



PHOTO BY HAFM JANSSEN

4

Quantitative Approaches to Research

Topics covered in this chapter:

Cross-sectional surveys
Cohort studies
Case-control studies

CROSS-SECTIONAL SURVEYS: EXPLORING THE MAGNITUDE OF VIOLENCE

Cross-sectional surveys provide an image of a situation at a specific time. When applied to the study of violence, cross-sectional surveys are useful for providing information about the proportion of women in a community who have experienced or are currently experiencing abuse. In the language of epidemiology, this figure is known as a **prevalence estimate**. (See Box 6.1 in Chapter 6 for a description of how prevalence estimates are calculated.)

Cross-sectional surveys can also give valuable insights into elements that define the context in which violence occurs:

- Characteristics and dynamics of abuse.
- How effectively women are being reached by existing services.
- The attitudes of men and women with regard to violence.

- Gender relations (e.g., decision making and control of resources within the family).

Until recently, violence against women has been virtually invisible in most countries, either because women are ashamed

Interview in Ethiopia



PHOTO BY M. ELSBERG

BOX 4.1 THE WHO MULTI-COUNTRY STUDY ON WOMEN'S HEALTH AND DOMESTIC VIOLENCE AGAINST WOMEN¹**Cross-sectional surveys**

The WHO Multi-country Study on Women's Health and Domestic Violence Against Women was initiated in 1997 with the aim of obtaining reliable and comparable data within and across culturally diverse countries on:

- The prevalence and frequency of different forms of physical, sexual, and emotional violence against women, particularly that inflicted by intimate partners.
- The association of violence by intimate partners with a range of health outcomes.
- Factors that may protect or put women at risk for intimate-partner violence.
- Strategies and services that women use to deal with the violence they experience.

It had, in addition to these, a number of process-oriented objectives:

- To develop and test new instruments for measuring violence cross-culturally.
- To increase national capacity amongst researchers and women's organizations working on violence.
- To increase sensitivity to violence among researchers, policy makers and health providers.
- To promote a new model of research on domestic violence, involving women's organizations with expertise on violence against women and fully addressing safety issues and safeguarding women's wellbeing.

Participating countries

The study involves collaboration between WHO, international research organizations (London School of Hygiene and Tropical Medicine and PATH, an expert steering committee of international content experts (researchers and advocates), and country research teams involving research institutions and women's health and rights organizations. The countries that participated in the first stage of the WHO multi-country study were: Bangladesh, Brazil, Thailand, Peru, Japan, Tanzania, and Namibia. Studies have also been performed in several other countries using the WHO methodology, including Samoa, Chile, Indonesia, Ethiopia, New Zealand, Serbia and Montenegro, and China.

Study methodology

The collection of rigorously sound and internationally comparable quantitative data on intimate partner violence has been a major focus of the WHO study. Qualitative data were also collected to inform the development and country adaptations of the questionnaire, as well as the interpretation of results. In most participating countries, the quantitative component of the study consisted of a cross-sectional population-based household survey conducted in two sites: the capital (or other large city) and one province with rural and urban populations. In each of these sites a representative sample of around 1,500 women aged 15 to 49 was selected to participate in face-to-face interviews. Women were asked about experiences of violence from intimate partners as well as nonpartners. Mechanisms to ensure comparability across countries included: a uniform core questionnaire, detailed documentation of the local adaptations to the core questionnaire (which were kept to a minimum), a standard module for interviewer training, the involvement of the core research team in all interviewer and data-processing training and in piloting activities, and the use of standardized procedures for data processing and analysis.

Questionnaire

A uniform core questionnaire with structured questions was used as the basis for all country questionnaires, with country modifications related to either adding country-specific issues or ensuring appropriate response categories. The questionnaire consisted of 12 sections; early sections collected information on less sensitive issues, whilst more sensitive issues, including the nature and extent of partner and nonpartner violence, are introduced in later sections, after rapport has been established between interviewers and respondents. As in many other surveys of partner violence, estimates of the prevalence of different forms of VAW were obtained by asking female respondents direct questions about their experience of specific acts of physical and sexual violence from any partner. Follow-up questions were asked regarding the timing and frequency of violence. Women were also asked about experiences of emotionally abusive acts and controlling behaviors by their partners, and violence during pregnancy. Questions about women's experience of physical and sexual violence by nonpartners since the age of 15, and of sexual abuse by nonpartners before the age of 15, were also included in the study.

Results

The range of lifetime physical partner violence found among the sites was 13 to 61 percent of ever-partnered women. The range of reported sexual violence was even greater, from 6 to 58 percent, whereas the range of women reporting either sexual and/or physical violence by a partner was 16 to 69 percent. In all of the sites, women who experienced physical and/or sexual violence consistently reported more emotional distress and recent physical problems such as pain, trouble walking, and dizziness.

(From WHO, 2005.¹)

to discuss it, because no one has thought to ask them about it, or because it is considered as a natural part of culture. Therefore, prevalence data are often needed to convince policy makers of both the pervasiveness of violence and its serious implications for women’s health. Even surveys carried out in a single region have proven very useful in many countries in drawing attention to the dimensions of violence. Women’s rights activists in Cambodia, (described in Box 4.2) Zimbabwe, and Nicaragua used survey results with great success to create public awareness around domestic violence, and to effect changes in national policy as well as legislation.

A cross-sectional survey may not be the most appropriate method to use if the goal is to determine the causes of violence or the impact of violence on women’s physical or emotional well-being. Cross-sectional studies provide a snapshot of a condition and its suspected causal agents (referred to as “**exposures**” or “**risk factors**” in epidemiology), where both are measured at the same time.

It is usually difficult to assess accurately which came first, exposure to the suspected risk factor or the condition. For example, many community surveys have found that women who have been battered tend to have more children than non-battered women. However, these studies often do not collect information on when in the marriage the violence began. Nor can one tell from this kind of data whether having many children increases women’s risk of being abused, or whether it is actually a consequence of abuse and results from coerced sex or the control many abusive partners exert over their partner’s use of contraception. It is sometimes possible to assume that one event occurs before another. (For example, “injuries due to violence” by definition must have taken place after the violence, not before.)

It is often common for cross-sectional surveys to collect some retrospective information (e.g., “when did the violence begin?”). However, to determine causality with greater precision, it is preferable to study individuals over time, or **longitudinally**.

Longitudinal studies may be either **prospective** (forwards) or **retrospective** (historical). The most common public health research designs for collecting longitudinal data, **cohort studies** or **case-control studies**, will be described in the next section.

COHORT STUDIES: EXPLORING THE CONSEQUENCES OF VIOLENCE

Cohort studies, also called **follow-up** or **incidence studies**, begin with a group of people (a cohort) that has not experienced a problem or condition. The people are classified according to

whether they have been “exposed” to a potential cause (or risk factor) of a condition or disease. The whole cohort is then followed over time to see whether those individuals with the suspected risk factor are more likely to develop the condition or disease than the group without prior exposure. (See Figure 4.1 for an example of how a cohort study could be applied to a

Longitudinal studies follow a group of individuals over time. Longitudinal studies may be either:

- *Prospective, meaning that changes are followed starting at the present time and into the future, or*
- *Retrospective, or looking at individuals’ past history.*

Cross-sectional surveys

- *Provide a snapshot of a population’s characteristics.*
- *Can be carried out on a population or community level, or in a service context.*
- *Require special sampling techniques to ensure that the findings are representative of the general population from which the sample was selected.*
- *Are relatively easy and inexpensive to design and implement, compared with cohort and case-control studies.*
- *Can provide retrospective (historical) information.*
- *Make it more difficult to determine when events took place, compared with a longitudinal study. Therefore it is important to be careful in concluding whether one condition or event causes or leads to another (also referred to as causality).*

BOX 4.2 DOMESTIC VIOLENCE IN CAMBODIA: A CROSS-SECTIONAL STUDY

Background and methods

In 1995, Cambodia became the first Asian country to undertake a representative sample survey of domestic violence. This study, initiated as a joint project between the Ministry of Women's Affairs (MoWA) and a Cambodian NGO, The Project Against Domestic Violence (PADV), surveyed 2,764 Cambodian households in six provinces and in Phnom Penh, the capital of Cambodia. The aim of the study was to determine the prevalence and nature of violence in Cambodian families, as well as awareness of violence. The survey grew out of an earlier qualitative study entitled *Plates in a Basket Will Rattle* (see Box 5.5 in Chapter 5). This study revealed the devastating impact of violence on the lives of Cambodian women, but raised questions about how widespread domestic violence actually was and whether men were also victims of partner abuse.

In all, 1,374 women and 1,286 men were interviewed (the men were not the partners of the women, but were sampled from nearby villages). The quantitative study used a modified version of the Conflict Tactics Scale (CTS) as a basis for measuring abusive behavior (the CTS is described in Chapter 6). In this survey, the CTS was modified to include behaviors that the Khmer staff of MoWA and PADV identified as common in Cambodia. Questionnaires were first written in Khmer, then translated and back-translated several times to ensure that the English and Khmer versions were clear, consistent, and meaningful. The survey used two questionnaires per household. The first instrument was a brief questionnaire that served to gather basic demographic information on all of the residents of the household. The second instrument was an individual-level questionnaire that was used to collect information on the respondent's perceptions of violence and on their individual experiences of specific abusive acts. Prior to the field work, all members of the research team underwent a three-week training course on domestic violence issues, interviewing techniques, and the logistics of random selection of households.

Findings

Sixteen percent of women reported having been physically abused by a spouse, and 8 percent, or one-half of all women reporting abuse, sustained injuries. More than 50 percent of reported injuries were head injuries. In contrast, 3 percent of men reported abuse by a spouse and less than 1 percent reported injuries due to abuse. Women living with their natal kin were less vulnerable to spousal abuse, suffering half as much abuse (8.3 percent) as the overall population of women. Thirty-four percent of abused women said they had not sought help from anyone.

(From Nelson and Zimmerman, 1996.²)

study of violence during pregnancy and low birth weight.)

Well-known examples of this type of research design include long-term studies to determine whether smoking causes lung cancer, or whether exercise reduces the risk of heart disease. The likelihood that an individual who has been exposed to a certain risk factor will contract the disease or condition can be calculated as the **relative risk**, which compares the rates or risks of a specified outcome between groups that have different exposures to the risk factor under study. For example, relative risks are used to estimate the probability that a woman who is beaten during pregnancy will have a baby with low birth weight compared to a woman who has not experienced abuse during pregnancy

Cohort studies provide the best information about the causes of health and social problems and the most direct measurement of the risk of developing a certain condition or disease. They also permit a researcher to study several outcomes with regard to a single exposure. For example, it would be possible to determine the effect of violence during pregnancy on infant birth weight as well as on women's physical and mental health.

A cohort study design might also be used is to evaluate the effectiveness of an intervention over time. For example, the

FIGURE 4.1 DIAGRAM OF COHORT STUDIES (USING A STUDY OF LOW BIRTH WEIGHT AS AN EXAMPLE)

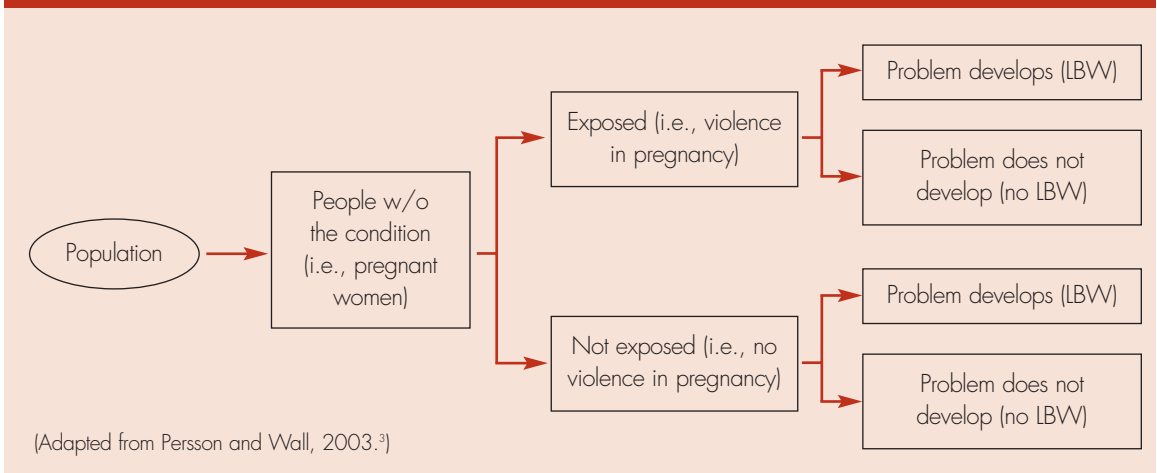




PHOTO BY M. ELLSBERG

Interview in Ethiopia

Nicaraguan NGO *Puntos de Encuentro* is currently carrying out a cohort study of 4,500 young people in three sites to find out whether their mass media program has been successful in changing the attitudes and behavior of youth with regard to high-risk sexual practices, use of violence, and stigmatizing attitudes toward persons living with HIV/AIDS. The same individuals will be interviewed at the beginning, middle, and end of a television series, developed by Puntos, called *Sexto Sentido* (Sixth Sense). The study will compare changes in attitudes and behavior between individuals who watched the program regularly, and those who never watched the program.⁴

The main drawback to cohort studies is that, despite being conceptually simple, they require more resources and time than other research designs. This is particularly true when studying relatively rare conditions, such as infant or maternal deaths, or where the outcome of interest occurs a long time after exposure to the risk factor, as in the effect of smoking on cancer incidence. These kinds of studies tend to involve very large samples and many years of follow-up before results are obtained.

Box 4.3 presents an example of a relatively simple cohort study by Parker and colleagues carried out in the United States to look at the impact of violence in preg-

nancy on birth weight. This study would be fairly easy to replicate in other settings because women are recruited to the cohort through their attendance at prenatal services, and because the follow-up period is relatively short. This design would work well in settings where a majority of women attend prenatal care, because the women in the cohort would be likely to be fairly similar to women in the population in general. However, it is less suited to a setting where few women attend prenatal care, because the women in the cohort would likely be quite different from other pregnant women in the community. Also, if women do not give birth close to where they received prenatal care, or if most women deliver at home, it may be difficult to obtain accurate birth weight information. In this case, a case-control design, such as the one described in Box 4.5, may be more suitable.

CASE-CONTROL STUDIES

Case-control studies—also known as **case referent studies**—are relatively simple and economical to carry out. They include people

Cohort Studies

- Follow a group of individuals over time.
- Allow researchers to determine whether individuals who have been exposed to a suspected risk factor for disease are more likely to develop the condition or disease than the group without prior exposure.
- May study several outcomes in relation to single (or multiple) exposures.
- May be prospective or retrospective (although prospective cohort studies are more common).
- Are considered the best way to determine the causes of a disease or condition.
- May be costly to perform, as cohort studies often require very large samples and follow-up over long periods.

Case-control studies

- Include people with a disease or other condition and a suitable control or reference group of people not affected by the condition or problem.
- Collect retrospective data on the individuals' exposure to potential risk factors.
- Study only one outcome at a time.
- Permit the identification of risk factors for disease.
- Usually require much smaller sample sizes than cohort studies.
- Are relatively simple and economical to carry out.

BOX 4.3 ABUSE DURING PREGNANCY: A COHORT STUDY**Background and methods**

The purpose of this study was to determine the incidence of physical and sexual abuse in a cohort of adult and teen pregnant women and to determine the effect of abuse on the birth weight of their babies. Using three simple screening questions for abuse, 1,203 African American, Hispanic, and white urban women in the United States were interviewed on their first prenatal visit and in the second and third trimesters. Infant birth weight was obtained by record review.

Findings

Abuse during pregnancy was reported by 20.6 percent of teens and 14.2 percent of adult women. Both abused teens and adults were significantly more likely than nonabused women to enter prenatal care during the third trimester (21.9 vs. 7.5 percent for teens; 15.8 vs. 8.7 percent for adults). Among the total sample of 1,203 women, women who were abused during pregnancy were significantly more likely to deliver infants with low birth weight, and to experience low maternal weight gain, infections, and anemia. They were also more likely to smoke and to use alcohol or drugs.

(From Parker et al, 1994.³)

BOX 4.4 THE DIFFERENCE BETWEEN ODDS RATIO AND RELATIVE RISK

The association between risk factors and outcomes is expressed somewhat differently in case-control studies and cohort studies. Cohort studies use **relative risk** and case-control studies use **odds ratios**.

Both can be translated into lay terms by referring to the relative likelihood of an outcome occurring in the case of cohort studies (e.g., low birth weight), or the relative likelihood of being exposed to a risk factor (e.g., violence during pregnancy) in the case of case-control studies. Although this distinction may appear small, it is useful to keep in mind when interpreting research results. For example:

- A relative risk of 3.0 in a cohort study of violence during pregnancy and low birth weight indicates that women who are beaten during pregnancy are three times more likely to have low birth weight infants than their nonabused peers.
- An odds ratio of 2.0 in a case-control study on the causes of low birth weight indicates that infants with a low birth weight are twice as likely to have mothers who were beaten during pregnancy.

When an odds ratio or relative risk equals 1.0, it means that there is no association between two variables, and a value greater than 1.0 indicates risk. A value less than 1.0 indicates that the exposure has a “protective” or preventive effect with regard to the outcome. Both odds ratios and relative risk figures are usually accompanied by **95 percent confidence intervals (95 percent CI)**, indicating the likely range for the true ratio. A statistically significant range is one that does not include 1.0. Sometimes a statistical test is performed resulting in a p-value. This gives the probability that the observed association is simply due to chance. If the p-value is very small (< 0.05), then we can say there is evidence that the association is real, and not merely due to chance.

with a disease or other condition (such as experiencing violence or depression) and a suitable control or reference group of people not affected by the condition or problem. The “cases” should represent all individuals from the specified population having the condition or disease being studied. The controls are then selected randomly from the same population, excluding those who already have the problem (see Figure 4.2).

Retrospective information is collected from both groups, with particular attention to the time before the onset of the condition. The frequency and distribution of suspected risk factors is then compared between cases and controls, and inferences may be made regarding the causal factors that increase the risk that a particular outcome will occur. The results are expressed as an **odds ratio**, which communicates the odds that a person with the disease or condition was exposed to the risk factor, compared to someone without the condition. See Box 4.4 for an explanation of the differences between odds ratios and relative risk.

In the study of violence, case-control studies may be useful for exploring factors that increase women’s risk for abuse, or for examining the effects of violence on other health outcomes. They are particularly useful for studying events or diseases that occur infrequently in a given population, such as infant mortality, because the overall sample size needed is much smaller than in cohort studies. When cases and controls are matched according to known confounding factors such as age and sex, the design is even more powerful in its ability to predict the outcome.

One constraint of case-control studies is that although multiple causes of a condition may be examined, only one outcome can be studied at a time. For example, to study the effects of violence on both birth weight and infant mortality, it would be

necessary to design two different studies, one where the “cases” were infants with low birth weight, and another where the cases were defined as children who died under a certain age.

Boxes 4.5 and 4.6 describe two examples of case-control studies—a low birth weight study that was carried out in a hospital setting, and a study of child mortality risk that was nested as a substudy within a larger household survey on reproductive and child health. The child mortality study in particular demonstrates the potential benefits of integrating research on violence into other research projects. Although violence was not the primary focus of the child mortality study, the integration of a set of questions regarding mothers’ experiences of violence complemented other research efforts on violence in the same region. They provided unique insight into violence as a contributing cause of child mortality, which would otherwise have been quite difficult and costly to obtain.

BOX 4.5 DOMESTIC VIOLENCE AND LOW BIRTH WEIGHT: A CASE-CONTROL STUDY

Background and methods

This study was performed in León, Nicaragua, in 1996. It differs from the child mortality study (Box 4.6) in that it was carried out in a hospital setting. This design was chosen because of the difficulties in obtaining reliable birth weight information from women interviewed in a household survey.

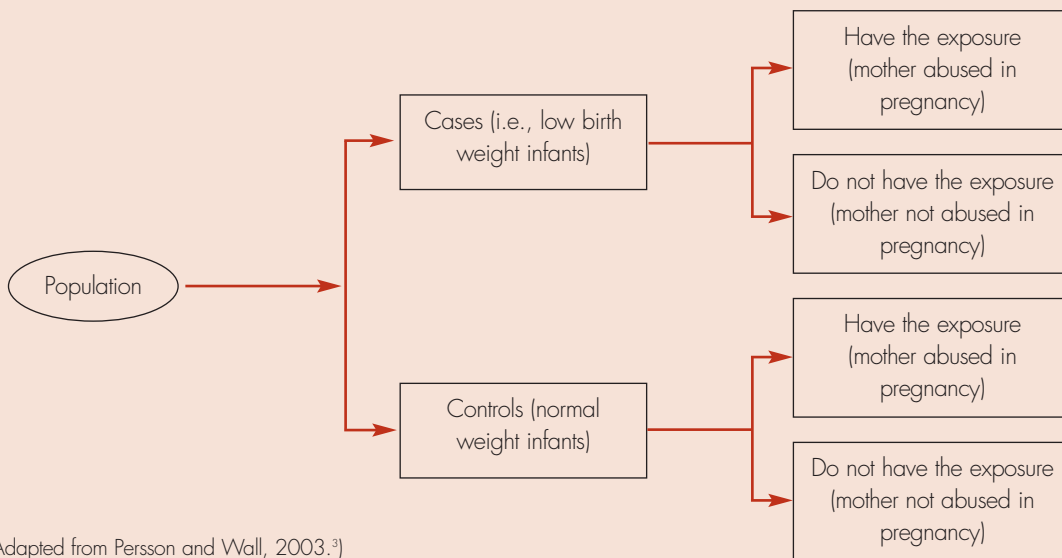
During a two-month period, all births in the León Teaching Hospital were monitored and 101 infants weighing less than 2,500 grams were selected as cases. Two controls were randomly selected for each case among infants weighing 2,500 grams or more. Mothers were interviewed in a special private room before leaving the hospital, usually within 24 hours of delivery. Women’s obstetrical histories were taken and compared whenever possible with hospital and prenatal records. Women were also asked about other relevant risk factors for low birth weight (LBW), such as smoking and alcohol use, and experiences of violence ever and during pregnancy, using the Abuse Assessment Screen.

Main findings

In this study, the following factors among mothers were found to be associated with having a LBW infant: mother’s young age, pre-eclampsia and bleeding, lack of or inadequate prenatal care, smoking, mother’s stress during pregnancy, poverty, and violence during pregnancy. Physical abuse during pregnancy was found in 22 percent of mothers of LBW infants (cases) compared with 5 percent among controls. This association was significant even after adjusting for socio-economic and medical risk factors. The study concluded that after poverty, violence was the second major cause of low birth weight in León, accounting for about 16 percent of LBW. This placed violence ahead of smoking, pre-eclampsia, or bleeding, all of which are recognized risk factors for LBW.

(From Valladares et al, 2002.⁶)

FIGURE 4.2 DIAGRAM OF CASE-CONTROL STUDIES



(Adapted from Persson and Wall, 2003.³)

BOX 4.6 THE IMPACT OF VIOLENCE AGAINST WOMEN ON CHILD MORTALITY: A CASE-CONTROL STUDY**Background and methods**

This study was carried out in León, Nicaragua, in 1996 by researchers from the National University at León and Umeå University, Sweden. The purpose of the study was to determine the impact of physical and sexual violence against women on both infant and under-five mortality risks.

The study was obtained from an ongoing demographic surveillance system in León. A household survey was conducted of 9,500 homes, in which 12,000 women ages 15-49 years were asked about their reproductive histories, including information about any children who were born, or who had died in the last two years. Through this process, 132 children were identified who had died within the previous two years before the age of five. These children were classified as the cases. For each case, two controls, matched by sex and age at the time of death, were randomly selected from the same population. Specially trained interviewers returned to the homes of the cases and controls and administered a new questionnaire to the mothers. The questionnaire focused on the circumstances leading up to the death of the child (for cases) or the 12 months prior to the interview (for controls), including her experiences of physical and sexual abuse. Because it was not possible to trace all the mothers, a final total of 110 mothers of cases and 203 mothers of controls were interviewed.

Findings

The study found that 61 percent of mothers of deceased children and 39 percent of those of controls had lifetime experience of physical or sexual abuse. Physical abuse by a partner during pregnancy was twice as frequent among mothers of children who had died (23 percent vs. 13 percent). The risk of under-five mortality, adjusted for relevant socio-economic factors, was two times greater among children whose mothers had experience of either physical or sexual partner abuse. The risk of under-five mortality for a child whose mother had experienced both physical and sexual partner abuse was six times greater than children whose mothers had never experienced violence. The study concluded, after adjusting for other risk factors, that violence against mothers could be responsible for as much as one third of child deaths in León.

(From Åsling-Monemi et al, 2003.)

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