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Influence of Maternal Exposure to IPV on Child Feeding Practices in India

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Hubert Department of Global Health

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Influence of Maternal Exposure to IPV on Child Feeding Practices in India

By

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Abstract

Influence of Maternal Exposure to IPV on Child Feeding Practices in India
By Kayla Marie Lavilla

Background: Intimate partner violence (IPV) is a global public health problem that has implications for child health. Previous studies have examined the associations between IPV and maternal and child health; yet, research is lacking on the effects of maternal exposure to IPV on infant feeding practices, especially in poor settings.
Project goal: This study will investigate the *compensatory* and *deficit* response theories of the effects of maternal exposure to IPV on breastfeeding. The hypothesis is that maternal exposure to IPV will have a *deficit* effect on infant feeding practices.
Methods: A secondary analysis was performed on data of 5,765 mother-child dyads from the 2005-2006 Indian National Family Health Survey. The sample included mothers who were linked to children six months of life or younger. Exposures of interest were maternal report of ever experiencing any IPV and ever experiencing only physical and/or sexual IPV. Logistic regression was used to assess the associations of these exposures with various feeding practice outcomes.
Results: Compared to mothers unexposed to IPV, those who were exposed to either any IPV or physical and/or sexual IPV only had a higher adjusted odds of feeding infants liquids (aOR = 1.47, 95%CI = 1.2 – 1.8 and aOR = 1.53, 95%CI = 1.2 – 1.9, respectively), solids (aOR = 1.55, 95%CI = 1.2 – 2.1 and aOR = 1.72, 95%CI = 1.3 – 2.3), and any foods other than breast milk (aOR = 1.45, 95%CI = 1.2 – 1.8 and aOR = 1.51, 95%CI = 1.2 – 1.9). Mothers exposed only to physical and/or sexual IPV were also more likely to report their infant having drank from a bottle with a nipple (aOR = 1.46, 95%CI = 1.1 – 2.0). Both exposure groups had lower adjusted odds of reporting exclusively breastfeeding their infants (aOR = 0.70, 95%CI = 0.6 – 0.9 for any IPV; aOR = 0.68, 95%CI = 0.5 – 0.8 for physical and/or sexual IPV only).
Conclusion: Results of the study support the hypothesis that maternal exposure to IPV elicits a *deficit* response to breastfeeding. Improvements can be made to maternal and child health through IPV prevention and the promotion of proper child feeding practices.

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CHAPTER 1: INTRODUCTION

Intimate partner violence (IPV) refers to "victim/perpetrator relationships among current or former intimate partners" (Saltzman, Fanslow, McMahon, & Shelley, 2002). IPV is a widespread public health problem that affects women worldwide. In a multi-country site-specific study conducted by the World Health Organization (WHO), 15 to 71 percent of ever-partnered women reported having had ever experienced physical or sexual violence, or both, by a former or current partner (Ellsberg, Jansen, Heise, Watts, & Garcia-Moreno, 2008). The study also found significant associations between lifetime experiences of partner violence and both self-reported poor health and specific health problems including pain, difficulty with daily activities, and emotional distress (Ellsberg, et al., 2008). Exposure to IPV during pregnancy is not uncommon, with the range of prevalence being greater in low-income versus high-income countries (J. Campbell, García-Moreno, & Sharps, 2004).

Women's exposure to IPV before and during pregnancy is of great concern because of its implications for infant and child health. Many of the Millennium Development Goals are related to child survival, growth and development. More specifically, Millennium Development Goal 4 focuses on the reduction of child mortality with a specific target of reducing the under-five mortality rate by two-thirds by 2015 (United Nations, 2011). The formative years of early childhood, particularly in the zero to three year age group, are a particularly vulnerable period for child development (Bellamy, 2000). Many child deaths are preventable, with under-nutrition being reported as an underlying cause of at least one half of all under-five deaths (Bryce, Boschi-Pinto, Shibuya, & Black, 2005). Nutrition interventions, including the promotion of early and exclusive breastfeeding, are one method that has been suggested reduce under-nutrition and improve child health.

The objective of this study is to assess the effects of maternal exposure of IPV on early childhood care, specifically feeding practices during the first six months of life of the child, using a sample of 5,765 mother-child dyads from recent, nationally-representative data from India. The hypothesis of this study is that maternal exposure to IPV will have a *deficit* effect on infant feeding practices, particularly on breastfeeding.

While previous studies have examined the associations between IPV and maternal and child health, research is lacking on the effects of maternal exposure to IPV on child feeding practices especially in poorer settings. The present research will further investigate the *compensatory* or *deficit* response hypotheses of IPV on breastfeeding (Kendall-Tackett, 2007; Klingelhafer, 2007) and contribute new knowledge regarding IPV exposure on young children to the existing literature.

CHAPTER 2: COMPREHENSIVE REVIEW OF THE LITERATURE

Defining intimate partner violence (IPV)

While intimate partner violence (IPV) is one of the most common forms of violence against women (United Nations, 2009), no standard definition for IPV currently exists (M. Moore, 1999). It is most often defined by the relationship between the perpetrator and the victim. According to the Centers for Disease Control and Prevention (2012), IPV occurs between two people in a close relationship and includes violence perpetrated by a current or former partner or spouse. IPV is often used interchangeably with other terms such as domestic violence (DV), partner abuse, spousal abuse and battering although their usage may have different implications (M. Moore, 1999).

Saltzman et al. (2002) has defined four categories of IPV: threats of physical or sexual violence, psychological/emotional violence, physical violence and sexual violence. Behaviors are considered threats when words, gestures or weapons are used to communicate the intent to cause death, disability, injury or physical harm. Emotional IPV includes threats as well as other coercive or controlling tactics that cause trauma to the victim. Such tactics are considered emotional violence when prior acts or threats of physical or sexual violence have occurred. Physical IPV includes any intentional behaviors where physical force is used and may cause harm, injury, disability or death. Whether or not the act is completed, the use of physical aggression to force a person to engage in a sexual act against his or her will is considered an act of sexual violence. Sexual IPV also includes abusive sexual contact and attempted or completed sex acts that disregard consent or involve a person unable to understand the nature or condition of the act. These four major types of violence are

associated with each other and do not often occur in isolation, with substantial overlap often observed between physical and sexual violence (Garcia-Moreno, Jansen, Ellsberg, Heise, & Watts, 2006).

Recommended feeding practices

Although there has been some debate regarding the optimal duration for exclusive breastfeeding (Kramer et al., 2003; Kramer & Kakuma, 2002), it a generally accepted global public health recommendation to exclusively breastfeed infants for the first six months of life with continued breastfeeding into the second year (World Health Organization, 2002b). Continued breastfeeding is recommended until at least the first two years of life with the introduction of complementary foods recommended at six months of life (World Health Organization, 2002a, 2002b).

Concern regarding the optimal duration of breastfeeding was addressed in a systematic review by Kramer and Kakuma (2002). In the review, 22 independent studies were selected to assess the effects of exclusive breastfeeding for six months versus exclusive breastfeeding for three to four months with mixed breastfeeding thereafter through six months on maternal and child health. Previous research has provided evidence to suggest that exclusive breastfeeding for six months can be protective for the child, specifically in regards to providing passive immunity and reducing risk of certain infections. For maternal health, exclusive breastfeeding through six months has been associated with a delayed resumption of menses (lactation ammenorhea) and a more rapid postpartum weight loss. The review also reported no benefit to the introduction of complementary foods between

four and six months of age. The authors concluded that there was no risk in a general population-based recommendation of exclusive breastfeeding for the first six months of life.

A more recent study that was embedded within the Netherland Generation R Study, a population-based prospective cohort study, found that infants who were exclusively breastfed until four months of age and partially breastfed thereafter had statistically significant lower risks of upper respiratory, lower respiratory and gastrointestinal tract infections in the first six months of life (aOR = 0.65, 95%CI = 0.5 – 0.8; aOR = 0.50, 95%CI = 0.3 – 0.8; aOR = 0.41, 95%CI = 0.3 – 0.7; respectively) (Duijts, Jaddoe, Hofman, & Moll, 2010). Exclusive breastfeeding until the age of six months showed similar trends that tended to be more protective but results were not statistically significant for lower respiratory tract and gastrointestinal tract infections. Researchers of this study have recommended exclusive breastfeeding for at least four months but preferably for six months in industrialized countries.

Breastfeeding and infant health

The World Health Organization (1991) has defined feeding categories relating to breastfeeding including: exclusive breastfeeding, predominant breastfeeding, full breastfeeding, and complementary feeding. Exclusive breastfeeding is defined as the receipt of only breast milk without any additional solids or liquids with the exception of drops or syrups used for medicines or vitamin or mineral supplements. Predominant breastfeeding occurs when the predominant source of nourishment is breast milk but the infant has also received water or water-based drinks; fruit juice; oral rehydration salts solution; vitamin, mineral and medicine drops or syrups; and limited quantities of ritual fluids. Full

breastfeeding includes both exclusive and predominant breastfeeding. Once breast milk is no longer enough to fulfill the nutritional needs of an infant, complementary foods should be added to diet. The transition from exclusive breastfeeding to family foods, when the infant had received both breast milk and solid or semi-solid food, is referred to as complementary feeding.

Past research has documented many nutritional and developmental advantages of breastfeeding. Human breast milk, particularly colostrum, is nutrient-rich and contains antibodies and other protective factors that can provide passive immunity to the infant (Hanson, 2004; Walker, 2010). Colostrum, or first milk, is the first lacteal secretion produced by the mother at the end of pregnancy and prior to the production of breast milk. Immediate breastfeeding after birth can ensure that the infant receives the colostrum produced by the mother. Past research has also proposed improved neurocognitive development among infants who were breastfed (Anderson, Johnstone, & Remley, 1999; Kramer, 2010). In analyses of data from a prospective population-based cohort study in the United Kingdom, results found a longer duration of breastfeeding to be associated with and better educational achievement at age five (Heikkila, Kelly, Renfrew, Sacker, & Quigley, 2012) and improved cognitive development (Quigley et al., 2012).

According to a WHO report regarding the optimal duration of exclusive breastfeeding (World Health Organization, 2002b), the greatest benefit of exclusive breastfeeding in poor settings is protection from infectious disease morbidity and mortality, specifically due to gastrointestinal infection and diarrheal disease. In a Belarusian observational cohort study that was nested within a larger randomized trial, infants who were exclusively breastfed for three months were compared to those exclusively breastfed for six months (Kramer, et al., 2003). Results of the research found a statistically significant

reduction in gastrointestinal infection during the three to six month period in the group that was exclusively breastfed for six months (adjusted incidence density ratio = 0.35; 95%CI = 0.1 – 1.0). Researchers have also previously examined the dose-response relationship between breastfeeding and infant health in a longitudinal analysis of the National Maternal and Infant Health Survey (NMIHS) data from the United States (Raisler, Alexander, & O'Campo, 1999). In comparing infants during the first six months of life that were exclusively breastfed to those that were partially breastfed, results showed a protective dose-response relationship between breastfeeding and diarrhea. The study also found greater reduced odds of illness and sick baby medical visits among those infants who were exclusively breastfed for the first six months of life.

Under-nutrition, which has been suggested to be in part due to the early abandonment of exclusive breastfeeding, may lead to growth faltering especially during the first two years of life (Victora, de Onis, Hallal, Blossner, & Shrimpton, 2010). According to a study by Black et al. (2008), suboptimum breastfeeding was estimated to be responsible for 1.4 million child deaths, of which 12 percent of those deaths are children under five years of age. The early initiation of breastfeeding has been often associated like a lower risk of neonatal mortality in low-income countries (Bhutta, Lassi, Blanc, & Donnay, 2010; Edmond, Kirkwood, Amenga-Etego, Owusu-Agyei, & Hurt, 2007; Edmond, Kirkwood, Tawiah, & Owusu Agyei, 2008; Mullany et al., 2008). Nutritional deficiency early in life has been linked to long-term consequences, including reduced productivity and impaired overall health during adolescence and adulthood (Dewey & Begum, 2011; World Health Organization, 2003).

IPV and consequences on young children

Maternal exposure to IPV before or in pregnancy may influence infant feeding practices and the health of young children through a number of pathways, some of which are further described in the current paper (Figure 1).

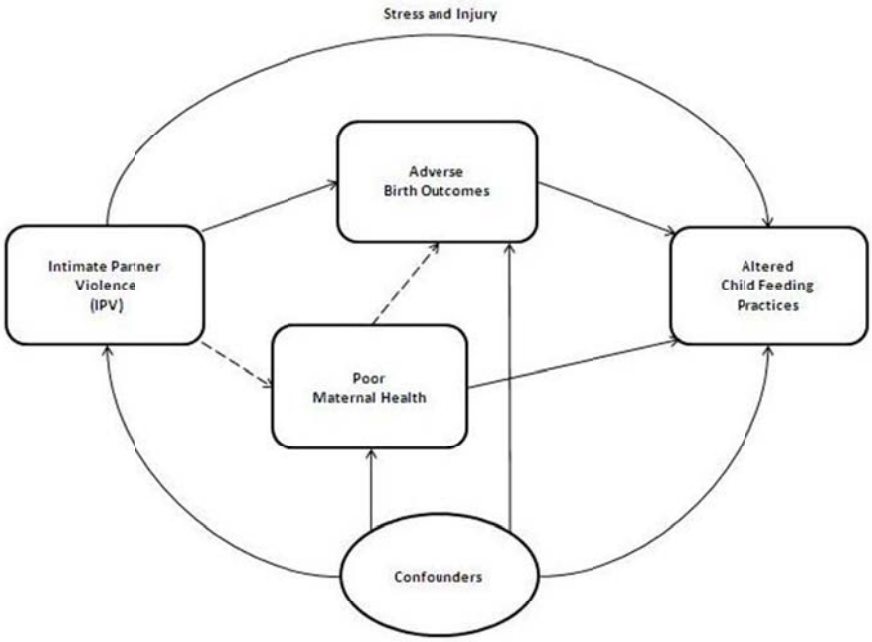

Figure 1. Pathways of influence for maternal exposure to IPV on child feeding practices.

Exposure to IPV may directly affect early childhood care through injuries and stress acquired during pregnancy. Poor health and pregnancy-related morbidities, such as vaginal bleeding and infections, have been associated with exposure to IPV (J. C. Campbell, 2002; Silverman, Decker, Reed, & Raj, 2006b). Victimized women also have more total health problems including chronic-stress related central nervous problems than women who were not victims of IPV (J. C. Campbell, 2002). Exposure to IPV can lead to poor quality of life

and negative physical health consequences and mothers with poor health statuses may have difficulty practicing appropriate child care if preoccupied with their own health needs.

IPV may have an indirect effect on the provision of care and child nutrition due to the influence IPV may have on birth outcomes. Systematic reviews and meta-analyses have documented that maternal exposure to IPV is associated with higher risks of low birth weight, preterm birth, and small for gestational age (Shah & Shah, 2010; Yount, DiGirolamo, & Ramakrishnan, 2011), while other studies have found that adverse birth outcomes affect health into adulthood (Dalziel, Parag, Rodgers, & Harding, 2007; Datta Gupta, Deding, & Lausten, 2011; Moster, Lie, & Markestad, 2008; Selling, Carstensen, Finnström, Josefsson, & Sydsjö, 2008). These poor outcomes may lead to altered early childhood care practices such as increased intensive care for the neonate (Silverman, et al., 2006b). It has also been noted that illness or growth faltering can lead to the early interruption of breastfeeding and the supplementation with other foods (Hill, 1977; Sauls, 1979).

Maternal exposure to IPV may impact childhood health not only through birth outcomes but also through the influence IPV may have on maternal behaviors toward children. For example, IPV can influence a mother's mental and emotional health which can then affect the care she will provide to her child. One study conducted in the United States found that mothers exposed to IPV were more likely to use harsh parenting strategies and were less attentive and emotionally available to their children when compared to those mothers who were not exposed to IPV (Dubowitz et al., 2001).

IPV and feeding practices

The importance of the women's power relative to men for child health and nutrition, especially in South Asia, has been well documented (Smith, Ramakrishnan, Ndiaye, Haddad, & Martorell, 2003). Women with less power may be more vulnerable to IPV (Dalal & Lindqvist, 2012). IPV can influence the quality of life of the mother and make it difficult for her to provide adequate care to her children. Because disability can influence health-seeking behaviors, maternal exposure to IPV may be associated with modified feeding practices which may affect child development and growth. In a multi-country study profiling domestic violence in Colombia, Egypt, India, Nicaragua, and Peru, children of mothers who had ever experienced IPV were more likely to be undernourished than those of mothers who had never experienced IPV (Kishor & Johnson, 2004). Among those countries, the difference between the exposed and unexposed groups was largest in India.

Previous research has shown mixed responses for the effects of IPV on infant feeding practices, specifically for breastfeeding. Kendall-Tackett (2007) and Klingelhafer (2007) have suggested that the effects of IPV may result in either *deficit* or *compensatory* responses to breastfeeding. On the one hand, a mother who has been exposed to IPV may be injured, depressed, or cognitively impaired and less able to breastfeed her young infant (Yount, et al., 2011). This mother also may have developed an aversion to breastfeeding as a result of IPV-related injury to the breasts or IPV-associated discomfort with the body (Klingelhafer, 2007; Wood & Van Esterik, 2010). In contrast, research of parental practices of women exposed to violence has shown mothers to be more sensitive to their child's needs and exhibit positive parenting behaviors (Holden & Ritchie, 1991; Levendosky, Huth-Bocks, Shapiro, & Semel, 2003; T. E. Moore & Pepler, 1998). Mothers may develop a *compensatory* response to violence as a means of coping with the violence or reclaiming their bodies and identities as women (Klingelhafer, 2007).

IPV has been associated with initiation and duration of breastfeeding in past research. In a cross-sectional comparative study in Hong Kong, women who had not experienced IPV had 1.84 greater adjusted odds of initiating breastfeeding ($p < 0.05$; 95%CI = 1.2 – 2.9) (Y. Lau & Chan, 2007). A Brazilian study investigating the role of severe physical violence during pregnancy in the early cessation of exclusive breastfeeding found that women exposed to violence had a 31 percent higher incidence density of early cessation of breastfeeding for children under five months of age than those women who had not experienced violence (Moraes, Arana, & Reichenheim, 2010).

Past studies have also found no associations or did not have sufficient evidence to make associations between IPV and breastfeeding. In a study of 212 women from two Women, Infants and Children (WIC) Nutritional Supplemental Program clinics in the Midwestern United States, researchers found no association between present or previous abuse and feeding choice of infants (Bullock, Libbus, & Sable, 2001). Research by Silverman et al. (2006a) found no association between mothers' exposure to IPV around the time of pregnancy and not breastfeeding or early cessation of breastfeeding after adjusting analyses for demographic variables and current smoking. Also, in a review of 94 studies on the impact of childhood exposure to parental IPV was unable to find sufficient evidence to make associations between women exposed to IPV and breastfeeding behavior (Bair-Merritt, Blackstone, & Feudtner, 2006). In contrast to these studies, Prentice et al. (2002) found that sexually abused women were more likely to initiate breastfeeding when compared to their non-abused counterparts.

The husband or the partner may play a direct role in the mother's infant feeding practices through his decision-making power or controlling behaviors. Research has shown that the perceived opinion of the partner regarding breastfeeding may influence a mother's

decision to breastfeed (Kong & Lee, 2004; Scott, Binns, Graham, & Oddy, 2006). In a study of primapara women in Hong Kong, researchers found significant agreement between fathers' feeding preference and actual maternal practice (Kappa = 0.4, $p < 0.001$). A majority of mothers in the study also reported either strongly agreeing or agreeing that encouragement and support in breastfeeding from their husbands was important (n = 183, 79.5%) (Kong & Lee, 2004). In another study in rural India of 600 mother-child dyads with children three to five months of age examining the influence of maternal autonomy on feeding practices and infant growth found that mothers with higher financial autonomy were significantly more likely to exclusively breastfeed, although results were not significant for non-acceptance or experience of domestic violence (Shroff et al., 2011).

IPV and birth outcomes

Prior research has provided evidence to suggest an association between IPV and poor birth outcomes. In a recent study by Yount et al. (2011), 48 studies of the effects of IPV on adverse birth outcomes were reviewed and authors concluded that low birth weight and small-for-gestational-age newborns were more likely among women exposed to IPV. Another review and meta-analysis of 30 studies also found higher adjusted odds of low birth weight among women exposed to IPV when compared to women who were not exposed (Shah & Shah, 2010). In a community-based longitudinal study in rural Bangladesh, exposure to any form of violence was negatively associated with the weight and length at birth and the weight-for-age and height-for-age SD scores at one year of age (Asling-Monemi, Naved, & Persson, 2009). A nationally-representative study in India also found physical IPV to be

associated with increased mortality rates among infants (L. K. Ackerson & Subramanian, 2009).

IPV and poor maternal health

While not the focus of this current research, it is important to note the influence of IPV on maternal health. IPV can affect a mother's emotional and psychological health which may impact her child care practices. The effect of IPV on the mental and emotional health of the mother may be linked to her ability to care for her children. Clinical partner abuse was found to be significantly associated with a number of psychiatric disorders in women in a birth cohort in New Zealand (Ehrensaft, Moffitt, & Caspi, 2006). The research also reported that these women were more likely to experience major depressive episodes and generalized anxiety disorder than those women who were not exposed to clinical partner abuse. A mentally and emotionally distressed mother may find it difficult to provide proper care to her infant. In a study of low-income African American women in the United States, mothers who exhibited persistent depressive symptoms were nearly three times as likely to have their infant ever hospitalized than those mothers who never had depressive symptoms (Chung, McCollum, Elo, Lee, & Culhane, 2004). In a systematic review by Kingston, Tough and Whitfield (2012), the researchers found that maternal experience of prenatal and postpartum distress can have adverse effects on infant development. Specifically, studies in the review had shown that prenatal distress may be associated with poor cognitive, behavioral and psychomotor development while postpartum distress was associated with cognitive and socio-emotional development.

Although exposure to IPV has often been associated with negative health outcomes for women and children, some studies have shown mixed results that may suggest that exposure to violence may also have a *compensatory* effect on maternal health care-seeking behaviors. Previous research has found mixed results for the association between exposure to violence and receipt of prenatal care. The results of an analysis of the 1998-1999 Indian NFHS-2 showed that women who experienced physical violence during pregnancy were less likely to receive prenatal care, a home-visit from a health worker for a prenatal check-up, and at least three prenatal care visits (Koski, Stephenson, & Koenig, 2011). These women were also less likely to initiate prenatal care early in the pregnancy. However, in an Egyptian study of domestic violence against women, ever-abused women were more likely to attend four or more prenatal care visits in comparison to their non-abused counterparts (Diop-Sidibé, Campbell, & Becker, 2006). Researchers in the study also found a positive association between a higher frequency of beatings in the past year and an increased likelihood of prenatal care visits by a health professional.

IPV and confounding factors

Other factors are important to consider in examining the association between IPV and early childhood health. Some factors that may be associated with IPV or early childhood care include urban versus rural environment, poverty or socioeconomic status, parity, education, religion, region and child gender.

Exposure to IPV and access to health resources may differ between rural versus urban environments. Although women living in urban have been shown to be significantly

more likely to experience IPV versus women living in rural areas for most countries, the opposite effect has been observed in India (Kishor & Johnson, 2004).

Although poverty and wealth have often been linked to IPV, the directionality and causality of the relationships are not clearly defined (Byrne, Resnick, Kilpatrick, Best, & Saunders, 1999; Heise, 1998). IPV has been found to be more prevalent and more severe in disadvantaged neighborhoods in the United States (Benson & Fox, 2004). In a study in slum and nonslum areas of urban Bangladesh, the prevalence of physical IPV within the past year was higher in slum than nonslum areas (Sambisa, Angeles, Lance, Naved, & Thornton, 2011). Although not applicable to all countries, a negative relationship between household wealth status and ever experiencing IPV has been observed in India (Kishor & Johnson, 2004).

Parity has been linked to IPV and may also influence early childhood care. Higher parity may result in a wider distribution of limited care and resources for each child. The relationship between IPV and parity may be due to a women's lack of control over her sexuality and fertility. A study in the United States found that partner unwillingness to use contraception was predictive of IPV (Gee, Mitra, Wan, Chavkin, & Long, 2009). In a study of DV in nine countries (Cambodia, Colombia, Dominican Republic, Egypt, Haiti, India, Nicaragua, Peru and Zambia), ever experiencing IPV was associated with an increasing number of children ever born for all countries but Haiti (Kishor & Johnson, 2004).

Education has also been associated with both IPV and access to resources. A study using data from in India found that women with no formal education were significantly more likely to report IPV than those women with who had received schooling for twelve or more years (Leland K. Ackerson, Kawachi, Barbeau, & Subramanian, 2008). Although increased education levels have been associated with lower risk of violence (Koenig, Ahmed,

Hossain, & Khorshed Alam Mozumder, 2003), research has also shown that women who were more educated than their partners were also more likely to report IPV (Leland K. Ackerson, et al., 2008).

According to the final report for the NFHS-3 (International Institute for Population Sciences (IIPS) & Macro International, 2007), exposure to IPV in India has varied by state of residence and religious affiliation. Reported experience of any sexual IPV ranged from one percent in the northern state of Himachal Pradesh to 18 percent in the eastern state of West Bengal. Report of any IPV was lowest in the Himachal Pradesh and highest in the eastern state of Bihar. In all states, physical IPV was the most common form of IPV reported. Prevalence of IPV by religion is large, with Buddhist/Neo-Buddhist reporting the highest levels of IPV at 41 percent and Jain reporting the lowest levels of IPV at 13 percent.

Son preference, which has been prevalent norm in India, has implications for child care practices. Son preference is especially observed in the declining sex ratio for girls six years of age and younger, which has been estimated to have reached an all-time low of 914 in 2011 (Government of India, 2011). This may be a result of excess female mortality due to the prevailing social and structural norms that lead to son preference in some regions of the country (Das Gupta et al., 2003; Pande & Astone, 2007). Although gender selection may affect child care practices, son preference has not been associated with IPV (Sabarwal, McCormick, Subramanian, & Silverman, 2012).

CHAPTER 3: MANUSCRIPT

Influence of Maternal Exposure to IPV on Infant Feeding Practices in India

Manuscript Draft for the International Journal of Epidemiology

Contribution of Student

Data Source and Sample

The data used for this study is from the 2005-2006 National Family Health Survey (NFHS-3), a national cross-sectional survey that is the Indian equivalent of the Demographic and Health Survey (DHS). The nationally-representative sample was chosen through a multi-stage stratified survey sampling procedure. Interviews were conducted by trained staff from November 2005 to August 2006. In the NFHS-3, 124,385 women had participated in the Women's Questionnaire. Birth history data of these women included 256,782 births. Survey dataset was made publicly available online by MEASURE DHS, ICF International.

Data Analysis and Paper Development

All writing, analyses, figure development, and table development were conducted by the corresponding author. Guidance was provided by Dr. Kathryn Yount and Dr. Sarah Zureick-Brown.

Summary

Introduction: Intimate partner violence (IPV) is a global public health problem that has implications for infant and child health. Previous studies have examined the associations between IPV and maternal and child health; yet, research is lacking on the effects of maternal exposure to IPV on child feeding practices, especially in poor settings. This study will explore whether *compensatory* or *deficit* model offer better explanations for the effects of maternal exposure to IPV on breastfeeding practices in a national sample of mother-child dyads in India. We expect that maternal exposure to IPV will have a deleterious effect on infant feeding practices.

Methods: A secondary analysis of mother-child dyads from the 2005-2006 Indian National Family Health Survey was performed in SAS 9.3. The sample included 5765 mothers who were linked to children six months of life or younger. Exposures of interest were maternal report ever experiencing any IPV and ever experiencing physical and/or sexual IPV only. Logistic regression was used to assess the unadjusted and adjusted associations of these exposures with various breastfeeding and complementary feeding practices.

Results: Compared to mothers unexposed to IPV, those who were exposed to either any IPV or physical and/or sexual IPV had higher adjusted odds of feeding infants liquids (aOR = 1.47, 95%CI = 1.2 – 1.8 and aOR = 1.53, 95%CI = 1.2 – 1.9, respectively), solids (aOR = 1.55, 95%CI = 1.2 – 2.1 and aOR = 1.72, 95%CI = 1.3 – 2.3), and any foods other than breast milk (aOR = 1.45, 95%CI = 1.2 – 1.8 and aOR = 1.51, 95%CI = 1.2 – 1.9). Mothers exposed to physical and/or sexual IPV only also had higher adjusted odds of their infant having drank from a bottle with a nipple (aOR = 1.46, 95%CI = 1.1 – 2.0). Both exposure groups had lower adjusted odds than their unexposed counterparts of exclusively breastfeeding their infants (aOR = 0.70, 95%CI = 0.6 – 0.9 for any IPV; aOR = 0.68, 95%CI = 0.5 – 0.8 for physical and/or sexual IPV only).

Conclusion: Maternal exposure to IPV is associated with a *deficit* response with respect to the recommended feeding practices of children in their first six months of life. Improvements in maternal and child can be made may be possible through screening for IPV in pregnant women and mothers with young children and promoting proper feeding practices in exposed groups.

Keywords: intimate partner violence (IPV); maternal and child health; infant feeding practices; breast feeding; complementary feeding

Introduction

Intimate partner violence (IPV) refers to "victim/perpetrator relationships among current or former intimate partners" (1). IPV is a global public health problem. In a multi-country site-specific study conducted by the World Health Organization (WHO), 15 to 71 percent of ever-partnered women reported having ever experienced physical and/or sexual IPV (2). The risk of IPV also is higher during and after pregnancy (3, 4).

Women's exposure to IPV before and during pregnancy has important implications for the health of mothers, infants, and young children (5). The formative years of early childhood, particularly in the zero to three year age group, are a particularly vulnerable period for child development (6). Exposure to IPV, particularly in pregnancy, is documented to have adverse effects on women's mental health (7-9), malnutrition (10), physical morbidity (11, 12), and care (13-15), as well as pregnancy outcome (16, 17), child survival (18, 19), and early child nutrition (20). However, research is lacking on the effects of maternal exposure to IPV on child feeding practices, especially in poor settings.

Many child deaths are preventable, with under-nutrition being reported as an underlying cause of at least one half of all deaths to children less than five years (21). According to a WHO report regarding the optimal duration of exclusive breastfeeding (22), the greatest benefit of exclusive breastfeeding in poor settings is protection from infectious disease morbidity and mortality, specifically due to gastrointestinal infection and diarrheal disease. In a Belarusian observational cohort study that was nested within a larger randomized trial, infants who were exclusively breastfed for three months were compared to those exclusively breastfed for six months (Kramer et al., 2000). Results of the research found a statistically significant reduction in gastrointestinal infection during the three to six

month period in the group that was exclusively breastfed for six months (adjusted incidence density ratio = 0.35; 95%CI = 0.1 – 1.0). Researchers also have examined previously the dose-response relationship between breastfeeding and infant health in a longitudinal analysis of the National Maternal and Infant Health Survey (NMIHS) data from the United States (23). In comparing infants during the first six months of life that were exclusively breastfed to those that were partially breastfed, results showed a protective dose-response relationship between breastfeeding and diarrhea. The study also found greater reduced odds of illness and sick-baby medical visits among those infants who were exclusively breastfed for the first six months of life.

The determinants of optimal feeding practices of infants have been a topic of considerable study (24-26). Although more general measures of social support are considered important determinants of optimal feeding practices (27), researchers have given surprisingly little attention to the possible effects of maternal exposure to IPV. Moreover, the scant available evidence regarding these possible effects is mixed. Kendall-Tackett (28) and Klingelhafer (29) have suggested that the effects of IPV may result in either deficit or compensatory responses to breastfeeding. On the one hand, a mother who has been exposed to IPV may be injured, depressed, or cognitively impaired and less able to breastfeed her young infant (5). This mother also may have developed an aversion to breastfeeding as a result of IPV-related injuries to the breasts or IPV-associated discomfort with the body (29, 30). In contrast, mothers who have been exposed to IPV may be more sensitive to their child's needs and exhibit positive parenting behaviors (e.g., (31-33). As a result, these mothers may develop a compensatory response to IPV as a means of coping with the experience or reclaiming their bodies and identities as women (29).

The objective of this study is to assess the unadjusted and adjusted associations of maternal exposure to IPV on the feeding practices that they adopt with infants during their first six months of life. We use a sample of 5,765 mother-child dyads from the 2005-2006 National Family Health Survey (NFHS), a nationally-representative sample of women of reproductive age and their children in India. Because exposure to IPV is well-known to be associated with adverse mental health effects on mothers (5) and suboptimal prenatal care, delivery outcomes, and other postpartum care practices (11, 16), we expect that maternal exposure to IPV will result in a deficit response with regard to infant feeding practices (13, 28, 29). This research will contribute new knowledge about the effects of maternal exposure to IPV on young children, and in so doing, will provide important insights about targeted screening for IPV and education about optimal infant feeding practices in poor settings.

Methods

Study setting

The Republic of India in South Asia is the seventh largest country by geographical area and shares borders with Pakistan, Nepal, and Bangladesh. Comprised of 28 states and seven Union territories, which are further divided into 640 districts, India has experienced rapid economic growth, especially following the beginning of the financial reform process in 1991 (34). In 2010, India ranked 4th in the world for highest Gross Domestic Product (GDP) based on purchasing power parity (35). GDP was estimated to grow 8.6 percent in 2010 to 2011 (36).

In addition to a growing economy, India is the second most populous country in the world, with a provisional population total is 1.2 billion (37). Although the country is still experiencing a population increase, growth has slowed over the past two decades as a result of substantial declines in fertility from 4.7 births per women in 1980 to 2.6 births in 2010 (35). As a result, India experienced a 17.6 percent growth in population size from 2001 to 2011, compared to a 21.5 percent growth in population from 1991 to 2001 (37).

Despite its rapid growth, India still faces problems with child mortality. Over a fifth of the world's under-five deaths occur in India, which is more than any other country (38). In 2010, the estimated under-five mortality in India was 63 deaths per 1000 live births with diarrheal diseases reported as one of the major causes of death among children under five years of age (39, 40). Although child mortality rates have been decreasing over the years since the 1980s, progress has slowed (41, 42). One in every three malnourished children in the world lives in India (41). According to the WHO growth standards used to describe the nutritional status of children, 43 percent were underweight and 20-30 percent of children are undernourished during the first six months of life (43).

To address concern over child mortality and under-nutrition, the Government of India has recommended that breastfeeding should be initiated immediately after childbirth, preferably within one hour, and that children be exclusively breastfed for the first six months of life (44). Although breastfeeding is prevalent in India (95.7 percent of children born in the five years preceding the NFHS-3 were ever breastfed), early initiation of breastfeeding and the exclusive breastfeeding of infants is not as common (43). For all of India, only 24.5 percent of children born in the last five years prior to the NFHS-3 were breastfed within one hour of birth. Reports of the early initiation of breastfeeding vary among states, however, with Mizoram reporting the highest at 66.4 percent and Bihar reporting the lowest at 3.7

percent. Also according to the survey, less than half (46.3 percent) of infants between zero and five months of age are exclusively breastfed. Of those infants aged four to six months, only 27.8 percent are exclusively breastfed.

With an extended history of social and structural norms that encourage a preference for males in parts of India (45, 46), the country's sex ratio has tended to favor boys. This bias is especially evident among children. The ratio of girls to boys aged 0-6 years has been declining over the years and is estimated to have reached an all-time low of 914 girls per 1,000 boys in 2011 (37). In this context of longstanding gender bias, it is not surprising that women in India report frequent exposure to IPV. Nationally, an estimated 34 percent of all women 15 to 49 years have ever experienced violence since age 15 (43). Among ever-married women 15 to 49 years, the reported prevalence of any type of IPV varies by state, from 6.9 percent in Himachal Pradesh to 60.8 percent in Bihar. Physical IPV is the most commonly reported form in all states (4.1 – 38.9 percent), while sexual IPV is, in all states but West Bengal and Manipur, the least commonly reported form (0 – 6.2 percent) (43).

In 1983, IPV was recognized as a criminal offence through an amendment of Section 498-A into the Indian Penal Code. This law states: "Whoever, being the husband or the relative of the husband of a woman, subjects such woman to cruelty shall be punished with imprisonment for a term which may extend to three years and shall also be liable to fine" (47). A more comprehensive and recent effort to address IPV took effect in 2006 with the Protection of Women from Domestic Violence Act 2005. This law includes a provision of protection against emotionally, physically, and economically violent husbands and partners.

The prevalence and determinants of IPV in India has been well documented in previous research (48-51). Although many studies have focused on the adverse effects of IPV on maternal and child health, much emphasis has been placed on areas of child

mortality (18, 52, 53), prenatal care (13), maternal and child nutrition (54), psychological health (2, 55), pregnancy outcomes (56), and reproductive health (57-59). Little research in the India context has given attention to the influence of maternal exposure to IPV on infant health with respect to infant feeding practices, especially breastfeeding.

Data and sample

The data for this study come from the 2005-2006 (43), a national cross-sectional household survey that is the Indian equivalent of the Demographic and Health Survey (DHS). The sample was selected through a multi-stage stratified probability sampling procedure and interviews were conducted from November 2005 to August 2006.
A total of 124,385 all women, ever-married and never-married, aged 15 to 49 years (or 94.5 percent of eligible women) participated in the Women's Questionnaire. In addition to other demographic and health data, this questionnaire included a birth history and detailed questions about the health, care, and feeding practices of children born in the prior five years. From the birth history, women reported a total of 256,782 births. Questions on child feeding practices concerned ever breastfeeding, timing of initiation, current breastfeeding, and frequency of breastfeeding; as well as complementary feeding practices, including the child's consumption of anything from a bottle with a nipple during the previous day or night, specified liquids during the previous day or night, and specified foods, either separately or combined with other foods, during the previous day or night. Substances included in the liquids category were plain water; tea or coffee; tinned, powdered or fresh milk; baby formula; baby cereal; porridge or gruel; and other liquids. Specified foods included any meat as well as eggs and organs; any nuts; food made from grains, roots, beans,

peas or lentils; any fruits or vegetables; any milk products; or any other solid or semi-solid foods.

Of the 124,385 participants in the Women's Questionnaire, 83,703 (69,704 ever-married women and 13,999 never married women) were selected randomly to participate in the Domestic Violence module, a modified and shortened version of the Revised Conflict Tactics Scale (CTS2) (60). This module asked questions about violence perpetrated by an ever-married woman's current or most recent husband. Questions asked about lifetime and prior-year physical IPV (slapped her; twist her arm or pulled her hair; pushed, shook, or threw something at her; punched her with his fist or with something that could hurt; kicked, dragged, or beat her up; tried to choke or burn her on purpose; or threatened to attack her with a knife, gun, or any other weapon), sexual IPV (physically forced to have sexual intercourse or to perform any sexual acts), and emotional IPV (humiliation in front of others; threats to hurt or harm her or someone close to her; insults or efforts to make her feel bad about herself).

For this analysis, children who were six months of life or younger (≤ 180 days) at the time of the survey were selected from the birth history data and matched to their mothers. [1] Matching resulted in a sample of 5,765 mother-child dyads, 4,202 of which were selected to complete the Domestic Violence module. Of those selected, 26 were unable to be interviewed due to a lack of privacy, and 5 were selected but not interviewed. The effective sample for the analysis was 2,759 mother-child dyads.

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[1] Additionally, similar analyses were performed on samples of mother-child dyads with neonates (0 months of life or ≤ 30 days) and children at 4 months of life (≤ 120 days). The mother-neonate sample consisted of 665 dyads. For mothers with children at 4 months of life, the sample of 3882 dyads was selected. Findings are available upon request.

Outcome measures

All seven outcome measures were coded as dichotomous responses. Breastfeeding outcomes measured whether the child was breastfed immediately after birth and whether the mother was breastfeeding at the time of the survey. Exclusive breastfeeding was measured as the mother reporting currently breastfeeding and the child not being fed any other food, liquid, or solid, over the previous day and night. Measures for complementary feeding practices (which are not recommended for children less than six months of age) included whether the child drank from a bottle with a nipple in the previous day and night, whether the child was fed either additional liquids other than breast milk or solid foods over the previous day and night, and whether the child was fed any other food (either liquid or solid) over the previous day and night.

Exposure variables

The main exposure variables for this analysis included reported experiences of IPV. Because prior-year IPV was relatively uncommon (e.g., less than 6 percent), all measures for IPV captured whether the woman reported any exposure to psychological, physical, or sexual IPV ("any IPV" yes/no) or whether she reported any physical and/or sexual IPV (yes/no).

Covariates

Covariates considered for the analysis were those that have been shown in prior studies to be associated with both IPV and infant feeding practices. These include urban versus rural place of residence (61-63), household wealth quintile (poorest, poor, middle, rich, and richest) (64-66), maternal age in years entered linearly (63, 67), parity non-inclusive of the index child entered linearly (68), mother's completed grades of schooling entered linearly (69, 70), the difference between the mother's and her husband's completed grades of schooling (mother fewer, mother and husband the same, husband more) (69), male or female sex of the child (45, 46, 56), mother's religion (Hindu, Muslim, Christian, Sikh, Buddhist/Neo-Buddhist, Jain, Donyi-Polo, and none or other) (43), and region of residence (North, Northeast, East, Central, South, West)[2] (43). The measure for household wealth was constructed from dichotomized items capturing the household's ownership of a list of assets, amenities or characteristics of the dwelling, and possession by a household member of bank or post office account.

Analyses

Frequencies were calculated for all outcomes, trichotomized exposure variables, and covariates. Chi-square tests of association between exposures and outcomes were conducted to obtain the Rao-Scott Chi-square values, which are adjusted for the complex survey design. Simple and multivariate logistic regression models were estimates to assess the unadjusted and adjusted associations of exposure to IPV and infant feeding practices. All analyses were

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[2] The North region consisted of Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Uttaranchal, and Delhi; Northeast included Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura; states of Bihar, Jharkhand, Orissa, and West Bengal were included in the East; Chhattisgarh, Uttar Pradesh, and Madhy Pradesh were included in the Central region; South consisted of Andhra Pradesh, Karataka, Kerala, and Tamil Nadu; and the West included Goa, Gujarat, and Maharashtra.

conducted in SAS 9.3 statistical software (71). SURVEY procedures were used to adjust for complex survey design. Strata, cluster (PSU) and weight variables were used for the procedures. The DHS domestic violence weight was divided by 1,000,000 before analyses.

Results

Descriptive analyses

Of all mother-child dyads, 20.1 percent of women reported their child being immediately breastfed after birth (Table 1). Although a majority of children included in the sample were being breastfed at the time of the survey (94.3 percent), more than half of the mothers reported feeding their children additional liquids within the past 24 hours (56.9 percent). Fewer mothers (10.4 percent) reported feeding their children solid foods. Slightly more than a third of mothers reported exclusively breastfeeding their child (39.6 percent). Of the women sampled, 30.0 percent of women reported exposure to any type of IPV within the past 12 months while 9.6 percent reported experiencing any IPV before the prior 12 months. Similarly, 27.5 percent reported experiencing physical and/or sexual IPV within the past 12 months, and 9.1 percent reported ever experiencing physical and/or sexual IPV before the prior 12 months.

The average age of mothers in the sample was 24.4 years. Most women resided in rural areas (24.1 percent in urban areas) (Table 2). A fourth (25.1 percent) of the women was in the poorest wealth index quintile. The average number of children for mothers, non-inclusive of the current child, was 1.7. On average, mothers had 4.4 years of education. Half

of the women who responded had less education than their partner (52.3 percent) and only 16.3 had more education than their partner.

Very few women who reported exposure to any IPV or to physical and/or sexual IPV only reported breastfeeding their child immediately after birth (6.9 percent and 6.4 percent, respectively). Dichotomous IPV variables were used for Rao-Scott Chi-square associative tests. For both IPV categories, statistically significant associations ($\chi 2$ $p < 0.05$) were found for breastfeeding immediately after birth, child having drunk from a bottle with a nipple, feeding the infant liquids, feeding the infant solids, feeding the infant any food other than breast milk, and exclusively breastfeeding.

Logistic regression results

Compared to mothers not exposed to any IPV, exposed mothers had 24.1 percent lower unadjusted odds of breastfeeding immediately after birth (95%CI = 0.6 – 0.9) (Table 3). Significant unadjusted associations were found between both mothers exposed to any IPV and those exposed to physical and/or sexual IPV only and feeding their infants liquids or foods other than breast milk in the prior 24 hours. Specifically, compared to unexposed mothers, those exposed to any IPV had 1.47 times the odds of feeding their infants liquids (95%CI = 1.0 – 1.5), and those exposed to physical and/or sexual IPV had 1.53 times higher odds of doing so (95%CI = 1.2 – 1.9). Mothers exposed to any IPV had 1.31 times the odds of feeding their infants solids or semi-solids (95%CI = 1.0 – 1.7) while those exposed to physical and/or sexual IPV had 1.49 times the odds of doing so (95%CI = 1.1 – 2.0) when compared to mothers unexposed to IPV. In regards to the feeding of any food other than breast milk, mothers exposed to any IPV had a 1.26 higher odds (95%CI = 1.0 – 1.7) and

mothers exposed to physical and/or sexual IPV only had a 1.30 higher odds (95%CI = 1.2 – 2.0) in comparison to the unexposed counterparts.

Similarly, results of adjusted analyses found statistically significant associations ($p < 0.05$) between both IPV exposure measurements and feeding of additional foods and exclusive breastfeeding. For those who reported ever experiencing any IPV, mothers were 1.47 times more likely to report having fed their infant liquids (95% CI = 1.2 – 1.8), 1.55 times more likely to have fed their infants solids (95%CI = 1.2 – 2.1), and 1.45 times more like to report having fed their infant any food other than breast milk (1.2 – 1.8) in comparison to mothers who were not exposed to any IPV. Women exposed to physical and/or sexual IPV also had a higher adjusted odds of having fed their infants liquids (aOR = 1.53, 95%CI = 1.2 – 1.9), solids (aOR = 1.72, 95%CI = 1.3 – 2.3) and any food other than breast milk (aOR = 1.51, 95%CI = 1.2 – 1.9). In addition, adjusted analyses also found that mother exposed to physical and/or sexual IPV were more likely to report their child having drank from a bottle with a nipple (aOR = 1.46, 95%CI = 1.1 – 2 .0). Both groups, those exposed to any IPV and those exposed to physical and/or sexual IPV only, had significantly lower adjusted odds of exclusively breastfeeding their infants (aOR = 0.70, 95%CI = 0.6 – 0.9 for any IPV; aOR = 0.68, 95%CI = 0.5 – 0.8 for physical and/or sexual IPV only).

Summary

In summary, women exposed to any IPV and those exposed to physical and/or sexual IPV only, had lower unadjusted odds of exclusive breastfeeding and higher unadjusted odds of feeding of solids, liquids, and any food other than breast milk than their unexposed counterparts. Lower adjusted odds of exclusive breastfeeding and higher adjusted

odds of feeding solids, liquids, and any food other than breast milk than those mothers unexposed to IPV was also found for both IPV exposure groups. Additionally, mothers exposed to physical and/or sexual IPV only had a higher adjusted odds of bottle-feeding their infants.

Conclusions

IPV is a global public health problem that can have detrimental effects on maternal and child health. The purpose of this paper was to examine maternal responses to exposure to IPV with respect to early childhood feeding practices. The potential effects of IPV on child health and development are especially important not only for the family but also for the community and larger society. Few studies have examined previously the associations of maternal exposure to IPV with infant feeding practices, specifically in poor settings. The results of this study enhance our understanding of the cascading effects of maternal exposure to IPV on young children.

The results of the analysis support research regarding the detrimental effects of maternal exposure to IPV on early childhood health. Specifically, the results support the deficit hypothesis that mothers exposed to IPV will have an aversion to breastfeeding and may engage in poor feeding practices (29). The present study suggests deleterious behaviors with respect to infant feeding practices, specifically the feeding of complementary liquids and solid foods to infants aged six months or less, in response to maternal exposure to either any IPV or physical and/or sexual IPV only.

Previous research has suggested both IPV exposure to have compensatory and deficit responses to breastfeeding (28, 29). Although the current research does not support

the compensatory response, it should be noted. Compensatory parenting practices, such as becoming a more effective and responsive mother, has been observed in previous research of mothers of young and preschool-age children who were exposed to IPV (31). It has also been reported that breastfeeding has been used as a coping and empowering mechanism for abuse survivors (29).

There are many suggestions as to why maternal exposure to IPV, particularly physical or sexual IPV, may alter breastfeeding practices. Breastfeeding and the breasts may hold sexual associations to those mothers who have experienced sexual IPV, which can make it difficult to breastfeed (29). Women who experience IPV are also more likely to engage in high-risk behaviors that are associated with breastfeeding cessation (72) and have impaired psychological health which may lead to poor infant outcomes (9). It is also possible that feeding an infant complementary foods too early may be a compensatory response to IPV exposure, especially if certain foods are scarce and valued or if early complementary feeding is perceived to benefit the child.

In addition to behavioral factors, biological and physical mechanisms related to IPV may affect maternal health and a mother's ability to breastfeed. Stress has been associated with a mother's lactation abilities (73). Research has suggested that psychological stress may inhibit milk release associated with infant suckling by decreasing oxytocin, a hormone involved in the regulation of milk ejection (74). The stress and other impairments, physical or mental, caused by IPV exposure may have an effect on a mother's health make breastfeeding and child care difficult for the mother (75).

Partner relationships and power dynamics may also play a role in child feeding practices. Past research in India has shown husband's controlling behavior to be a strong predictor of IPV (50) and results of another study has suggested that improving maternal

decision-making autonomy can positively affect infant feeding practices in rural areas (76). This may be especially important in male-dominant or patriarchal cultures, which is observed in India and many other East Asian and Southeast Asian countries. Maternal autonomy may influence the care the mother is able to provide for her child and consequently affect child health and development (77).

There are some limitations in the current research. First, the data were collected using a cross-sectional survey, which does not permit us to make causal inferences. Also, the exposure variable for IPV is derived from mothers' self-report. Violence can be a sensitive topic, and open discussion of the problem may not be accepted. Despite this concern, the revised conflict tactics scale has been validated cross-culturally (60) and tends to yield a higher prevalence of IPV than single-question formats (43, 78). The study also relied on the 24 hour recall of infant feeding practices which might bias the results, especially if exposure to IPV has affected a woman's cognitive abilities (9). Although the conduct of this analysis in the large and diverse country of India is a strength, the analysis should be replicated in other poor countries.

There are few studies on the influence of IPV on breastfeeding and complementary feeding practices, and further research should be conducted to validate the conclusions of the current research. Specifically, future studies should examine the effects of IPV on exclusive breastfeeding. To be comparable, research should follow consistent measurements of breastfeeding, such as those defined by the WHO (79). While cross-sectional data may be more convenient and available, a prospective study design would be ideal. This study also supports further research on the effects of maternal IPV exposure on the health of young children, specifically of infants and neonates. Qualitative studies among mothers exposed

and unexposed to IPV are needed to clarify the rationale for feeding practices and the link between child nutrition and IPV.

Overall, the present study found an association between mothers exposed to IPV and poor child feeding practices for infants aged six months of life and younger. Proper feeding practices to ensure that the child receives appropriate nutrition, especially in the early stages of life, are essential for the development and growth of the child. In the case of a child aged six months or younger, as is included in the sample of this study, exclusive breastfeeding is recommended (22). Findings of this research suggest a need to screen for IPV in both post-partum and maternal and child health services as well as a need to promote proper child feeding practices. Routine screening for IPV in healthcare services may help reduce the health consequences associated with violence for both the mother and her child. For women who have been identified as survivors of IPV, breastfeeding support and child nutrition education are important for both the health of the mother and infant. Early initiatives may enhance feeding practices during this critical window of child growth and development. Along with the promotion of breastfeeding, interventions for the proper introduction of complementary feeding are also important. In addition to their global recommendation for breastfeeding (22), the WHO has developed guiding principles for complementary feeding that may assist program developers in planning effective programs (80).

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Tables and Figures

TABLE I: DESCRIPTIVE ANALYSES OF MATERNAL EXPOSURE TO IPV AND CHILD FEEDING PRACTICES **

OUTCOMES	ANY TYPE OF IPV				PHYSICAL/SEXUAL IPV ONLY				Total (n = 4352.0, 100%)
	Never (n = 2618.0, 60.2%)	Prior to past 12 months (n = 417.0, 9.6%)	In the last 12 months (n = 1306.0, 30.0%)	Rao-Scott $\chi 2$ p-value	Never (n = 2725.0, 62.6%)	Prior to past 12 months (n = 418.0, 9.1%)	In the last 12 months (n = 1198.0, 27.5%)	Rao-Scott $\chi 2$ p-value	
Breastfed immediately after birth (%)	572.5 (13.2)	67.7 (1.6)	233.4 (5.4)	0.0147 *	596.1 (13.7)	65.9 (1.5)	211.6 (4.9)	0.0097 *	873.6 (20.1)
Currently breastfed (%)	2471.0 (56.8)	405.7 (9.3)	1215.0 (27.9)	0.7716	2571.0 (59.1)	406.8 (9.4)	1114.0 (25.6)	0.7922	4103.0 (94.3)
Drank from a bottle with a nipple (%)	316.3 (7.3)	67.4 (1.6)	142.2 (3.3)	0.8790	320.7 (7.4)	67.8 (1.6)	137.5 (3.2)	0.5015	526.5 (12.1)
Fed liquids (%)	1422.0 (32.7)	225.7 (5.2)	801.1 (18.4)	0.0148 *	1476.0 (33.9)	233.5 (5.4)	739.5 (17.0)	0.0083 *	2456.0 (56.4)
Fed solids (%)	247.4 (5.7)	50.3 (1.2)	156.1 (3.6)	0.0486 *	250.2 (5.8)	52.8 (1.2)	150.9 (3.5)	0.0088 *	453.8 (10.4)
Fed food other than breastmilk (%)	1435.0 (33.0)	225.7 (5.2)	806.8 (18.5)	0.0304 *	1489.0 (34.2)	233.5 (5.4)	745.1 (17.1)	0.0099 *	2475.0 (56.9)
Exdusively breastfed (%)	1090.0 (25.1)	187.0 (4.3)	443.2 (10.2)	0.0239 *	1138.0 (26.2)	180.2 (4.1)	402.3 (9.2)	0.0146 *	1724.0 (39.6)

* $p < 0.05$.

** Weighted values are shown.

TABLE II: DESCRIPTIVE ANALYSES OF MATERNAL EXPOSURE TO IPV AND COVARIATES *

COVARIATES	ANY TYPE OF IPV			PHYSICAL/SEXUAL IPV ONLY			Total (n = 4352.0, 100%)
	Never (n = 2618.0, 60.2%)	Prior to past 12 months (n = 417.0, 9.6%)	In the last 12 months (n = 1306.0, 30.0%)	Never (n = 2725.0, 62.6%)	Prior to past 12 months (n = 418.0, 9.1%)	In the last 12 months (n = 1198.0, 27.5%)	
Urban (%)	751.3 (17.3)	61.7 (1.4)	237.4 (5.5)	771.7 (17.7)	57.4 (1.3)	221.2 (5.1)	1050.0 (24.1)
Wealth Index (%)							
Poorest	503.5 (11.6)	135.8 (3.1)	444.2 (10.2)	525.4 (12.1)	136.7 (3.1)	421.4 (9.7)	1094.0 (25.1)
Poorer	519.7 (11.9)	115.6 (2.7)	352.5 (8.1)	550.0 (12.6)	119.8 (2.8)	318.1 (7.3)	987.9 (22.7)
Middle	521.9 (12.0)	89.8 (2.1)	247.2 (5.7)	544.7 (12.5)	89.6 (2.1)	224.6 (5.2)	858.9 (19.7)
Richer	560.3 (12.9)	61.0 (1.4)	188.6 (4.3)	577.7 (13.3)	61.3 (1.4)	170.9 (3.9)	810.4 (18.6)
Richest	512.8 (11.8)	14.8 (0.3)	73.8 (1.7)	527.6 (12.1)	10.8 (0.3)	63.1 (1.5)	601.4 (13.8)
Parity (SE)	1.3 (0.1)	2.8 (0.2)	2.1 (0.1)	1.4 (0.04)	30. (0.2)	2.1 (0.1)	1.7 (0.1)
Mother's education, years (SE)	5.5 (0.2)	3.0 (0.4)	2.7 (0.2)	5.4 (0.2)	2.9 (0.4)	2.6 (0.2)	4.4 (0.1)
Education difference (%)							
Less	1398.0 (32.1)	228.5 (5.3)	651.1 (15.0)	1465.0 (33.7)	228.0 (5.2)	585.0 (13.4)	2278.0 (52.3)
Same	737.3 (16.9)	138.6 (3.2)	477.8 (11.0)	767.8 (17.6)	140.8 (3.2)	445.1 (10.2)	1364.0 (31.3)
More	482.7 (11.1)	50.0 (1.2)	177.3 (4.1)	492.9 (11.3)	49.2 (1.1)	167.9 (3.9)	710.5 (16.3)
Maternal age, years (SE)	24.0 (0.1)	26.2 (0.5)	24.7 (0.2)	24.0 (0.1)	26.5 (0.5)	24.7 (0.3)	24.4 (0.1)
Female child (%)							
Religion (%) **							
Hindu	2044.0 (47.0)	358.4 (8.2)	1033.0 (23.7)	2140.0 (49.2)	357.5 (8.2)	937.9 (21.6)	3445.0 (79.2)
Muslim	428.4 (9.8)	50.7 (1.2)	229.6 (5.3)	436.6 (10.0)	52.2 (1.2)	219.9 (5.1)	709.2 (16.3)
Christian	63.6 (1.5)	1.0 (0.02)	16.2 (0.4)	65.3 (1.5)	1.0 (0.02)	14.6 (0.3)	80.8 (1.9)
Sikh	47.8 (1.1)	3.4 (0.1)	5.1 (0.1)	48.9 (1.1)	2.2 (0.1)	5.1 (0.1)	56.3 (1.3)
Region (%)							
North	388.5 (8.9)	34.0 (0.8)	175.2 (4.0)	402.9 (9.3)	32.7 (0.8)	162.1 (3.7)	598.3 (13.8)
Northeast	105.4 (2.4)	12.6 (0.3)	58.2 (1.3)	108.3 (2.5)	13.6 (0.3)	54.3 (1.3)	176.3 (4.1)
East	515.6 (11.9)	86.0 (2.0)	439.6 (10.1)	533.9 (12.3)	86.1 (2.0)	421.2 (9.7)	1052.0 (24.2)
Central	743.3 (17.1)	211.4 (4.9)	418.7 (9.6)	787.9 (18.1)	212.7 (4.9)	372.9 (8.6)	1373.0 (31.6)
South	470.1 (10.8)	35.2 (0.8)	116.2 (2.7)	482.4 (11.1)	37.7 (0.9)	101.4 (2.3)	621.5 (14.3)
West	395.4 (9.1)	37.8 (0.9)	98.2 (2.3)	409.9 (9.4)	35.3 (0.8)	86.2 (2.0)	531.4 (12.2)

* Weighted values are shown.

** Buddhist/Neo-Buddhist, Jain, Donyi-Polo, and other/no religion not induded in table.

TABLE III: LOGISTIC REGRESSION ANALYSES OF MOTHER-CHILD DYADS

Outcomes	Crude			Adjusted		
	p-value	OR	95% CI	p-value	OR	95% CI
Any IPV						
Breastfed immediately after birth	0.0144 *	0.76	(0.61, 0.95)	0.5538	1.08	(0.840, 1.384)
Currently breastfed	0.7717	0.95	(0.65, 1.37)	0.3863	0.84	(0.554, 1.256)
Drank from a bottle with a nipple	0.8788	1.02	(0.76, 1.38)	0.1021	1.31	(0.948, 1.801)
Fed liquids	0.0150 *	1.27	(1.05, 1.53)	0.0003 **	1.47	(1.192, 1.812)
Fed solids	0.0490 *	1.31	(1.00, 1.71)	0.0032 **	1.55	(1.159, 2.075)
Fed food other than breastmilk	0.0187 *	1.26	(1.04, 1.52)	0.0005 **	1.45	(1.178, 1.788)
Exdusively breastfed	0.0242 *	0.81	(0.67, 0.97)	0.0006 **	0.70	(0.570, 0.858)
Physical and/or sexual IPV only						
Breastfed immediately after birth	0.6359	0.94	(0.74, 1.20)	0.7072	1.05	(0.81, 1.36)
Currently breastfed	0.3816	0.84	(0.56, 1.25)	0.3984	0.84	(0.55, 1.27)
Drank from a bottle with a nipple	0.0590	1.35	(0.99, 1.86)	0.0244 *	1.46	(1.05, 2.02)
Fed liquids	0.0084 *	1.53	(1.25, 1.88)	0.0002 **	1.53	(1.23, 1.90)
Fed solids	0.0050 *	1.49	(1.13, 1.97)	0.0003 **	1.72	(1.28, 2.31)
Fed food other than breastmilk	0.0101 *	1.30	(1.06, 1.59)	0.0002 **	1.51	(1.21, 1.88)
Exdusively breastfed	0.0149 *	0.79	(0.65, 0.95)	0.0003 **	0.68	(0.55, 0.84)

* $p < 0.05$.

** $p < 0.001$.

CHAPTER 4: CONCLUSION AND RECOMMENDATIONS

Introduction

IPV is a global public health problem that can have detrimental effects on maternal and child health. The purpose of this paper was to examine the maternal response to exposure to IPV with respect to early childhood feeding practices. The effect of IPV on child health and development is especially important not only for the family but also for the community and larger society. Few studies have previously examined the influence maternal exposure to IPV has on infant feeding, specifically in poor settings, and the results of this study will add to a greater understanding of the effect of maternal exposure to IPV on young children.

The results of the analysis support research regarding the detrimental effects of maternal exposure to IPV on early childhood health. Specifically, the results support the *deficit* hypothesis that mothers exposed to IPV will have an aversion to breastfeeding and may engage in poor feeding practices (Klingelhafer, 2007). The present study suggests deleterious behaviors in infant feeding practices, specifically the feeding of complementary liquids and solid foods to infants at six months of life and less, in response to maternal exposure to either any IPV or physical and/or sexual IPV only.

Discussion

Previous research has suggested both IPV exposure to have *compensatory* and deficit *responses* to breastfeeding (Kendall-Tackett, 2007; Klingelhafer, 2007). Although the current

research does not support the compensatory response, it should be noted. Compensatory parenting practices, such as becoming a more effective and responsive mother, has been observed in previous research of mothers of young and preschool-age children who were exposed to IPV (Levendosky, et al., 2003). It has also been reported that breastfeeding has been used as a coping and empowering mechanism for abuse survivors (Klingelhafer, 2007).

There are many suggestions as to why maternal exposure to IPV, particularly physical or sexual IPV, may create barriers to breastfeeding. Breastfeeding and the breasts may hold sexual associations to those mothers who have experienced sexual violence which can make it difficult to breastfeed (Klingelhafer, 2007). Women who experience IPV are also more likely to engage in high-risk behaviors that are associated with breastfeeding cessation (Bailey & Daugherty, 2007) and have impaired psychological health which may lead to poor infant outcomes (Huth-Bocks, Levendosky, & Bogat, 2002). For example, IPV victims are more likely to smoke (Letourneau, Holmes, & Chasedunn-Roark, 1999) and research has shown that women who smoke were less likely to intend to breastfeed, less likely to initiate breastfeeding, and more likely to have a shorter breastfeeding duration in comparison to their nonsmoking counterparts (Amir & Donath, 2002). It is also possible that feeding an infant complementary foods too early may be a compensatory response to IPV exposure, especially if certain foods are scarce and valued or if early complementary feeding is perceived to benefit the child.

In addition to behavioral factors, biological and physical mechanisms related to IPV may affect maternal health and a mother's ability to breastfeed. Stress has been associated with a mother's lactation abilities (C. Lau, 2001). Research has suggested that psychological stress may inhibit milk release associated with infant suckling by decreasing oxytocin, a hormone involved in the regulation of milk ejection (Ueda, Yokoyama, Irahara, & Aono,

1994). The stress and other impairments, physical or mental, caused by IPV exposure may have an effect on a mother's health make breastfeeding and child care difficult for the mother (Rahman, Harrington, & Bunn, 2002).

Partner relationships and power dynamics may also play a role in child feeding practices. Past research in India has shown husband's controlling behavior to be a strong predictor of IPV (Dalal & Lindqvist, 2012) and results of another study has suggested that improving maternal decision-making autonomy can positively affect infant feeding practices in rural areas (Shroff, et al., 2011). This may be especially important in male-dominant or patriarchal cultures, which is observed in India and many other East Asian and Southeast Asian countries. Maternal autonomy may influence the care the mother is able to provide for her child and consequently affect child health and development (Smith, et al., 2003).

Strengths and limitations

There are some limitations in the current research. First, the data were collected using a cross-sectional survey, which does not permit us to make causal inferences. Also, the exposure variable for IPV is derived from mothers' self-report. Violence can be a sensitive topic, and open discussion of the problem may not be accepted. Despite this concern, the revised conflict tactics scale has been validated cross-culturally (Straus, 1990) and tends to yield a higher prevalence of IPV than single-question formats (International Institute for Population Sciences (IIPS), 1995; International Institute for Population Sciences (IIPS) & Macro International, 2007). The study also relied on the 24 hour recall of infant feeding practices which might bias the results, especially if exposure to IPV has affected a woman's cognitive abilities (Huth-Bocks, et al., 2002). Although the conduct of this analysis in the

large and diverse country of India is a strength, the analysis should be replicated in other poor countries.

Conclusion and recommendations

Overall, the current research found an association between mothers exposed to IPV and poor child feeding practices for infants aged six months of life and younger. Proper feeding practices to ensure that the child receives appropriate nutrition, especially in the early stages of life, are essential for the development and growth of the child. In the case of a child aged six months or younger, as is included in the sample of this study, exclusive breastfeeding is recommended (World Health Organization, 2002b).

Findings of the present study suggest a need to screen for IPV in both post-partum and maternal and child health services as well as a need to promote proper child feeding practices. Routine screening for IPV in healthcare services may help reduce the health consequences associated with violence for both the mother and her child. For women who have been identified as survivors of IPV, breastfeeding support and education is important for both the health of the mother and infant. Along with the promotion of breastfeeding, interventions for the proper introduction of complementary feeding are also important. In addition to their global recommendation for breastfeeding (World Health Organization, 2002b), the WHO has developed guiding principles for complementary feeding that may assist program developers in planning effective programs (World Health Organization, 2002a).

There are few studies on the influence of IPV on breastfeeding and complementary feeding practices and further research can be performed to validate the conclusions of the

current research. Specifically, future studies should examine the effects of IPV on exclusive breastfeeding. To be comparable, research should follow consistent measurements of breastfeeding, such as those defined by the WHO (1991). While cross-sectional data may be more convenient and available, a large prospective study design would be ideal. This study also supports further research on the effects of maternal IPV exposure on the health of young children, specifically of infants and neonates.

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