WOMEN'S EMPOWERMENT AND CHILD NUTRITIONAL OUTCOMES IN MODERN-DAY INDIA

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ABSTRACT

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India still struggles to mitigate its severe childhood malnutrition rates despite its impressive economic growth and reduced poverty rates. In exploring effective ways to improve child nutritional outcomes in South Asia, social scientists and public health officials have recently identified the disempowerment of women as a significant barrier to achieving child welfare goals. Although there have been cross-national studies carried out throughout South Asia and other developing countries, none have specifically examined the association between women's empowerment and child malnutrition in modern-day India. Using India's 2005-06 National Family and Health Survey, this study assesses the significance of the relationship between four women's empowerment indicators—household decision-making power, mobility, attitudes towards domestic violence, and highest level of schooling—and malnutrition in children under five years of age, as measured by the prevalence of stunting and wasting. The main analysis used a progressively adjusted logistic regression model, which estimated the effects of women's empowerment on child's nutrition outcomes whilst controlling for maternal age at birth, the household wealth index, and the type of place of residence, meaning, rural or urban settings. **Results indicate that women's empowerment varies**

Keywords:

Women's Empowerment, Gender Inequality, Child Malnutrition, India

ACKNOWLEDGMENTS

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DEDICATION

I dedicate this thesis to the women of Sanatkada in Lucknow, Uttar Pradesh who showed me the true meaning of inner-strength and fearlessness. The way that you all persevere—for yourself, for your friends, and for your children—despite your difficult circumstances are a testament of *power* and beauty. Thank you for inviting me into your lives for, what seemed to me, to be too short of a period of five months. Even though it may be a while before I can make my way back to U.P., I hope that we can all meet again.

CHAPTER I: INTRODUCTION

Childhood malnutrition is a significant public health problem in many low- and middle-income countries and causes unimaginable suffering. Indeed, malnutrition[1] is associated with more than half of child deaths (aged 6-59 months) in 53 developing countries, with thirty percent, meaning 167 million, of all children under the age of five in developing countries malnourished (Pelletier *et al*., 1995; Smith and Haddad, 2000). And those who survive malnutrition as children experience serious health concerns during development and into adulthood (Hoddinott *et al*., 2012; NFHS-2 1998-99).

Although child nutritional stats in developing countries have improved over the past several decades, South Asia continues to struggle to achieve substantial improvements with its high rates of childhood malnutrition. Estimates show that South Asia has the highest prevalence of malnutrition in the developing world, giving rise to 50% of malnourished children under the age of five globally (Smith and Haddad, 2000).   Moreover, of the two regions that have the world's most severe malnutrition rates, Sub-Saharan Africa (SSA) and South Asia, South Asia's rate is almost 20% higher than SSA's (Smith and Haddad, 2000). Long-accepted determinants of child nutritional status fail to explain South Asia's high malnutrition rate; rather, these determinants would predict South Asia's lower malnutrition rate relative to SSA's (Smith and Haddad 2000). Child health and nutrition expert Vulimiri Ramalingaswami dubbed this puzzling incongruity the "(South) Asian enigma" (Ramalingaswami *et al.*, 1996).

In India, undernutrition rates in children under three years is measured in terms of the prevalence of stunting (low height for age) and wasting (low weight for age). According to the

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[1] Here, malnutrition is defined as having a weight-for-age that is more than two standard deviations below the median weight-for-age per National Center for Health Statistics/World Health Organization standards

2015 India Health Report (IHR) on Nutrition, 39% of children under five suffer from stunting and 15% from wasting. These statistics warrant serious consideration because the overall global stunting rate is 24%, and the prevalence of wasting usually falls below 5%, even in poor countries. Likewise, the World Health Organization considers the prevalence of wasting at or above 15% to be critical, making India one of the worst cases of child undernutrition. The country's exceptionally high malnutrition rates, thus, makes the subcontinent a priority in addressing malnutrition in developing countries. If its leaders fail to address this issue, India's record economic growth will likely suffer. The health deficits from nutritional deprivation will lead to a growing workforce with poor cognitive skills and lowered productivity. Mitigating childhood malnutrition is crucial in achieving better child health outcomes, as laid out in Goal 1 of the Millennium Development Goal, and has the potential to positively affect the nation's future developmental gains (UNESCAP Team, 2015). In addition to India's leaders and health workers, relevant members of the international community also have a moral responsibility to help combat this humanitarian crisis.

Fortunately, the answer to South Asia's struggle to resolve this "Asian enigma" may lie in empowering women. India's unusual circumstances have led researchers to examine a rather novel relationship—that is, the link between women's status, or their "power relative to men," and child nutritional outcomes (Ramalingaswami *et al*., 1997, Haddad *et al*., 1996). This connection bears merit because women's status in India's is substantially lower than that of women's in SSA (Smith and Haddad, 2000). The discrepancy likely results from India's unique economic and political structures along with its patriarchal socio-cultural norms, both of which beget the discrimination of women and their inferior status.

Many studies suggest that women's low status affect their children's nutrition status through compromising maternal health. Poor maternal health unsurprisingly negatively impact the birthweight of their children. It follows that women, or aspects about them, who are mothers may have a significant role in influencing their children's nutritional status. Thus, this study attempts to more directly examine *how* mothers influence child nutritional outcomes by focusing on a subset of the concept of status known as women's empowerment. Previous studies have demonstrated an indirect association between women's empowerment and child nutritional outcomes through mediating variables, usually that of maternal health status (Richards *et al.*, 2013; Bhagowalia *et al.*, 2012; Smith *et al.*, 2003; Ziaei *et al.*, 2012). However, this thesis aims to explore the presence of a direct relationship between women's empowerment in the household and child development outcomes. There is considerable evidence that indicate examining women's empowerment as a function of intra-household dynamics could help shed light on improving child nutritional outcomes (Kishor, 2000; Jejeebhoy, 2000; Bold *et al.*, 2013; de Schutter, 2013). As none of previous relevant studies focus on modern-day India in both urban and rural contexts, as far as I am aware, this thesis will do so using nationally representative data from India's third National Family Health Survey (NFHS) conducted in 2005-06.   The study asks two questions:

1. In contemporary India, is women's empowerment in the household associated with childhood malnutrition?

2. If this association exists, which aspects of women's empowerment are the most relevant?

In considering these questions, the study focuses on three direct indicators and one proxy indicator as measurements of women's empowerment to better understand the role that these

indicators play in relation to child nutrition status. The indicators are involvement in household decision-making power, mobility, attitudes toward domestic violence, and level of education.

The next chapter discusses relevant literature on women's empowerment indicators and child malnutrition in the context of developing countries and, more specifically, in South Asia. Chapter 3 describes the data and methodology that the subsequent results in Chapter 4 displays. The last chapter, Chapter 5, offers intervention recommendations based on the implications of the results and finishes with closing remarks.

CHAPTER II: LITERATURE REVIEW

Most existing studies evaluating the association between women's empowerment and child's nutritional status find a positive relationship. Most recently, Smith et al.'s (2003) cross-national study found that women empowerment has a positive influence on child nutrition indicators. The evidence in support of mitigating child malnutrition by empowering women is certainly robust.

However, the evidence is not as consistent in the context of India. There is predominantly a positive relationship between women's empowerment and children's nutritional status, though there are also some cases that exhibit ambiguous results. For example, Maitra's (2004) study using the NFHS-2 finds that child health is indirectly affected through improved healthcare usage, which is determined by women's education and control over household resources. Again, using the NFHS-2 data, Kravdal's (2004) study shows that women's empowerment, as measured by (i) average women's education and (ii) attitudes towards domestic violence, display a significant association with child mortality rates. Lastly, Ackerson and Subramanian's (2008) analysis of the NFHS-2 data also reveal that domestic violence increases the prevalence of stunted children and of underweight adult women. Naturally, if we were to examine the studies that specifically analyzed our three proposed empowerment indicators, we will find similarly unclear results.

Indeed, prior research set in South Asia that studied our first three indicators of women's empowerment in relation to child nutrition show indeterminate results. For instance, some studies suggest that no association, or even a negative association, exists between women's involvement in household decision-making power and some child nutrition measures (Shroff *et al.*, 2011; Begum and Sen, 2009; Bose, 2011; Sethuraman *et al.*, 2006; Shroff *et al.*, 2009;

Brennan *et al.*, 2004). Other studies suggest that maternal decision-making power has a positive

or protective effect on some child nutrition outcomes (Aslam and Kingdon, 2012; Shroff *et al.*,

2011). Similarly, measures of mobility also display inconclusive associations with child

nutrition (Shroff *et al.,* 2009; Shroff *et al.*, 2011; Sethuraman *et al.*, 2006). In relation to the

attitudes towards domestic violence indicator, however, the results are largely homogenous.

These studies show that children of women who are less likely to condemn acts of violence are

more likely to have poor health outcomes (Bhagowalia *et al.*, 2012; Smith *et al.*, 2003;

Jejeebhoy, 1998).

      Although the existing literature reveal somewhat inconsistent outcomes, the presence of

an association between the two variables warrants additional analysis of the explanatory

variables in a different context—or mainly, in India, as the subcontinent is the most populous

country of South Asia. The country's massive population size may mean that mitigating the

prevalence of child malnutrition through addressing gender inequality could translate to a

decrease in South Asia's overall malnutrition rates. In investigating the nature of the

relationships of women's empowerment and child health outcomes, this review will also address

the weaknesses of previous analyses. The aim of this analysis, more than to simply determine

the true nature of the association, is to promote methodological improvements that will aid future

studies in achieving results with greater accuracy and precision. Before further discussing the

relevant literature on the indicators, however, I will define women's empowerment to provide

the conceptual underpinnings of the indicators. I will then offer my hypotheses as I also discuss

the strengths and limits of previous research. Finally, I will present my conceptual framework as

a part of a discussion about relevant theoretical considerations behind my theory.

(a) Definitions and Measurements of Women's Empowerment

Many definitions of women's empowerment have focused on notions of agency, control, decision-making, and power (Kabeer, 2001; Malhotra *et al.*, 2002; Alsop *et al.*, 2006; Ibrahim and Alkire, 2007; Samman & Santos, 2009). A popular definition that has guided many contemporary conceptualizations of empowerment frames it as a process of enhancing an individual's or group's capacity to make effective choices—that is, the perceiving an ability *to make choices and then to transform those choices into desired actions and outcomes* (Alsop *et al.*, 2006). This capacity is influenced by two interrelated factors: agency and opportunity structure. And, thus, the degree of empowerment hinges on the extent of the actor's perceived agency and the nature of the available opportunity structure. Agency refers to *an actor's or group's ability to make purposeful choices;* and opportunity structure refers to the *broader institutional, social, and political context of formal and informal rules and norms within which actors pursue their interests*. The interaction between agency and opportunity structure is thus iterative because the presence or absence of one influences the degree of impact of the other.

This current study focuses on women's empowerment in the domestic sphere—meaning, their freedom from control by other family members and ability to effect desired outcomes within the household. The aspects enumerated earlier—involvement in household decision-making power, mobility, and attitudes toward domestic abuse — will be considered indicators of the woman's agency. However, I argue that one should consider agency as comprised of behaviors *and* attitudes. Behaviors include the first two indicators—household decision-making powers and mobility— as these indicators clearly reveal the woman's intra-household agency. We should modify the accepted definition of agency to incorporate attitudes—mainly, attitudes

toward domestic violence— as the woman's justification of certain instances of physical abuse demonstrates her acceptance, however resigned, of a patriarchal gender system. And this system may ultimately inform the way that she acts or does not act, which effectively strips her of her inter-agency. An attitude of acceptance about domestic violence can reveal as much as about the woman's agency as her behavior does.

Lack of consistency in age ranges of child anthropometry data also hinders the scope of scholarly review. Some studies like to cap measuring for childhood nutrition outcomes at 59 months, others like to do so at 36 months, and others argue that the cap should be during the end of the second or third year of a child's life (Maluccio *et al.*, 2007; Ruel, 2010; Cunningham *et al.*, 2014). Both Cunningham and Ruel argue that child nutrition outcomes may be more accurately measured up to 24 months, given that children within this age range are more dependent on their mothers, and therefore are more responsive to changes in the mother's empowerment status. Until recently, many studies use the 59 months' cut-off, however, I believe that future studies should be mindful of growing evidence-based support for a lower age cut-off.

Social context can also be an important indicator to examine as a part of the woman's opportunity structure, a component that many do not consider. Relevant social contexts include the local geographic community, or the context in which much of the day-to-day interpretation of social norms and informal sanctioning of those who violate the occurs; and communities of identification, such as religious or ethnic communities. As individuals belong to and are strongly influenced by ideologies or normative systems within these communities, these individuals may share or are subject to ideologies of gender that can strongly influence the situation of women. These ideological systems define the fundamental principles of social life, such as, how to organize families (family systems), or how to organize relations between males and females

(gender systems). The variability in gender and family systems across different communities will be considered as additional explanatory variables in determining the degrees of empowerment women experience in different regions.

A synthesis of existing literature on this topic finds that at the national or subnational level, regions in South Asia show a general association between women's empowerment and child nutritional status in the domestic subdomain (Mason and Smith, 2003). For instance, the lowest levels of women's empowerment—in terms of economic decision-making, say in family size decisions, and freedom of movement—in South Asia are found in Pakistan and Uttar Pradesh, northern areas of predominantly Muslim communities. On the other hand, women in Tamil Nadu, a southern state of predominantly Hindu communities, have the greatest reported freedom of movement. However, the aggregated results neither provide a consistent conclusion of the direction of the relationship nor do they allow for comparisons between studies. The lack of uniformity between the individual studies' findings is a result of context-specific factors, the inconsistent use of age ranges of children, and methodological differences.

Empowerment is a relational concept, meaning groups or individuals are empowered or disempowered in relation to the people with whom they interact (Narayan, 2005; Mason, 2005). And, because empowerment is relational, it is also related to aspects such as norms, values, and beliefs of society (Narayan, 2005; Mason, 2005). As an example, in a 2003 study of five Asian countries, country and community of residence better predict women's domestic empowerment than their personal demographic and socioeconomic traits (Mason and Smith, 2003). In another example, in India, Muslim women tend to have less empowerment than their Hindu counterparts, even though both groups of women often live in the same geographic regions (Mason, Morgan, and Smith, 1998). Although the meaning of empowerment indicators does not necessarily vary

across different contexts, sociocultural effects of different geographical or cultural influences create context-specific variance. This context-specific variation calls for a more in-depth examination of the effects that demographic differences can have on explaining differences in levels of women's empowerment.

The discrepancy in the definition, operationalization, measurement, and analytical approaches in the relevant literature make comparisons difficult to interpret. For example, empowerment currently has twenty-seven different definitions, its indicators are split into twenty different indirect vs. direct measures, composite indices can be used to test the presence of an association, and the analytical methods range from regression analysis to confirmatory factor analysis (Ibrahim and Alkire, 2007).

There is, however, an important development that the scholarly community has agreed upon and respects its precedent. Despite the wide variety and, sometimes, imperfect, measures of empowerment, more contemporary studies argue for the exclusive use of direct, as opposed to proxy, measures in its conceptualization (Malhotra *et al*., 2002; Meizen-Dick *et al.*, 2012). Frequently used proxies included measures such as women's age, age at first marriage, age difference between husband and wife, and employment status (Mason, 1986). These indicators initially appear logically sound. As an example, a larger age gap between husbands and wives should undermine the women's empowerment. Earlier research argues that a larger age differential means that the husband more likely deprives his partner's empowerment as his status relative to hers—as measured by his sense of self-confidence and overall experience—increases (Cain and Kaufmann, 1994).

These proxy measures, however, only index individual-level processes, which cannot accurately represent women's empowerment at an aggregate level, like that of an entire country.

As I had briefly mentioned earlier, the interrelatedness of women's empowerment and community factors—such as gender and family systems—demonstrate the necessity of using indicators that take into consideration the appropriate social context. If we reexamine the age gap example, we see that this indicator is explained in the context of the household, and not that of the community. A more accurate way of determining whether this indicator is appropriate for measuring women's empowerment should consider if the applicable gender system that contributes to the larger age gap between spouses *also* disempowers women (Mason and Smith, 2003). Thus, proxy measures that some previous studies have used only index some aspects of women's empowerment, and, even then, they only do so in certain contexts.

As a last example, a woman's level of education is an indicator that many recent findings have called into question as an adequate—or direct—measure of empowerment. These results suggest that providing a woman with schooling do little to empower them (Mason and Smith, 2003). An extensive education may equip the woman with knowledge and a sense of self-efficacy, however, even the best education cannot provide the woman with social or socioeconomic parity if she lives in a society that practices—no matter how inadvertent or deliberate—sex-based discrimination. The persisting gender pay gap in the US is testament to this idea that educated and qualified women do not necessarily have the same earning potential as similarly-educated and qualified men. Thus, the three indicators examined in this study are direct measures of empowerment in the sense that they do take into consideration the appropriate community structure.

(b) Controls

Certain demographic variables can distort our study's estimate of the effect of women's empowerment on child nutritional outcomes. These variables are considered confounding

variables because they vary systemically with our study's hypothetical causal variables, the three empowerment indicators, and can lead to erroneous conclusions about the relationship between our variables. As a result, this study includes three controls in the data analysis that serves to maintain the internal validity of our experiment. The controls are maternal age at birth, household wealth index, and type of place of residence, that is, either urban or rural areas.

Many studies done in India show that maternal age at birth plays an important role in determining the child's health, as measured by rates of infant and child mortality. Women who have children between the ages of 20-29 have the lowest infant mortality rate (50 per 1,000 live births) whereas women who have children at either less than 20 (77 per 1,000 live births) or within 40-49 years of age have a significantly higher infant mortality rate (72 per 1,000 live births). Other possible confounding variables are birth order, with undernutrition increasing steadily with higher birth order for both stunting and wasting prevalence; and interval between previous and current births, with undernutrition decreasing with longer birth intervals. Even though our experiment doesn't control for the two latter confounders, future studies should examine the impact that they have on the relationship between women's empowerment and child nutritional outcomes.

Our study's second control is socioeconomic status, as measured by household wealth index. Data shows that child nutrition outcomes improve steadily with an increase in household wealth index. For instance, children from households with a high standard of living are twice as likely to display healthy nutrition markers as children from a low standard of living. Moreover, the infant and under-five mortality rates are highest for children in households in the lowest wealth quintile. Although our study doesn't account for caste or tribe of the household, caste is another important socioeconomic determinant that should be examined in more detail. In

example, children belonging to scheduled castes and tribes, or other backward classes experience the highest levels of undernutrition according to wasting and stunting prevalence.

The last control is the type of place of residence according to rural or urban standards. A significantly higher child undernutrition rate occurs in rural areas than urban areas. Interestingly, however, child sex differentials is also an important source of variation in nutritional outcomes. Statistics from the NFHS-3 indicate that females in rural areas and males in urban areas have higher infant and under-five child mortality rates.

(c) Hypotheses

Research demonstrate that increased maternal involvement in household decision-making, specifically in controlling the household budget, increases child's chances of survival by 20% (Walsh, 1998). There general association with child nutritional status in developing countries, with many even showing a negative association (Cunningham *et al*., 2014). Usually, women involved in household decision-making do so with their spouse or with another member of the family. And, usually, the decisions can be grouped into healthcare-seeking behavior (for herself or for her children), financial autonomy (large household purchases, daily household purchases), or mobility autonomy (freedom to visit family or relatives). The presence of negative associations between the decision-making power and child malnutrition variables support the belief that, given agency, the mother will likely allocate household resources in a way that would positively affect her child's health (Roushdy, 2004; Shroff *et al*., 2009). In other words, the greater the maternal decision-making power, the less likely the child will exhibit malnutrition symptoms. As such, I assert the following hypothesis:

Hypothesis 1: In households where women have greater involvement in household decision-making, a smaller proportion of children experience stunting and wasting than in

households where women have less involvement in household decision-making, even after statistically controlling for maternal age at birth, household wealth index, and type of place of residence.

My stating Hypothesis 1 is not without acknowledging that several studies carried out in developing nations have provided contrary or inconsistent results. A 2008 study in Afghanistan found that a lack of maternal decision-making autonomy was positively associated with stunting and wasting in children under five years of age (Mashal *et al.*, 2008). Another study in Andhra Pradesh, India found no association between a woman's ability to control her own health and her child's height-for-age Z-scores (HAZ) under 3 years of age (Shroff *et al.*, 2009). And a third study carried out in Uttar Pradesh and Karnataka, India reveal that a woman's sole or joint decision-making for her own health care, in comparison to somebody else making the decision, increased the risk of malnutrition for her children (Brennan *et al.*, 2004). Also, as unexpected as the results of the three previous studies, a 2009 study in Nepal found no association between maternal decision for daily household purchases and large household purchases with the child's HAZ (Dancer and Rammohan, 2009). There are many possible explanations for these unanticipated findings, with the most probable being that the models did not adequately capture all the dimensions of maternal decision-making power. Thus, the results of the data analysis may not have accurately represented the true nature of this relationship.

The second indicator, mobility, conveys the degree of the woman's autonomy to move about and her ability to be mobile without permission. The woman's mobility is an important aspect of women's empowerment, especially in patriarchal countries such as India that have a long and widely-accepted tradition of female seclusion, or *purdah*. Their autonomy in travelling outside the home alone reveal that attitudes about gender roles within their homes are such that

(i) they don't necessarily impede the women's ability to carry out their intended actions and (ii) there is a level of independence that the women possess.   The woman's freedom of mobility indicates the likelihood that she, as a mother, will encounter new health and nutrition knowledge—a kind of social capital—that may improve their ability to care for the child. Moreover, in a country like India, where deleterious culturally-based health beliefs often drive behaviors, exposure to more progressive ideas or methods of caretaking could help her adjust in a way that improves her childcare.

On the other hand, women who are more restricted in their mobility are less likely to engage in social interactions that could help them better understand the harm in their patterns of beliefs or behaviors. The woman's ability to purchase goods in a timely manner may also affect her child's nutrition outcomes.   As opposed to waiting on her husband's permission or planning her day around somebody else's ability to chaperon her trip, the woman can purchase food or medicine for her child as soon as she sees fit (Smith *et al.*, 2003). Therefore, the woman's freedom of movement demonstrates a possible link to child nutritional outcomes and this understanding leads me to assert that:

Hypothesis 2: In households where women have more freedom of mobility, a smaller proportion of children experience stunting and wasting than in households where women have less freedom of mobility, even after statistically controlling for maternal age at birth, household wealth index, and type of place of residence.

The lack of recent consistent results concerning the association between maternal mobility and child malnutrition provide the necessary impetus to once again examine its link in this study. A 2009 study found that mothers in Andhra Pradesh who had greater freedom of mobility to go the markets were less likely to have stunted children, measured under three years

of age (Shroff *et al.*, 2009). However, a more recent study in India reports that mothers who could go to places without asking for permission had children with better length-for-age Z-scores, but no associations were found with actual mobility (Shroff *et al.*, 2011). This study shows that there seems to be a significant discrepancy between freedom of mobility and mobility. Conversely, a study in Karnataka, India demonstrates that freedom of mobility within the village was associated with improved child wasting outcomes (Sethumaran *et al.*, 2006).

The last indicator, attitudes towards domestic violence, affect child nutritional outcomes through different, but ultimately simple, pathways. The presence of domestic violence itself demonstrates a significant psychosocial risk factor for the mother and child in the household. Previous research shows that domestic violence directly affects the physical and mental well-being of women and displays associations with maternal health outcomes such as depression, anxiety, and low self-esteem and self-efficacy in South Asia (Smith *et al.*, 2003).

In India, specifically, exposure to intimate partner violence is associated with women experiencing anemia and being underweight, with evidence that suggests similar symptoms of morbidity in children within the same household (Ackerson and Subramanian, 2008). Needless to say, a woman who experiences domestic violence is less likely to be physically and psychologically adept to provide for her child. Many studies use *experiences* of physical violence as a reliable way to measure women's empowerment, or her lack thereof. Though quantitatively aggregating instances of physical abuse may have been a preferable measurement for this study's analysis, there is a substantial dearth in data points that allows this study to use as a representative sample population. Understandably, women are more likely to express their attitudes towards domestic violence, rather than disclose instances of their experience with spousal abuse.

Regardless of the data set's lacking substantial data points, however, we can arguably reason that women who condone greater instances of domestic violence are less so able to positively impact their child's well-being. The woman's misconception of any domestic violence acts as justifiable behaviors—in any circumstances—demonstrates a lack of understanding that these behaviors negatively affect her and her child in the long term, and, thus, she's less likely to seek help or remove herself from the situation. Moreover, her accepting of spousal abuse is an indication that she either believes or is forced to accept the belief that women are inferior to men, and, therefore, they should be treated with less consideration regarding their pain or discomfort. In this second scenario, she may understand on some level that she deserves better, but since she cannot feasibly escape the situation—because of cultural expectations or financial constraints—she accepts that it is her responsibility to behave in a way that does not provoke her husband's violence. From both perspectives, we see that her justifying physical violence reveals her disempowerment and/or contributes to her being disempowered. The possibility of an association between the woman's attitudes towards domestic violence and the child's nutritional outcomes, thus, leads me to present my third hypothesis:

Hypothesis 3: In households where women condone less instances of domestic violence, a smaller proportion of children experience stunting and wasting than in households where women condone more instances of domestic violence, even after statistically controlling for maternal age at birth, household wealth index, and type of place of residence.

Although we briefly established earlier in the literature review that education isn't necessarily a direct measure of women's empowerment, substantial evidence show that improving women's access to education reduces the prevalence of childhood malnutrition. Smith and Haddad's (2000) cross-country analysis of 63 developing nations covering a 25-year

period found that 43% of the aggregate 15.5% reduction in malnutrition rates was attributable to improvements in female school enrollment rates. The proven impact that women's education has on reducing malnutrition rates compels me to further explore its association to child nutritional status as a part of my study. My fourth and final hypothesis, thus, states:

Hypothesis 4: In households where women have achieved higher levels of schooling, a smaller proportion of children experience stunting and wasting than in households where women have achieved lower levels of schooling. After statistically controlling for maternal age at birth, household wealth index, and type of place of residence, the differences in stunting and wasting prevalence between the households where women have achieved higher levels of schooling and the households where women have achieved lower levels of schooling will narrow.

(d) Theoretical Considerations

This section first offers a short discussion about a popular and widely-accepted conceptual framework and then details my study's conceptual framework.

Engle, Menon, and Haddad's 1999 study on child malnutrition determinants provide a conceptual framework—as depicted by Figure 1—that has informed many studies regarding women's empowerment and child health outcomes. Their conceptual framework, however, emphasizes women's status as a main determinant of child nutrition outcomes. If we consider that the concept of empowerment is a subset of that of status, we can assume that a woman's status and level of empowerment are essentially interchangeable terminologies, albeit with slightly different definitions. Now that we have reconciled the differences in jargon, we can move on to examine a specific component of their framework.

As shown by arrow D in Figure 1, the researchers had proposed maternal health, labeled as the women's health and nutritional status, as an intervening variable that links women's status

and child nutritional status, as measured by birth weights. I had mentioned earlier in the introduction that the scholarly community recognizes this idea that maternal health and wellness act as an indirect link between women's status and child nutritional status. Naturally, we understand that a woman's lower status confers negative effects on her overall health, which affects her child's health. In patriarchal societies such as that of India's, the woman's health is considered secondary to that of man's, and she surely receives or only has access to poorer quality material resources, such as food or healthcare, and will more likely be malnourished or sick. As a brief example, India has a marked gender differential in daily consumption of fruits and protein, with men consuming over 10% more of these food products than women do (NFHS-3, 2005-06). This example illustrates that gender inequality leads to adverse child nutritional outcomes when chronically malnourished or nutrient-deprived women give birth to low birth-weight infants, who tend to remain underweight even as children (WHO, 1995; Ramakrishnan *et al.*, 1999).

Of course, the woman's mental health also acts as an important component that may affect the state of her overall health. Lower status women are more likely to experience psychological or emotional abuse in their homes, and this abuse can affect the woman in a way that also negatively affects her child's nutritional outcomes. For instance, the woman's mental distress may be serious enough to cause a loss of appetite, and, as a result, she becomes unable to maintain a healthy weight during her pregnancy. Although the relationship between this kind of abuse and child nutrition status remains unsupported by empirical evidence, the well-accepted understanding of the interrelatedness of one's physical and mental health justifies our assumption. In other words, the woman's mental health affects her physical health, which ultimately affects her child's health.
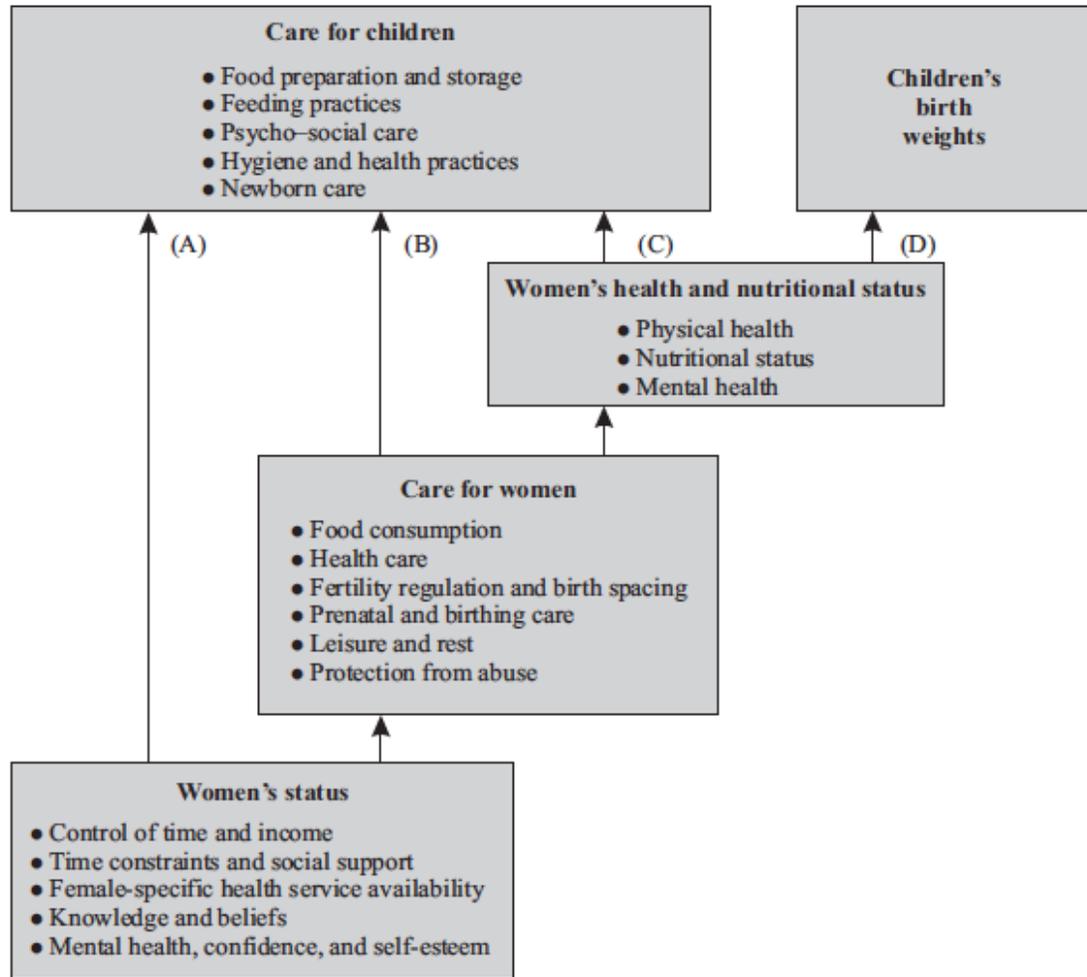
Source: Adapted from Engle, Menon, and Haddad 1999.

Figure 1: Indirect Links Between Women's Status and Child Nutrition Outcomes

Engle, Menon, and Haddad's conceptual framework helped me to visualize the different

pathways through which a woman's status affect her child's nutritional outcomes. Unlike their

framework, however, I aim to examine the presence of a direct association between the woman's

level of empowerment and her child's nutritional status. In other words, my study excludes

maternal health status as an interceding variable. With this adjustment and my prior literature

review in mind, I constructed this study's conceptual framework, as depicted in Figure 2.

The conceptual framework includes three main components: the opportunity structure, the agency indicators, and the child's health indicators. As I had noted earlier, the two iterative factors that guide the conceptualization of women's empowerment are (i) the nature of the relevant opportunity structure and (ii) the degree of agency the woman possesses. Since my study examines empowerment in the context of intra-household dynamics, the opportunity structure must include factors that influence the degree to which the woman can make effective choices within the home. Based on an analysis of applicable studies, I reasoned that these factors should be gender and family structures as they are relevant properties of the woman's social context that determine the nature of her intra-household relationships (Mason and Smith, 2003). I represent this logic by placing the opportunity structure as a preceding component to the woman's agency indicators. And the woman's intra-household agency is measured by her participation in household decision-making, her degree of autonomy of mobility, and her attitude toward domestic violence. The last component, the child's nutritional status, is measured by the prevalence of stunting or wasting. My framework more succinctly illustrates what has been discussed here—that is, the nature of a woman's opportunity structure influences the degree of her agency within the household, which ultimately influences the child's nutritional status.

Figure 2: The Conceptual Framework
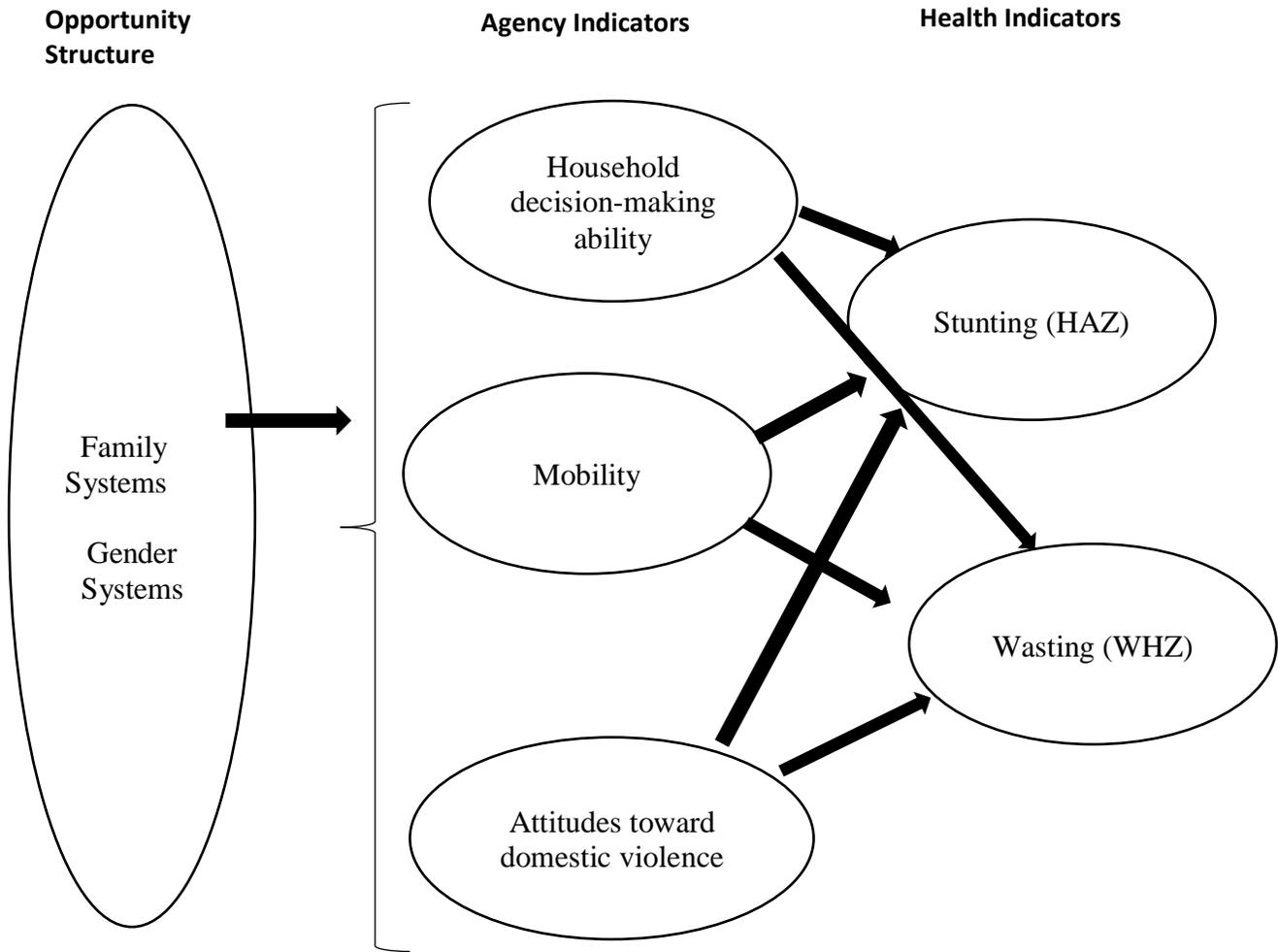
CHAPTER III: Method

(a) Data and Sample

This study uses individual-level data from India's third National Family Health Survey (henceforth NFHS-3) as the survey provides nationally representative data about health and nutrition trends for women and young children. Under the supervision of the Government of India, the International Institute for Population Sciences (IIPS) coordinated the survey in two phases from November 2005 to its completion in August 2006.

The NFHS-3 used three types of questionnaires to collect data on population, health, and nutrition trends. For the purposes of this study, I exclusively examined the Women's Questionnaire as it collected data on women's empowerment indicators, including the three indicators that the analysis uses. An initial population of 124,385 ever-married and never married women aged 15-49 at the time of the study were interviewed, obtaining a response rate of 94.5%. The analytical sample ultimately narrowed in size to 16,485 women. The sample population for analysis necessarily excluded women who did not have children; mothers whose children were not within the measured age range at the time the study was conducted; and/or mothers whose children did not have recorded responses for their height and weight.

To measure the child's nutrition status, the analysis used the anthropometric data provided by the national survey. Starting with an initial sample of 51,555, I restricted the sample size to include only children within the 36 to 59 months' range as the NFHS-3 includes the weights and heights of children who were <5 years of age (n=32,956 observations deleted). I then further restricted my sample size to exclude cases wherein the children did not provide the necessary height and weight measurements, were not living in the household at the time the survey was conducted, or were otherwise not present (n=1,720 observations deleted).

Accordingly, all children in the family who met the age requirement for the analysis, meaning, from 3 to <5 years of age, and who had valid measurements to determine stunting and wasting prevalence were included in the final analytical sample size of 16,879.

(b) Measures

(1) Independent Variables

In addition to the stunting and wasting variables, our regression analysis includes measures of household decision-making, freedom of mobility, attitudes towards domestic violence, and the mother's highest level of education as predictor variables.   Many studies of this nature create aggregate measures of each empowerment indicator. These studies design indexes that consider the degree to which the woman has (i) sole autonomy or control over a range of decisions and (ii) complete freedom to visit a list of places unescorted (Hindin, 2005). My study, therefore, models this kind of index-building to capture the variation in levels of empowerment that the woman experiences in her specific setting as accurately as possible.   And I created the necessary aggregate measures by constructing variables that pool information from multiple relevant variables into one. Although there were generally little missing data, I made sure to drop all missing cases or responses prior to creating the new aggregate variables. Most of the key variables contained around 4% of missing cases, with all three empowerment indicators containing an ultimate sample size of approximately n=15,904.

To measure household decision-making autonomy, I constructed the variable MEANDM, which combines information from five already-constructed decision-making variables provided by the NHFS-3. As five separate decision-making variables, they are all highly correlated with each other and the presence of this multicollinearity would lead to less precise estimates of their association with the response variable. These variables assessed the women's decision-making

power regarding: their own health care, making large household purchases, making purchases for daily needs, visiting their family or relatives, and allocating the husband's earnings. And the women indicated the degree of autonomy in decision-making available to them by recording who usually makes these kinds of decision: mainly them, mainly their husband, them and their husband jointly, or someone else.

To construct my MEANDM variable, I used an additive index of participation in decision-making that accounted for the variability in the degree of autonomy or lack thereof that the woman has in making said decisions. I recoded the variables so that the most matriarchal response gets the lowest numerical demarcation and the most patriarchal response gets the highest: (0) the woman mainly makes the decision, (1) the woman and her husband jointly makes the decision, (2) someone else makes the decision, (3) mainly the husband makes the decision. Afterwards, I added the scores on these individual variables and converted them into percentages to capture the proportion of the five decisions that the woman played a role in.

Next, I constructed the MEANGO variable to measure the woman's degree of freedom of mobility. MEANGO contains information from three maternal mobility variables recorded by the NFHS-3. The variables indicate the places the women are usually allowed to go to, meaning: the market, the health facility, and places outside the village or community. The women demonstrate their degree of freedom of movement outside the home by indicating whether they can go to each of the three places: alone, only with someone else, or not at all.

Like what I did before, I recoded the variables in a way that assigns the most patriarchal response the greatest numerical value: (0) the woman can go alone to the locations, (1) the woman can only go with someone else, and (2) the woman cannot go at all. To get the

MEANGO variable, I once again summed the scores on the variables and converted them into percentages to calculate the proportion of places the respondent travels to freely.

The last empowerment variable I constructed is the COUNTBEAT variable, which measures the woman's attitude towards domestic abuse. Although there are certainly other instances of domestic violence that affect the woman's empowerment, accepted statistics indicate that spousal violence is the most prevalent form of domestic violence that women age 15-49 experience in India. Therefore, I created the COUNTBEAT variable to capture the wife's attitude toward domestic violence instances as perpetrated by the husband. The COUNTBEAT variable incorporates information from five original variables that indicate the instances during which the woman believes wife-beating is justified—these instances include: if the wife goes out without telling him, if she neglects the house or children, if she argues with him, if she refuses to have sex with him, if she does not cook the food properly. The woman's response of yes, no, or don't know to any of these instances elucidates the household attitude regarding gender roles. We expect women who have more egalitarian gender-role attitudes to be less likely to condone spousal abuse, and, therefore, to be more empowered.   Thus, as before, I quantified the responses using an additive index based on the number of statements that the respondent agreed that physical violence was justified. I recoded the variables to give the most patriarchal attitude the greatest numerical value: (0) wife beating is not justified, (1) don't know if wife-beating is justified, and (2) wife beating is justified. To get the COUNTBEAT variable, I averaged the number of questions the respondent answered, summed the responses, and found the mean of the responses as the sum over the average.

The last explanatory variable, the mother's highest level of education, was coded as ordinal variables: (0) no education, (1), primary, (2) secondary, and (3) higher. This variable combines the necessary data as is, so I did not see a need to construct a new variable.

(2) Dependent Variables

The anthropometric information expresses nutritional status as standard deviation units, or Z-scores, from the median of the reference population[2]. My analysis looked at the Height for Age Z-score (HAZ score) and the Weight for Height Z-score (WHZ score) to determine the prevalence of stunting and wasting, respectively. Children who are stunted or wasted have HAZ and WHZ scores that are less than -2, which means that they are less than two standard deviations below the median. These two indexes of the child's nutritional status are widely-used as measures of malnutrition because they identify long-term growth faltering and acute growth disturbances. In the analysis, the child's nutritional status was coded using dummy variables "1," for stunted and/or wasted, and "0," for healthy.

(3) Control Variables

To isolate the effect of women's empowerment on child nutrition status, the regression models controlled for Maternal Age at Birth, socioeconomic status as measured by Household Wealth Index in quintiles, and the Type of Place of Residence, as classified by urban vs. rural living conditions. The maternal age at birth, as originally continuous variable, was recoded into a discrete variable with three categories wherein: (1) comprises of teenage years, or 12-18, (2) comprises of adolescent to adulthood years 19-34, and (3) comprises of adulthood to middle-age years 35-56. Household wealth index is an ordinal variable with categories that refer to: (1)

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[2] The Z scores represent the number of standard deviations above or below pre-derived growth reference curves obtained from a reference population from the United States National Centre for Health Statistics, as recommended by the WHO (2006).

poorest, (2) poorer, (3) middle, (4) richer, and (5) richest. The type of residence is a binary variable containing: (1) urban and (2) rural.

(c) Methodology

I began the data analysis with descriptive statistics for all the variables of interest, including the control variables. After I documented the differences in frequency and variance of key attributes of the children, their mothers, and their households, I carried out a brief bivariate analysis of the independent and dependent variables to determine the nature of their relationships. The bivariate analysis consisted of cross-tabs of the dependent variables by the independent variables, with all continuous variables recoded into discrete variables prior to carrying out the analysis. In conjunction with the cross tabs, I ran chi-square tests between all combinations of the explanatory and response variables. The results of the chi-square tests allow us to determine the significance of the relationships, which helps us to establish the first step in demonstrating causality. I also ran a chi-square test of the two dependent variables to determine the strength of their correlation. In the case that a high enough or a significant correlation exists between the two response variables, my model must include the appropriate statistical analysis to account for this association.

Afterwards, I used logistic regression analysis to predict the odds of stunting and wasting relative to the four explanatory variables. This method is most apt as the main method of multivariate analysis because the study's stunting and wasting outcomes are measured with dichotomous variables. To determine my modeling strategy, I ran a correlation of the three empowerment indicators with each other and I then examined the means on each of the empowerment variables by education. And after I examined the correlation coefficients of the empowerment indicators with each other and the nature of its relationship with maternal

education, I carried out the logistic regression analysis for both response variables. I first ran a

base model with all three controls. Then, I ran three models with the controls plus one of the

empowerment indicators, with a fourth model that includes the controls and maternal education.

And, lastly, my final model includes the controls and the four explanatory variables. In

summary, Model 1 comprises of the three controls—that is, maternal age at birth, household

wealth index (in quintiles), and type of residence (urban vs. rural); Model 2 comprises of the

three controls plus the first empowerment indicator, attitudes toward domestic violence; Model 3

comprises of the three controls, the first empowerment indicator, and the second empowerment

indicator, degree of autonomy of mobility; Model 4 comprises of the three controls, the first two

empowerment indicators, plus the last empowerment indicator, household decision-making

participation; and, finally, Model 5 comprises of the three controls, all three empowerment

indicators, and maternal education. If the relationships between any of the four explanatory

variables prove significant, this use of progressively adjusted regression models will help us best

understand the extent to which the prevalence of stunting and/or wasting in children under five

are explained by the control variables.

CHAPTER IV: DISCUSSION OF RESULTS

Table 1 shows the descriptive statistics of the variables used in this study, which include key characteristics of children, their mothers, and their households. Unlike the rest of the variables, two empowerment indicators—mobility and attitude towards domestic violence—contain frequencies that are representative of the original sample size at n=124,385. This discrepancy occurred because I had difficulty calculating their frequencies according to the analytical sample size as I had transformed the indicators into aggregate measures.

The data indicate that the stunting and wasting prevalence among children are approximately at 44% and 14%. In the analytical sample, almost 58% of women are either uneducated or have not attained a post-primary education level. And fewer than 7% of women have either began or finished higher education. The maternal age at birth indicates that most of the sample, or at 84%, was within the 19-34 years range when they gave birth, with the mean maternal age falling slightly above 24 years old.

Of the 15,137 women included in the household decision-making sample (this indicator only includes women who were currently married at the time of the survey), 36.7% said that they do participate in making decisions regarding her own health care, making major household purchases, making purchases for daily household needs, or whether she can visit her family or relatives—either jointly with her husband or alone. Conversely, 20.5% indicated that they do not participate in any capacity in household decision-making regarding those four matters. The remaining 43% take part in some but not all the decisions. Although this information regarding the fifth household decision-making variable of the analysis isn't included in Table 1, 68.2% of women say that they alone or jointly with their spouse determine how to allocate his cash earnings.

Overall, a little less than 4% of the original sample size of women say that they do not travel alone to any of the three locations asked in the survey, whereas 33% reported that they do travel alone to all three locations. The largest population of women at 61% comprise of those who can either go alone to only one or two of the places, or are accompanied by her husband or someone else to one or two of the places.

Around 54% of women in the population sample size agreed that a husband justifiably hits or beats his wife in at least one of the following seven listed reasons: if she goes out without telling him, if she neglects the house or children, if she argues with him, if she refuses to have sex with him, if she doesn't cook the food properly—i.e., burns it, if he suspects her of cheating, and if she disrespects her in-laws. The rest of the women did not agree that any of the seven reasons rightly warranted physical spousal abuse.

The household wealth quintiles divided the sample into five different economic strata, and separates the household population into brackets according to their relative level of wealth, considering their expenditure and income measures. The data shows that the largest population of homes in the analytical sample fall within the middle and richer subdivisions. And, finally, the type of place of residence variable categorizes individual households as located within urban or rural areas according to the size of the applicable area. NFHS-3 classified rural areas as areas that are countryside, with urban areas making up of a range of city sizes, from small cities to large capital cities with over a million in population. It should be noted that the survey's original sample size of 109,041 households contain relatively even split population of urban and rural residences with approximately 46% and 54% of households in either category. Figure 1, however, contains data from the analytical sample size, with close to 64% of the families residing in urbanized spaces.

Table 1.

Descriptive Statistics of Key Variables Used

	N	Percent	Std.	Min/Max	Description
Child Attributes					
Age in Months (mean=47.79)	**15,968**		6.66	37/59	Continuous
Stunting Prevalence	7,002	43.85	0.50	0/1	Binary, 0–1
Wasting Prevalence	2,198	13.77	0.35	0/1	Binary, 0–1
Mother's Attributes					
Highest Educational Level	**16,485**			0/3	Ordinal, 0–3
No Education	6,976	42.32			
Primary	2,502	15.18			
Secondary	5,875	35.64			
Higher	1,132	6.87			
Maternal Age at Birth in Years	**16,485**	(mean=24.2071)	5.28	12/46	Continuous
12–18	1,976	11.99			
19-34	13,749	83.35			
35-46	769	4.66			
Participation in Decision Making	**15,137**			0/5	Ordinal
Participation in all of first four decisions	5,555	36.7			
Participates in 0 of first four decisions	3,103	20.5			
Mobility	**124,385**			0/2	Ordinal
No Mobility	498	4.0			
Low Mobility (alone or with someone else)	75,875	61.0			
High Mobility (always can go alone)	41,047	33.0			
Attitudes Toward Domestic Violence	**124,385**			0/5	Ordinal
Never justified for all reasons	56,720	45.6			
Justified for one or more reasons	67,665	54.4			
Household Attributes	**16,485**				
Wealth Index (Quintiles)				1/5	Ordinal, 1–5
Poorest	2,965	17.99			
Poorer	3,022	18.33			
Middle	3,465	21.82			
Richer	3,612	21.91			
Richest	3,421	20.75			
Type of Place of Residence	**16,485**			1/2	Categorical, 1–2
Urban	6,154	37.33			
Rural	10,331				

Source: *National Family Health Survey India 2005-06*

Table 2 provides a more detailed look at the statistics of our three indicators of empowerment, broken down into their respective components. With respect to the population sample, we see that married women are most likely to take part in decisions regarding their own healthcare at 62.2% reporting that they do so, and are least likely to do so concerning large household purchases, with only 52.9% saying that they do. We can also see that 67% of women say that they must be accompanied to go to all three locations, reaffirming our earlier estimation that only 33% of women have complete freedom of mobility. Lastly, we learn that women are most likely to justify domestic violence in situations wherein the wife neglects the house or children at 34%, and are least likely to do so in situations where the wife refuses to have sex with the husband at 14%.

Table 2.
Women's Empowerment as Measured by Key Indicators

Women's Empowerment Measurements	Percent
Percentage respondents who have some say in making decisions (alone, with husband, or other)	
Own healthcare	62.2
Making major household purchases	52.9
Making purchases for daily needs	60.1
Visiting their family or relatives	60.5
Participates in all four decisions	36.7
Percentage respondents who have some degree of mobility (alone, with husband, or others)	
Can go alone to all listed locations	33.0
Can go to listed locations with someone else only	67.0
Percentage of respondents who justified domestic violence	
Wife beating justified if	
She goes out without telling husband	29.0
She neglects the house or children	34.7
She argues with husband	30.3
She refuses to have sex with him	14.1
She doesn't cook properly	20.4

Source: *National Family Health Survey India 2005-06*

Tables 3 through 11 depict the cross tabs results of each explanatory variables by both malnutrition outcomes. Most of the bivariate relationships are significant with a p-value <0.05, as indicated by the results of the chi-square tests, apart from two tab crosses that failed to reject the independence of the variables. Although there are many reasons why these two relationships failed to establish significance, we will have more of an explanation once we examine the results of the logistic regression models. Moreover, even though most of the crosstabs demonstrate that the relationship between stunting and wasting in relation to the women's empowerment indexes are significant, it is possible that the differences in the levels of empowerment are explained by any of the three controls. I therefore examined the interrelationship between these variables in the logistic regression before I drew any further conclusions.

Table 3 shows the distribution of stunting prevalence by maternal education. In general, the prevalence of stunting less likely occurs with increased levels of maternal education, with the lowest prevalence of stunting most likely occurring in mothers who have the highest level of education. Table 4 displays similar results with the distribution of wasting prevalence by maternal education, albeit with less striking results than that of Table 3. The prevalence of wasting decreases with increased levels of maternal education, with the lowest prevalence of wasting most likely occurring in mothers who attained higher education. The chi-square tests for both Tables 3 and 4 indicate that differences in levels of education are significant relative to stunting and wasting prevalence.

Tables 5 and 6 shows the distribution of stunting and wasting prevalence by participation in household decision-making. Table 5's results show a general trend of decreased stunting with greater maternal involvement in household decision-making. Table 6, however, shows inconclusive results regarding the general direction of the relationship between wasting and

household decision-making. Ultimately, only the chi-square test for the relationship between stunting and degree of involvement in household decision-making demonstrates statistical significance.

Tables 7 and 8 show the distribution of stunting and wasting by degree of autonomy the mother has in going outside of the home. Table 7's results indicate that the lowest prevalence of stunting more likely occurs with the greatest amount of freedom in maternal mobility. These results are significant according to the chi-square test. Table 8 similarly indicates that child wasting less likely occurs when women have the greatest amount of freedom of mobility. However, unlike the relationship between stunting and mobility, wasting by mobility does not show a significant relationship according to the chi-square test results.

Tables 9 and 10 show the distribution of stunting and wasting prevalence by maternal attitudes toward domestic violence. The results indicate that stunting is least likely to occur with mothers who have the most progressive attitudes towards domestic violence. However, they also suggest that greater approval of domestic violence is negatively associated with wasting. In other words, stunting and wasting have markedly different relationships with approval of spousal abuse. The results are further complicated by the results of the chi-square analysis, which show that both relationships between stunting and wasting to domestic violence attitudes are significant. Nevertheless, we will have a clearer understanding of this inconsistency with the results of the multivariate analysis.

Table 11 depicts a crosstab of the two dependent variables, or stunting by wasting. The results indicate that the relationship is not significant, which allows us to analyze one dependent variable at a time in relation to the explanatory variables later in the logistic regression models.

Table 12 gives us a correlation matrix of the three empowerment indicators by each other. The three variables are correlated with each other, albeit the correlation coefficients are all less than 0.90. Considering these results, I concluded that there is not a high intercorrelation among the predicators. Nevertheless, I carried out a progressively adjusted regression models wherein I added one explanatory variable at a time and examined its effects on the significance of the relationships.   Lastly, Table 13 shows the means of the three empowerment indicators by highest maternal education, which gives us a more detailed snapshot of the relationships between the four variables.

Table 3. Stunting by Maternal Education

Highest Educational Level	Stunted	
	0	1
No Education	44.21	55.79
Primary	53.41	46.59
Secondary	65.84	34.16
Higher	84.66	15.34
Total	56.15	43.85
(n)	(8,965)	(7,002)

* Chi-square test significant at p <.05

Table 4. Wasting by Maternal Education

Highest Educational Level	Wasted	
	0	1
No Education	83.39	16.11
Primary	86.07	13.93
Secondary	88.40	11.60
Higher	89.66	10.34
Total	86.23	13.77
(n)	(13,770)	(2,198)

* Chi-square test significant at p <.05

Table 5. Stunting by Decision-Making

Decision-Making Index	Stunted	
	0	1
0	54.87	45.13
0.2	64.10	35.90
0.4	59.29	40.71
0.6	59.77	15.34
0.8	56.99	43.01
1	55.71	44.29
1.2	57.95	42.05
1.4	57.60	42.40
1.6	58.37	41.63
1.8	56.52	43.48
2	52.88	47.12
2.2	53.85	46.15
2.4	52.34	47.66
2.6	51.91	48.09
2.8	35.48	64.52
3	55.03	44.97
3.2	25.00	75.00
3.4	83.33	16.67
3.8	66.67	33.33
Total	56.17	43.83
(n)	(8,228)	(6,421)

* Chi-square test significant at p <.

Table 6. Wasting by Decision-Making

Decision-Making Index	Wasted	
	0	1
0	84.62	15.38
0.2	84.62	15.38
0.4	87.61	12.39
0.6	87.41	12.59
0.8	87.06	12.94
1	86.13	13.87
1.2	86.52	13.48
1.4	86.50	13.50
1.6	86.22	13.78
1.8	84.83	15.17
2	86.12	13.88
2.2	85.58	14.42
2.4	85.54	14.46
2.6	85.55	14.45
2.8	88.71	11.29
3	83.59	16.41
3.2	81.25	18.75
3.4	100.00	100.00
3.8	100.00	100.00
Total	86.05	13.95
(n)	(12,606)	(2,044)

* Chi-square test **not** significant at p <.05

Table 7. Stunting by Mobility

Degree Of Mobility	Stunted 0	1
0	60.54	39.46
0.33	57.73	42.27
0.67	56.28	43.72
1	52.01	47.99
1.33	50.25	49.75
1.67	51.21	48.79
2	50.53	49.47
Total	56.15	43.85
(n)	(8,965)	(7,002)

* Chi-square test significant at p <.05

Table 9. Stunting by Attitudes Toward Domestic Violence

Domestic Violence Attitude Index	Stunted 0	1
0	58.88	41.12
1	55.37	44.63
2	53.34	46.66
3	54.22	45.78
4	50.61	49.39
5	49.73	50.27
Total	56.15	43.85
(n)	(8,965)	(7,002)

* Chi-square test significant at p <.05

Table 11. Stunted by Wasted

Stunted	Wasted 0	1
0	86.24	13.76
1	86.25	13.75
Total	86.24	13.76
(n)	(13,770)	(2,197)

Table 8. Wasting by Mobility

Degree Of Mobility	Wasted 0	1
0	87.02	12.98
0.33	84.66	15.34
0.67	86.01	13.99
1	85.79	14.21
1.33	87.49	12.51
1.67	85.51	14.49
2	87.77	12.23
Total	86.23	13.77
(n)	(13,770)	(2,198)

* Chi-square test **not** significant at p <.05

Table 10. Wasting by Attitudes Toward Domestic Violence

Domestic Violence Attitude Index	Wasted 0	1
0	85.43	14.57
1	87.14	12.86
2	86.95	13.05
3	86.01	13.99
4	88.38	11.62
5	87.88	12.12
Total	86.23	13.77
(n)	(13,770)	(2,198)

* Chi-square test significant at p <.05

Table 12. Correlation of Empowerment Indicators

	MEANGO	MEANDM	COUNTBEAT
MEANGO	1.0000		
MEANDM	0.2591	1.0000	
COUNTBEAT	0.0724	0.0921	1.0000

Table 13. Means of Empowerment Indicators by Education

No Education

Variable |	N	Mean	Std. Dev.	Min	Max
meango	6,976	0.656202	0.5298591	0	2
meandm	6,478	1.537512	0.7901025	0	3.8
countbeat	6,976	1.513618	1.736255	0	5

Primary Education

Variable |	N	Mean	Std. Dev.	Min	Max
meango	2,502	0.5984546	0.5331111	0	2
meandm	2,311	1.459282	0.7591971	0	3.4
countbeat	2,502	1.414868	1.646652	0	5

Secondary Education

Variable |	N	Mean	Std. Dev.	Min	Max
meango	5,875	0.5052482	0.5143735	0	2
meandm	5,310	1.34452	0.7126465	0	3.8
countbeat	5,875	1.102638	1.519318	0	5

Higher Education

Variable |	N	Mean	Std. Dev.	Min	Max
meango	1,132	0.2932862	0.4281183	0	2
meandm	1,038	1.174952	0.602781	0	3.2
countbeat	1,132	0.4381625	0.9756865	0	5

Tables 14 and 15 depicts the odds ratios from five logistic regression models predicting the odds of stunting and wasting, respectively, relative to the three empowerment indicators and maternal education. As I stated prior, Model 1 for both sets of odds ratios includes the three demographic controls. Its results in Table 14 indicate that stunting is 1/0.78 ~ 1.28 times *less* likely to occur in 'poorer' households than 'poorest' households; is 1/0.18 ~ 5.56 times *less* likely to occur in 'richest' households than 'poorest' households; and is 0.42/0.18 ~ 2.33 times *less* likely to occur in 'richest' households than 'richer' households.

Model 2 includes the three demographic controls along with the first empowerment variable, Attitudes Toward Domestic Violence. Its results indicate that controlling for Maternal Age at Birth, Household Wealth Index, and Type of Place of Residence, a 1 unit increase (or that of a more patriarchal perspective) in Attitudes Toward Domestic Violence *increases* the odds of stunting by 1.02. In other words, controlling for the three stated variables, stunting is 1.02 times *more* likely to occur when the Domestic Violence Attitude index is 1 than 0, or $(1.02)^5$ ~ 1.11 times *more* likely to occur when Domestic Violence Attitude index is 5 than 0. The results' p-value is significant at less than 0.1. However, when the subsequent models include other indicators, the effect of Attitudes Toward Domestic Violence displays an ambivalent, even insignificant, association to child stunting.

Model 3 depicts the regression results of the three controls, Attitudes Toward Domestic Violence, and the Degree of Freedom of Mobility that the mother possesses. Its results indicate that controlling for the three demographic variables along with Attitudes Toward Domestic Violence, a 1 united increase in the Freedom of Mobility index *increases* the odds of stunting by 1.12. From another perspective, the results show us that stunting is 1.12 times more likely to

occur when the Freedom of Mobility index is 1 than 0, or $(1.12)^2 \sim 1.25$ *more* likely to occur

when the Freedom of Mobility index is 2 than 0. The p-value indicates that these results are

significant at $p < 0.001$.

Model 4 shows that controlling for Maternal Age at Birth, Household Wealth Index,

Types of Place of Residence, and the first two empowerment indicators, an increase in the

Household Decision-Making index increases the odds of stunting by 1. Stated differently,

stunting is 1 time *more* likely occur when the Decision-Making index is 1 than 0. However,

considering that these results fail to fall within a significant range acording to the p-value, we

cannot conclude that these results help us to establish a statistically significant assocation

between the mother's participation in household decision-making and the prevalence of stunting.

Lastly, Model 5's results tells us that controlling for Maternal Age at Birth, Household

Wealth Index, Type of Place of Residence, and the first three empowerment indicators, stunting

is $1/0.33 \sim 3.03$ times *less* likely to occur for mothers with higher education than mothers with

no education. If we break down this index further, we see that the results indicate that stunting is

$1/0.78 \sim 1.28$ times *less* likely to occur for mothers who have primary education than mothers

with no education, and that stunting is $0.62/0.33 \sim 1.88$ times *less* likely to occur for mothers

who have higher education than for mothers who only attained secondary education. These

results are significant at a p-value of less than 0.001. At the same time, however, differences in

Freedom of Mobility in this final model are reduced in comparison to the earlier models,

illustrating that differences in education helps to explain the child's stunting prevalence.

Table 14.

Effects of Decisionmaking, Mobility, Attitudes Toward Domestic Violence, and Maternal Education on Stunting
Odds Ratios

	Model 1	Model 2	Model 3	Model 4	Model 5
Attitudes Toward Domestic Violence		1.02†	1.02	1.02†	1.00
Mobility			1.12***	1.12***	1.09*
Household Decision-Making Participation				1.00	0.97
Mother's Attributes					
Highest Educational Level					
No Education					
Primary					0.78***
Secondary					0.62***
Higher					0.33***
Maternal Age at Birth in Years	0.95	0.95	0.97	0.97	0.94
Household Attributes					
Wealth Index (Quintiles)					
Poorest					
Poorer	0.78***	0.78***	0.78***	0.78***	0.84**
Middle	0.61***	0.61***	0.61***	0.61***	0.71***
Richer	0.42***	0.42***	0.42***	0.42***	0.55***
Richest	0.18***	0.18***	0.18***	0.18***	0.30***
Type of Place of Residence					
Urban					
Rural	0.92*	0.92*	0.91*	0.91*	0.92*
† p < 0.1 * p <0.05 ** p <0.01 *** p < 0.001					

Source: *National Family Health Survey India 2005-06*

Model 1 includes all three controls

Model 2 includes all three controls and attitudes toward domestic violence

Model 3 includes all three controls, domestic violence attitudes, and degree of autonomy of mobility

Model 4 includes all three controls, domestic violence attitudes, mobility, and household decision-making

Model 5 includes all three controls, the three empowerment indicators, and maternal education

The results in Table 15's Model 1 indicate that wasting is $1/0.73 \sim 1.37$ times *less* likely to occur in 'poorer' households than 'poorest' households; is $1/0.49 \sim 2.04$ times *less* likely to occur in 'richest' households than 'poorest' households; and is $0.59/0.49 \sim 1.20$ times *less* likely to occur in 'richest' households than 'richer' households.

Model 2's results tell us that controlling for Maternal Age at Birth, Household Wealth Index, and Type of Place of Residence, a 1 unit increase in Attitudes Toward Domestic Violence *decreases* the odds of wasting by $1/0.94 \sim 1.06$, or that wasting is $1/0.94 \sim 1.06$ times *less* likely to occur when Domestic Violence Attitude index is 1 than 0. In other words, wasting is $1/(0.94)^5 \sim 1.36$ times *less* likely to occur when the Domestic Violence Attitude index is 5 than 0 when controlling for said variables.

Model 3 depicts the regression results of the three controls, Attitudes Toward Domestic Violence, and the Degree of Freedom of Mobility that the mother possesses. Its results indicate that controlling for the three demographic variables along with Attitudes Toward Domestic Violence, a 1 united increase in the Freedom of Mobility index *decreases* the odds of wasting by $1/1.12 \sim$, or stunting is 1.12 times more likely to occur when the Freedom of Mobility index is 1 than 0.

Model 4 shows that controlling for Maternal Age at Birth, Household Wealth Index, Types of Place of Residence, and the first two empowerment indicators, an increase in the Household Decision-Making index increases the odds of wasting by 1. We can also say that stunting is 1 time *more* likely occur when the Decision-Making index is 1 than 0. However, considering that these results are not significant at any measure of the p-value, we cannot

conclude that these results help us to better understand the relationship between the mother's participation in household decision-making and the prevalence of wasting.

Our last model's results indicate that controlling for Maternal Age at Birth, Household Wealth Index, Type of Place of Residence, and the first three empowerment indicators, wasting is 1/0.77 ~ 1.30 times *less* likely to occur for mothers with higher education than mothers with no education. This index also tells us that wasting is 0.62/0.33 ~ 1.88 times *less* likely to occur for mothers who have higher education than for mothers who only attained secondary education. These results are significant at a p-value of less than 0.001.

Table 15.

Effects of Decisionmaking, Mobility, Attitudes Toward Domestic Violence, and Maternal Education on Wasting
Odds Ratios

	Model 1	Model 2	Model 3	Model 4	Model 5
Attitudes Toward Domestic Violence		0.94***	0.94***	0.94***	0.93***
Mobility			0.95	0.93	0.92†
Household Decision-Making Participation				1.07*	1.06†
Mother's Attributes					
Highest Educational Level					
No Education					
Primary					0.91
Secondary					0.82**
Higher					0.77*
Maternal Age at Birth in Years	0.97	0.97	0.97	0.97	0.96
Household Attributes					
Wealth Index (Quintiles)					
Poorest					
Poorer	0.73***	0.73***	0.73***	0.73***	0.75***
Middle	0.70***	0.70***	0.70***	0.70***	0.74***
Richer	0.59***	0.58***	0.58***	0.58***	0.65***
Richest	0.49***	0.47***	0.46***	0.46***	0.55***
Type of Place of Residence					
Urban					
Rural	0.94	0.95	0.95	0.95	0.96

† p < 0.1 * p <0.05 ** p <0.01 *** p < 0.001

Source: *National Family Health Survey India 2005-06*

Model 1 includes all three controls

Model 2 includes all three controls and attitudes toward domestic violence

Model 3 includes all three controls, domestic violence attitudes, and degree of autonomy of mobility

Model 4 includes all three controls, domestic violence attitudes, mobility, and household decision-making

Model 5 includes all three controls, the three empowerment indicators, and maternal education

There exist some limitations in this study that may make these results problematic. The first issue is that of our lack of longitudinal data. Even though this study used a nationally representative data set, it is limited because it is a cross-sectional data set. In exploring the relationship between women's empowerment and child nutritional outcomes, the limited ability of cross-sectional data to explain long-reaching effects only helps us to examine a small snapshot in what is otherwise a long and systemic issue in India. A second potential issue is that I did not follow the recommended method of handling missing cases in studies of this nature, which is to perform multiple imputations of missing values on the explanatory variables using the –mi- command suite in STATA. The use of appropriate statistical measures confers greater internal validity to the experiment, and allows us to interpret the results with greater confidence of accuracy. Moreover, the large amount of missing cases makes it difficult for us to have maintained a representative sample size.

CHAPTER V: CONCLUSIONS

(a) Discussion and Intervention Recommendations

The results from this study helps us to understand that women's empowerment is an incredibly complex issue, which can confer wide-ranging effects on the child's health. The results show us that there are significant relationships between three out of the four women's empowerment indicators and the child's stunting outcomes. More specifically, the mother's education demonstrates the most significant relationship to child nutritional status. This specific result conveys the importance of ensuring proper access to education. The only nonsignificant relationship exists only between attitudes towards domestic violence and child wasting outcomes. Although the relationship between approval of domestic violence and child wasting outcomes seem strange, if not inconclusive, it nevertheless tells us that these ideas need more in-depth research and focus. The child's welfare is dependent upon the degree of autonomy the woman has in effecting change in her household. This understanding, combined with efforts towards improving women's empowerment can transform India's family dynamics, and the betterment of India's society.

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BIOGRAPHY

Tammy Spear was born in Ho Chi Minh City, Vietnam in 1994 to two eccentric and too-cool individuals who taught her the importance of a lot of learning and a little of humor. She enrolled at the University of Texas in Fall 2012 as a Plan II Honors, Hindi, and pre-med student, and graduated with too many majors in Spring 2017. After graduation, she plans to attend medical school to fulfill her unrequited dream of picking just one major.