

Chapter 2

Data and Methodology of the study

2.1 Introduction

Until recently, violence against women has been virtually invisible in most countries, either because women are ashamed to discuss it, because no one has thought to ask them about it, or because it is considered as a natural part of culture. Hence there is scant data available on domestic violence in many countries including India. Prevalence data are often needed to convince policy makers of both the pervasiveness of violence and its serious implications for women's health. However, until recently, the documentation on the prevalence and correlates of domestic violence against women has remained scant (INCLLEN 2000). Even surveys carried out in a single region have proven very useful in many countries in drawing attention to the dimensions of violence. The survey results can be used with great success to create public awareness around domestic violence, and to effect changes in national policy as well as legislation. The large data sets generated by these studies, including many other reproductive and child health outcomes, can be used to deepen understanding of risk factors and health consequences of violence.

The National Family Health Survey (NFHS) is a large-scale, multi-round survey conducted in a representative sample of households throughout India. This research work uses the data generated by the third round of NFHS-3 conducted in 2005-06 with the aims and objectives as mentioned below.

2.2 Aims and Objectives

The main purpose of this research is to shed light on the phenomenon of domestic violence with the aim to examining the prevalence of domestic violence and its correlates in ever married women at all India level. Examining the characteristics of the women who experience violence and the contexts in which they live helps to identify some of the common risk factors, if any, for violence. The thesis also explores the extent of link between domestic violence and various health consequences and women's empowerment.

More specifically, the objectives of the study are as follows:

- a. To estimate lifetime and current prevalence of physical, sexual and emotional violence in ever married women in India.
- b. To examine prevalence of domestic violence (any one of physical, emotional or sexual violence) in ever married women in India.
- c. To identify the major correlates of domestic violence.
- d. To explore the nature of association between women empowerment and domestic violence.
- e. To study the health consequences of domestic violence.

2.3 Significance of our study

Scientific investigation of the problem of domestic violence is a relatively recent endeavor. It is only within the past 30 years that violence against women has been acknowledged internationally as a threat to the health and rights of women as well as to national development. The past two decades have seen an increase in both international attention and programmatic efforts towards developing interventions to prevent and respond to violence against women. Reducing violence against women is addressed specifically by one of the Millennium Development Goals (MDGs) which all 191 Member States have pledged to achieve by 2015. Reducing violence against women will also contribute to the achievement of all of the MDGs since it contributes to the full range of health and development outcomes covered. Strategies to prevent and respond to violence against women have been launched by agencies around the world based in a range of sectors, including governmental and non-governmental organizations. The multisectorial nature of prevention and response efforts is critical to the ultimate success of programs. The primary prevention of violence against women must focus on both the underlying causes as well as the determinants. As noted by the United States Centers for Disease Control and Prevention (CDC 2004), in order to prevent violence against women it is crucial to understand the circumstances, and the risk and protective factors, that influence its occurrence. The lack of a clear understanding of the causes of intimate partner violence and its relationship to other forms of interpersonal violence has frustrated efforts to build an effective global response. Studies to advance the understanding of violence are needed on a variety of fronts, including: Studies that examine the prevalence, consequences and risk and protective factors of violence by intimate partners in different cultural settings, using standardized methodologies (WHO 2010).

“Domestic Violence” is a sensitive topic and the varying causes which can spark the violence within the four walls of homes need to be analysed carefully as study of the factors causing the violence may prevent a family to suffer from the menace of domestic violence. Domestic violence may have a far wider and deeper impact and what is required is to see closely the association of the factors provoking a particular form of domestic violence. If these factors can be controlled then more than one form of violence can be prevented from harming an individual or our society and India would be a much better place to live in.

Violence is preventable. Although no silver bullet will eliminate it, a combination of efforts that address income, education, health, laws and infrastructure can significantly reduce violence and its tragic consequences. First and foremost, abusive behavior towards women must be viewed as unacceptable. Communities need to have an important role in defining solutions to violence and providing support to victims. And men must be engaged in the process too, as agents of change standing alongside women to end violence.

Many different theoretical models attempt to describe the risk and protective factors for domestic violence, including those based upon biological, psychological, cultural and gender equality concepts. Ahuja (1998) and Sharma (1997) highlight a common approach in some of the theories that focus on individual aggressors. There are two kinds of explanations focusing on individuals. One includes psycho-pathological explanations that focus on personality characteristics of victims and offenders. These theories provide pathological explanation for violent behaviour focusing on brain structures, chemical imbalances, dietary deficiencies, hormonal factors as well as evolutionary theories and genetic characteristics to explain violent behaviours. This model thus links mental illnesses and other intra individual phenomena such as alcoholism and drug use to violent behaviour. The socio- psychological model on the other hand argues that violent behaviour can be understood by careful examination of the external environmental factors that have an impact on the behaviour of individual leading to stressful situation or family inter-actional patterns. Feminist analysis of violence has been based on power relations between men and women that deny women equal access to power and resources thus making them more vulnerable to violence from men. According to this the cause of violence can be traced to patriarchy -the ideology that bestows on men power and authority over all aspects of women’s lives including her bodies. Ahuja proposes an integrated model that includes a combination of the above factors to explain violent behaviours among individuals. The model proposes the influence of four factors on violent behaviour among individuals. They are : Social norms and social organizations that socialize the individuals personal characteristics; Intrapersonal characteristics of the

individual that include his or her relations and interactions with other individuals and family; economic and environmental factors that influence the behaviour of individuals. Heise (1998) proposes a clearer and interrelated ecological framework for understanding violent behaviour among individuals. This framework includes a range of physical, social, emotional and psychological factors at the personal community and societal levels. Each of these models contributes to a better understanding of domestic violence and helps to build programmes that aim to reduce modifiable risk factors and strengthen protective factors.

Critical understanding of the above models suggests that any effort to prevent partner violence is based on an implicit theory of what leads particular men to abuse their partners. Thus research and theory on what increases risk of partner violence is highly relevant to the design and evaluation of programmes aimed at reducing partner violence. In the 1970s and 1980s, understanding of partner violence was informed primarily by theory and research emanating from isolated academic disciplines: criminology, sociology, psychology, and feminist theory. Each examined the phenomenon through the isolated lens of its own discipline. Patriarchy, social and economic disadvantage, social learning modeled on parent's behaviour, and psychopathology were all proposed as the "real" or primary cause of partner violence. Not surprisingly, acrimonious debates ensued over whether particular factors—such as heavy alcohol use, patriarchal gender norms or poverty—were causally linked to violence against women. By the mid 1990s, several theorists began to argue for moving beyond single-factor theories to recognise the complex nature of abuse. They maintained that abuse must be conceptualized as a multifaceted phenomenon grounded in the interplay among personal, situational and socio-cultural factors. No one factor "causes" violence; rather, violence is more or less likely to occur as factors interact at different levels of the social ecology (Heise 1998). The resulting paradigm became known as the "ecological framework."

As applied to partner violence, the ecological framework has been conceptualized in a variety of ways, although they all share the notion of embedded pathways of causality. Women bring to their relationships a genetic endowment, certain personality traits and a host of experiences from their childhood and adolescence. They partner with men who likewise bring personal histories and in-born proclivities to their union. The couple is in a relationship that has its own dynamics, some of which may increase or decrease the risk of abuse and the relationship is embedded in a household and neighbourhood context that affects the potential for violence. In many low income settings this includes the influence of extended family members who interact with the couple in ways that may either increase or lessen the chances of abuse. In turn, both partners engage with various different "communities" including those

related to work, friendship networks, faith communities, and governance structures. Finally, the entire system is embedded in a macro-system which refers to the cultural, economic and political systems that inform and structure the organisation of behaviour at lower levels of the social ecology.

Ecological thinking represented a significant step forward for the field of violence studies because it conceptualized the causes of violence as probabilistic rather than deterministic. In other words, factors operating at different levels combine to establish the likelihood of abuse occurring. No single factor is sufficient, or even necessary, for partner violence to occur. There are likely to be different constellations of factors and pathways that may converge to cause abuse under different circumstances. Likewise the same set of genetic, personal history and situational factors (such as abuse in childhood, a proclivity toward impulsiveness, and having too many drinks) may be sufficient to push a particular man toward partner violence in one socio-cultural and community setting, but not in another. One can imagine that a man's response to "perceived" provocation may be quite different based on what his expectations are regarding male/female relations; whether his friends, neighbours and local authorities are likely to find his behaviour "acceptable" or shameful; and whether his partner has the social permission and economic means to leave him if he crosses the line.

Women in India are subject to violence not only from husbands but also from members of both the natal and marital home. Girls and women in India are usually less privileged than boys in terms of access to material resources. Nevertheless, there are regional and community variations. Women in the north have relatively less autonomy than their counter parts in south, and experience fewer opportunities for control over economic resources (Karve 1965). Although there are some difference in reporting by region-women in the south report fewer beatings than their counter parts in the north –in depth qualitative studies have found considerable under reporting in the data (Rao 1997). Spouse disparity in educational attainment level or marital age, lack of autonomy within the home, dowry pressure, child hood abuse, unemployment, alcoholism and poverty are all linked to high rates of domestic violence in India (Jejeeboy 1998; Ahuja 1987; Mahajan and Madhurima 1995).

In India comprehensive household data on the prevalence and costs of domestic violence are lacking. The multi-site INCLEN study is a pioneering effort to estimate comparable rates of violence within and across for countries: India, Chile Brazil, Egypt and Philippines. In India the study by INCLEN is undertaken between 1997 and 1999 at seven diverse and regional sites: Bhopal, Chennai, Delhi, Lucknow, Nagpur, Thiruvananthapuram

and Vellore. According to this study the overall figure of domestic violence for India are 36.9% physical violence and 35.5% psychological violence, while for Kerala it is 62.3% and 61.61% respectively. In the rural areas the overall figure is 51.7% of physical violence and 49.7% of psychological violence, while the Kerala figure 68.8% physical violence and 68.9% psychological violence. The study tried to determine what women consider to be the precipitating factors for the violence. Women identified lapses in fulfilling their responsibilities (Cooking, attending to household, looking after children and in laws) as key factors influencing the occurrence of violence. These findings reiterate that violence is mechanism for enforcing the gender roles and expectations within the family. Moreover, mother-in-law too reported these same factors as precipitating violence in their own marriages. Not infrequently, women attributed violence due to infidelity or suspicion of infidelity of either of the spouses. Another area of conflict was dissatisfaction with the dowry. The same study conducted in Kerala (Thiruvananthapuram) by Dr. Raj Mohan of R-CERTC and Dr. M.K.C Nair of Child Development Centre, Trivandrum states that overall 45% of women reported at least one incident of physical violence in their lifetime. Psychological and physical violence were reported in higher numbers by women who have less social support. Despite the violence more than 95% of women remained in their marriage. The study also analyzed that if the gap between husband and wife's education and employment status (especially if the women is more educated and better employed than her husband) is greater, the possibility of psychological and physical violence is greater. Violence against women spans all geographical region, economic strata, education levels, and age and employment status. It could be seen that despite the total literacy and global model of development, Kerala tops the list in Domestic Violence, according to the survey conducted by ICRW.

The foregoing paragraphs are a sure indicator towards the prevalence of domestic violence in our society. This is in stark contrast to the UN Human Rights Declaration (of which India signatory) and our constitutional and legal provisions. But most women are not aware of their rights to protection of life, liberty etc. Even if they were aware, they would lack the resources in terms of money, skill, time, experience, confidence and courage to invoke these provisions. Moreover, traditionally women believe in tolerating harassment at home. Domestic violence is to be perceived not as a law and order problem alone. Primarily it is a socio cultural problem. Its impact has far reaching effects on the family life, health of woman, life of children etc. Studies such as these which examines the causes, its nature and manifestations and consequences would assist the general society to understand the magnitude as well as its implications on the lives as well as the institution of family.

Examining the characteristics of the women who experience violence and the contexts in which they live helps to identify some of the common risk factors, if any, for violence. Risk factors increase the likelihood of someone becoming a victim and/or perpetrator of domestic violence and their reduction should therefore be a key target of prevention efforts, as well as an integral concept in programme monitoring and evaluation efforts. Similarly, protective factors, which buffer against the risk of becoming a victim and/or perpetrator of intimate partner and sexual violence, may need to be fostered-including through structural and other interventions for achieving gender equality and the empowerment of women.

There is a need to investigate why the problem occurs by determining its causes and correlates, the factors that increase or decrease the risk of its occurrence (risk and protective factors) and the factors that might be modifiable through intervention. This cross sectional study aims at providing a snapshot of how frequently domestic violence occurs and its associated factors which would assist the local bodies at the grass root levels to be vigilant against the menace and chalk out meaningful and effective measures to create a blockage to domestic violence

Gender relations and roles may affect or be affected by the prevalence of violence against women in a given society. This study analyzes the relationship between gender relations and roles and domestic violence. Among the indicators of gender relations and roles considered here are currently married women's participation in various types of household decisions, their acceptance of wife-beating by husbands, attitudes toward a woman's right to refuse to have sex with her husband, and controlling behaviors by husbands that could strongly circumscribe women's lives.

Domestic violence not only poses a direct threat to women's health, but it also has adverse consequences for other aspects of women's health and well-being and for the survival and well-being of children. This study examines the bivariate relationships of domestic violence with a number of demographic and health outcomes, including women's and children's nutritional status, women's fertility, the intendedness of a woman's most recent birth, birth spacing, unmet need and contraceptive use and the prevalence of sexually transmitted infections (STIs). Although quite a reasonable amount of literature has been found on issues related to HIV/AIDS and Domestic Violence which exists at global level, Indian study on the subject is relatively very rare. This obviously calls for or leaves scope for such studies in Indian context. Secondly, epidemiologically speaking, it is of crucial importance to 'test a hypothesis and see if the results are replicated in as many different settings and by different methods as possible' in order to establish an hypothesized

association and causality between domestic violence and HIV epidemic. There is much need and scope for sound scientific studies on this question.

A growing advocacy effort to address domestic violence in developing countries contrasts sharply with the still limited available empirical evidence on this issue. Despite promising recent initiatives, community-based data on the magnitude of domestic violence, on its precipitating factors, and consequences for women and their families of domestic violence still remain extremely slender in almost all developing countries. In the absence of reliable data on the magnitude of this problem, there remains a reluctance among policy makers to address this issue, as it touches upon a highly personal and sensitive aspect of family life which continues to be viewed by many as 'off limits' for intervention. The paucity of information on the determinants and precipitating factors for domestic violence have similarly impeded the formulation of sound and effective programs to address this issue, especially in the area of prevention. Similarly, limited understanding of the linkages between domestic violence and other health problems has resulted in missed opportunities in terms of more effectively and directly addressing this issue within existing health programs.

Our objective in this research work is to contribute to the currently limited body of community-based research on domestic violence in India. Using the large scale national level survey data we present evidence on the prevalence of domestic violence in India. We subsequently examine the determinants of domestic violence within this population, exploring the effects of various factors. This study investigates these issues, ponders the questions, indicates new research and provides practical applications.

2.4 Data

The present study uses the data obtained from the third round of the National Family Health Survey (NFHS-3). NFHS is a large-scale, multi-round survey conducted in a representative sample of households throughout India and is a collaborative project of the International Institute for Population Sciences (IIPS), Mumbai, India; ORC Macro, Calverton, Maryland, USA and the East-West Center, Honolulu, Hawaii, USA. The Ministry of Health and Family Welfare (MOHFW), Government of India, has designated IIPS as the nodal agency, responsible for providing coordination and technical guidance for the NFHS. NFHS was funded by the United States Agency for International Development (USAID) with supplementary support from United Nations Children's Fund (UNICEF). IIPS collaborated with a number of Field Organizations (FO) for survey implementation. Each FO was responsible for conducting survey activities in one or more states covered by the NFHS.

Technical assistance for the NFHS was provided by ORC Macro and the East-West Center. Three rounds of the survey have been conducted with the first survey in 1992-93, second in 1998-99 and third in 2005-06. The main purpose of the NFHS surveys is to provide state and national information for India on fertility, infant and child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services. Each successive round of the NFHS has had two specific goals: a) to provide essential data on health and family welfare needed by the Ministry of Health and Family Welfare and other agencies for policy and programme purposes, and b) to provide information on important emerging health and family welfare issues. Technical assistance for the NFHS was provided mainly by ORC Macro (USA) and other organizations on specific issues. The funding for different rounds of NFHS has been provided by USAID, DFID, the Bill and Melinda Gates Foundation, UNICEF, UNFPA, and MOHFW, GOI.

The details of all the rounds of the survey methodology and survey findings are published at all the state level and national level in the forms of reports. The methodology adopted by NFHS-3 is available in two volumes as NFHS-3 report volume I and volume II.

NFHS-3 interviewed ever married and never married women and men consisting of 124,385 women age 15-49 and 74,369 men age 15-54 from all 29 states. Throughout India, 102,946 women and men were tested for HIV in NFHS-3. The survey adopted a two-stage sample design in most rural areas and a three-stage sample design in most urban areas. A total of 83,703 women (of which 68,704 were ever married women) were interviewed for domestic violence taking precautions in keeping with the World Health Organization's ethical and safety recommendations for research on domestic violence. Though NFHS-3 captures information on violence experienced by never married women on physical and sexual violence most of the information on all the aspects of violence was sought from ever married women. Also ever married women had much higher prevalence of violence than never married women which agrees with the literature that the most common form of domestic violence is spousal violence. Thus since spousal violence is the most common form of violence against women ever married women were considered in this research work. As per NFHS-3 almost 16% of never married women had ever experienced physical violence and 1.1% report sexual violence. Also never married women report violence perpetrated by mainly family members, particularly mothers as the person committing violence or at the hands of teachers. Since proportionately few never married women report violence as

compared to ever married women, only ever married women is considered for the analysis through out in this work.

2.5 Measurement of Domestic Violence in NFHS-2 and NFHS-3

The measurement of domestic violence within the Demographic Health Survey (DHS) program has been evolving in keeping with the research on how to improve the validity of prevalence measurement in response to higher ethical standards in the collection of private sensitive data (Ellsberg *et al.* 2001; WHO 2001).

The first time domestic violence data were collected as part of a DHS in India in NFHS-2 which did not use standardized questions. It used a single question threshold approach whereas NFH-3 used a modified Conflict Tactics Scale (CTS) to measure spousal violence.

The single-question threshold approach: This approach was used in Egypt, India, Peru, and Zambia. The respondent is asked a single question to determine whether she has ever experienced violence. Women who give a positive response are then asked more questions, such as who the perpetrator was/is (including the husband), and in Egypt, India, and Zambia, they are asked about the frequency of the violence. No followup questions are asked of women who say “no” to the initial question. Thus, the woman is given only one chance to disclose the occurrence of violence.

The modified CTS approach, as embodied in the domestic violence module: This approach involves implementing a modified version of the CTS to get information on spousal violence and then a series of single questions to get at violence experienced at the hands of someone other than a husband or partner, as well as violence during pregnancy. The original CTS, developed by sociologist Murray Straus in the 1970s, consists of a series of individual questions regarding specific acts of violence, such as slapping, punching, and kicking. The original scale had 19 items (Straus 1979, 1990). The modified list used by the DHS program includes only about 15 acts of physical and sexual violence. If the respondent affirms that any one of the specified acts or outcomes has taken place, she is considered to have experienced violence. The modified CTS approach was used in Cambodia, Colombia (2000), Dominican Republic, Haiti, and Nicaragua.

The modified CTS approach has several advantages over a single-question threshold approach, particularly in the context of cross-cultural research. By asking separately about specific acts of violence, the violence measure is not affected by different understandings between women of what constitutes violence. A woman has to say whether she has, for example, ever been “slapped,” not whether she has ever experienced “violence” or even

“beatings” or “physical mistreatment.” All women would probably agree what constitutes a slap, but what constitutes a violent act or what is understood as violence may vary among women and across cultures. Another advantage of the modified CTS approach is that it gives respondents multiple opportunities to disclose the experience of violence. The level of comfort in disclosing such experiences to anyone, let alone to an interviewer, is likely to vary among cultures as well as among women sharing the same culture. Some women may not be immediately willing to disclose their experience of violence the very first time they are asked, and hence an approach that uses a single gate keeping question would yield a lower prevalence. Also, a single question is much less likely than multiple questions are to capture women’s varied experiences of violence. Thus, an approach that asks about violence from many different angles using separate questions, is likely to encourage disclosure because it gives women some time to think about their experiences and permits them to disclose when they are ready and/or when they are asked a question describing an experience with which they identify.

Domestic Violence in NFHS-3 was measured by using modified Conflict Tactics Scale (CTS) (Strauss 1990). Detailed information on the different forms of violence perpetrated by husbands (current/former) against their wives was taken from ever married women aged 15-49 years.

Following set of questions were used to measure various forms of violence.

Physical Violence was measured using following set of questions:

(Does/did) your (last) husband ever do any of the following things to you:

- a) Slap you?
- b) Twist your arm or pull your hair?
- c) Push you, shake you, or throw something at you?
- d) Punch you with his fist or with something that could hurt you?
- e) Kick you, drag you or beat you up?
- f) Try to choke you or burn you on purpose?
- g) Threaten or attack you with a knife, gun, or any other weapon?

Sexual Violence

(Does/did) your (last) husband ever:

- h) Physically force you to have sexual intercourse with him even when you did not want to?
- i) Force you to perform any sexual acts you did not want to?

Emotional Violence

(Does/did) your (last) husband ever:

- j) Say or do something to humiliate you in front of others?
- k) Threaten to hurt or harm you or someone close to you?
- l) Insult you or make you feel bad about yourself?

If the woman responds 'yes' to one or many questions from a) to g) she is believed to be facing physical violence. Similarly if the woman responds 'yes' to any of the questions from h) to i) she is believed to be facing sexual violence and if the woman responds 'yes' to any of the questions from j) to l) she is believed to be facing sexual violence.

In the present study, domestic violence is categorized as binary response variable i.e. 'yes' and 'no'. If the woman has experienced any one of the different forms of violence i.e. physical violence or sexual violence or emotional violence she is believed to be undergoing domestic violence. If she responds 'no' to the question of experience of physical, sexual and emotional violence, she is taken to be free of domestic violence.

2.6 Correlates of Domestic Violence

The causes of DV are multifaceted and its consequences are damaging. Therefore it is essential to investigate the socio-psychological causative roots of DV and its impact on women who are exposed to violence behind closed doors. Examining the characteristics of the women who experience violence and the contexts in which they live helps to identify some of the common risk factors, if any, for violence. These risk factors have been put forward as being related to the risk of perpetrating violence against an intimate partner. The identification of risk factors is important for informing strategies and programmes to ameliorate or buffer against risk – and ultimately to guide for formulation of a prevention policy. Recent review of literature on the risk factors for intimate partner violence or domestic violence and sexual violence has identified over 50 risk factors (Heise and Gracia-Moreno 2002).

Woman's Characteristics

Age: A woman's age is thought to affect the likelihood that she will experience domestic violence. Women of younger age group are at higher risk of domestic violence as compared with those of elder age group because elder women are not prone to file assault charges either because of traditional attitude or because of possibility of divorce. The National Family Violence Survey conducted in America indicated that all forms of domestic violence against women occur most frequently among those less than 30 years of age. The rate of domestic

violence against those less than 30 years of age was found to be more than double the rate for the age for 31 to 50 years. Researchers argue that as a woman ages, she often grows in social status as she becomes not only a wife, but a mother, and perhaps a more economically productive or socially influential member of her community; thus, older women are less likely to report current experience of abuse than young women (Fernandez 1997). Various other studies have shown that women's age affects the likelihood that she would experience domestic violence (Daga 1998; Visaria 1999). Ever-experience of violence is generally hypothesized to increase with age, since older an ever-married woman is, the longer has been her period of exposure to the risk of violence. However, the relationship of women's age and experience of domestic violence is not simple. It does not increase monotonically and fluctuates inconsistently within a narrow range of age. In Egypt and India, it first rises, peaking for women age 30-34, and then falls. (Kishor and Johnson 2004). We would expect a woman's age to be negatively related to domestic violence, since over time marital relationships could cement and become more stable, and so reduce the husband's tendency to violence.

Age at first marriage: Age at marriage is an important variable in the study of domestic violence

against women. A woman's young age at first union is generally thought to be another risk factor for the experience of domestic violence (Kishor and Johnson 2004). Younger age at marriage puts a lot of stress for adjustment which may result in use of violence on the part of young husbands. It can therefore, be presumed that women who are married at an early age are at higher risk of being abused by the husbands and/or in-laws. This hypothesis has both contextual and individual-level explanations. At the societal level, age at marriage reflects status of women (Mason 1987). Violence is often positively correlated with very early marriages in societies where women's status is low (Ghosh 2007). At the individual level, a woman's age at marriage is related to her risk of experiencing violence because when she marries at younger age she was probably not be given enough chance to acquire the levels of understanding and maturity needed to ensure her security in marriage (Ghosh 2007). The data pertaining to age of respondents at marriage will be used in this study to find out any correlation between the extent of violence and the age at marriage.

Number of children ever born: The presence of children could either enhance violence by increasing parental stress or deter violence if they support their mother. Several studies have

shown that the vulnerability of experiencing domestic violence is positively related to the number of children (Ellsberg 2000; Martin 1999). The general perception among family violence researchers is that large families are more prone to violence because they experience greater stress associated with the necessity to provide for several children. The association between violence and number of children could be conceptualized such that when there are more children in a household there is economic insecurity, insufficient resources, which may lead to disturbing levels of stress for the head of the household. Family size has a high potential for generating frustration because of its low probability of resolution. Violence not only becomes a possible response to this frustration, but also an acceptable one. This in turn may further lead to violence in some instances. Hence more the number of children, the greater are the likelihood of violence (Martin 1999). On the other hand, the presence of greater number of children in a household might be a result of domestic violence rather than a cause (Johnson 2003). That is, women who are subject to partner violence may less able to control their own sexuality and fertility than women who are not subject to violence do. Thus, the direction of the relationship between number of children and domestic violence remains unclear. In most countries, the reported rate of violence increases fairly consistently with the number of children. For example, in Peru, 22 percent of women who have no children report ever experiencing violence, compared with 38 percent of women with one or two children, 45 percent of women with three or four children, and 53 percent of women with five or more children. This pattern is similar to that in Cambodia, Colombia, the Dominican Republic, Egypt, India, and Nicaragua (Kishor and Johnson 2004). In India though the total fertility rates are gradually declining, it still remains much higher. High fertility rates, coupled with widespread poverty, can be a major source of stress for families. Thus we hypothesize that women with larger families are more likely to experience domestic violence than women with smaller families.

Education: Educational plays a significant role in the life of any individual. Education has been shown to be a source of empowerment for women, facilitating their ability to “gather and assimilate information, manipulate and control the modern world, and interact effectively with modern institutions” (Kishor 2000). Higher the level of education, higher is the potential for resisting any action of injustice, exploitation and toucher. As far as women are concerned, education gives them a voice against all types of evils affected on them and empowers them to fight for justice. It is generally presumed that the extent of domestic violence is less in cases where the women are educated. Formal education helps a woman to

know what is happening outside her immediate surroundings. It also facilitates her to develop rational outlook towards life. Education widens the horizon and makes the woman more knowledgeable. Education also helps a woman to get jobs and economic returns. It also enhances social prestige of a woman. It is hypothesized that women with more education have greater resources to draw upon in times of need, such as when dealing with a violent partner. Thus, it is expected that women with more education experience less violence. For example, in Cambodia, 21 percent of women who have no education report having ever experienced violence, compared with 17 percent of those with primary education and 12 percent of those with secondary or higher education. In the Dominican Republic, Egypt, Peru, and Zambia, the highest rates of violence are found among women with primary education and the lowest rates are found among women with secondary or higher education. However, it is also speculated that there may be a transition for women who have begun their autonomy. For example, the urban, better educated, and economically active women may in fact suffer more violence than other women precisely because of the greater agency they exert in their own lives, thereby challenging existing gender norms (Daga 1998; INCLIN 2000). In Haiti, education is positively related to the ever-experience of violence: the more education a Haitian woman has, the more likely she is to report that she has ever experienced violence (Kishor and Johnson 2004).

Work Status: The effect of the woman's employment status is likely to vary by the type of employment — whether the work is physically and economically visible and brings in earnings, or is invisible, as unpaid work in the family enterprise tends to be, and which may provide little protection for the woman. Very-low-paid work may also make rather little difference. But we would expect regular employment — which brings in dependable income — to strengthen a woman's fall-back position in the home, and so reduce her risk of violence.. Economic independence is also one of the main sources of women's empowerment. A woman who brings in more earnings than her husband, or who has a higher employment status, for instance, could be subject to either less violence because he respects her more and values her economic contribution, or to more violence because he wants to show her, her 'proper place' within the relationship and knows that, for the reasons mentioned, employment alone would not provide her with an immediate exit option. The relationship between work status of a woman and her risk to experience domestic violence can be conceptualized in a way that women who are engaged in paid employment have more say over financial and household matters than women who are not active in the labor market

(Malhotra 1997). Thus, women who are currently employed are expected to be at lower risk to experience domestic violence. However, it is interesting to note that frequently women engaged in paid employment are found more likely to be subjected to domestic violence than those who are not in the labor force. Women's economic power is in transition, men are more likely to feel threatened by this, and there is often a (relatively) shortterm spike in male violence against women (Bloomberg, 2005). In Colombia, the Dominican Republic, Haiti, India, Nicaragua, and Peru, women who report that they are currently working and earning cash also report significantly higher levels of ever-experience of violence than do women who are not currently working. For example, in Peru, 46 percent of working women earning cash report having ever experienced domestic violence, while 36 percent of nonworking women report the same. As per the study findings only in Egypt are women in paid employment significantly less likely to have ever experienced violence than those who do not work: 36 percent of women not working report having ever experienced violence, compared with 21 percent of those who do work for cash. There is no consistent relationship across countries between violence and employment by type of payment (Kishor and Johnson 2004). Using a cross-sectional investigation of married women sampled via the Bangladesh Demographic Health Survey (BDHS), Rahman et al (2011) found that about currently working women were more likely to experience sexual and physical violence than women who were not working. The authors speculate that employed women may be at higher risk of experiencing violence because they may be more likely to challenge their husband's authority or because their husbands perceive a threat to their authority. The study also explored how women's empowerment indicators (participation in household decision-making and acceptance of wife beating) were related to domestic violence among Bangladeshis. The authors found that the likelihood of all forms of domestic violence increased with women's participation in household decision-making. Bhattacharya et al (2009) study of both women and men in eight villages in Uttar Pradesh, a northern Indian state, highlights the importance of controlling for variables that influence female work participation (endogenizing work participation). At first glance, the study data appears to suggest that women's engagement in paid work is associated with increased violence, with 56 percent of women experiencing violence doing some form of paid work compared to 42 percent of women who do not. However, the researchers caution against drawing misleading conclusions and the need to account for the possibility that violence may motivate a woman to seek work. A closer look at the data, controlling for variables likely to have an effect on violence and women's work participation, found that women engaged in regular paid work outside the household are 22

percent less likely to experience violence, as compared to women who do not work or work on the family farm. Women's ownership of land and property is even more strongly associated with a reduction in violence, a 36 percent difference.

We hypothesize that educated women are at a risk of experiencing more domestic violence than uneducated women.

HIV Status of woman: Studies from several countries have found that HIV-positive women report higher rates of domestic violence (Dunkle *et al.* 2004a; Maman *et al.* 2000a) and there is increasing evidence that HIV risk is linked to lifetime exposure to violence in complex ways (Campbell *et al.* 2008). Rape is a potential cause of direct infection with HIV for some women, yet even in high-prevalence settings the low HIV transmission risk during a single sexual act makes it unlikely that rape results in a substantial proportion of population-level HIV cases. Violence and gender inequality are more likely to increase HIV risk through indirect pathways, including chronically abusive relationships where women are repeatedly exposed to the same individual, and are unable to negotiate condom use for safer sex (WHO/UNAIDS 2010).

The HIV status of women in our analysis for NFHS-3 data is dichotomized in two categories: HIV positive and HIV negative. The HIV status of the women selected in domestic violence module of NFHS-3 is determined by linking and merging the domestic violence data file and the HIV data file of NFHS-3. The NFHS-3 survey gives 5 different data files for various modules including women file for domestic violence module, HIV file of men and women together without any demographic details except the line number, household number, national PSU number and case id number in common with other files. The HIV data file of NFHS-3 had 13 variables. The results of the HIV status are required to be merged with the women questionnaire on domestic violence file which was having the demographic data along with the domestic violence module questions. The variables line number, household number, case id number and national PSU number from HIV file are matched simultaneously with the same variables of the domestic violence module file and then the HIV status of the women selected individually is obtained. In other words 1,24,385 individuals from women file were matched with each and every 1,05,657 individuals from HIV file to obtain the HIV status of the women respondent in the domestic violence module. Since the matching of so many respondents (124385 * 105657) was not possible manually a computer programme was written to merge the required information from HIV data file to women file (Appendix B).

Husband's/partner's Characteristics

To fully understand spousal violence, the characteristics of the husband or partner who is the alleged perpetrator of the violence also need to be examined.

Education: Women whose husbands have secondary or higher levels of education have lower rates of ever-experience of violence in most countries. In countries such as Cambodia, Colombia, the Dominican Republic, India, and Nicaragua, the relationship between education and violence is negative and monotonic (Kishor and Johnson, 2004). However, this association is also subject to fluctuation and inconsistencies. For example, in case of Haiti, the relationship between education and violence is positive and monotonic (Kishor and Johnson 2004). It is expected that level of husbands education may increase the awareness of a husband, which may help him to recognize the need for giving freedom to his wife.

Occupation: We would expect the husband's unemployment — and the associated stress and frustration — to enhance the probability of his being violent toward his wife, and for regular employment to lower the probability. Men's feelings of powerlessness may stem from an inability to earn a salary that keeps up with inflation and the family's standard of living – or from the stress of a high-pressure occupation, which is not necessarily a high-status one. Men may use physical expressions of supremacy to compensate for their lack of occupational success, prestige, or satisfaction (Anderson 1997). Research using the National Surveys of Families and Households found that financial adequacy reduced the risk of couple violence. Husband's unemployment is also found to be associated with domestic violence (Gelles and Cavanaugh 2005). Some of the literature indicates that in developing societies where agricultural land is inherited exclusively by sons, women are more likely to be culturally devalued (Dyson and Moore 1983; Miller 1981), and hence could be at a higher risk of experiencing violence. Kishor and Johnson in 2004 studied household and individual-level data from the Demographic and Health Surveys (DHS) program to examine the prevalence and correlates of domestic violence and the health consequences of domestic violence for women and their children. Nationally representative data from nine countries—Cambodia (2000), Colombia (2000), the Dominican Republic (2002), Egypt (1995), Haiti (2000), India (1998-1999), Nicaragua (1998), Peru (2000), and Zambia (2001-2002)—are analyzed within a comparative framework to provide a multifaceted analysis of the phenomenon of domestic violence. Egypt, India, and Colombia are the countries where there is some evidence that women whose husbands are in agricultural occupations have experienced higher rates of

violence (Kishor and Johnson 2004). In Egypt, 37 percent of women whose husbands were in agriculture had ever experienced violence, as compared to 33 percent of women whose husbands were in nonagricultural occupations; in India, 22 percent of women whose husbands were in agriculture had ever experienced violence, as compared to 17 percent of women whose husbands were in nonagricultural occupations; and in Colombia, the corresponding figures were 45 and 42 percent, respectively.

Alcohol consumption: Of all measurable variables hypothesized to influence the likelihood of domestic violence, a partner's habitual drunkenness has one of the strongest, most consistent relationships to the phenomenon (Johnson 2003). The results from a multi-country study of prevalence and incidence of domestic violence reinforces that the relationship between the experience of violence by wives and the frequency of drunkenness among men who consume alcohol is positive, monotonic, and highly significant (Kishor and Johnson 2004). The relationship between alcohol use and domestic violence is complex (Roizen 1997). While most research confirms that alcohol and violence go hand-in-hand (Hotaling and Sugarman 1986) there is little agreement over the exact role alcohol plays in partner violence. Martin (1993) argues that the relationship between alcohol and violence differs depending on factors such as who has been drinking, the drinking context, and the relationship between perpetrator and victim. Theory building is difficult because so many factors combine to determine the link between alcohol and violence (Stith and Farley, 1993). Selective disinhibition theory (Parker and Rebhun, 1995) might be the most promising explanation, positing that alcohol's negative effects on people's perceptions and judgment interact with a complex set of social and psychological factors to result in violence in certain cases. The combination of problem drinking and social pressure to drink may make women particularly susceptible to violence. Thus we hypothesize that women whose partners sometimes or frequently get drunk are more likely to experience domestic violence than women whose partners never get drunk

Union characteristics

Risk factors for women's vulnerability to spousal violence include not only their own characteristics and the characteristics of their husbands, but also how their own characteristics compare with those of their husbands. The literature suggests that where men are of higher educational status than women, they are more likely to assert unequal, and even violent, power in the relationship (Hornung *et al.* 1981). The author also found that when

women have greater achieved status than their husbands, there is an increased risk of marital violence.

Spousal age difference: Spousal age difference, however, could be linked with either greater or lesser incidence of violence. If the woman is much younger than her husband, he might either be more impatient and violent with her, or he might be more willing to overlook her presumed faults and so be less violent. Wide differences in spousal age, in which the husband is much older than the wife, are hypothesized to imply power imbalances in the relationship. Combination of seniority and masculinity in many cultures puts wives younger than their husband at a comparative disadvantage position (Kishor and Johnson 2004). However, there is little evidence in the empowerment literature regarding the effect of converse situation where the wife is older. But Kishor (2004), in her multi-country profiling of domestic violence was of the opinion that it may be more likely that because relationships in which women are older than their husband are so contrary to the normative marital arrangement in most societies, they may be at greater risk for marital disharmony. We hypothesize that women are more likely to experience domestic violence when there is wider spousal age difference.

Spousal educational difference: Status inconsistencies in relationships, specifically with regard to educational attainment, lead to higher levels of spouse abuse in Western contexts (Anderson, 1997). In patriarchal societies, women who have more education than their partners have a high risk of abuse because gender roles entail that husband have more education than their wives (Okun, 1986; Walker, 1984). Gelles (1974) contend that if a husband does not possess more skills and resources than his wife to legitimate his superior status, he may feel threatened by an educational disadvantage to his wife and may use physical force as a last resort. Men with higher levels of education than their wives are also more likely to become violent. Goode (1971) explains this phenomenon in terms of access to resources: Men with higher levels of education possess more resources, which means they have the ability to use force. Where both spouses are educated we would expect them to settle their differences through a discussion-driven approach rather than a violence-driven one. But, the educational gap effect, where the woman is more educated than the man, could be adverse, leading to more violence due to a perverse relative capabilities effect. The literature suggests that men with higher educational status than women having both higher ascribed (on the basis of gender) and achieved (on the basis of higher educational attainment) status are

more likely to assert unequal, and even violent power in the relationship (Hornung 1981). It has also been suggested from various other studies that when women have greater achieved status than their husbands, there is an increased vulnerability of marital discord (Hornung 1981; Daga 1998; INCLLEN 2000). Thus we hypothesize that woman with more or less education than their partners are more likely to experience domestic violence than women whose education levels are the same as their partners'.

Marital duration: We would expect length of marriage to be negatively related to domestic violence, since over time marital relationships could cement and become more stable, and so reduce the husband's tendency to violence. Long years of marriage could also be a learning experience for the woman in that she would seek to avoid contexts that led to violence in the past. The rate of ever-experience of domestic violence is expected to rise with marital duration because a longer marriage provides a greater period of exposure to the event of violence. However, this relationship could also be argued in converse manner. Marital duration is considered a proxy for compatibility in a marriage, particularly in cultures where divorce is legal and socially accepted. In such cases, the experience of violence is likely to be negatively associated with marital duration (Kishor and Johnson 2004).

Household Characteristics

An important aspect of the context of women's lives is the characteristics of the households in which they reside, including the location of the household (urban or rural), the composition of the household (nuclear or not), and the wealth of the household.

Area of residence: The anonymity of urban living is generally believed to be associated with a higher risk of violence. In a multi-country study of prevalence and incidence of domestic violence in developing world (Kishor and Johnson 2004), six out of nine countries, (Cambodia, Columbia, Dominican Republic, Nicaragua, Peru and Zambia) show women living in urban areas are significantly more likely to report domestic violence than rural women. Only two countries (India and Egypt) show opposite relationship.

Household structure: The household composition is an important variable for understanding the phenomenon of domestic violence against women. Family structure can be considered a contextual setting within which women are empowered to act or are constrained from acting, possibly through the use of domestic violence (Kishor 2000). Previous researches have shown different relationship of perpetuation of domestic violence and the number of people

in the household. Women living in extended and joint families are required to make adjustments with a large number of family members as compared with those living in nuclear families. The patrilocal residence and patriarchal structure of the family places women into subservient position. The men are more likely to act as sons rather than husbands. The parents-in-law and other kinsmen continue to have greater affiliation with sons as compared with daughters-in-law. This gives rise to maltreatment of wives by their husbands. Hence, presence of a large number of members in the family not only creates the problem of adjustment but they also act as instigators for domestic violence against women. Some studies indicate that when a woman lives with her in-laws especially in highly patriarchal societies, she is at higher risk of subordination to her husband as well as other members of his family. Some associate patriarchal extended or joint family living arrangements with less empowerment for women and hence at a higher risk to experience domestic violence, while other studies suggest that women living within a joint family receive a degree of protection from domestic violence given the regular presence of other members of the family in the household (Daga 1998; Visaria 1999; Kishor and Johnson 2004).

Standard of living: It is commonly assumed that women who are poor are more likely to experience violence than women who are not poor (Ellsberg et al. 1999; Heise 1998; Jewkes 2002a). Poverty is not necessarily viewed as a causal factor, but it is generally assumed to increase the risk of domestic violence. In 9 of 11 case-comparison studies from the United States, Hotaling and Sugarman (1986) identified family income as a consistent marker of wife assault. The relationship between socioeconomic status and domestic violence is also well established internationally, in Cambodia (Nelson & Zimmerman 1996) and Nicaragua (Ellsberg et al. 2000). A variety of domestic violence perspectives espouse the idea that domestic violence is more widespread among the poor because families living in impoverished conditions are subject to higher levels of stress than families not living in poverty (Martin et al. 1999). Although domestic violence cuts across income classes, there can be differences by income class. We would expect violence to be less likely among better-off households, since several potential elements of friction that are linked to low income, such as shortage of consumption goods, less physical space and privacy for the married couple, or inadequacies of housework, would be less present in such households. Such households are also more likely to have domestic help for housework and childcare, and hence there is less likelihood that the way these tasks are performed becomes a source of spousal conflict. Carlson's (1984) structural theory of intra familial violence contends that the

inequitable distribution of societal resources causes stress and tension among people with insufficient material resources. When combined with other aggravating factors such as living conditions, overcrowding, a sense of hopelessness, and lack of employment opportunities, poverty can significantly increase the risk of domestic violence (Heise 1998). A study at INCLIN (2000) suggests that this variation should be interpreted carefully as women with higher education and from higher income group are less likely to disclose such experiences. Moreover, the direction of the relationship between standard of living and domestic violence is unlikely to be unidirectional. The perpetuation and experience of domestic violence may also contribute to aggravation or even causation of economic instability (Byrne 1999). We hypothesize that families with lower socioeconomic status are more likely to experience marital violence than families with higher socioeconomic status.

Intergenerational Effect

A woman who has witnessed domestic violence in childhood is more likely to tolerate her husband's violence because of low self-esteem and seeing it as part of a 'woman's lot'. This can perpetuate marital violence. Research has documented an important negative effect of domestic violence on children, even if the children are not themselves abused: male children who see their mother being abused by their father are at a higher risk of becoming abusers in their intimate relationships as adults, while female children are more likely to enter abusive spousal relationships as adults (Kalmuss 1984; Seltzer and Kalmuss 1988).

There is a need to understand the factors and processes that contribute to the phenomenon of domestic violence. Further, the relationships between the background characteristics and domestic violence also need to be recognized. For example, while poverty is recognized by many to be a risk factor for domestic violence, violence is also a risk factor for poverty since abuse can result in increased vulnerability to falling into poverty. By examining selected background characteristics of the individuals and relationships affect involved in an intimate partner violence, it is possible to begin to discern certain factors that are associated with an increased risk of experiencing domestic violence. In assessing whether there is any association between domestic violence and various correlates, bivariate analysis using chi-square test is carried out that show the characteristics and context of violence in terms of women's own characteristics, characteristics of their husbands and the marital union, and characteristics of their household. Along with the significance of the correlate odds ratio is calculated. The present analysis has taken all the above mentioned correlates for bivariate

as well as multivariate analysis. Table 2.1 shows the variables considered as correlates for the analysis.

Table 2.1: Variables along with definition considered as correlates for the analysis.

VARIABLES	DEFINITION
Women's Characteristics	
Age of the respondent in 5-year group from 15-19, 20-24,45-49	Age in completed years of the women interviewed
Age at first marriage	Age in completed years (<15, 15-19, 20-24, 25+)
Total number of children	No children, 1 -2 children, 3 -4 children, 5+ children
Education	Whether women had education (0-No education, 1-Primary, 2-Secondary, 3-Higher)
Work Status	Not working, Paid in cash, Paid in kind, Paid in cash and kind, Working, not paid
HIV status of women	Whether women is HIV positive or HIV negative (Dichotomous: 0-No, 1-Yes)
Husband's/Partner's Characteristics	
Partner's Education	Whether partner had education (0-No education, 1-Primary, 2-Secondary, 3-Higher)
Partner's Working Status	Whether partner is currently working (Dichotomous: 0-No, 1-Yes)
Alcohol Use	Whether partner drinks alcohol (Dichotomous: 0-No, 1-Yes)

Union Characteristics

Spousal age difference	Husband is younger, 0-4 years older, 5-9 years older, 10-14 years older, 15+ years older
Spousal educational difference	Husband has less education than wife, both have no education, both have same education and husband has more education than wife
Marital duration	In completed years (0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30+)

Household Characteristics

Ares of residence	Place of residence of the respondent as Urban and Rural (0-urban, 1-rural)
Household structure	Dichotomous: 1-Nuclear, 2-Joint
Standard of living	Composite Index (Categorical: 1-Low, 2-Medium, 3-High)

Intergenerational Effect

Women has seen her father beat her mother in childhood	Whether women has witnessed violence among parents in childhood (Dichotomous: 0-No, 1-Yes)
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Outcome Variable

Domestic Violence	Whether women faced domestic violence at the hands of her partner (Dichotomous: 0-No, 1-Yes)
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Source: NFHS-3 India 2005-06

Bivariate analysis is one of the simplest forms of the quantitative (statistical) analysis. It involves the analysis of two variables (often denoted as X, Y), for the purpose of determining the empirical relationship between them. In order to see if the variables are related to one another, it is common to measure how those two variables simultaneously change together. Bivariate analysis can be helpful in testing simple hypotheses of association

and causality – checking to what extent it becomes easier to know and predict a value for the dependent variable if we know a case's value on the independent variable

Social scientists have realized for many years that human behavior can be understood only by examining many variables at the same time, not by dealing with one variable in one study, another variable in a second study, and so forth. These (univariate) procedures have failed to reflect our current emphasis on the multiplicity of factors in human behavior. In the reality of complex social situations the researcher needs to examine many variables simultaneously.

2.7 Multivariate Analysis Using Logistic regression: Model Specification

We need to construct a robust model that will enable us to recognize the factors influencing the outcome variable i.e. experiencing domestic violence and will also provide the extent to which outcome variable is influenced by each of them. An attempt is made to examine the relative importance of the factors determining the probability of being subject to domestic violence using multivariate framework of analysis. In univariate analysis risk factors are examined independently of each other. When the outcome variable as in our case is binary (i.e. present/absent) the correct statistical technique to analyse such data is logistic regression which can tell us how well the selected background characteristics taken together explain the variation in the dependent variable. It is preferable to use logistic regression, instead of multiple linear regression technique since in such a case the error term would not be normally distributed (Kendall 1975). Logistic regression does not need to assume that predictor variables are distributed as a multivariate normal distribution with equal covariance matrix. Instead, it assumes that the binomial distribution describes the distribution of the errors that equal the difference between actual Y and predicted Y. The binomial distribution is also the assumed distribution for the conditional mean of the dichotomous outcome. This assumption implies that the same probability is maintained across the range of predictor values. The binomial assumption may be tested by the normal z test or may be taken to be robust as long as the sample is random; thus, observations are independent from each other.

Logistic regression is a form of regression which is used when the response or outcome variable is binary and the explanatory variables are of any type namely continuous, ordinal, nominal or dichotomous. Our outcome variable is reporting of violence which is binary variable. The predictor variables are ordinal, nominal and categorical.

Logistic regression is useful for situations in which we have to predict the presence or absence of a characteristic or outcome based on the values of a set of predictor variables.

Logistic regression can be used to rank the relative importance of predictor variables on response, which is one of our requirements. Logistic regression coefficients can be used to estimate odds ratios for each of the independent variables in the model. These ratios give odds of experiencing domestic violence for each factor. Each odds ratio gives the increase or decrease in the odds of the event (ever-experience of domestic violence) occurring for a given value of the independent variable as compared to the reference category. For example, an odds ratio of 1.15 in Table 3.7 for the age category 20 to 24 says that the odds that a woman age 20 to 24 years has ever experienced violence are 15 percent higher than if she were only 15 to 19 years of age (the reference category). Similarly the odds of 1.21 for age category of 25-29 years of age implies that the women has 21% more chance of experiencing domestic violence as compared to the reference category of 15-19 years of age with odds ratio of 1.00. This multivariate analysis adds to the bivariate discussion by identifying the factors that significantly affect the likelihood of violence net of all other factors hypothesized as relevant. The focused consideration of the above points justifies utility of logistic regression analysis to serve our purpose.

In any regression problem the key quantity is mean value of the outcome variable, given the value of the predictor variables. This is called “Conditional Mean”. Let ‘Y’ denote the outcome variable and ‘X_i’ denote ith predictor variable. Let X be the vector of the predictor variables, given by X=[X₁, X₂, X₃, ...X_p]. The conditional mean of outcome variable is denoted as E[Y/X]. This is interpreted as “The expected value of outcome variable Y given the value of predictor variables X”. We try to model out this quantity for different values of predictor variables. With binary data the conditional mean must be greater than or equal to zero and less than or equal to 1. i.e. 0≤E[Y/X]≤1. Our outcome variable ‘experience of domestic violence’ is binary. Let Y represent the value of the outcome variable. So if the observation is Yes, y=1 and if it is No, y=0. So Y is either 1 or 0. The model which fits is logistic distribution.

Let $\Pi(X) = E[Y/X]$ to represent conditional mean of Y given X when the logistic model is used. $\Pi(X)$ could also be interpreted as predicted probability. This is the estimated probability that the particular covariate pattern yields the outcome that is of interest.

The mathematical form of Logistic Regression is as given below

$$\pi(x) = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 \dots + \beta_p x_p}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 \dots + \beta_p x_p}}$$

Where β_i 's are unknown coefficients of corresponding X_i 's for $i=1,2,\dots,p$, which are to be estimated. The transformation of $\Pi(X)$ that will be central to our logistic regression is the logit transformation.

The transformation is defined as follows.

$$g(x) = \ln \left[\frac{\pi(x)}{1 - \pi(x)} \right]$$

Therefore, $g(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p$

$g(x)$ = Logit transformation which is probability of occurrence of outcome variable expressed as a function of explanatory variables

X_i 's are the explanatory variables

β_i 's are the coefficients.

The importance of this transformation is that $g(x)$ has many desirable properties of a Linear Regression Model. The logit, $g(x)$ is linear in its parameters, may be continuous, and may range from $(-\infty, +\infty)$ depending on the range of X .

Central to the consideration of logistic regression is the estimation of the coefficients in the model and testing for their significance. The method used for estimation is 'Maximum Likelihood Method of Estimation'. Once we estimate the coefficients of explanatory variables, we also need to check whether they have had significant role to play in the proposed model. This is called as 'testing for the significance of the coefficients'. To check this we require calculating the standard error in estimating each of the coefficient and covariance between each of the predictor variables. After estimating the coefficients, our first look at the fitted model commonly concerns an assessment of the significance of the variables in the model. This usually involves formulation and testing of the statistical hypothesis to determine whether the independent variables in the model are "significantly" related to the Response variable.

One approach to testing for significance of the coefficients of the variables in any model relates to the following question. Does the model that includes the variable in question tell us more about the response variable than does a model that does not include that variable? This question is answered by comparing the observed values of the Response variable to those predicted by each of the two models; the first with and the second without variables in

question. The mathematical function used to compare the observed and predicted value depends upon the particular problem. If the predicted values with the variable in the model are better, or more accurate, than when the variable is not in the model, then we say that the variable is “significant”. In other words we would like to know how effective the model is in describing the outcome variable. This is referred to as Goodness of fit. We assess the model fit by ‘Hosmer and Lemeshow test’. Having satisfactory results from the logistic regression analysis we look for the odds ratio of the predictor variables in the model. 95% confidence intervals are also calculated. Its use is quite obvious as our solution set is not unique. The 95% confidence interval gives us the region within which our estimated coefficient of corresponding variable lies with 95% confidence i.e. with probability 0.95.

Thus in our analysis in order to identify the strongest associations between violence and the correlates discussed above, the values for the main outcome variables were dichotomized to allow for the use of Logistic Regression Modeling. The outcome variable domestic violence was dichotomized as 0 and 1. Women experiencing domestic violence were coded as 1 and women not experiencing domestic violence were coded as 0. We first try to find out various factors that are perhaps responsible for domestic violence of women. It is assumed that the incidence of domestic violence is influenced/determined jointly by the wife’s and the husband’s characteristics, marital characteristics, household’s socioeconomic status and other household characteristics.

2.8 Multicollinearity of the predictors or independent variables

Multicollinearity is statistical phenomenon in which two or more predictor variables in a regression mode are highly correlated, meaning that one can be predicted from the other. Though multicollinearity does not reduce the predictive power or reliability of model as a whole, it only affects the calculation of individual predictors. That is, a multiple regression model with correlated predictors can indicate how well the entire bundle of predictors predicts the outcome variable, but it may not give valid results about any individual predictor. In the present research work the outcome variable namely domestic violence along with various types of violence and the various predictors were subjected to statistical analysis to detect if there exist multicollinearity in the independent variables. Multicollinearity is tested using tolerance or the variance inflation factor (VIF). A variance inflation factor (VIF) quantifies how much the variance is inflated.

tolerance= $1-R_j^2$, and

VIF= $1/\text{tolerance}$

where R_j^2 is the coefficient of determination of a regression of predictor j. The general rule of thumb is that VIFs exceeding 4 warrant further investigations, while VIFs exceeding 10 are signs of serious multicollinearity requiring correction. Depending on the VIF value the independent variables were selected for further logistic regression analysis.

In the following chapter the findings and their analysis are presented.