78.7	64.5	21.5	72.8
Out of the common Support							
No experienced physical violence	6.2	3.5	12.6	18.0	29.2	71.8	22.8
Experienced physical violence	4.4	3.2	11.2	21.3	35.5	78.5	26.8

Source: DHS, Peru 2000. Own calculations.

Table 6
Average Characteristics of women in and out of the common support

Control set	Variables	Group	Average age	Number of Children ever born	Husband get drunk	Was hurt by father or punished as child	Income level	Years of education (women)	Spousal Education Difference
1	Age, Number of children and Husband drunk	Matched	32.56	2.99	0.76				
		Unmatched NV	35.16	3.74	0.32				
		Unmatched V	39.05	5.97	1.84				
2	Age, Number of children and if was hurt by father or punished as child	Matched	32.63	2.99		0.61			
		Unmatched NV	33.32	3.80		0.99			
		Unmatched V	36.65	5.89		1.86			
3	Age, N. of children, Husband drunk, Was hurt by father or punished as child	Matched	32.39	2.96	0.77	0.63			
		Unmatched NV	34.88	3.50	0.48	0.58			
		Unmatched V	37.30	5.21	1.58	0.98			
4	Age, N. of children, Husband drunk, Income Quintile	Matched	32.78	3.09	0.82		2.73		
		Unmatched NV	35.04	3.40	0.44		2.82		
		Unmatched V	37.56	5.11	1.46		2.54		
5	Age, N. of children, Husband drunk, Was hurt by father or punished as child and Income Quintile	Matched	32.36	3.05	0.86	0.68	2.68		
		Unmatched NV	34.90	3.34	0.53	0.53	2.88		
		Unmatched V	37.14	4.82	1.25	0.83	2.58		
6	Age, N. of children, Husband drunk, Was hurt by father or punished as child and Income Quintile, Years of education	Matched	31.27	2.99	0.90	0.76	2.62	7.91	
		Unmatched NV	33.81	3.20	0.70	0.59	2.79	7.94	
		Unmatched V	35.42	4.09	1.03	0.76	2.64	6.91	
7	Age, N. of children, Husband drunk, Was hurt by father or punished as child and difference in spousal education	Matched	32.09	2.91	0.82	0.65			2.35
		Unmatched NV	34.21	3.31	0.51	0.56			2.16
		Unmatched V	37.02	4.98	1.32	0.88			2.16

Source: DHS, Peru 2000. Own estimates.

Table 7
Gap Decomposition results for selected control groups

Outcome	Set of control 3					Set of control 7				
	Delta	Delta 0	Delta V	Delta NV	Delta X	Delta	Delta 0	Delta V	Delta NV	Delta X
Women's Health										
Weight *Height (centimeters* kilograms)	0.007	0.015	-0.003	0.001	-0.005	0.007	0.021	-0.003	-0.002	-0.008
Amenia (severity degree)	-0.075	-0.141**	0.013	0.005	0.047	-0.075	-0.171**	0.045*	0.0145	0.043
Number of Children	0.194***	-0.006	0.056***	-0.011***	0.155***	0.194*	-0.009**	0.103*	-0.024	0.121
Terminated Pregnancies	0.561**	0.492**	0.040	-0.000	0.028*	0.561***	0.538***	0.068***	-0.017**	-0.027
Last child wanted (index: 1=wanted - 3=did not want more children)	0.108***	0.054***	0.026***	-0.020***	0.043***	0.108***	0.049	0.043***	-0.030***	0.042***
STD (%)	0.057*	0.125***	-0.029***	0.008*	-0.046*	0.057	0.083*	-0.026*	0.016	-0.015
Delivey Complications (%)	0.298**	0.271**	0.002	-0.014	0.035	0.298***	0.276***	0.026	-0.017	0.012
Women's use of health facilities										
Visit health facility (%)	-0.033*	-0.015	-0.006	0.009**	-0.020*	-0.033*	-0.016	-0.014*	0.017**	-0.022
Antenatal care (%)	0.004011	0.006	-0.0003	0.002	-0.003	0.004	0.009**	-0.005**	0.005*	-0.005*
Births assisted by health Care Professional (%)	-0.034	0.051	-0.023	0.04402	-0.094	-0.034	0.061	-0.041	0.036	-0.090
Unmet family plans (%)	-0.135***	-0.189***	0.024*	-0.034***	0.064*	-0.135***	-0.125***	0.033*	-0.047***	-0.001*
Contraceptive use (%)	0.048***	0.043***	-0.012***	0.017***	-0.001**	0.048***	0.043***	-0.021***	0.024***	0.0003***
Women's employment										
Employed and earnning cash (probability)	0.025*	0.064***	-0.005	0.003	-0.035**	0.025*	0.074***	-0.010*	0.007	-0.045**
Children's health										
Diarrhea (%)	0.476***	0.511***	0.002	-0.008	-0.032	0.476***	0.436****	0.004	-0.017	0.048
Anemia (%)	0.012	0.014	-0.035*	-0.003	0.028	0.012	-0.026	-0.038*	0.001*	0.062**
Height*age (centimeters* age in months)	-0.156***	-0.100**	-0.016**	0.018**	-0.053**	-0.156***	-0.104***	-0.021	0.021	-0.048
Weight* height (centimeters* kilograms)	-0.028*	-0.019	0.003	0.002	-0.013*	-0.028*	-0.017	0.004	0.002	-0.017*
Inmunization (%)	0.212**	0.080	0.005	-0.021	0.151*	0.212**	0.049	0.031	-0.037	0.153**
Under 5 year mortality (per 1000 births)	-0.051	-0.152	0.033	0.017	0.059*	-0.051	-0.135	0.043	-0.039	0.073
Children's educational achievement										
Educational Gap	-0.105**	-0.061	0.040***	-0.042***	-0.043**	-0.105***	-0.094	0.075***	-0.054***	-0.038**
Schooll attendance (%)	0.032***	0.018***	-0.005***	0.007**	0.012*	0.032***	0.018*	-0.005*	0.010***	0.010**
Mother's using violence to discipline Child										
Use violence to discipline child (%)	0.345***	0.199***	0.020***	-0.002	0.128***	0.345***	0.210***	0.028**	-0.010	0.113*

Significant at 10%; ** significant at 5%; *** significant at 1%
Source: DHS, Peru 2000. Own estimates

Table 8
Comparison of results from PMS and Matching Decomposition Technique

Outcome	PSM	Delta Decomposition (Delta X)	
		Control 3	Control 7
Women's Health			
Weight *Height (centimeters* kilograms)	158.31	-0.005	-0.008
Amenia (severity degree)	-0.048**	0.047	0.043
Number of Children	0.030	0.155***	0.121
Terminated Pregnancies	0.101	0.028*	-0.027
Last child wanted (index: 1=wanted - 3=did not want more children)	0.09**	0.043***	0.042***
STD (%)	4.0 ***	-0.046*	-0.015
Delivey Complications (%)	0.070***	0.035	0.012
Women's use of health facilities			
Visit health facility (%)	0.014	-0.020*	-0.022
Antenatal care (%)	-0.001	-0.003	-0.005*
Births assisted by health Care Professional (%)	0.052***	-0.094	-0.090
Unmet family plans (%)	-0.029***	0.064*	-0.001*
Contraceptive use (%)	0.036***	-0.001**	0.0003***
Women's employment			
Employed and earnning cash (probability)	0.06***	-0.035**	-0.045**
Children's health			
Diarrhea (%)	0.067***	-0.032	0.048
Anemia (%)	-0.027	0.028	0.062**
Height*age (centimeters* age in months)	-111.22*	-0.053**	-0.048
Weight* height (centimeters* kilograms)	-124.69	-0.013*	-0.017*
Inmunization (%)	0.129***	0.151*	0.153**
Under 5 year mortality (per 1000 births)	-0.068	0.059*	0.073
Children's educational achievement			
Educational Gap	-0.043*	-0.043**	-0.038**
Schooll attendance (%)	0.022***	0.012*	0.010**
Mother's using violence to discipline Child			
Use violence to discipline child (%)	0.070***	0.128***	0.113*

Significant at 10%; ** significant at 5%; *** significant at 1%
Source: DHS, Peru 2000. Own estimates.

Figure 1

Percentage of women who reported physical violence by an intimate partner in past 12 months and over lifetime
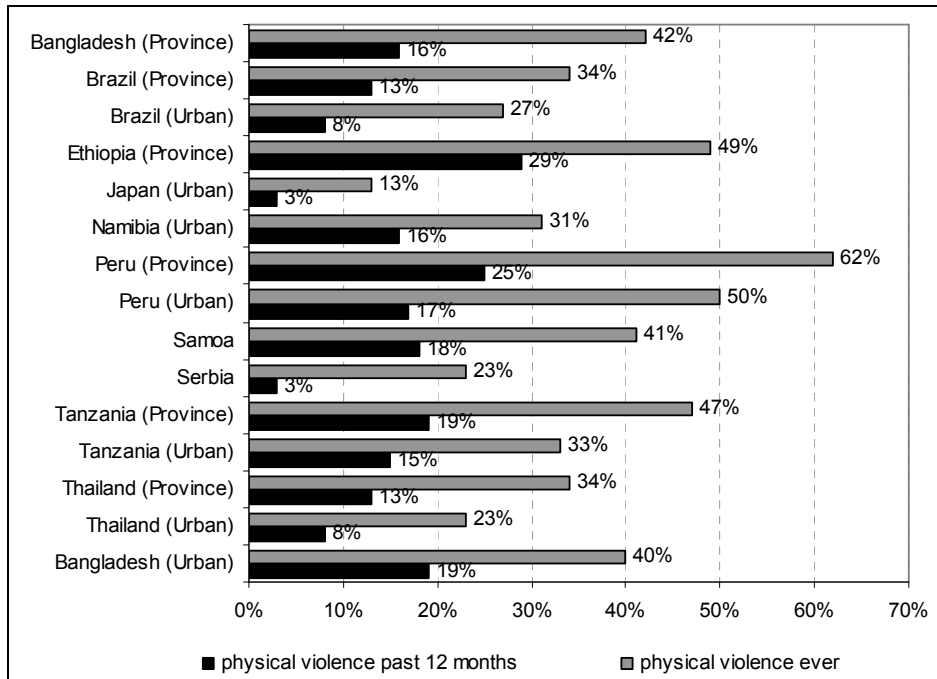
Source: Unpublished data from the WHO Multi-country study on Women's Health and Domestic Violence Against Women. The final published comparative report is forthcoming. Cited with permission.
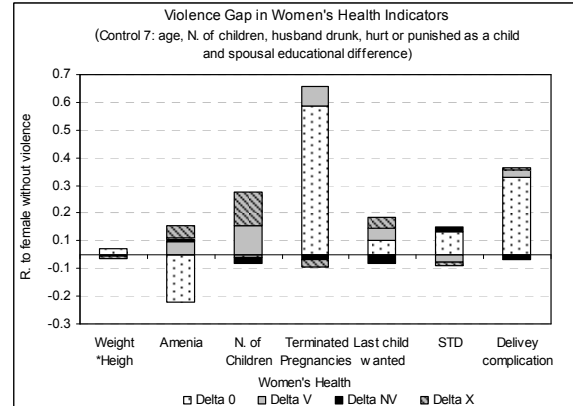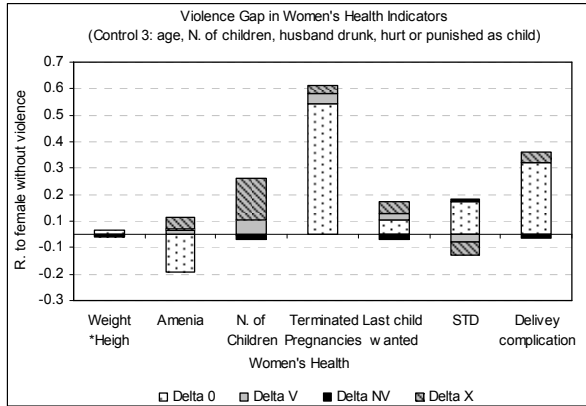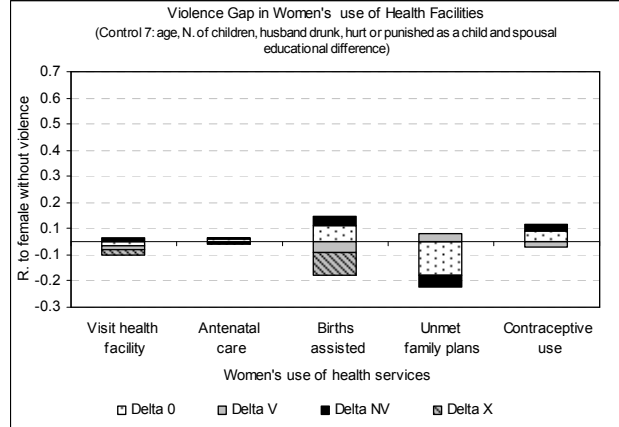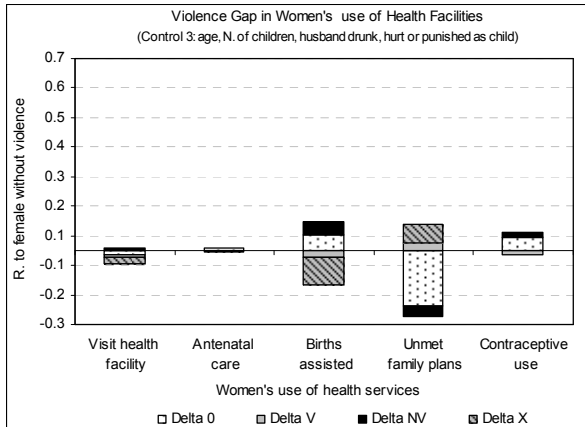
Figure 2

Violence Gap in Women's Health Indicators
(Control 3: age, N. of children, husband drunk, hurt or punished as child)

Violence Gap in Women's Health Indicators
(Control 7: age, N. of children, husband drunk, hurt or punished as a child and spousal educational difference)

Figure 3

Violence Gap in Women's use of Health Facilities
(Control 3: age, N. of children, husband drunk, hurt or punished as child)

Violence Gap in Women's use of Health Facilities
(Control 7: age, N. of children, husband drunk, hurt or punished as a child and spousal educational difference)

Figure 4:

Violence Gap in Women's employment and earning
(Control 3: age, N. of children, husband drunk, hurt or punished as child)

Violence Gap in Women's employment and earning
(Control 7: age, N. of children, husband drunk, hurt or punished as a child and spousal educational difference)
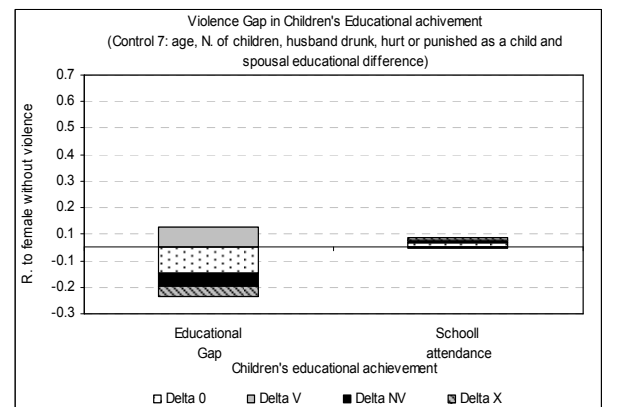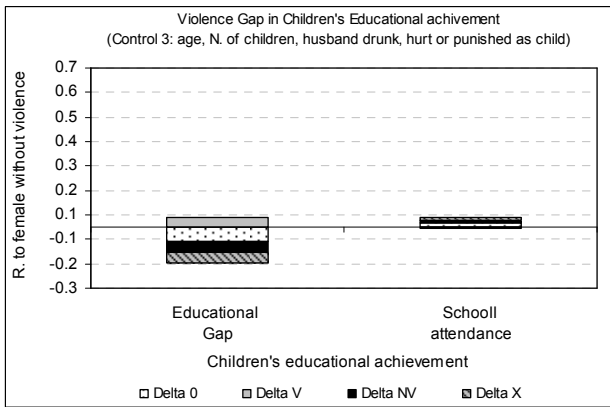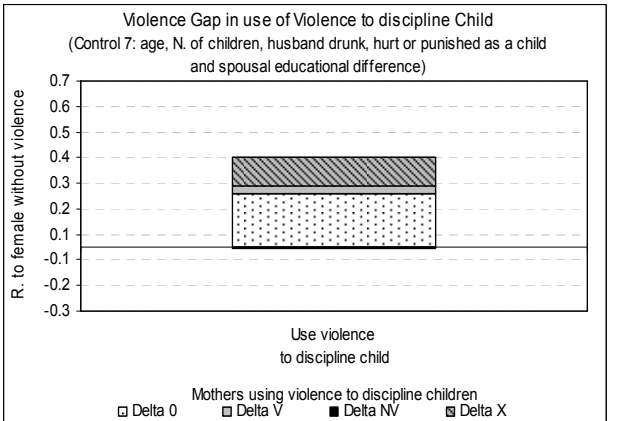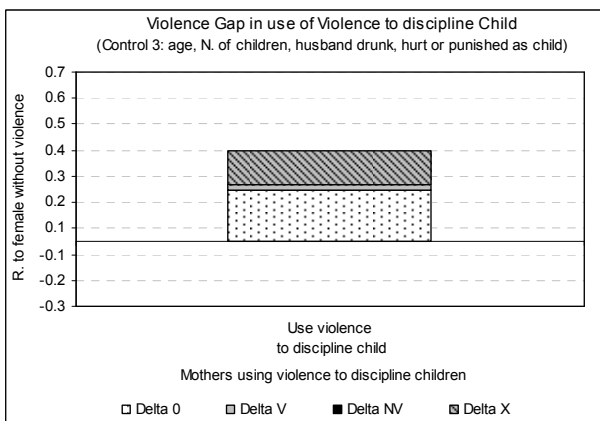
Figure 5

Figure 6

Figure 7

Source: DHS, Peru 2000

Annex Table 1

Logit estimations (odds ratio) of risk factors of ever experiencing physical violence by intimate partner

Explanatory variable	Logit estimates (odds ratios)
Individual Characteristics	
Age group (ref. age group 15-19)	
20-24	1.215
25-29	1.740***
20-34	1.930***
35-39	1.900***
40-44	2.105***
45-49	2.356***
Wome's age at marriage (ref. less than 15 years old)	
15-19	0.812***
20-24	0.567***
25 and more	0.377***
Number of unions (ref. one union)	
More than one union	0.889*
Number of children ever born (ref. no children)	
1-2	1.673***
3-4	1.897***
5 or more	2.134***
Wome's education level (ref. no education)	
Primary	1.089
Secondary or higher	1.055
Women was hurt by father or punished physically as a child	1.511***
Partner's Characteristics	
Partner's education level (ref. no education)	1.206
Primary	1.313
Secondary or higher	
Husband's drunkenness (ref. does not drink)	
Sometimes comes home drunk	2.034***
Requently comes home drunk	9.249***
Relationship level	
Spousal age difference (ref. husband is younger)	
Husband is 0-4 years older	0.862**
Husband is 5-9 years older	0.860**
Husband is 10-14 years older	0.686***
Husband is 15 and more years older	0.663***
Spousal education difference (ref. husband have less education)	
Both have no education	0.722***
Both have same level of education	0.783***
Husband has more education	1.131
Decision making participation	
(ref. does not participate in economic decisions)	0.920*
Family structure (ref. non nuclear)	
Nuclear	1.058
Household wealth status (ref. poorest quintile)	
Second quintile	1.183**
Middle quintile	1.222***
Fourth quintile	1.016
Richest quintile	0.710***
Community level	
Area of residence (ref. rural)	
Urban	1.304***
Log likelihood	7107.63
Number of women	11539
LR chi squared (29)	1347***
Pseudo-R squared	0.0866
Percentage predicted correctly	65.53%
Percentage predicted correctly naïve model	59.67%

* Significant at 5%, *** significant at 1%
   Source: Morrison and Orlando (2004)

Annex Table 2. Matching Decomposition Results- Control Sets 5 and 7

Outcome	Set of control 4					Set of control 5				
	Delta	Delta 0	Delta V	Delta NV	Delta X	Delta	Delta 0	Delta V	Delta NV	Delta X
Women's Health										
Weight *Height (centimeters* kilograms)	0.007	0.011	-0.002	-0.001	-0.0004	0.007	0.007	0.002	-0.002	0.000
Amenia (severity degree)	-0.064	-0.047*	0.033	0.014	-0.062	-0.063	-0.062	0.024	0.029	-0.052505
Number of Children	0.177***	-0.011	0.072**	-0.011***	0.127***	0.177***	-0.014	0.107***	-0.020***	0.104***
Terminated Pregnancies	0.541**	0.519**	0.036	-0.014	0.001*	0.539***	0.456**	0.051**	-0.034*	0.066
Last child wanted										
(index: 1=wanted - 3=did not want more children)	0.102***	0.045***	0.031***	-0.016***	0.041***	0.103***	0.038**	0.052***	-0.022***	0.037***
STD (%)	0.063*	0.116**	-0.035***	0.002*	-0.019*	0.064*	0.084	-0.054***	0.011	0.023
Delivey Complications (%)	0.282**	0.240**	0.013	0.0005	0.029**	0.281**	0.237**	0.037*	0.009	0.003*
Women's use of health facilities										
Visit health facility (%)	-0.023	-0.002	-0.016**	0.012*	-0.017	-0.023	-0.001	-0.026*	0.012	-0.008
Antenatal care (%)	0.005	0.002	-0.0003	0.002	0.001	0.005	0.003	-0.002	0.004*	0.001
Births assisted by health Care Professional (%)	-0.025	-0.018	-0.0003	0.012	-0.016	-0.024	0.005	-0.013	-0.006	-0.013
Unmet family plans (%)	-0.126***	-0.137**	0.019	-0.016	0.008	-0.127***	-0.122*	-0.0005	-0.012	0.007
Contraceptive use (%)	0.047***	0.043***	-0.017***	0.025***	-0.003***	0.047***	0.037***	-0.020***	0.030*	0.0004***
Women's employment										
Employed and earnning cash (probability)	0.031*	0.043***	-0.006	0.001	-0.006	0.031***	0.037*	-0.005	-0.001	0.001
Children's health										
Diarrhea (%)	0.491***	0.399***	0.0006	0.035*	0.064	0.489***	0.418***	-0.011	0.092***	0.006*
Anemia (%)	-0.014	0.025	-0.043*	-0.013	0.007	-0.020	-0.037***	-0.016	-0.001	0.033
Height*age (centimeters* age in months)	-0.151***	-0.103***	-0.003	-0.010	-0.036	-0.151***	-0.103	-0.010	-0.015	-0.025
Weight* height (centimeters* kilograms)	-0.025**	-0.031**	0.005	-0.003	0.003	-0.025***	-0.032*	0.012*	-0.007	0.003
Inmunization (%)	0.201**	0.229**	-0.019	-0.024	0.013	0.201**	0.194*	-0.026	-0.023	0.051*
Under 5 year mortality (per 1000 births)	-0.085	-0.055	0.003	0.001	-0.034	-0.088	-0.138	0.067	-0.012	0.000337
Children's educational achievement										
Educational Gap	-0.115***	-0.033	0.054***	-0.084***	-0.058***	-0.116***	-0.020	0.079***	-0.103***	-0.076***
Schooll attendance (%)	0.030***	0.007	-0.005**	0.015**	0.013*	0.030***	0.009	-0.005*	0.019***	0.008**
Mother's using violence to discipline Child										
Use violence to discipline child (%)	0.343***	0.286***	0.003	0.008	0.045**	0.343***	0.204***	0.002***	0.073	0.069*

Source: DHS, Peru 2000

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