

**CHILD NUTRITIONAL STATUS, FEEDING PRACTICES AND
WOMEN'S AUTONOMY IN RURAL ANDHRA PRADESH, INDIA**

by

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ABSTRACT

Monal R. Shroff: Child nutritional status, feeding practices and Women's Autonomy in Rural Andhra Pradesh, India (Under the direction of Margaret Bentley)

Childhood under-nutrition is a prevalent public health issue through out the developing world. In recent surveys, such as the one carried out by the National Nutrition Monitoring Bureau, India, poor dietary intakes (energy, protein and micro-nutrients) and nutrition status was evident among 0-3 year old children, even in families where the adults meet their daily dietary requirements (NNMB, 2001). This indicates that availability of food may not be the only necessarily cause of under-nutrition among the under three-year-olds in such families. Further, recent research postulates the linkage between women's autonomy and child health, particularly in countries such as India where mothers play a vital role in childcare. This dissertation investigates the influence of maternal autonomy on child feeding and child nutritional status in a sequence of three essays. In the first essay, using logistic regression, we examine the overall effect of mother's autonomy on child stunting using a secondary dataset from the state of Andhra Pradesh (AP) in India. In particular we examine the influence of indicators of autonomy on child stunting. Our results show financial independence and not needing permission to go to the local market have a positive impact in reducing child stunting. In the second essay, we further investigate the role of woman's autonomy on feeding behavior through a set of qualitative interviews, conducted among a sample of 43 mothers in 3 rural villages of Andhra Pradesh, India. In particular, we explored the perception and beliefs regarding women's autonomy and environmental factors such as

income and family structure and their influence on infant feeding practices. We find that not only does mother's autonomy play a role in the woman seeking information through formal health care system for a her to introduce foods and liquids to the infant, but the family structure and the cultural norms surrounding the mother-child environment also plays an important role in child feeding practices. In our third essay, using structural equation modeling approach, we examine the impact of seven latent dimensions of maternal autonomy on infant feeding practice. Our results indicate that mothers with higher autonomy [indicated by financial autonomy and decrease experience of domestic violence] are more likely to breastfeed 3-5 month old infants. Mothers in joint family households are more likely to have infants with poor growth. Overall, these results suggest that improving certain dimensions of maternal autonomy will have a positive impact on infant care and growth outcomes in rural settings of India. Future research should consider autonomy as a multi-dimensional concept to examine the influence of individual dimension of autonomy on health behaviors and health outcomes.

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CHAPTER 1

1. Introduction

1.1. Overview

Childhood under-nutrition is a prevalent public health issue through out the developing world. There are several determinants identified for under-nutrition, including poor availability of food and high rates of infection (Caulfield, Huffman, & Piwoz, 1999), and the specific factors differ depending on geographic, social, and cultural setting. In recent surveys, including the one carried out by the National Nutrition Monitoring Bureau, India, poor dietary intakes (energy, protein and micro-nutrients) and nutrition status was evident among 0-3 year old children, even in families where the adults were meeting their daily dietary requirements. This indicates that availability of food was not a limiting cause of under-nutrition among the under three-year-olds in such families. Some of these statistics you see here are abnormally high by many standards and researchers have tried to come up with theories to explain these high prevalence. In 1996, researcher Ramalingaswamy et al, wrote an article to explain the South Asia's anomalously high rates of malnutrition. They titled the article "The Asian Enigma" and they explored many theories to explain these high rates in South Asia. They concluded that the low status of women seem to be very closely related to the low nutritional status of children (Ramalingaswami, Jonsson, & Rohde, 1996). The low status of women is thought to compromise their own health, the subsequent birth weight of their children, and the quality of care that children receive during their infancy.

The importance of cultural and behavioral factors related to children's nutrient intake, especially during the first two years of life, has been recognized recently (Patrice L. Engle et al., 1999). In India and other developing countries, mothers play a vital role in childcare and feeding practices (Bhandari, Bahl, Taneja, de Onis, & Bhan, 2002) . Simultaneously, the personal power in the household, and her ability to make choices and execute her own decisions (autonomy) (Shireen J. Jejeebhoy, 1997) are important factors related to child care and child health outcomes. The links between female autonomy, feeding practices and child health outcomes, however, have not been fully investigated. The proposed study will investigate the relationships among maternal autonomy, child feeding and child nutritional status, while controlling for socio-economic factors and other maternal factors, including maternal nutritional status.

1.2. Specific Aims

This dissertation will address three aims using variety of methods and data:

Aim 1: The National Family Health Survey 1998/99 data from the state of Andhra Pradesh will explore the association between maternal autonomy and child's nutritional status.

1.a. Examine the association of maternal autonomy children 0-36 months of age. We hypothesize that women with higher autonomy levels of autonomy will have children less likely to be low in their height-for-age indicator of nutritional status.

Aim 2: Qualitative research will be conducted to understand (1) the beliefs and reasons behind infant feeding practices, an established determinant of child growth and development and (2) the domains of women’s autonomy. This research will target mothers with children less than two years of age from the three villages of Andhra Pradesh, India.

2.a. Elucidate an understanding regarding current practices, beliefs and perceptions related to breastfeeding and introduction of foods during the first six months of infants life – what are the current practices and reasons behind the following, (a) Initiation of breastfeeding and colostrums feeding and (b) Introduction of foods and liquids during the first six months of infant’s life

2.b. Explore local perceptions of women’s autonomy involvement in decision making within the household, especially related to child care practices, freedom of movement, sources of support and information regarding child care; experience of and attitudes towards domestic violence.

Aim 3: Examine the association between women’s autonomy and early infant feeding practices in a cross-sectional study of mothers with 3 months old infants who are enrolled in a randomized trial in 60 villages of Andhra Pradesh, India.

3.a. Analyzed cross-sectional baseline dataset and used Structural Equation Modelling to examine the association of individual dimensions of women’s autonomy

on infant feeding practice before 6 months of age – The hypotheses is that mothers, who exhibit higher level of autonomy, will be more likely to have recommended feeding practices towards their infants compared to mothers with lower levels of autonomy when controlling for potential confounders.

1.3. Background and Significance

1.3.1. Problem and Causes of Child Malnutrition

Under-nutrition in young children is widely distributed and fairly concentrated in the developing regions of the world. Over 150 million children suffer from under-nutrition globally. This malnutrition starts early in the life cycle of a child and thus interventions will not only improve a child's intellectual capacity and nutritional status, but it is also a long term investment in raising human capacity, national productivity and reducing future health care expenditures (Gillespie & Allen, 2002; Grantham-McGregor, 1995). More than half of underweight children live in South Asia and are found in just three countries: Bangladesh, India and Pakistan (UNICEF, 1998).

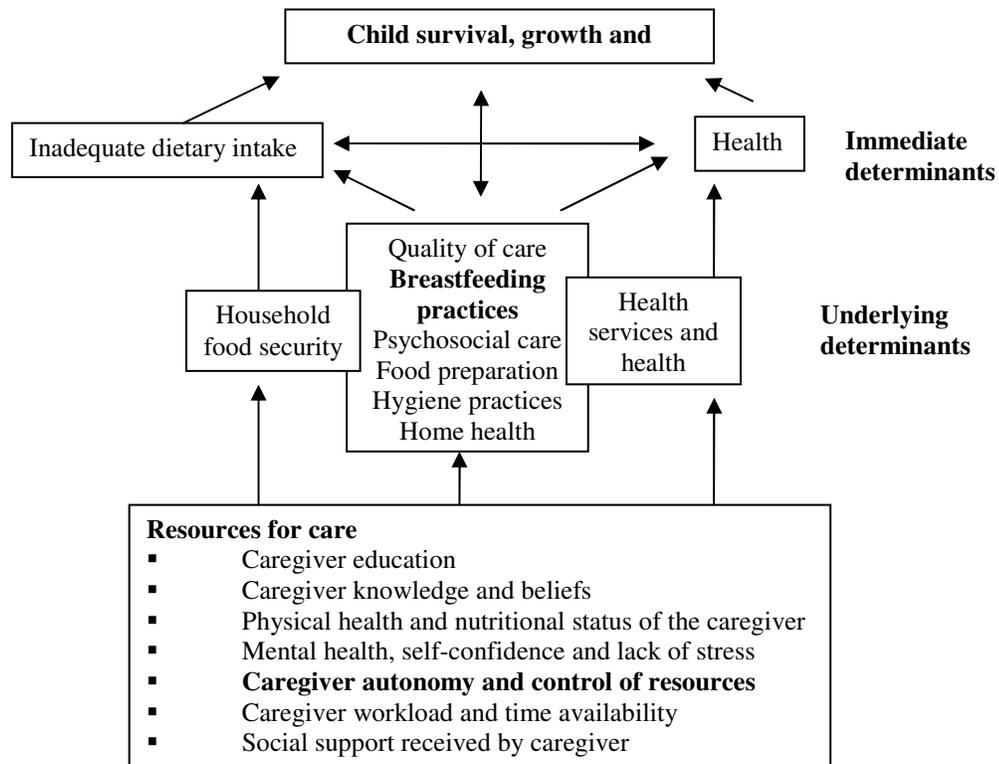
There is an abundant literature detailing the causes of child malnutrition, especially under-nutrition, and the means of reducing it. (Caulfield et al., 1999; P. Engle, Dustagheer, & Shrivastava, 2000). Poor availability of food both in terms of quality and quantity, poor dietary diversification and high rates of infection are the major determinants of under-nutrition in the majority of developing countries like India. (Caulfield et al., 1999; J. Mason, Hunt, Parker, & Jonsson, 1999). But recent research suggests that apart from the poor composition of the diet, inappropriate caregiver-feeding behaviors may play an important role in child nutrition and development. These include mixed feeding and early cessation of

breastfeeding, the untimely introduction of complementary foods, low psychosocial stimulation of children, poor food preparation and food hygiene practices, and inappropriate care for children during illness, among others (P. L. Engle, Bentley, & Pelto, 2000; Pollitt, Gorman, Engle, Martorell, & Rivera, 1993; Pollitt, Gorman, Engle, Rivera, & Martorell, 1995). The quality and quantity of food available to a household are not the only factors explaining the determinants of malnutrition in infants and young children. Care and feeding practices of the caregiver are key factors that lead to undernourishment in young children (Bentley, Stallings, Fukumoto, & Elder, 1991; P. L. Engle, Pelto, & Bentley, 2000; Gittelsohn et al., 1998).

1.3.2. Framework for Child growth, Development and Survival

The UNICEF conceptual framework is an ecological model, applicable globally, as it encompasses factors not only at the individual level but also recognizes community, organizational and political factors, and their interaction to influence child health (McElroy & Townsend., 1979; Pelto, Goodman, & Dufour, 1999). It recommends various indicators and assessment strategies to measure various constructs listed in the framework within the cultural context and recommends to measure variability within as well as between the cultures with regard to these constructs (Patrice L. Engle et al., 1999). The framework suggests that apart from the immediate determinants of child's nutritional status, like child's dietary intake or morbidity, there are the underlying determinants namely maternal care and feeding behaviors, in addition to food security, health care services, and a healthy environment, which are critical for children's survival, growth and development (Aruna, Vazir, & Vidyasagar, 2001; P. L. Engle, M. Bentley et al., 2000). It is shown that when

poverty causes food insecurity, appropriate and attentive care giving practices can optimize the use of existing resources, such as time and local foods, and improve health and nutrition in women and children (P. L. Engle, 2002).



Adapted - UNICEF's conceptual framework: Care for nutrition (Patrice L. Engle, Menon, & Haddad, 1999)

Figure 1 UNICEF Framework

1.3.3. Child Care – a proximate determinant of child growth

1.13.3.a. Importance of care

Child care has received important attention in recent years, since the relation between income per capita and child nutritional status was found to be less significant than expected (Gillespie & Allen, 2002). Care is defined as the behaviors and practices of caregivers (mothers, siblings, fathers, and childcare providers) to provide the food, health care,

stimulation, and emotional support that is necessary for children's healthy survival, growth, and development (Martin-Prevel, 2002). A cross-sectional survey from Chad (F. Begin, Frongillo, Delisle, & Habicht, 1999) showed caregiver's decisions regarding feeding/breasting feeding practices, sanitation and hygiene and treatment during illness of the child, had a positive association to child height-for-age indicator and was significant even when controlled for other household variables like household structure, income generating activities, social support, etc.

1.3.3.b. Care during first year of life

The period from birth to two years of age is identified as a "critical window" for promotion of optimal growth, health and development (Dewey, 2003). This is because the child is susceptible to growth faltering, certain micronutrient deficiencies and acute infections during this period leading to significant morbidity, mortality and delayed mental and motor development. Thus importance of optimal feeding of infants and young children becomes a priority to avoid long-term consequences of malnutrition such as impaired intellectual performance, low work capacity and poor overall health during adolescence and adulthood (Dewey, 2003). The nutrient needs of full-term normal birth weight infants can be met by the human milk alone for the first six months. A systematic review suggests the optimum duration of breastfeeding and the benefits of exclusive breastfeeding is not only for the infant but the mother too (Kramer & Kakuma, 2002).The expert consultation concluded that the potential health benefits of waiting until six months to introduce other foods outweigh any potential risks (Dewey, 2003). The caregiver thus needs resources in order to

perform optimal feeding and it is important to look at these resources required for care so as not hold the caregiver solely responsible for inadequate care.

1.3.3.c. Resources for care

In order to perform these care practices, the caregiver needs resources which under this framework are described as human, economic, and organizational resources of care. They have been identified as caregiver characteristics such as education, physical health and nutritional status, mental health, self-confidence and lack of stress; caregiver knowledge and belief about care; caregiver autonomy and control of resources; caregiver workload and time availability and social support received by caregiver (Patrice L. Engle et al., 1999). At the population level each one is associated with the child growth and development but also is entwined with each other. For example, a recent randomized controlled intervention trial in Africa shows that iron deficiency anemia alters the mother-child interactions. (Perez et al., 2005) They assessed the interaction using the Parent/Caregiver Involvement Scale (PCIS) at 10 wk and 9 months, and observed that anemic mothers scored lower and were less responsive than the control mothers who were non-anemic. This group of researchers (Beard et al., 2005) also showed that anemic mothers were also depressed and low on cognitive functioning. This shows the interplay of various resource factors for a caregiver in order to give optimal care to the infant.

Amongst the various resources identified at the household level, the caregiver's capacity and ability to make decisions related to the child care and other matters in the household seem to not have received adequate attention.

1.3.4. The Asian Enigma

Sub-Saharan Africa and South Asia are amongst the poorest regions in the world, but the prevalence of underweight < 5 children is much higher in the Asian sub-continent (nearly 48%) as opposed to Africa (30%) (UNICEF, 1998). There are efforts to explain this difference when the two regions are similar in terms of poverty, agricultural performance; with the diet quality is not much higher in Africa than Asia and the Government of India administering one of the largest efforts to combat nutritional problems of children in the country through the Integrated Child Development Services (ICDS) program. Ramalingaswami et al has tried to explain this difference by describing this situation as the Asian Enigma (Ramalingaswami et al., 1996). They identified one factor, the extreme low status of women relative to men, as a part of the difference in these malnourished rates. They describe the low status to be related to low participation in decision-making in both inside and outside the home. They suggest this to compromise women's own health, the subsequent birth weight of their children, and the quality of care that the children receive during their infancy. India being a part of this region is thus inflicted with situation of high rates of malnutrition and low status of women.

1.3.5. Women's Status and Women's Autonomy

Understanding the role of women's status in relation to child outcomes has been problematic because each study has defined it using different parameters. Status and autonomy are standard concepts used in the literature to capture the degree of access, control and independence women have in decision-making. Mason (K. O. Mason, 1986) states that women's status is more at the societal measure and it is a measure about the expectations set

by the society. For example, she broadly describes status to refer as the inequality in the power, prestige and control of resources related to men in the society, which can be further argued that achieving status does not necessarily reflect autonomy of a woman (Abadian, 1996). Thus autonomy is a term more specific and amenable to empirical measurement (UN, 1987). It captures the capability or ability to achieve well-being, and in particular for this study well-being of mothers and children. Kabeer says (Kabeer, 1999) “autonomy is rooted in the notion of individual rather than the women’s status which is at a societal level”. Kabeer describes autonomy as a concept which is measured from the individual perspective, e.g. what is her perception of decision-making, whether she feels she has control over finances in the house, etc. On the other hand, women’s status is measuring how the woman is perceived in the society.

In India, several studies have shown that “women have limited control over their own lives, material and other resources; have restricted access to knowledge and information, are constrained to make independent decisions, are enforced physical immobility, and their inability to forge equitable power relationships within families” (Basu, 1991). This is defined by Jejeebhoy and others (Dixon, 1978; Dyson, 1983) as a lack of autonomy. In other words we can say that autonomy, as described earlier by Kabeer, is the control and the power experienced by the women at the individual level.

Thus, autonomy has various definitions in the literature, for example Balk defines autonomy as “the ability to obtain information and use it to make decision about one’s concerns and their kinship” (Balk, 1994). Where as Dixon (Dixon, 1978) defines it as “the degree of women’s access to, and control over, material resources (including food, income,

land and other forms of wealth) and to social resources (including knowledge, power and prestige) within the family, in the community, and in the society at large”.

Jejeebhoy (Shireen J. Jejeebhoy, 1997) expands the definition further and describes autonomy as having different dimensions: (1) Knowledge autonomy – the exposure to the outside world so as to be aware of new ideas, the basis for making informed choices; (2) Decision-making autonomy – decision related to family and their own lives and well-being; (3) Physical autonomy – the freedom from constraints on physical mobility, to be able to extract most from the opportunities and having the self-confidence to deal with the outside world; (4) Emotional autonomy – great self-esteem and less of self-denial among women, importance of spousal communication; (5) Economic autonomy – the greater economic self-reliance rather than reliance on husband or other family members. These dimensions of autonomy will be used in the study and the basis for units of analyses in the study.

1.3.6. Measurement of Autonomy

The studies described are those in which the concept of autonomy is measured in line with what has been defined by Jejeebhoy (Shireen J. Jejeebhoy, 1997). Most research till date defines autonomy as a separate entity or as a dimension under the over arching concept of women’s status. Also, majority of the studies looking at the concept of autonomy addresses it as an explanatory factor for demographic change especially with regard to fertility. There is no gold standard of measuring this concept which makes it more ambiguous in operational definition of this concept. Till date studies have measured autonomy using proxy variables, as an index of autonomy or separately measuring the dimensions of autonomy.

Proxy measures for autonomy are several (Abadian, 1996; Dreze & Murthi, 2001; Anju Malhotra, Vanneman, & Kishor, 1995), namely education, economic status, age at marriage, spousal age difference, marital duration, presence of mother-in-law, size of dowry, distance from natal home, etc. Some of the measures, like size of the dowry and number of sons, are used in specific settings (Shireen J. Jejeebhoy, 1997), where as education, economic status, age at marriage, are more extensively used as proxy measures. But these measures are now known to not represent the women's status or autonomy. Most of the studies use either single index for autonomy or if the autonomy was assessed using different dimensions, the measures were used as separate indices (Bloom, Wypij, & Das Gupta, 2001; Dharmalingam, 1996; Govindasamy & Malhotra, 1996; Shireen J. Jejeebhoy, 1997).

The autonomy index (Amin, Becker, & Bayes, 1998; Basu, 1992) is used in many studies as dimension of women's status or position (Amin et al., 1998; Balk, 1997; Gupta, 1990; Koenig, Ahmed, Hossain, Alam, & Mozumder, 2003), with women's position or status being the main explanatory variable. In Bangladesh, autonomy was accessed within a scale developed to measure women's empowerment and its relationship with the participation in the rural credit program (Hashemi, Schuler, & Riley, 1996). They used dimensions like, mobility, economic security, ability to make larger purchases, involvement in major decisions and relative freedom from domination by the family. They conducted logistic regression to examine how the women's exposure to the credit program affects dimensions of women's status individual and as a composite index.

In Jordan (Miles-Doan & Bisharat, 1990), mother's autonomy was measured as her structural position in the household, a proxy measure to indicate the relative power of mother in the household. In the middle-eastern culture the presence of mother-in-law may create a

conflict during decision-making process of child feeding. The researchers divided the mothers in low and high autonomy groups and found the children to have low nutritional status in the household where the mother seemed to have low autonomy. This was significant even after controlling for mother's age, education and household size. The study by Morgan (Morgan & Niraula, 1995) in two Nepali villages with two different levels of autonomy, looking at use of contraception. They hypothesized that these difference in autonomy will affect the intention for more children and their contraceptive use and these were consistent with what they expected as the study results. This shows that the differences in the level of autonomy have different relationship with outcomes, mainly a behaviour outcome. Studies where autonomy is measured using direct indicators use different dimensions in order to keep it culturally appropriate and also keep it outcome specific. The measures are divided into different dimensions measuring similar concept in autonomy, such as decision-making power in the household or outside; the freedom of movement, which is explained in studies to capture the access to outside information or exposure to the outside world, also sometimes it also is an indicator of the prestige given to a woman in a society; control over resources which is closer to the power that a woman experiences in the household or in the society.

Recent studies use **different dimensions of autonomy** rather than measuring and analysing autonomy as a single index. Agarwal et al. (Agarwala & Lynch, 2006) mention that the researchers have failed to show the differential importance of the dimensions and the differential importance of the items within a single dimension. After carefully studying the various autonomy instruments used in the field globally, the confirmatory factor analyses results presented by Agarwala informs us not to use a summed scale, for each dimension has a distinct contribution to autonomy. She used the data from Pakistan and India from a survey

on Status of Women and Fertility (SWAF) 93-94, which was administered in five countries in Asia. They constructed four dimensions namely, autonomy from violence (emotional autonomy), autonomy in family decisions (decision-making autonomy), autonomy in community involvement (physical as well as knowledge autonomy) and autonomy in household economics (financial autonomy). The dimensions mentioned in the brackets in the earlier sentence is relates autonomy dimension presented earlier to the proposed measure of dimensions for the proposed study of women's autonomy and child growth and care practices.

Jejeebhoy also used the survey on status of women and fertility (SWAF 1983) to operationalize autonomy among rural Indian women in two states in India, Uttar Pradesh in the north and Tamil Nadu in the south (Shireen J. Jejeebhoy, 1997). There were series of questions asked related to economic decision-making, child-related decision-making, marriage related decision-making, freedom of movement, power relations with husband, access to resources and control over resources. The results have shown a strong regional difference but a general limited decision-making authority where women are less likely to be involved in decisions related to major household purchases, rather than decisions related to children and childcare. The dimensions of autonomy to closely correlate were economic decision-making, mobility, and access to resources. The association between freedom from threat and control over economic resources were weak on the other hand. The child-related decision-making domain was eliminated as it did not pertain to all women. These results suggest that in India, irrespective of region and religion, decision-making, mobility, and access to economic resources are closely related, though autonomy is multidimensional. It

has been proposed in the literature to use more direct measures to assess autonomy as it is a multidimensional concept (Agarwala, 2004; K. O. Mason, 1986).

The response categories for the various dimensions are also cultural specific and differ from situation to situation. The main emphasis is on the responses for decision-making in the household. As we are interested in maternal autonomy and the decisions related to child feeding practices, it is important to study the various players involved in the decisions. In India, for a young mother in a household with other older female members, the older woman generally exerts control over the younger one. This also means that the older woman has authority over decisions regarding her grandchildren and the care of them. It will be important to study the influence of the other older members in the household, other than the husband, on the decisions regarding child feeding and care practices.

1.3.7. Link between Women's Autonomy and Child growth and Child Care

1.3.7.a. Definition of autonomy for this study

In this study, we define autonomy as the control women have over their own lives – the extent to which they have an equal voice with other members including the other female members in the household in matters affecting themselves and their families, especially infants in the household, control over materials and other resources within and the outside the house, freedom from constraints on physical mobility; access to knowledge and information and the authority to make independent decisions in household as well as decisions regarding their infant's health. This definition emphasizes the control, access and decision-making capacity of a woman in the household with regard to the health and feeding of an infant.

1.3.7.b. Studies investigating Women's status/autonomy and Child growth or child feeding practices

Child feeding practices are one of the most important proximate determinants of child survival, growth and development according to the UNICEF conceptual model. There have been studies that examined associations among child growth, child care practices and women's status. Engle et al (Patrice L. Engle et al., 1999) identifies women's autonomy and control over resources as a key factor for child health outcomes, along with other factors mentioned in the UNICEF conceptual framework.

Several studies have focused on the influence of women's empowerment on the decline in fertility and some on the child mortality and growth. A recent report from IFPRI (L. C. Smith, 2003) presents empirical evidence that higher women's status has a significant, positive effect on children's nutritional status in three developing regions of the world: South Asia, Sub-Saharan Africa, and Latin America. This report defines women's status as women's power relative to men in a number of areas. This study was limited with a cross-sectional analyses and restricted to the questions related to women's status from the DHS datasets from 36 countries between 1990 and 1998. They measure women's status as whether the woman works for cash income, the woman's age at first marriage, the percent difference in the women's and her partner's age and the difference in the woman's and her partner's years of education. Thus these were more of indirect measures of women's status and not measure of autonomy. But they do confirm that women's status impacts child nutrition because women with higher status have better nutritional status themselves, are better cared for, and provide higher quality care for their children. They also observed child care practices

and found negative relation of income and social status with initiation and duration of breastfeeding, but again these are proxy measures of autonomy.

There is considerable evidence that in the developing world women are primarily responsible for the health of infants and small children, and taking care of the children from birth, is considered to be “women’s work” (Basu, 1991; S. J. Ghuman, 2003). This notion is irrespective of the region and cultural settings in the various states in India. As Jeffrey and Basu (1996) note, to most women in South Asia it matters very little if they have access to resources, what matters is whether they have *control* over these resources. Autonomy has also been defined as the women’s own agency (individual ability) to gain greater access and control over resources (Gurumurthy, 1998).

Maternal health could influence care giving by reducing energy to provide care, but it is seen that mothers with low BMI are less economically productive and thus able to spend more time with the child (Patrice L. Engle et al., 1999). However, the quality of child care giving among women whose health is compromised and who have less access to resources because of socioeconomic status remains to be investigated fully. Maternal mental health is associated with poor child care and health outcomes. Recently in Pakistan maternal depression predicted poor growth and associated with high risk of diarrhea in the community (Rahman, Iqbal, Bunn, Lovel, & Harrington, 2004). Thus it is believed that the emotional status of a mother interferes with the quality of child care and can be also thought to link with the autonomy described earlier by Jejeebhoy (Shireen J. Jejeebhoy, 1997).

1.3.7.d. The situation in India: Socio-cultural differences in the northern and the southern states

India, though one country, is vastly diverse in culture and societal norms and traditions. But there is a consensus on a broad north-south regional division within the country (Dyson, 1983). Especially in social sciences this divide is based on the contrast observed between areas of low female status and unfavorable demographic trends (high of birth and death rates), on one hand, and comparatively high female status and relatively favorable demographic performance on the other (Dyson, 1983). Dyson and Moore identified kinship structure to explain this divide though one observes gender stratification existing through out the country. The kinship structure in the north is more patriarchal where as the south being more egalitarian. They explain this difference mainly because of the history and the lineage of the cultures being different. They observed the northern culture to be less favorable to female autonomy than the southern culture, mainly because of the matrilineal influence in the south and also increased involvement of women in the labor force (Anju Malhotra et al., 1995). But the matrilineal society does not exist in the entire south, but exists only in certain groups of the Kerala society (Karve, 1963). Karve describes the kinship structure to be entirely different in the other three states of the south other than Kerala. Compared to the North, the females or daughters in the Southern regions of India are more valued, both economically and socially; they are more likely to survive, to be educated, to be involved in the productive economy, to marry later, and to closely maintain ties with parents after their marriage. (Jeffery, Jeffery, & Lyon, 1988; Sopher, 1980). Dyson (1983) has noted that the southern kinship structure in India predominates in the states of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh, as against the northern system that prevails in the states of

Rajasthan, Gujarat, Uttar Pradesh, Haryana and Punjab (Dyson, 1983). But it is also described that Karnataka, Andhra Pradesh and Tamil Nadu and among certain important castes in these regions, the predominant form of family organization is the patrilineal and patrilocal joint family (Karve, 1963).

Various studies have looked at child health outcomes and female status taking into consideration the north-south divide and differences in women's status and other indicators. Griffiths et al (P. Griffiths, Hinde, & Matthews, 2001) looked at infant and child mortality in three states in India, Tamil Nadu, Uttar Pradesh and Maharashtra. They used the National Family Health Survey (NFHS) data of 1992-93. Their aim was to examine the survival of infants and young children in these states and also focus on the potential impact of mother's autonomy. Maternal autonomy variables in this dataset were more proxy variables than direct measures of women's autonomy.

Another study, conducted in Karnataka and Uttar Pradesh, found a weak relation between stunting and decision-making capacity of the mother, but here autonomy is measured only as the mother's decision to make health care choice for herself which was poorly correlated with education. But this study did show evidence of some recommended early positive care practices, such as the mother not squeezing out colostrums from her breasts, not use a feeding bottle with a nipple, exclusive breastfeeding for the first 4-6 months, etc., that could reduce prevalence of severe stunting up to 30% (Brennan, McDonald, & Shlomowitz, 2004).

Another study by Griffiths et al (P. Griffiths, Matthews, & Hinde, 2002) investigated the clustering of underweight children within families in three culturally contrasting states and observed the association with gender as an interaction term and structure of the

household. Thus, there is evidence of a significant influence of region on female status and importance to study its influence on child nutritional status within these different geographical settings.

Jejeebhoy surveyed a sample of women in Uttar Pradesh and Tamil Nadu using the SWAF instrument (Shireen J. Jejeebhoy, 1997). This study showed bivariate association with different indicators or proxies of autonomy used in various studies. They found maternal education to have a positive effect on protection from physical threat and on women's control over resources, although this was more likely in south than the north. The mother working for wage enhances mobility and also associated with access to resources. The influence of parity and age showed strong positive influence on all the autonomy indicators. The other most important determinant was the presence of mother-in-law, and severely constrained autonomy in women from Uttar Pradesh than from the south. Natal connection or whether a woman resides in or close to her natal home is identified as an important determinant of autonomy dimensions in India. Finally household economic status appears to have little influence on decision-making authority or mobility, but greater control and access over economic resources. Thus in India, socio-cultural factors like economic-activity (occupation), co-residence, education and size of the dowry (cultural norms) are related to the domains of autonomy identified in the study.

3.8. Conceptual Framework setting up the link between Autonomy and Feeding Practice in India

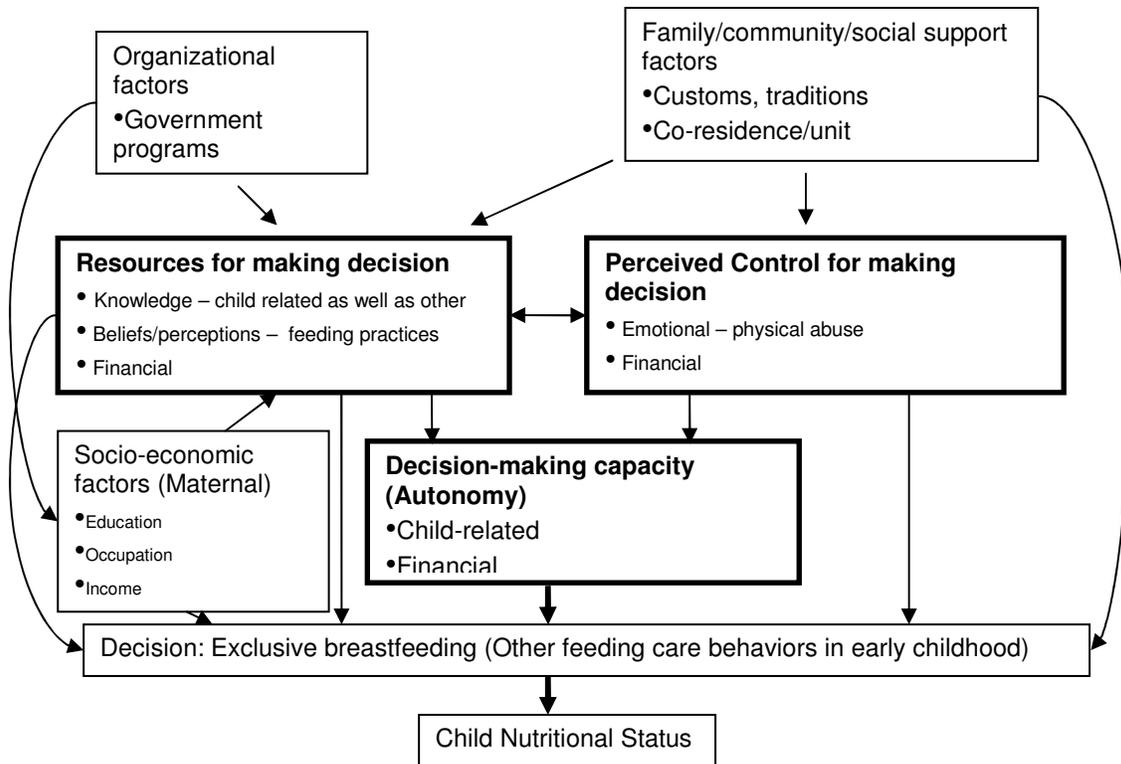


Figure 2 Conceptual Framework linking Maternal autonomy and Feeding Practice

McLeroy et al's (McLeroy, Bibeau, Steckler, & Glanz, 1988) social ecological framework is a model for health promotion and mainly based on the concept of behavioural change influenced by factors that are at several levels of the society and environment surrounding the household and the society. The macro level factors are at the political level, organizational level, community or environment level, interpersonal level and the individual level. The model assumes that appropriate changes in the social environment will produce changes in individuals, and that the support of individuals in the population is essential for implementing environmental changes. The UNICEF framework for care for nutrition, also address the factors influencing child growth, survival and development at various levels of

the society and environment. The present study has been developed using the ecological framework as a way to conceptualize the overall study aims and research questions.

The framework above emphasizes the linkages between the caregiver's autonomy and control over resources with caring practices, which then are related to the child growth outcomes. Autonomy in this model follows the conceptualization of Kabeer, so that at the individual level it is how the mother perceives and experiences her ability to have access and control of resources and decision-making related to caring for her child. The feeding behaviour of the mother is influenced by a number of factors at the individual as well as the household level (interpersonal level) and also at the community, organizational and political level. There are factors that influence a society at large and within the society the behaviours are influenced by other individual characteristics, cultural beliefs and attitudes, etc.

The decision of feeding practices in an Indian household is influenced by various factors in the society and individual at large. Thus there could be factors of community level programs affecting infant feeding behaviours, but the influence it has on the behaviour will also depend on how the information and the knowledge will be translated into practice. The organizational factors listed in the figure above directly influences the decision of feeding practices, as well as affect the decision-making capacity of individual through the environmental and interpersonal factors like social support or customs and norms. In India, the ICDS program is a nationally placed program which not only aims to improve the health status of infants and young children through food supplementation, growth monitoring and carries out several other preventive treatments for better child survival, growth and development, but also engages the local community in building a sustainable inter-sectarian service program. This is a national based program that gives food supplementation, growth

monitoring. Thus the main resource in the community towards the infant feeding knowledge is theoretically uniform across villages and regions and should not differ at the political or organizational level. This program is widely present in the state of Andhra Pradesh and thus most of the villages are equipped with the infrastructure for this program. Thus to a large extent we can assume that the mothers in these villages receive similar services from this program, but that variation may result from the quality of delivery or supervision.

While we expect many households to be resource-poor in our setting, there will be variability in household socioeconomic status that will contribute to our behavioural and biological outcomes. In rural India, the villages have various caste systems with varied traditions, norms and attitudes and these differences may also play an important role in caring practices. In India, the presence of mother-in-law is a key factor at the household level that may influence the infant feeding and care decisions, either positively through additional support and care to the mother, or negatively, through control over decision-making for care and feeding. For example, young mothers may be pressured by their mother-in-law to provide non-breast milk fluids or foods before the infant has reached six months of age. The factors at the individual and household level influence frequently and have a more immediate effect, rather than the governmental or organizational influence of breastfeeding messages. The community and environment factors are more proximate to the infant feeding practices in these communities. In the rural villages of Andhra Pradesh, there exists caste system but the customs and traditions don't change to a large extent (Formative research data). In these areas, there exist various women's groups and other local groups, which are accessible to everyone. The family structure is joint in nature, but there does exist nuclear families independent of the caste or financial status.

Autonomy is a factor recognised at the household, interpersonal level, which lies at the individual level of the mother, is influenced by various other factors, but in itself can affect the outcome as certain infant feeding practices. We define autonomy dimension to be captured by (1) resources for making decision (e.g. the knowledge and information she is exposed to regarding breastfeeding), (2) the perceived control to make the decision (e.g. whether she feels she can make a decision to breastfeed her infant) and (3) finally what decisions she makes (e.g. whether she is currently breastfeeding or not). In the rural settings of India, if the mothers have access to same information regarding feeding their children in the first six months of their lives, there might be factor at the family level or individual level such as pressure from the mother-in-law, her own health, occupation, education, that will play a role in how much control she perceives on the decision she would want to make for her child's feeding practice. This can be independent of the income or education. As we are studying this in only rural Andhra Pradesh, the level of education and income generation by women is not too varied and thus we assume to not have too much of an influence on access to resources. The perceived control for decision, measured through different dimensions of autonomy, is influenced by the environmental factors and can lead to affect her overall health. One of the dimensions is measuring her emotional stability through the way she views domestic violence and in turn can act as a proxy for self-esteem. Her emotional stability is important for her to take care of her child and provide optimum care. This will also affect directly on the care practices leading to better growth or not. Another important dimension of autonomy is the access and control measured through the mobility indicator. The freedom of movement the mother has in her movements, not only for the actions needed for child care, refers to her overall control over her life. In this setting of Andhra Pradesh, the mothers don't

have too much freedom of movement without consent of the elders in the household, especially for young mothers. Thus these mothers could be in position, where even for child care, they don't have too much of freedom. By relating this dimension to the decision of care will allow us to explore whether the mother, who is generally restricted to movement for going to market or temple or neighbors, also have the same constrain while it comes to child care practices. This decision-making capacity will in turn lead into a decision of whether a mother does what is good for her child, by internalizing the information she receives and taking an action on it. Thus if we have two mothers with the same access to resources in terms of knowledge for infant feeding, then whether or not she does what is good for the child will be her perceived control that will finally lead into her ability to make decisions.

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CHAPTER 2

2. Maternal Autonomy is Inversely Related to Child Stunting in Andhra Pradesh, India (Paper 1)

2.1. Abstract

Background: In South Asia, the low status of women is thought to be a primary determinant of under-nutrition across the life-span. Maternal autonomy (defined as a woman's personal power in the household and her ability to influence and change her environment) is likely an important factor influencing child care and ultimately infant and child health outcomes. In this study, we hypothesize that, in Andhra Pradesh, mothers with higher levels of autonomy will be less likely to have stunted children, even after controlling for maternal education and socioeconomic status. **Setting and Subjects:** We analyzed data from the state of Andhra Pradesh in the National Family Health Survey 1998/99 (NFHS-2). We used cross-sectional demographic, health and anthropometric information for mothers and their oldest child <36 months (n=821). **Methods:** Logistic regression models were carried out to test the associations between indicators of female autonomy and the risk of having a stunted child.

Results: Women with higher autonomy [indicated by access to money (OR =0.731.; 95% CI 0.546, 0.981) and freedom to choose to go to the market (OR=0.593; 95% CI 0.376, 0.933)] were significantly less likely to have a stunted child, after controlling for household socio-economic status and mother's education. **Conclusion:** In this south Indian state, two

dimensions of female autonomy have an independent effect on child growth, suggesting the need for interventions that increase women's financial and physical autonomy.

Keywords: child stunting; maternal autonomy; India

2.2. Introduction

Although there is a significant economic progress in India in recent decades, under-nutrition, infectious and chronic diseases remain pervasive problems. India's GNP has risen 6% since 1985 (WB, 2003) with overweight, obesity, and chronic diseases becoming growing problems in urban areas (P. L. Griffiths & Bentley, 2001; Yajnik, 2004). But in the last two decades, India has reached self-sufficiency in food grain production and infant mortality rates reduced by 26% (NFHS-3, 2007). Despite these rapid changes and improvements in certain health indicators, India remains one of the most impoverished countries in terms of child under-nutrition. In a seminal paper, "The Asian Enigma", written more than a decade ago, Ramalingaswami, et al. proposed that the extreme low status of women is a key factor responsible for high rates of child under-nutrition in South Asia (nearly 48%) compared to Africa (30%). The authors suggested that if women's status were improved, there would be improvements in the nutritional status of their children (Ramalingaswami et al., 1996). They hypothesized that women's low status not only compromises maternal physical health, resulting in low infant birth weight, but may also lead to a subsequent decline in quality of care provided during infancy and childhood.

A recent UNICEF report states that "Eliminating gender discrimination and empowering women will have a profound and positive impact on the survival and well-being of children" (UNICEF, 2007). Direct and complex indirect pathways underlie the

relationship between women's autonomy and health outcomes, especially child growth and survival (Patrice L. Engle et al., 1999; UNICEF, 2007). According to the UNICEF conceptual framework (P. Engle, Lhotska, & Armstrong, 1997b) underlying factors, such as feeding and care practices, maternal autonomy, household food security and community health services (Ha et al., 2002) effect dietary intake, morbidity, and child nutritional status. Several studies have observed that specific dimensions of maternal autonomy impact child growth and survival (F. Begin, Frongillo, Delisle et al., 1999; Caldwell & Caldwell, 1993; Doan & Bisharat, 1990; Kishore, 1998). In a study from Chad, caregiver's decision-making ability, a component of maternal autonomy, was associated with child feeding practices and child stunting after controlling for household structure, income generating activities, and social support (F. Begin, Frongillo, Delisle et al., 1999). A study completed in the Dominican Republic found children to be significantly less stunted in female-versus male-headed households, suggesting that female generated income is allocated to ensure adequate dietary intake for children (Johnson & Rogers, 1993). Smith et al. (L. C. Smith, 2003) find women's status (defined by equality between women and men) to impact child stunting. These studies suggest that maternal autonomy can have important implications for a woman's own health and that of her children. But these studies operationalized the concept of autonomy as a single indicator representing a certain dimension or use of an indirect/proxy measure of autonomy. Recent literature presents autonomy to be a multi-dimensional concept, identifying key elements such as : decision-making capacity inside and outside the house, mobility outside the house, and financial independence and freedom from domestic violence (Balk, 1994; Shireen J. Jejeebhoy, 1997; S. J. Jejeebhoy, 2002; K. O. Mason, 1986; Vlassoff, 1992a). To our knowledge, no studies have investigated simultaneously the effect of these

multiple dimensions of maternal autonomy on the outcome of child stunting in the presence of other socio-demographic explanatory variables, such as maternal education within the South Asian context (Milman, Frongillo, de Onis, & Hwang, 2005).

The present study examines the association of maternal autonomy with child stunting in the southern state of Andhra Pradesh, India. There is vast heterogeneity in culture and traditions throughout India despite a consensus that a broad north-south regional division exists within the country that influences gender roles and health outcomes (Dyson, 1983). On average, the north is less egalitarian than the south (Dyson, 1984) and shows lower levels of female autonomy as well as higher birth and death rates among infants and children, including skewed sex ratios that favor males (Grover & Vijayvergiya, 2006). However, there are states in the south of India that mimic socio-demographic conditions of the north (Guilmoto & Irudaya Rajan, 2005). For example, the levels of maternal autonomy and literacy in the southern state of Andhra Pradesh are below the national average (NFHS-2, 2000). At the same time, Andhra Pradesh has experienced a reduction in poverty in the last 30 years. According to State Reports, the numbers of poor people have reduced from 49% to 30% (AP Govt., 2003). This shift in levels of poverty may explain improvements in household food adequacy reported by the National Nutrition Monitoring Bureau Survey conducted in 2001 (NNMB, 2001). Given that households are food secure, and that child stunting remains prevalent, there may be other factors that influence care and feeding practices, such as maternal autonomy, that influence child growth and survival (P. L. Engle, 2002; Frongillo, 1997).

In this study, we hypothesize that, in Andhra Pradesh, mothers with higher levels of autonomy will be less likely to have stunted children, even after controlling for maternal education and socioeconomic status.

2.3. Subject and Methods

The 1998-99 National Family Health Survey, (NFHS-2), is a nationally representative cross-sectional study conducted by the International Institute of Population Science (IIPS) in India and ORC Macro in the United States (NFHS-2, 2000). This survey was collected using a two stage sampling design with stratification by urban-rural setting. To create a sample representative of the state of Andhra Pradesh, sample weights were used to account for the differential probability of selection for mothers into the sample (NFHS-2, 2000). In the NFHS-2 survey information was collected from 4,032 women of reproductive ages (15-49 years) living in Andhra Pradesh. For these participants, there were 991 children < 36 months of age who had complete anthropometric data. Where households included more than one eligible child, the oldest was selected for inclusion in our analysis to ensure that observations were not clustered within households. The final sample consisted of 821 mother-child dyads.

Stunting was defined using a height-for-age z-score < -2 SD, based on the WHO/NCHS reference (WHO, 1978). Autonomy measures were based on four theoretical distinct domains; 1) decision-making power of women in various activities including cooking, buying jewelry, obtaining health care and visiting the natal home, 2) women's freedom of movement, including whether permission was needed to go to the market or to visit family and friends, 3) financial autonomy defined as a woman's ability to keep money for personal discretionally purposes, and 4) attitudes about domestic violence, including

whether women felt that wife beating was acceptable. Previous studies have found that each of these domains of autonomy have independent effects on health behaviors and outcomes, and have thus discouraged the use of a single index to represent autonomy (A. Malhotra, Schuler, & Boender, 2002). As autonomy is considered to be a multifaceted concept, researchers argue that a single index dilutes the true effect of each of the multiple dimensions of autonomy. In this study, there were seven autonomy variables identified in the NFHS-2 questionnaire to represent these four conceptual domains. In the original questionnaire six of these seven variables were created as binary ‘yes’ or ‘no’ questions. We retained this format for our analyses, where ‘0’ represented a relatively high level of autonomy and ‘1’ represented a lower autonomy level (Table 2). With respect to the seventh variable (dimension) of autonomy, domestic violence, the questionnaire included a description of six scenarios. For all scenarios each woman was asked whether the husband was justified in beating his wife. If a woman responded that she felt the husband was unjustified in all six scenarios, she was given a score of ‘zero’ representing high autonomy. However, if the woman responded that the husband was justified in at least one of the six scenarios she was given a score of ‘1’ representing low autonomy.

There are several covariates considered in our models exploring the relationship between maternal autonomy and child stunting including: child sex, age, and birth order; maternal level of education, age, and religion; and household-level socio-economic status and urban-rural residence. Household socio-economic status (SES) was measured using a standard of living index, based on quality of household construction and land and household ownership as well as ownership of household assets (NFHS-2, 2000). Specifically, index items included: house type, toilet facility, source of lighting, main fuel for cooking, source of

drinking water, separate room for cooking, ownership of the house, agricultural land, irrigated land, livestock and household assets such as radio, television, and a bed. The index score was divided into tertiles and an indicator variable was created with the lowest index score used as the referent category.

Statistical Methods

Descriptive statistics based on the association between each of the autonomy variables and stunting were assessed using chi-square tests. Differences between low versus high autonomy were considered significant at $p < 0.05$. Logistic regression was used to calculate the independent effect of each covariate on child stunting separately. The covariates that were independently associated with stunting were then included in a multivariate logistic regression to test confounding of the relationship between the measures of maternal autonomy and child stunting. Covariates that produced a $>10\%$ change in any of the autonomy parameter estimates, were retained in our model as confounding factors. The importance of interactions between covariates and main explanatory variables were assessed to be significant when $p < 0.05$. To account for the survey design and sample weights, all analyses were carried out using survey commands in STATA (StataCorp., 2003).

2.4. Results

Sample Description

Table 1 presents descriptive statistics of the sample, including information on child, mother and household demographic characteristics. Children's age ranged from 0-35 months and did not differ by child gender. Male and female children were equally represented and

stunting (48%) was 2% lower than the national average (NNMB, 2001). The majority (66%) of mothers were between 15 and 24 years of age and approximately one half (49%) were illiterate. The majority of households were located in rural areas (75%) and approximately one half (49%) reported a medium standard of living.

Table 1: Baseline characteristics of mothers and children in Andhra Pradesh, India, NFHS-2 survey data, 1998-99

Characteristics	n	Mean (SE)
Anthropometric		
Height-for-age Z-score	821	-1.728 (1.442)
Weight-for-age Z-score	821	-1.681 (1.174)
Weight-for-height Z-score	825	-0.789 (1.059)
Stunting		
<-2 SD Height-for-age Z-score	333	-3.019 (0.881)
>= -2 SD Height-for-age Z-score	488	-0.847 (1.027)
<hr/>		
Characteristics	n	Percentage
Children		
Age, mo (821)		
0 -11	264	29
12-23	350	38
24-35	298	33
Sex (821)		
Boys	409	50
Girls	412	50
Birth order (821)		
1	752	92
2	41	5
3	12	1
4+	16	2
Mothers'		
Age, y (821)		
15-24	547	66
25-34	245	30
35-49	29	4
Education (821)		
No education	396	49
Complete primary	292	35
Complete secondary and higher	133	16
Socio-economic		
Standard of living index (816)		
Low	297	37
Medium	400	49
High	119	14
Place of residence (821)		
Rural	607	75
Urban	214	25
Religion (819)		
Hindu	694	85
Muslim	69	8
Christian	56	7

Table 1 Sample Descriptive

Table 2 presents the unadjusted proportions of stunting by different dimensions of women's autonomy. Of the variables representing the *decision making domain of autonomy*, 3 of the 4 variables had an equal number of households in both the high and low levels of autonomy. Additionally, there was no statistical difference in the proportion stunted between the autonomy levels for each variable. For both the variables representing the *permission domain of autonomy*, a majority of women (>80%) had low levels of autonomy. Of all the items in this domain, only "permission to go to the market" was significantly associated with child stunting ($p=0.038$). With respect to the *financial domain of autonomy*, there was a relatively equal distribution of women in both high and low levels of autonomy, and low levels significantly increased the likelihood of having a stunted child ($p=0.007$). For the dimension of autonomy related to *disapproval of domestic violence*, the percentage of women who reported that they did not approve of some form of domestic violence was low. The difference in the percentage of stunted children between those women who approved and did not approve of gender based violence was not statistically significant. Of all the autonomy measures tested, *permission to go to the market* and *freedom to use financial resources* were significantly associated with stunting, and these were included in the multivariate regression analysis.

Table 2: Bivariate analysis of Autonomy variables by stunting in Andhra Pradesh, India, NFHS-2, 1998-99

Autonomy variables	Categories	n	% Stunted	p-value
Decision variables				
Who makes the following decisions in your household:				
What items to cook?	Respondent plays a role	(653)	41	0.539
	Respondent doesn't play a role	(168)	39	
Obtaining health care for yourself?	Respondent plays a role	(408)	40	0.943
	Respondent doesn't play a role	(413)	41	
Purchasing jewelry or other major household items?	Respondent plays a role	(447)	41	0.938
	Respondent doesn't play a role	(374)	41	
Your going and staying with parents or siblings?	Respondent plays a role	(414)	42	0.297
	Respondent doesn't play a role	(407)	39	
Permission variables				
Do you need permission to:				
Go to the market?	Doesn't need permission	(145)	31	0.038*
	Needs permission	(676)	42	
Visit relatives or friends?	Doesn't need permission	(99)	34	0.184
	Needs permission	(722)	41	
Financial decision variable				
Are you allowed to have some money set aside that you can use as you wish?	Yes	(415)	36	0.007*
	No	(406)	45	
Emotional autonomy variable				
The respondent was asked if she thought that a husband is justified in beating his wife in six different circumstances.	Not justified under any circumstances	(172)	34	0.131
	Justified in beating under some or all the circumstance	(619)	41	

* p<0.05 (p-values based on chi-square statistics with appropriate degree of freedom)

Table 2 Bivariate analyses -stunting and autonomy

Associations between stunting and the socio-demographic covariates are presented in Table 3. Factors that were significantly associated with stunting were child's age ($p < 0.001$), with higher levels in the older age groups, maternal education, where the number of stunted children was significantly higher ($p = 0.002$) among mothers who did not go to school compared to mothers who had completed primary or secondary school, standard of living and place of residence. Lower rates of stunting were observed in households with higher levels of socioeconomic status and/or household in urban settings. Based on the results of these bivariate analyses, child's age, mother's education, SES and place of residence were tested as possible confounders in the relationship between maternal autonomy and child stunting. There was a 10% or greater change in parameter estimates for at least one of the two variables representing maternal autonomy when controlling for each of the four covariates independently (results not shown). Therefore, all four covariates were included in our logistic regression analyses as confounders.

Table 3: Bivariate associations of stunting with socio-demographic factors, Andhra Pradesh, India, NFHS-2, 1998-99

Characteristics	n	% Stunted	p-value
Children			
Age, mo			0.000*
0 -11	264	25	
12-23	350	47	
24-35	298	48	
Sex			0.710
Boys	409	42	
Girls	412	40	
Birth order			0.371
1	752	40	
2	41	51	
3	12	52	
4+	16	50	
Mothers'			
Age, y			0.513
15-24	547	42	
25-34	245	38	
35-49	29	45	
Education			0.002*
No education	396	48	
Complete primary	292	38	
Complete secondary and higher	133	26	
Socio-economic			
Standard of living index			0.001*
Low	297	47	
Medium	400	40	
High	119	25	
Place of residence			0.001*
Rural	607	44	
Urban	214	31	
Religion			0.986
Hindu	694	41	
Muslim	69	41	
Christian	56	40	

* **p<0.05 (p-values based on chi-square statistics with appropriate degree of freedom)**

Table 3 Bivariate analyses stunting and covariates

Table 4 shows the logistic regression model presenting the independent effect of autonomy on stunting after controlling for previously identified confounders. Use of discretionary money for personal purposes (financial autonomy) and permission to go the market (physical autonomy) remained significant predictors of stunting after controlling for confounding factors. A mother with higher financial autonomy had lower odds (OR =0.731.; 95% CI 0.546, 0.981) of having a stunted child. Mothers with higher levels of physical autonomy were less likely (OR=0.593; 95% CI 0.376, 0.933) to have stunted children. Mother's education and place of residence were not significant predictors of child stunting. Mother's education became insignificant after introducing standard of living, (a proxy for income) to the model. Unlike mother's education, the effect of place of residence was not significant whether or not other covariates were included in the model. The odds of stunting were lowest in the highest SES category (OR=0.584; 95% CI 0.364, 0.999). Child age was also independently associated with stunting, where the oldest age group of 24 – 36 months had the highest risk of being stunted (OR=3.108; 95% CI 2.057, 4.695).

Table 4: Survey Logistic models (crude and adjusted models[†]) : Odds ratio and 95% confidence intervals for the significant predictors of stunting in children under the age of 36 months, Andhra Pradesh, India, NFHS-2, 1998-99

	Crude		Adjusted	
Financial Autonomy: Are you allowed to have some money set aside that you can use as you wish?				
No	1.0	-	1.0	-
Yes	0.681*	(0.513, 0.906)	0.731*	(0.546, 0.981)
Permission need to go to the market:				
Needs permission	1.0	-	1.0	-
Does not need permission	0.637*	(0.407, 0.996)	0.593*	(0.376, 0.933)
Child's age:				
Ref. 0-11			1.0	-
12-23			3.026*	(2.050, 4.469)
24-35			3.108*	(2.057, 4.695)
Standard of living index:				
Ref. Low			1.0	-
Medium			0.878	(0.630, 1.224)
High			0.584*	(0.364, 0.999)
Place of residence:				
Ref. Rural			1.0	-
Urban			0.699	(0.483, 1.014)
Mother's education:				
Ref. No education			1.0	-
Complete primary			0.749	(0.530, 1.061)
Complete secondary and higher			0.666	(0.373, 1.186)

***p<0.05; [†]Adjusted for Child's age, Standard of living, Place of residence and Mother's education**

Table 4 Survey Logistic Model

2.5. Discussion

The results of this study support the hypothesis that low maternal autonomy (represented by single indicators namely the *freedom to use discretionary money* (financial) and *permission to go to the market* (physical)) is associated with child stunting, in Andhra Pradesh where the prevalence of child stunting is 40%, one of the highest rates in India. This significant association is independent of the effect of maternal education and household socioeconomic status.

There are potential explanations for why the two autonomy indicators, *freedom to use discretionary money* and *freedom to go to market*, affect child stunting. Maternal permission to go to the market may allow for possible interactions and information exchange with people outside the family circle (Shireen J. Jejeebhoy, 1997). A mother who is able to go to the market has the capacity to purchase or influence the purchase of resources for the household including food for appropriate meal preparation. A market setting may also provide the potential for interacting with people beyond the family and close neighbors. This could potentially provide a forum for exchange of information that helps a mother to gain knowledge and advice beneficial for care, feeding, or nutrition advice for children's health. Consistent with earlier studies, we found that financial autonomy was a strong predictor of child stunting (Hashemi et al., 1996; Miles-Doan & Popkin, 1993). With high financial autonomy a mother likely has higher negotiation power through higher participation in household purchasing decisions (P. L. Engle, 1991; Hashemi et al., 1996; Shireen J. Jejeebhoy, 1997; Miles-Doan & Popkin, 1993). In turn, a mother's power to affect purchasing decisions and resources allocated to food or child care has been identified as an important factor for child nutritional status, particularly in resource poor settings (P. L.

Engle, 1991; Hashemi et al., 1996; Shireen J. Jejeebhoy, 1997; Miles-Doan & Popkin, 1993). In addition, mothers who have a greater income will also have higher participation in the decision-making, which in turn can have immediate positive consequences for children (P. L. Engle, 1993).

Indicators representing the decision-making and emotional domains of maternal autonomy were not statistically significantly associated with stunting in our study. Previous studies have found a strong association between the decision-making domain of autonomy and women's nutritional and reproductive health (Dharmalingam, 1996; Govindasamy & Malhotra, 1996; Hindin, 2000; K. Mason & Smith, 2000; Morgan & Niraula, 1995). Although these studies found a positive relationship between high decision-making autonomy and women's health, our study suggests that this may not extend to the health of their children. One limitation of the decision questions listed in the NFHS-2 survey is the wording that might capture dimension of autonomy that might be more relevant to women's own health rather than the children's health. Emotional status of a mother has been known to play a role in the development of children (Patel, Rahman, Jacob, & Hughes, 2004). Emotional autonomy, frequently measured as women's perception or disapproval of domestic abuse, has been known to play as an important role in child development (Koenig et al., 2003; Patel et al., 2004). In our study we did not find a significant association between the perceived domestic abuse and child stunting. In our study only 22% of women reported that domestic violence was not justified under any circumstances, perhaps suggesting that the lack of association between this dimension of autonomy and child stunting could be indicative of the normative nature of violence that is experienced by women throughout India (Go et al., 2003; Shireen J Jejeebhoy & Cook, 1997).

Maternal education and socio-economic status have independent effects on child stunting and confound the impact of maternal autonomy. In some studies maternal education is commonly used as a proxy for autonomy (Abadian, 1996; Dreze & Murthi, 2001; Dyson, 1983). While other studies have shown that maternal autonomy has independent effects on child health when controlling for education (Basu & Stephenson, 2005; Vlassoff, 1992b) and others have found that maternal education may be a mediator or a confounder for the relationship between maternal autonomy and child health (Kravdal, 2004). The nature of the impact of maternal education depends on the outcome of interest (Frongillo, 1997). In our study, the loss of significance of mother's education indicates insufficient residual variance remaining after controlling for SES and autonomy. Finally, maternal autonomy remained a significant predictor of stunting whilst controlling for mother's education, highlighting the independent effect of autonomy in this context.

The study was limited in the variables available through the NFHS-2 survey to represent the four maternal autonomy domains. We may have seen a greater impact of some of these domains if there had been a greater variety of questions pertaining to autonomy so that we could have compiled factor scores and analyzed domains rather than individual items. For instance information on freedom of movement has been captured by asking questions on not only needing permission to go to various places outside of the home, but also whether a woman could do this with out being accompanied by somebody else from the family (H. L. Smith, Sharon J. Ghuman, Helen J. Lee, & Mason., 2000). There were also factors, such as child care practices, that may be important mediators of the effect of maternal autonomy on child stunting, such as health care practices related to child nutrition and growth that we have

not been able to study. Understanding the association of autonomy with these factors is an important next step for researchers to design appropriate intervention tools.

As discussed by Ramalingaswami et al. in their report describing the Asian Enigma (Ramalingaswami et al., 1996), factors beyond household economics, such as women's status, are hypothesized to be responsible for the differences in the prevalence of under-nutrition between Africa and South Asia. The results of our study provides further evidence for this hypothesis, by showing two dimensions of maternal autonomy to be independent predictors of stunting of children < 3 years of age in Andhra Pradesh, India. The World Bank and United Nations emphasize the importance of empowerment of women with relation to child growth and development in their policy statements (M. D. Gupta, 2000; UNICEF, 2007). Many women's empowerment programs (such as developed by Grameen Bank in Bangladesh and Self Employed Women's Association in India) include strategies to achieve improved health care seeking behaviors of women and educational programs for child care (Bhuiya & Chowdhury, 2002; Sen, 1997). Our study suggests that such interventions will not only improve the woman's own health but also impact the well-being of her children. Thus, we believe that government and NGO resources would be well spent by increasing finances to programs that are aimed at improving women's financial and physical autonomy to reduce the extremely high levels of stunting observed in this setting.

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CHAPTER 3

3. Role of maternal autonomy and household status in Infant feeding practices among rural mothers in Andhra Pradesh, India: A Qualitative Analysis (Paper 2)

3.1. Abstract

Recently, UNICEF recognized women's autonomy and women's control over resources as an underlying determinant of child survival. Largely recognized as an important determinant for reproductive health, women's autonomy is less understood as a factor influencing child health. A better understanding of this linkage can be developed by examination of a woman's role in the community as a mother and her perceptions and beliefs about infant care practices that may originate from her surrounding environment. In this context, it is important to understand the effect of social and environmental factors on the caregiver to the extent that it affects infant feeding and care behaviors. With the objective of understanding this linkage among rural mothers in South India, we use qualitative methods to understand the beliefs and practices with regard to infant feeding and care behaviors among mothers with infants between 3 to 15 months of age. We explore the differing nature of these behaviors across different household level factors, namely family structure (joint or nuclear), income level (high or low), and varying levels of maternal autonomy. Using 43 in-depth interviews with mothers of infants aged between 3 and 15 months from villages in rural Andhra Pradesh, India, we find that mothers, irrespective of family structure and income levels, do not initiate breastfeeding immediately after birth and beliefs related to delay in colostrum feeding have strong cultural rationale. But the study does highlight the role of both maternal autonomy and family structure to be important factors related to early infant feeding practices.

3.2. Introduction

The recent UNICEF report on the state of the world's children quotes "*When women are healthy, educated and free to take the opportunities life affords them, children thrive and countries flourish, reaping a double dividend for women and children.*" (UNICEF, 2007) (pp. 2). The report suggests a strong relationship between women's empowerment and child health and well-being. The importance of women's autonomy for child survival was recognized by researchers in the "UNICEF Child Survival Framework" published in 1997 (UNICEF, 1997). In addition to a woman's autonomy, this framework also identifies several other factors which can affect child well-being, such as adequate dietary intake, availability of health services, inadequate maternal and child care practices and the overall health environment in a particular setting. For example, inadequate dietary intake among infants leading to child under-nutrition is affected by household level factors, such as insufficient access to food or incorrect maternal and child care practices. In addition, the community surrounding the households has an influence on the caregivers' behavior because it may provide the woman with the necessary child care information.

Maternal autonomy is a multi-dimensional concept that includes a mother's participation in household related decisions, her freedom to physically move in and around the household, the level of financial independence she enjoys and her emotional well-being (Shireen J. Jejeebhoy, 1997). These dimensions are thought to be critical for a mother to provide adequate care to her children (Ramalingaswami et al., 1996). In addition, the household structure (joint or nuclear family) and socio-economic factors are important determinants of infant care and feeding practices (Prakash, Swain, & Negi, 1994; Sharma & Kanani, 2006) and likely influence the level of maternal autonomy. This is particularly relevant in the context of developing countries such as India, where family structure and the deeply held cultural norms often play a critical role in influencing infant

care and feeding behaviors (Laroia & Sharma, 2006). A holistic perspective on role of woman's autonomy on child growth and care practices can be developed by qualitatively investigating the interactive effects of cultural norms, family structure and mother's autonomy on child care behaviors.

Right from birth, caring practices play an important role in the development of infant health. The first year of an infant's life is considered a critical period for child growth and development. The World Health Organization has recommended feeding behaviors and best practices during the first year of life for maximizing growth, development, and survival (Dewey, 2003; Gillespie & Haddad, 2001). These include initiation of breastfeeding within one hour of birth, feeding the first milk secretion (colostrum) to the infant, exclusive breast feeding for the first six months of life and introduction of complementary foods at the end of six months (180 days after birth) (Dewey, 2003).

National data on infant feeding behaviors from India indicate that the WHO guidelines are not followed by a substantial proportion of mothers. The NFHS-2 data (NFHS-2, 2000) showed that 16% of mothers in India initiate breastfeeding within one hour of birth and 37% within one day. By 4 months of age, 55% of mothers exclusively breastfeed their infants, and these rates drop to 27% between 4-6 months of age (NFHS-2, 2000). To understand inappropriate infant feeding behaviors, it is important to understand community level social, cultural, and environmental factors related to these behaviors in order to provide qualitative context needed for developing intervention programs.

The role of maternal autonomy on child care and feeding decision-making behaviors may be particularly relevant in India, where women's status and gender roles result in overall low levels of autonomy and lack of power for decision-making in a variety of domains (Balk, 1994; Shireen J. Jejeebhoy, 1997; K. O. Mason, 1986). There

are few quantitative studies conducted in India that explore how women's autonomy impacts health behaviors or health outcomes. Studies have shown the impact of decision-making power of women in the household to affect child health enhancing behaviors (Visaria, 1993), maternal autonomy is predictor of maternal health seeking behaviors (Bloom et al., 2001), contraceptive use increases among women who have higher autonomy in the villages of southern India (Dharmalingam, 1996) and there is higher infant mortality when women experience domestic violence and abuse (Ahmed, Koenig, & Stephenson, 2006). However, no studies have yet explored different dimensions of autonomy simultaneously and their impact on health outcomes using qualitative methods.

We examine four feeding behaviors that are relevant to the WHO guidelines (Dewey, 2003): (1) the initiation of breastfeeding within one hour of birth of an infant, (2) the feeding (not discarding) of the first milk secretion, colostrum, (3) the introduction of complementary foods of appropriate quality and quantity at about six months of age, including commercial weaning foods. The main objectives of this qualitative study are to better understand:

- The beliefs and reasons behind infant feeding practices, in context of household structure and income levels.
- The role of maternal autonomy (as defined through several alternative constructs) in context of household social structure (joint or nuclear) and its relationship to infant care behaviors.

3.3. Methods

Study Setting and Sample Description

This study is a part of a larger behavioral intervention trial to improve growth and development of infants between 3 to 15 months of age (Indo-US collaborative project under the Maternal and Child Health objective, 2004). The data were collected during the

formative phase of the intervention trial study for the purpose of intervention design. We collected qualitative data using a purposive sample of 43 mothers with infants between 3 to 15 months of age in Nalgona district, Andhra Pradesh, India.

The mother-child pairs were recruited from three villages in the district and were purposively selected to differ in population size. One village consisted of a population of 1,000 people, another with a population of 1,300 people and the third with a population of 2,500 members. We selected the dyads according to age groups of the infants, so that 4 children for each of the following age groups are included in each village: 3 – 5.5 months, 6 – 9, 10 – 12 and 13 - 15 months, with an equal representation of infant boys and girls in each age group. There was equal representation of mothers from schedule caste/tribe, backward class and the forward class.

Consistent with literature that conceptualizes autonomy as multidimensional (Agarwala & Lynch, 2006; Shireen J. Jejeebhoy, 1997), we explored maternal perceptions of several dimensions of maternal autonomy through in-depth interviews. The following four dimensions of autonomy were included in our interview guide (Appendix 2): (1) Decision-making autonomy – this dimension explored the issues regarding her participation in household level decisions and child care decisions, (2) Freedom of movement – this dimension examined the level of permission she needs to take to go out of the house and why would she need permission to go, and also includes places where she can go out by herself and her perception on why is the freedom important, (3) Financial independence – this aspect of autonomy captures the level of independence the mother has in spending money, whether she was allowed to keep the wages if she worked or she gave it to the elders in the household, the reasons behind those, and whether she could use money for her own interest if she wanted to without

asking for permission (4) Emotional autonomy – this dimension investigated the woman’s experience of domestic violence and her perception about domestic violence.

The concept of autonomy is a sensitive issue to talk about openly, especially for women in rural India (Shireen J. Jejeebhoy, 1997). To overcome this limitation, we used a methodology of short narratives or vignettes that describe fictional characters and scenarios that are appropriate to the setting (Hughes & Huby, 2002). The participant is asked to respond to the characters and plot of the story and to share their perceptions on how specific scenarios should or can be resolved. Thus, narrative vignettes provide an indirect way to investigate sensitive topics and participants can share their views without being asked direct questions about their own situation or behaviors. Vignettes have been used extensively in social science research to study sensitive concepts such as eating disorders (Currin, Schmidt, & Waller, 2007) social stigma and depression (Perry, Pescosolido, Martin, McLeod, & Jensen, 2007) and HIV/AIDS (Sivaram et al., 2004). We used several narrative scenarios as a way to categorize mothers for several constructs of autonomy, which then allowed an analysis of whether infant feeding practices and behaviors were related to different types of autonomy.

An example of one story and the questions posed to the participants is shown below:

Laxmi is 23 year old woman who was married to Ram 5 years ago. She has a 3 year old girl named Rani and a 7 month boy Raja. Ram works in a factory in the big city. Laxmi on the other hand takes care of the house and the children. Ram’s mother and father also live in the same house. Ram gives money for food and other necessary items in the home, but Laxmi also works in local shop and earns some money.

Scenario 1: If Rani fell ill, had high fever and became very weak, what do you think the family will do? (Probe: who and what kind of decisions will be taken? What will be

Laxmi's role?) **Scenario 2:** One day Laxmi came home from work, she had just received her pay from the shop. When she returned, Ram was drunk and asked her for her wages. What do you think Laxmi will do?

Data collection

We conducted semi-structured interviews by trained study personnel, who traveled to the homes of respondents who had agreed to participate. The training included skills to establish rapport and trust with the mother and the family, to conduct interviews and other assessments in a respectful and private manner, and to protect the confidentiality of the data and participants. Topic guides formed the basis for discussion of women's autonomy, breast feeding practices and other lifestyle patterns (See Appendices 1 and 2). The interviews were conducted in Telugu – the respondent's local language (the official language of the state of Andhra Pradesh, India). Each interview lasted for approximately one hour, and was audio-taped to ensure accurate transcription into Telugu. Study personnel were involved in transcribing and simultaneously creating a hand-written transcript for each interview. These transcripts were later translated into English by an independent professional translator who was not a part of the data collection team. The study protocol was approved by the Institutional Review Board of University of North Carolina, Chapel Hill and an independent Ethical Review Board appointed by the Indian Council of Medical Research, New Delhi, India.

Data Analysis

We interviewed 43 mothers but as is often the case with qualitative methods, we are missing some of the topic areas among some of the respondents. Thus our final data set consists of 37 transcripts with narratives on infant feeding and care practices and

behaviors and 35 transcripts captured qualitative data on autonomy. The transcripts were coded using qualitative data analysis software, Atalst.Ti (version 5.2), by the principal author and one other trained researcher. The codes were created based on the research questions and through a careful reading of the transcripts by the two coders (Ulin, Robinson, & Tolley, 2004). A coding tree was subsequently created which consisted of themes of interest for investigation in this work including maternal autonomy, initiation of breastfeeding, beliefs and practices behind colostrum feeding, introduction of other foods and liquids before six months of age, and reasons and beliefs behind the practices to introduce foods (Appendices 3 and 4).

Data reduction involved abstracting the required information using the matrix analysis methodology (Miles M. & A.M., 1994). We analyzed the data generated by these cross thematic analysis based on matrices we developed that allowed for an examination of patterns. The concept of autonomy was captured through a topic guide (Appendix 2) and the use of the vignette scenarios (mentioned earlier). Through matrix analyses, we reduced the data into four main themes that includes responses to the perceptions and reasons behind mother's behaviors with regard to autonomy: (1) decision making autonomy – the extent of mothers say in the household, (2) financial autonomy – extent to which she would have control and access to financial resources in the household, (3) freedom of movement – the freedom that she enjoys in moving in and around the house on whether or not she needs permission from others in the household to go to market, and (4) her emotional well-being.

Coded data from the autonomy transcripts under each of the themes was further examined such that each quote under each theme could be identified to be representative of high or low autonomy. The quote representative of high autonomy was given a score of

“1” and as for the quote related to the low autonomy was scored “0”. If the responses to certain dimensions were not available (or alternatively cannot be coded), we categorized it as missing. Next, we estimated the fraction of autonomy dimensions (of the number of dimensions for which we had responses) on which the mother had high autonomy. If this fraction was greater than or equal to half then we categorized them as high autonomy or else low autonomy. Finally, note that missing data is taken into consideration in this categorization.

We classified mothers to belong to a low income group if the overall family income was less than Rs. 45,000/- per annum. If greater than this amount the household was classified as high income group. This was done in order to explore the role of income on the feeding practices.¹

3.4. Results

Sample Characteristics

Our sample consists of 43 mother child dyads. Table 5 presents sample characteristics. The infants in our sample were between 3 to 15 months of age. Our sample had 12 infants less than 6 months old, 10 infants between 6-9 months of age, 16 infants are between 10-12 months of age and 5 between 13-15 months of age. There were 24 female infants and 19 male infants. Less than half of the mothers in our sample were between 15 and 20 years of age and another half were 21 to 25 years old. There was only one mother who was 40 years old and about 5 mothers in the age group of 26 and 30 years. Most of the mothers did not have a secondary or higher education and majority possessed a BMI of less than 20 (17 mothers less than 18.5 BMI).

¹ The poverty line in India is about Rs.15,000 per year.

Autonomy Dimensions

Table 6 presents selected narrative about the concept of autonomy that illustrate their understanding of four main domains of autonomy. Such narratives from the autonomy transcripts were coded and quotes representing the different dimensions of autonomy were put in form of matrix where each column represents each dimension. As mentioned earlier, each quote was given a score of “0” if it represented low autonomy and “1” if it was high autonomy. Following this table each mother ended up with a score of “0” or “1” for each of the narratives in each of the dimensions.

Only 9 mothers were categorized as high autonomous when examined across all the four dimensions (Table 7). But when we look at the percentages of mothers who score higher across individual dimensions of autonomy, 48% were autonomous in making child care decisions and only 11% of mothers reported to have freedom of movement. Thus the level of autonomy in this sample of mothers was relatively low, except for autonomy related to child care decision-making.

The results and discussion in the next few sections are based on the two distinct phases for pattern of infant feeding behaviors described earlier. We synthesize our findings based on family structure (joint or nuclear), the level of maternal autonomy (high or low) and the level of family income (high or low). This allowed us to understand the various socio-demographic and cultural factors that influenced infant care and feeding behaviors. Table 7 is another example with sample quotes to better illustrate the responses by mothers with various socio-demographic and autonomy levels. To maintain the confidentiality of the subjects, we replaced the participant’s name by the case identification numbers.

I. Feeding behaviors right after birth: Initiation of breastfeeding and colostrum feeding

Although breastfeeding initiation is near universal in this setting, two-thirds of mothers in our sample did not initiate breastfeeding within one hour of child birth, as recommended by the WHO. Some mothers were aware of the practice of putting the infant to the breast after birth and also the benefit of giving colostrum. It was observed that these behaviors are deeply embedded in tradition and cultural norms and influenced by elders in the family and not so much by maternal autonomy.

For initiation of breastfeeding, a common reason reported by mothers was that they did not have enough breast milk secretion to feed the child in the first 2-3 days of delivery and this is a normative belief. Some illustrative quotes are:

Belief about no secretion of milk --

“We were watching. Milk secretion was after three days. From then onwards, I have been giving” (12)²

“We won’t have milk immediately after birth. Also they (the child) will be sleeping. Too much of sleep and they don’t even wake up even if we try.” (13)

“After birth, there won’t be milk. That whole day, he was on glucose water” (23)

The mothers also mentioned some reasons for no secretion of milk --

“Milk is not given immediately after birth is not it. Some mothers will not totally have milk. Children grow big with our milk. Some mothers will not totally have milk. May be that is their body’s nature. Some will have excess of milk, while some others will not have sufficiently”. (18)

² The number in the parantheses are the case identification number

“That is, those who are weak, will not have milk. They always feed tinned milk or top milk. But I have never given like that”. (19)

“No. No. it will not be produced. Nobody gets it. You can also ask doctors.” (26)

Three of 43 mothers in the sample did report that they *initiated breastfeeding immediately after birth; at the same time they believed there was ‘no milk’ yet in their breast*. Some mothers knew they are suppose to let the infant suckle on the breast, though they did not know the reason behind it --

“There was yet no milk. But the child was crying very much. Thinking that if breast is given, she may keep quiet ... I let her suckle. There was severe pain in the nerves. As she suckled, there was milk” (19)

“It was not available. But my grandmother said that if I keep giving, it will flow. So I gave”. (30)

“Milk was not secreting but I just gave (the breast)... At 3 hours after birth ...because he has to suckle the breast. There was no milk... Don’t get till 3 days.” (14)

Several mothers in nuclear families in our dataset reported consulting the doctor as opposed to the mothers in joint families who reported taking advice of elders. The following quotes from mothers in nuclear family illustrate our observations.

“Milk secretion was there. She drank. That’s all. There was milk. Doctor asked me to give. First child, so I gave fully” (17)

“ Nothing else. Only glucose water. Glucose water (for the first 3 days). Doctors told us.” (31)

“I gave. Doctor asked me to give the breast to the child. Will she (mother) be there and tell? I only gave. As he was crying, I gave” (36)

Nearly 1/3rd of the mothers (13) reported that they gave prelacteal fluids, such as glucose water, honey and a local medicinal product called ghutti, after birth, primarily because they perceived that had no breast milk secretion right after birth. There is equal number of mothers in the joint and nuclear family households who introduced either of the prelacteal feeds.

“Tried putting her to breast but no secretion for 3 days, so gave outside milk.” (5)

“We gave her glucose water. We gave it only because doctors advise. The neighbors mentioned (to give honey) ... But we gave only glucose water for three days.” (3)

“If you squeeze, don’t you know? I squeezed and saw. It (the breast milk) was not there. I had operation, isn’t it? I could not turn to a side. After I could turn, I gave milk. On Thursday, there will be milk. Then I gave milk. Only glucose water (was given for 3 days). Now and then he was allowed to suck”. (36)

Most mothers in the sample were well aware of the importance of the first milk (colostrum) called “murrupalu” – this means the first milk in the local language. Regarding colostrum, several mothers reported that they squeezed their breast to express it, and then discarded it. This is based on a cultural belief that the colostrum milk is stale and bad for the child’s health and misinformation from the doctor:

“That is stale milk. I didn’t give. First I squeezed out a glassful and threw away. It is not good to be fed to children. They will have motions. They become weak. I removed during my first delivery since the child will get fever. For this delivery, I didn’t throw it. I gave it as such” (19)

“That milk will be in the breast for a very big time. We squeezed and throw away that milk and then we give” (29)

“No, doctor told me to squeeze and throw, she (the doctor) thinks the child will get diarrhea (31)”

The practice of discarding colostrum was prevalent in both joint and nuclear families. 17 out of 22 mothers who lived in a joint family household gave colostrums, compared to nearly all of mothers in a nuclear family (10/11). One case the mother living in a nuclear family reported her doctor advised her against this practice:

“No, doctor told her to squeeze and throw, she thinks the child will get diarrhoea (31)”

While the delay in initiation of full breastfeeding is evident, 13/16 mothers who delayed breastfeeding for 2-3 days did feed their infant colostrum. 8 mothers gave glucose water during the first few days of birth of the infant, in addition to feeding colostrum. Among mothers who gave no colostrum, the majority also delayed breastfeeding. Only 3 mothers initiated breast feeding (out of 33).³ The remaining mothers did not initiate breast feeding right after birth, and two of these mentioned an alternative -- wet nursing from other female relatives

³ Data on 10 mothers was missing

“We made my co-daughter-in-law give her milk to the child. She came on the morning after my delivery. So we got her milk given”, “Doctors said that glucose water should be given. Because I was still drowsy, I didn’t give” (33)

“My sister-in-law gave milk. She is an infant’s mother. She gave her milk. Because I had no milk” (2)

II. Feeding behaviors during the first 6 months of life of an infant: Introduction of complementary foods

Though breastfeeding the infant was universally practiced in our sample, exclusive breastfeeding was not the norm: 12/43 mothers reported they exclusively breastfed through six months. The mothers are very well aware of the advantage of breast milk but still unable to exclusively breastfeed due to perception that the mother does not produce enough breast milk for the infant.

Following quotes illustrate the knowledge the mothers have about goodness of milk --

“They say mother’s milk is strong milk. There will be vitamins and others. There will be vitamins in the food we eat... (and)... these will reach the milk” (3)

“Yes, breast milk is given by god to the baby” (6)

“Those who do not have mother’s milk will be weak. No other milk can be equal to mother’s milk. Whatever is fed, children won’t be healthy. They will have one or the other complaint. They have fever or other sickness. They say mother’s milk is best” (13)

Introduction of foods and liquids:

The mean age of introduction of weaning or complementary foods in our sample was 5 months. 27 out of 35 mothers introduce a type of commercially available weaning food (Cerelac)⁴, other local weaning food or other milks before 6 months of age. The predominant foods that were introduced were the following: commercially available weaning food (Cerelac) and a type of lentil preparation (called dal). Other household made weaning food (locally called as “uggu”⁵), was fed by 5/43 mothers. Other complementary foods included, plain boiled rice (annam) or other milks (buffalo, cow and sheep milk).

There were many reasons given for the early introduction of food. Many mothers reported that the commercially available weaning food, Cerelac, would make their infant stronger and appear healthier, especially when they perceived that mother’s milk is insufficient. The following quotes illustrate beliefs about Cerelac:

“Yes, if milk is not adequate it (Cerelac) should be given at 3rd month” (8)

“Because my feeding has been less (we give Cerelac). Feeding of my milk has been less.” (10)

“It (mother’s milk) has not been sufficient from five months, since then I have been giving Cerelac. If a little mother’s milk is in the stomach, and that is drained once he passes urine, there must be some support in the stomach. So at least some Cerelac must be given, my children should be well and strong. They should be stout.” (18)

⁴ Almost all the mothers in our sample that introduced commercially available weaning food, introduced called Cerelac.

⁵ Uggu is a mixture of lentil and rice

“If Cerelac is given, they will be stout and good looking.” (19)

“When we saw our neighbors feeding it, we thought we can make Bujji strong, as she was born weak. It (Cerelac) is good if fed at 3 months” (21)

“Because he has been weak and thin, I gave him from 4 months” (20)

“When we watch TV, they will show that these should be fed to children, in advertisements. Like that we have seen and given. We develop a good opinion about them and feed.” (34)

Feeding of Cerelac is complemented with other local foods and liquids. Out of the 21 mothers who fed Cerelac to the infant in our sample, only 4 fed it exclusively. In almost all the cases, the introduction of Cerelac and other foods or liquids started before the infant turned six months old. Many mothers also believe introducing foods early and mixing foods is a practice that has a positive impact on the health of the infant as seen in the following quotes:

“We asked the doctor. We gave (Cerelac) because we wanted to give. When we saw our neighbors feeding it, we thought we can make Bujji strong, as she was born weak. It (Cerelac) is good if fed at 3 months” (21)

“I gave Cerelac to my boy from the time he completed 3 months. When mother’s milk is not sufficient, some give ‘uggu’. If they are weak, some are given Cerelac, horlicks. When I had no milk, I had also given Cerelac to my son. But since there is enough milk, I am feeding her annam only” (30)

“I gave Cerelac after completion of 2 months and on entering 3rd month. Since I got these tins, I gave it in milk (cow’s milk). I got him used to it by the completion of 2 months, in the beginning of 3rd month.” (35)

Further with the introduction of Cerelac, mothers also introduced other foods and liquids, such as other milks, dals or rice simultaneously. The act of simultaneously introducing Cerelac and other foods and liquids suggests that Cerelac and other weaning foods are perceived as equivalent. For example, some mothers quote:

“Cerelac is being given from 3 months. ‘Uggu’ is also like Cerelac isn’t it? It will be good if given from 3 months.” (34);

“While I was feeding that milk, I got the idea of feeding the biscuits and I started from then onwards and we have been giving one biscuit at 9 O’clock and again at 4 O’clock. Then I was thinking what milk should be used for the biscuit.” (23)

One mother in the joint family household mentioned,

“My husband told me. My grandmother told me that Cerelac should be given. So we gave.” (28).

Impact of maternal autonomy on infant feeding practices (Narratives):

The qualitative examination of the role of maternal autonomy yielded description of how infant feeding practices varied across the levels of autonomy in different domains. We describe here some observations based on two domains of autonomy, (1) child-care decision-making autonomy and (2) financial autonomy.

Child-care decision making autonomy -

In our sample we analyzed and observed that not all mothers were able to making child-care decisions by themselves. Among the mothers in our sample, 12 out of 25 mothers interviewed on the child care autonomy dimension said that they had the power to make those decisions, while the remained said such decisions were not entirely up to them. When we looked at specific infant feeding behaviors by the child care decision making autonomy dimension, we observed mothers with lower autonomy to be more likely to squeeze and discard colostrum --

For example, this mother (20) said – “*We squeezed because it is not good, it is sticky. My grandmother (told me).*” But on asking on what she was her opinion about colostrum, she said – “*It (colostrum) will be sticky. It is good milk but they (the elders) say it should be squeezed.*”

Another mother (21) quotes, “*Nothing will happen. I mean I do not know what will happen, but I squeezed aside like that.* On asking who told her to throw away, she said “*Mothers of children. Mothers of babies.*”

With regard to introduction of foods and Cerelac feeding before 6 months of age, we saw a similar pattern. Mothers who did not have autonomy for child care decisions were more likely to introduce Cerelac, and this was particularly influenced with influence by elders and others in the community, as illustrated in this quote by a woman with low autonomy.

“*My husband told me. My grandmother told me that Cerelac should be given. So we gave.*” (28).

To further demonstrate how low and high level of child-care decision making capacity can affect the behavior of the mothers, we describe **two case-studies** that illustrate how autonomy might be playing out in infant feeding practices.

We first talk about Durga (this is a fictitious name to protect respondents identify). This mother is 18 years old with 8 month old infant. They live in a family with high income and the family lives in a joint nature. When we asked her about her decision-making ability in the household and specifically about child feeding, she said,

“My mother-in-law has experience. She knows what is good to feed and bring them up. She would suggest to me to feed this or that. She takes care of the child well.” (28)

The infant in this household also received Cerelac when the infant turned 4 months old. On asking about who decided to introduce Cerelac, this same mother said –

“My husband told me. My grandmother told me that Cerelac should be given. So we gave.” (28).

This shows us clearly that this mother does not possess autonomy and she was categorized as possessing low autonomy based on our scoring system described earlier.

Another case, Savitri is 25 years old and with an infant who is 4 months old and lives in a Joint family. This mother started with Cerelac, again an inappropriate feeding behavior, but she did it because the doctors advised her to give Cerelac and she believes it is good.

“I am wanting to use from 3 months but it seems they will become stout if they eat it. If they become stout, and they have some problem it seems it would subside. In another 15 days, he will be completing 3rd month and I am thinking of using later.”

(23) (High Decision-making)

When we talked about her decision-making power and autonomy she mentions –

“If the mother-in-law does not agree, I (the mother) will buy from the money that I earn by stitching clothes. I work and I buy from my money. If the mother-in-law does not want, she is not worker. She is not giving, then what is her word on this? We have the capacity to say that we rear children and get for them something from our earnings.”

Through this case one can see that this mother is more autonomous than Laxmi and makes her own decisions regarding child feeding, and we. We categorized this mother as having high autonomy for this dimension.

Financial autonomy -

To better understand the factors influencing infant feeding behaviors, we examined some cases that shed some light on the interplay of financial autonomy and household status factors. While we were surprised about the penetration of this commercial product, Cerelac in these rural villages, the data also showed that sustainability of its use as an infant food is a problem for some families, like one mother says...

“...then a tin was brought for Rs.100/- ...lasted one week. His father brought another tin. Because it is sweet, he ate well. Then his father said we could stop it and he could be given outside milk. Since then I am giving him outside milk” (36)

This mother, Laxmi, is 28 years old with an infant who is now 12 months old. Laxmi lived with her in-laws since she got married but she and her husband moved away, we don't the reason, and now live in another village. But knowing the communities the reason could be because the husband had to move away for a job. We talked to Laxmi about how she fed her infant for the last 12 months and also about her autonomy. She started giving Cerelac to the child at the completion of 2 months.

According to the quote above we can see this mother is restricted in financial autonomy and her husband seems to telling her what to do about infant feeding. Also because this product is an expensive product her husband told her to stop it and feed outside milk. This mother also reported that she did not possess any decision-making capacity when they lived with her in-laws.

“She (the mother) should ask only the mother-in-law. What should be done. What has to be cooked? If the mother-in-law gets them or the husband gets, she can cook.”

Over all, in our sample there were 4 mothers out of 17 who reported on financial autonomy, were not restricted with their freedom to use money. These mothers clearly demonstrated that because they had this freedom they could make a choice on whether to feed the infant formula foods or not.

Complementary Feeding by Levels Household Type:

15 out of 29 mothers living in joint family household introduced Cerelac, compared to 8 out of 14 mothers in nuclear family households who introduced Cerelac to their infants before 6 months. Some of these mothers also do mix feeding before the infant is 6 months of age. There is more mix feeding happening in nuclear family household (7/8) as oppose to 11/15 in the joint family households.

Sources of information for introduction of complementary foods --

We found that some mothers from the joint family households were likely to seek information from sources such as anganwadi worker and TV shows. Our study also sheds some light on the role of village anganwadi⁶ workers, who is meant to provide detailed information on infant feeding in the first months of life. The anganwadi workers in villages play a role in disseminating nutritional information to mothers with young children. Evidence of what kind of information the mothers get from outside is captured in the following quotes:

“While we were leaving, she used to say if it is a powder like this, they make it dirty, you sprinkle some water and make balls and give, she (anganwadi worker) used to say. They will spill it, make it dirty and flies gather, so we feed like that. We are doing as per their advice” (23)

“When we watch TV, they will show that these should be fed to children, in advertisements. Like that we have seen and given. We develop a good opinion

⁶ Anganwadi workers and helpers are workers engaged by the Government to work in the State operated Integrated Child Development Services which cater to the health and pre school education needs of 0-6 year old children as also the health and nutrition needs of pregnant women, nursing mothers and adolescent girls. (Source: http://en.wikipedia.org/wiki/Andhra_Pradesh_Anganwadi_Workers_and_Helpers_Union)

about them and feed. Nobody told. Doctors too did not tell. We developed the opinion that it should be fed and we gave it.” (34)

All the mothers from the nuclear family seek advice outside the house, such as the anganwadi workers or doctors primarily due to the fact that they lack the guidance and direction from elders in the household. Hence, it is important to train the anganwadi teachers or health care professionals with right information and knowledge for suggesting foods that are appropriate for the infant. This phenomenon is evidenced in the following quotes –

“We only asked. On completing 3 months and beginning of 4th month, he (doctor) asked me to start (Cerelac)” (25)

“First I gave Cerelac. Doctor asked me to give...” (36)

Complementary Feeding by Levels of Income:

In our sample, 9/15 mothers in the high income group chose to feed Cerelac. Equivalently 14/28 mothers in the low income group also fed Cerelac. This suggests that Cerelac feeding is relatively normative in this setting, despite its cost. We explored the cost of feeding Cerelac and the following quotes illustrate the household financial constraints of its use, even though it is believed to be beneficial:

“No. presently, those who have money get Cerelac and give. Those who don't have soak rice in a 'gurigi', add redgram dal or greengram dal, mash it soft and feed. Those can't afford as that others get tinned foods and give.” (31)

“Those who have given what they can, spending money. We poor, from where can we get. We give whatever we can” (32)

“Once we gave two (cans) and stopped it. These two lasted for 15 days. His father felt that it was very costly and stopped it. He is not getting again (this mother then started introducing bread and tea); Just like that as my mother soaks bread in tea and gives; My mother is giving since 5 months” (32)

“...then a tin was brought for Rs.100/- ...lasted one week. His father brought another tin. Because it is sweet, he ate well. Then his father said we could stop it and he could be given outside milk. Since then I am giving him outside milk” (36)

Further, because the mothers perceive that other foods are equivalent to Cerelac as observed earlier they feel free in stopping the feeding of Cerelac at any point in time.

3. 5. Discussion

In this rural setting of Andhra Pradesh, infant feeding practices are influenced by several factors that are embedded at different levels of the socio-ecological framework (Black, Morris, & Bryce, 2003; Mosley & Chen, 1984; Pandey & Arvind, 1998). Through the help of vignettes, we aimed to qualitatively understand the influence of maternal autonomy on infant feeding practices under varying household level factors surrounding the mothers and children, namely household structure and financial status. In addition we also discussed the role of cultural norms (such as throwing away colostrum) in infant feeding. Despite considerable resistance from mothers in talking about sensitive issues (such as decision-making and domestic violence) related to their position within the family, many mothers were forthcoming and shared their personal experiences.

Among the majority of our sample, there is extensive knowledge and understanding of the importance of breastfeeding and other appropriate early infant feeding behaviors, even when they did not practice them. For the early infant feeding practices, especially right after birth, mothers gave several reasons for not following recommended behaviors. Initiation of breastfeeding was not a universal practice and the majority of the mothers in our study concerned about not having enough milk secretion to initiate breastfeeding. Although some women believe that milk doesn't flow right a way, it is a function of the baby's sucking. They need to understand that all that comes from the mother's breast is needed for the infant's health including colostrum. Therefore, mothers need to put the baby to the breast immediately and pursue the recommended breast feeding practices. Further, in the context of India, as opposed to the to the recommended behavior of breast feeding by WHO, Sharma (2006) finds that majority of grandmothers believe that initiation of breastfeeding need not occur right after the birth (Sharma & Kanani, 2006). Thus, further research is needed to understand some issues behind these perceptions and explore the temporal nature of the behavior and the perception, for example, to understand if the belief of no secretion of milk influences the mother not being persistent with initiation of breastfeeding, or whether there is physiological problem and that leads to no initiation of breastfeeding right after birth. This will give us an insight into addressing early antenatal behaviors of infant feeding in the rural settings of India. Wet nursing was talked about by small number of mothers. Prior literature has also observed the prevalence of the culture of wet nursing (A. Gupta, 2000). This practice has been mentioned and prevalent since ancient India (Laroia & Sharma, 2006) and thus also existing among rural communities of Andhra Pradesh, India.

Similarly, though colostrum feeding is prevalent, cultural beliefs and norms for discarding colostrum are strong. In our study the practice of throwing away colostrum

was more prevalent in the joint family household than the nuclear family household. A possible explanation for this difference can be found in the fact that mothers in the nuclear families are more likely to consult the health system because of lack of availability of a direct mentor – an elder in the family – who can provide advice on child feeding behaviors. Also, we observed that mothers who did not have child-care decision making autonomy were more likely to throw away colostrum, and many reported that they did this based on the advice and suggestions from the elders and people in the community. Ancient vedic literature from India mentions the deleterious effect of colostrum and advocate squeezing and throwing away right after birth (Laroia & Sharma, 2006). Thus it is a challenge for the health educators to find a balance between being sensitive to cultural norms and advocating scientific knowledge behind good infant feeding practices. Traditional knowledge behind colostrum needs to be modified with culture appropriate messages and develop non-contradictory scientific messages.

The introduction of prelacteals was common in our sample and introduction of glucose water or other milks was a well accepted norm. A recent articles mentions (Laroia & Sharma, 2006), embedded in the olden scriptures, that feeding of prelacteal in not something new in the Indian society. It has been a belief for years and centuries and mentioned in the older scriptures to feed prelacteal fluids before initiating breastfeeding. But we did observe this practice present in joint as well as nuclear household and hence there is a deep-rooted community norm that governs this practice. This leads us to an important observation through our study. We find, unlike prior literature (Kaushal et al., 2005; Kumar, Agarwal, & Swami, 2006), the practice of throwing away of colostrum was not as predominant as expected but at the same time the delay of initiation of breastfeeding still exists. This suggests that the mothers did believe that feeding

colostrum was an important practice unlike initiation of breastfeeding. This is a unique finding which has not been extensively investigated by researchers.

The practice of feeding a commercial infant cereal, Cerelac, was surprising and may be a cause of concern because of cost and sustainability. In this sample, low income families did report a problem of sustaining the feeding of Cerelac because of cost.. For example, when mothers perceive they do not have sufficient breast milk, they may introduce Cerelac, as advised by elders and others. If resources are limited, however, Cerelac feeding may be discontinued and other foods/fluids that are perceived to be equivalent may be introduced.

Mothers' perception that Cerelac is a breast milk substitute is despite the fact that Cerelac advertisements mention that it is not⁷. In-depth information needs to be further gathered regarding the reasons behind the introduction of Cerelac in the community and the origin of the practice. This is because despite the inappropriateness of this practice of formula feeding before 6 months of infant age based on the WHO recommendations, evidence from observation studies in southern India suggests that doctors themselves promote the introduction of formula feeding practice prior to six months of an infant (Fidler & Costello, 1995). Thus, further qualitative research will help us understand the problems and deep-rooted cultural norms regarding the introduction of Cerelac. It will also provide insights for intervention messages that will help towards developing educational messages for the health care professional as well as the community leaders and workers.

Our study highlights the influence of maternal autonomy on infant feeding practice. As mothers are primary caregivers of infants and children, their personal

⁷ <http://www.nestle.co.uk/Nutrition/InfantAndChildNutrition/ProductInformation/CERELAC.htm>

characteristics may influence the care behaviors they deliver (P. Engle, Lhotska, & Armstrong, 1997a).

Our data suggest that mothers with low child-care decision making autonomy are less likely to follow the recommended infant feeding practices by formal health care system. Though discarding colostrum was not practiced by all it still exists and was more likely to be practiced by mothers with lower decision-making power. Maternal autonomy did play out differentially based on the family structure, but overall we observed that mothers who did have higher child-care decision making capacity or financial independence tend to make decision based on their own knowledge and judgments and were less likely to be influenced by others.

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Table 5: Sample distribution of infants in 3 villages of Andhra Pradesh, India

Characteristics	n
Infants (n = 43)	
<i>Age</i>	
< 6 months	12
6 – 9 months	10
10 – 12 months	16
13 – 15 months	5
<i>Sex</i>	
Males	19
Females	24
Mothers (n = 43)	
<i>Age</i>	
15 – 20	17
21- 25	20
26 – 30 (40)	5 (1)
<i>Education</i>	
1 st – 3 rd grade	20
4 th – 6 th grade	21
> 6 th grade	2
<i>BMI</i>	
< 18.5	17
18.5 - < 20	10
20 - 25	11
<i>Caste</i>	
Schedule caste/tribe	10
Backward class	27
Forward class	6
<i>Income (per annum)</i>	
< Rs. 15,000	11
Rs. 15,000 – 45,000	17
> Rs. 45,000	15

Table 5 Qualitative study: Sample Characteristics

Table 6: Examples of Quotes representing data under each dimension of Autonomy and the different level of autonomy

Decision-making dimension	Freedom of movement	Financial independence dimension	Emotional well-being dimension
<p><i>“Does not go beyond my word. Even I have to listen to him.” People in some community will have a say and the others may not have. “Some will have, some will not.” (5) (High - 1)</i></p>	<p><i>“If he (the husband) knows the reason for going, to avoid his scolding, I tell in advance. If we don’t tell and go that night we will not have sleep.” (37) (Low - 0)</i></p>	<p><i>“She should silently get the wages and give to the mother-in-law. Then there won’t be any problem.” (31) (Low - 0)</i></p>	<p><i>“I did not listen to something told to me. For something, something was to be brought and I did not bring. So he beat.”; “Justice or injustice, I don’t know. “It is not that women should be beaten but they are beaten. It is injustice.” (22) (Low - 0)</i></p>

Table 6 Example of quotes representing maternal autonomy

Table 7: Table presenting a procedure for categorization of women as High or Low autonomy*

Case ID	Decision-making	Child care decision	Freedom of Movement	Financial autonomy	Domestic Violence	Number of High autonomy dimensions	Total Dimension answered	Proportion Number	Categorization
1									
2		1				1	1	1.00	HA
3			0			0	1	0.00	LA
4								Missing	
5	1	1	0	1		3	4	0.75	HA
6	0	0	0	0		0	4	0.00	LA
7	0	1				1	2	0.50	HA
8	0							Missing	
9	0	0				0	2	0.00	LA
10		0	0	0		0	3	0.00	LA
11		1	0	0		1	3	0.33	LA
12	0	0	0	0		0	4	0.00	LA
13	0	1	0	1		2	4	0.50	HA
14		0		0		0	1	0.00	LA
15		1	0	0		1	3	0.33	LA
16	0	0		0		0	3	0.00	LA
17				0		0	1	0.00	LA
18					0	0	1	0.00	LA
19	1	0	0	0	0	1	5	0.20	LA
20	1	0	1			2	3	0.67	HA
21	0	0	0	0	0	0	5	0.00	LA
22	1		0		0	1	3	0.33	LA
23	1	1	0			2	3	0.67	HA
24								Missing	
25								Missing	
26								Missing	

27								Missing		
28	0		1	0			1	3	0.33	LA
29	0		0				0	3	0.00	LA
30	0	0			0		0	3	0.00	LA
31	0	0	0	0	0		0	5	0.00	LA
32	0	1	0				1	3	0.33	LA
33	0	1	0	1	1		3	4	0.75	HA
34	0		0	1	1		2	5	0.40	LA
35	1		0				1	3	0.33	LA
36	0				0		0	2	0.00	LA
37	0	1	0		0		1	4	0.25	LA
38	0	1			0		1	4	0.25	LA
39		1					1	1	1.00	HA
40	0	0					0	2	0.00	LA
41									Missing	
42	1		0		1		1	2	0.50	HA
43	0	0	1				1	3	0.33	LA

Table 7 Mothers scoring high and low autonomy among various dimensions

CHAPTER 4

4. Maternal autonomy is an independent predictor of feeding practices and growth in rural Indian infants (Paper 3)

4.1. Abstract

Objective: The high prevalence of child under-nutrition remains a profound challenge in the developing world. Maternal autonomy is recognized and postulated to be an important determinant of infant growth, care and survival. Despite the importance of this issue, empirical data are lacking, particularly related to feeding practices. We examine how different dimensions of a woman's autonomy impact the introduction of complementary foods/liquids and growth of infants aged between 3 and 5 months after adjusting for socio-economic and demographic variables. **Design:** We validate our conceptual model using the Structural Equation Modeling methodology using a cross-sectional baseline dataset. 59-item autonomy questionnaire was used to measure different dimensions of autonomy. Anthropometric measurements collected and demographic survey was administered by trained research staff at the National Institute of Nutrition, Hyderabad, India. **Setting:** 60 villages in the rural district of Nalgonda, State of Andhra Pradesh, India. **Subjects:** 602 mother-infant pairs enrolled in a longitudinal randomized behavioral intervention trial. **Results:** Our results indicate that mothers with higher autonomy measured by financial autonomy and a decreased experience of domestic violence are more likely to breastfeed 3-5 month old infants. We also found that mothers in joint family households are more likely to

have infants with poor growth. **Conclusion:** These results suggest that improving maternal autonomy will have a positive impact on infant care and growth outcomes.

4.2. Introduction

Child malnutrition and related morbidity and mortality are challenges faced throughout the developing world. India, a country with a population of more than a billion, has one of the highest rate of undernourished children in the world with 47% children underweight and 38% stunted (Gragmolati, Bredenkamp, Shekar, Gupta, & Lee, 2006). While the literature identifies several determinants of ill health among infants and children, lack of adequate dietary intake and high rates of infection in the early stages of growth of children is a fundamental determinant of poor child health (Mosley & Chen, 1984). Despite the high levels of child malnourishment in India, recent data show adult dietary requirements are being met, indicating sufficient availability of food (NNMB, 2001). Thus availability of food may not be necessarily the cause of under-nutrition among children under three-years in such families.

Recent studies suggest that the status of a woman in the society may be linked to child malnourishment. For example, Ramalingaswami et al. (Ramalingaswami et al., 1996) observe that child malnutrition is higher in Asia in comparison to Africa despite similar socio-economic status of the two regions. Coining this anomaly as the “Asian Enigma”, they suggest that the low status of women in the Asian sub-continent may be one of the factors having an impact on infant growth and survival. Smith et al. (L. C. Smith, 2003) also suggest that women’s power (ability to make choices) is an important factor that determines child’s nutritional status. Further, Doan and Bisharat (1990) find that mothers with low autonomy

(defined as the mother's structural position in the family) have wasted children as compared to mothers with high autonomy. A study in Chad (France Begin, Habicht, & Delisle, 1997) observed that stunting was predicted by the level of a mother's involvement in decision-making regarding the kind of food to be given to children.

The positive link between women's autonomy and child feeding behaviors have been suggested by other researchers (F. Begin, Habicht, Frongillo, & Delisle, 1997; Patrice L. Engle et al., 1999; Heaton, Huntsman, & Flake, 2005; Umeta, West, Verhoef, Haidar, & Hautvast, 2003). The most recent report from UNICEF (UNICEF, 2007) calls for more research to establish empirical evidence. The rationale behind the importance of woman's autonomy in determining child nutrition can be seen in the fact that mothers are the primary caregivers to the children. Organizations such as WHO and UNICEF recommend care practices, such as timely introduction of complementary foods and exclusive breast feeding that the mothers should provide to their children (Dewey, 2003; WHO, 2003). In order for a mother to execute these practices, certain amount of freedom with regard to physical movement, finances and household decision-making is required (Patrice L. Engle et al., 1999; S. J. Ghuman, 2003), assuming that mothers receive and hold similar knowledge and beliefs about feeding behaviors.

Our research differs from prior work linking women's autonomy to overall child nutrition. The idea that higher autonomy results in better child nutrition still needs an understanding of whether higher levels of maternal autonomy are associated with better feeding and child care behaviors, as recommended by organizations such as WHO and UNICEF. We address this issue empirically by examining how maternal autonomy affects child feeding behaviors. Further, we examine maternal autonomy as a multi-dimensional

concept. Despite recognition that autonomy is a multidimensional construct (Agarwala & Lynch, 2006), earlier research has investigated only one or two dimensions of autonomy. For example, Begin et al. (F. Begin, Frongillo, & Delisle, 1999) find the influence of household food expenditure and the decision-making about child feeding a significant predictor of improved height-for-age z-scores. Engle (1993) examines the impact of financial independence and finds that mothers with a higher contribution of money to the family income had significantly improved child nutritional status.

In this study, we consider seven dimensions of maternal autonomy. We examine whether rural Indian mothers who exhibit higher levels of autonomy are more likely to exhibit early appropriate feeding practices and have infants with better growth, compared to mothers who exhibit lower levels of autonomy, after adjusting for potential confounding factors.

4.3. Data and Methods

Study Design and Study Population

We used baseline data from a longitudinal educational randomized intervention trial aimed at improving the growth and development of 3-15 months old infants. The data was collected from 602 mother-infant pairs in 60 villages in the district of Nalgonda in the state of Andhra Pradesh, India. These villages are a part of three major project areas where the government administers the Integrated Child Developmental Services (ICDS), a multi-package of services that involves supplementary food to vulnerable groups, coverage for immunizations and non-formal preschool education. Infants in the study were, (a) between 3 and 5 months of age (b) weighed more than one and half kilograms at birth and (c) had no

apparent chronic or congenital illness. Data collection was done by research staff that had undergone extensive training in all the assessments.

Outcome Variables

The primary outcome is “introduction of food or liquids” to infants between 3-5 months of age to assess whether mothers were exclusively breastfeeding in the first six months of life, following WHO guidelines for appropriate feeding (WHO, 2003). For the purpose of this research, we measured feeding behavior in a dichotomous fashion with the referent category as exclusive breast feeding practice and the other category being introduction of foods or liquids at or before 6 months of age. This categorization was taken into consideration to study the adherence of WHO recommendation of breast-feeding behavior since even feeding of non-nutritive liquids can increase risk of diarrheal diseases (Popkin et al., 1990). Next, we examined nutritional status indicators, weight-for-height, height-for-age and weight-for-age z scores as a second set of outcomes. The z-scores used in the study are based on the new WHO 2005 growth reference (WHO, 2006). The age of the child was calculated by subtracting the date of birth of the infant from the date of survey.

Autonomy: Explanatory Variable

The concept of women’s autonomy is extensively studied in the sociology literature and has been identified as a concept that can not be directly observed. Thus it is a latent variable that is represented by measures that capture the underlying concept. Much of the current literature has used single representative measures to characterize the multiple dimensions of autonomy (F. Begin, Frongillo, Delisle et al., 1999; Dharmalingam, 1996). For example, Mason (J. Mason et al., 1999) studied the effect of multiple dimensions of

autonomy on women's fertility but this work sums up different items of autonomy. They used the OLS regression methodology to regress health outcomes of fertility or child mortality, on the summed indices of various autonomy dimensions. The underlying assumption in such regression model is that there is no measurement error in the items of autonomy. To overcome this limitation, more recently, Agarwala and Lynch (Agarwala & Lynch, 2006) operationalized autonomy as a latent concept taking into consideration the measurement error associated with multiple indicators to measure each dimension of autonomy. In our study, these dimensions were measured using a 59-item autonomy questionnaire (Table 9). A significant majority (53) of the questions in our survey instrument came from the survey on the Status of Women and Fertility (SWAF) questionnaire (H. L. Smith et al., 2000).

4.3.1. Model Building: Construction of Latent Autonomy Factors (Dimensions)

To confirm whether the indicators of each autonomy dimension effectively measure the respective latent dimensions, we ran a Confirmatory Factor Analysis (CFA) where we reduced our 59 items into seven latent factors. We observed an over all fit for this model such that the latent dimensions loaded well on each measured item of autonomy (example, Figure 2). The model fit, the factor to item R^2 and factor loadings from the CFA were examined to assess the construct validity of the factors. Several other model fit indices -- chi-square, CFI (Comparative Fit Indices), TLI (Tucker-Lewis Index) and RMSEA (Root Mean Square Error of Approximation) were used to assess the goodness of fit of the CFA model (Brown, 2006).

Covariates

We considered several household, maternal, and infant characteristics, including mothers age, education, height, caste, standard of living, child's age and household social structure (joint versus nuclear), that may act as confounders of the relationship of autonomy with the feeding and growth outcomes. The household standard of living is adapted from the National Family Health Survey (International Institute for Population Sciences & Macro, 2000). These questions measure the quality of household construction and land and household ownership, house type, toilet facility, source of lighting, main fuel for cooking, source of drinking water, separate room for cooking, ownership of the house, agricultural land, irrigated land, livestock and household assets such as radio, television, and a bed.

4.3.2. Structural Equation Model

We then used Structural Equations Modeling (SEM) approach to examine the impact of the latent autonomy factors with covariates on the observed outcome variables (Figure 3). By using SEM we are explicitly able to account for the measurement error in the indicators for each of the latent factors. Also, a simultaneous equation modeling approach allows examination of which dimensions of autonomy have an impact on the outcomes, after accounting for other dimensions. We used the latent factors validated by the CFA in our SEM analysis to regress our outcome on these latent factors. The coefficients of the SEM are probit coefficients that measure the effects of the independent latent variable on the Z score of the underlying dependent variable. In our study the dependent variables “introductions of foods/liquids before 6 months of age” was categorical. In such cases, the assumption of multivariate normality is violated and we cannot use standard maximum likelihood

estimators. To accommodate this problem, we treat the data as categorical in our analysis and use the Weighted Least Square (WLS) estimator as opposed to the standard maximum likelihood estimates. One of the key advantages of the adopting and using the WLS procedure is that the estimator is distribution free. We used Mplus 4.1 to perform the analysis.

4.4. Results

Sample Descriptive

The study sample (Table 8) consists of 602 mothers-child dyads, consisting of equal distribution of nuclear and joint family households. These households are predominantly Hindu and 65% of the sample belonged to the “backward class” of the caste system⁸. More than one third of the mothers have no education, and another third have only primary education. 30% of the mothers in our sample are undernourished, with a BMI <18.5. 12% of children in our sample weigh between 1500 and 2500 grams and all other children weight over 2500 grams.

Tables 9-1 through 9-7 show descriptive statistics of the items for the seven dimensions of autonomy in the study sample, and reflect generally low levels of autonomy for certain dimensions. For example, two thirds of mothers reported that the decisions regarding how her own earnings are to be spent or whether she can decide whether to seek healthcare for herself are taken by others in the household. For financial autonomy, approximately 65% of the mothers in the sample report they do not feel free to buy small item of jewelry (such as a bangle or earrings), and 45% do not have their own cash on hand

⁸ Backward class is a term used by the Government of India, for castes which are economically and socially disadvantaged and face, or may have faced discrimination on account of birth. (Backward Class 2007, June 27)

for household expenditures. 70% reported they need permission to go to any place in or outside the village (whether alone or accompanied), 80% report needing permission to go to the local health care center. One quarter of the mothers report having experienced domestic violence, while 60% are afraid to disagree with their husband because he will be angry or beat her.

SEM Analyses

The CFA model was based on the concept of loading respective autonomy factor on the items that were a priori conceptualized to represent a particular factor (dimension). The factors (dimensions) conceptualized that were consistent with prior literature are as follows: (1) Decision-making ability regarding household items, (2) Permission needed to go out, (3) Freedom to go out alone, (4) Control over finances and household resources, (5) Decisions regarding child care, (6) Perceptions on gender base violence and (7) Experience of gender based violence. The first CFA model with all the indicators in each of the dimensions did not fit well, because there were items with low loadings. To improve our model fit of the CFA model (Table 10) we observed cut-off points and removed the items from the respective dimension if the R-square was less than 0.40 and modification indices (MI) greater than 10.0 value (Brown, 2006). Our final model fit well with the following indices: CFI – 0.945, TLI – 0.947, RMSEA - 0.046. These are acceptable indices as they follow the criteria prescribed by researchers: RMSEA should be less than 0.05 and CFI and TLI should be greater than 0.9 for a fair acceptability of the model (Bollen, 1989). Overall, these findings suggest that the measurement model performs well. Table 10 displays the factor loadings for the CFA model.

The SEM analyses modeled the independent latent autonomy factors to have a direct impact on the outcome variable -- “introduction of foods/liquids”. The model controls for socio-economic status, maternal age and education. The model allows for free correlation between the seven autonomy dimensions (unconstrained model). The rationale in allowing the free correlation is that the various dimensions fall under a broader single construct of autonomy. As shown in Table 11, the highest correlation between a pair of constructs was 0.306 (between financial independence and experience of domestic violence) where as other majority of the dimensions had insignificant correlations. To examine the independent effect of the financial independence and experience of domestic violence dimensions, we ran another model where we constrained these two constructs to have zero correlation (partially constrained model in Table 12). The correlations between the other constructs were allowed to remain mainly due to the fact that they were already close to zero (see Table 11). We draw our insights based on these two competing models.

Tables 12 and 13 present the results of the SEM analysis for the key dependent variables -- “introduction of foods/liquids before 6 months of age” and the three infant nutrition status variables. Further the tables show the probit coefficients from the unconstrained model and the partially constrained models. **For Table 12**, the first model presents the association between the outcome and the various autonomy dimensions without adjusting for the various covariates. The second and the third models are our focus of interest and present the estimates for the unconstrained model with covariates and the partially constrained model with covariates respectively.

In the unconstrained model with covariates, maternal experience of domestic violence is negatively associated with introduction of food and liquids for infants below 6 months of

age [probit coefficient = -0.184; 95% CI = -0.404, 0.036]. Using the estimated probit coefficients, we can determine the change in predicted probability for any unit change in dependent variables using the following illustrative example procedure. Here we show how to get the overall change in the predicted probability of “introduction of foods to infants” when domestic violence has a unit change from its mean. We first fix the values of all the independent variables, including domestic violence, to their respective mean scores and calculate the Z score for the outcome. In our case this value is 0.115. The predicted probability is 0.545 for this Z score which is obtained using the standard normal distribution tables. Next, we increase the score on domestic violence by 1 unit and recalculate the Z score (-0.068) and the predicted probability corresponding to this Z score from the standard normal distribution (0.472). Thus our results show a decrease of 13.15% in predicted probability that a woman will feed foods and liquids before 6 months with each one SD increase in the autonomy score on the domestic violence dimension.

Second, focusing on the results of the partially constrained model, we find that not only is the construct “experience of domestic violence” significant but “financial independence” is also a significant determinant of “introduction of foods and liquids” to infants below 6 months of age. The two dimensions are both predictors of the outcome, as shown by their significance in the partially constrained model [probit coefficient for financial dimension = -0.155; 95% CI = -0.313, 0.003; probit coefficient for the domestic violence dimension = -0.321; 95% CI = -0.619, -0.022]. Contrasting the results of the unconstrained and the partially constrained model, we find that when the financial independence and domestic violence dimension are allowed to be correlated, financial independence dimension loses its significance. Similar to the above example, in the partially constrained case, a unit

change in experience of domestic violence dimension from its mean when all the other variables are fixed to mean, causes a 23.2 % reduction in the predicted probability of the outcome “introduction of foods or liquids before 6 months of age.”

We followed a similar protocol of creating competing models for the three growth outcomes. Table 13 shows the final partially constrained models and indicates that none of the autonomy dimensions are significantly associated with weight-for-age, height-for-age and weight-for-height z-score variables. These indicators did not have a significant impact before controlling for the covariates either. However, some covariates are significantly associated with the growth outcomes: maternal age, maternal body mass index and household family structure. Mothers with greater body mass index are more likely to have infants with better weight-for-height z-score and weight-for-age z-score. Infants living in nuclear, not joint households, have better weight-for-height z-scores. Older infants are more likely to be stunted than younger infants.

4.5. Discussion

In a sample of 602 mother-infant dyads in rural Andhra Pradesh, India, we examined different dimensions of maternal autonomy on the introduction of other foods and liquids to infants before 6 months of age and child growth. Two of the maternal autonomy constructs were related to the infant feeding outcomes. Mothers with higher levels of financial independence are less likely to introduce foods and liquids before 6 months of age, while those who have experienced domestic violence are more likely to introduce foods, independent of other autonomy dimensions and controlling for various covariates. Among mothers who have higher levels of financial independence but who also report experiencing

domestic violence, the effect of financial autonomy may not have a significant impact on feeding practices. We did not find any effects of other dimensions of maternal autonomy on infant growth.

Focusing first on the dimension of financial autonomy, we find that financial independence significantly impacts “introduction of food and liquids before 6 months of age”. This construct measures the freedom the mother possesses to use money when she wishes and in emergency health care needs for the children. The positive impact of financial autonomy of mothers on child nutritional status has been shown by prior work in this area (F. Begin, Frongillo, & Delisle, 1999; P. L. Engle, 1993). Further, study using data from Philippines show that higher expenditure on food was incurred in households where mother held control over the finances (Schmeer, 2005). We did not find any significant effect of financial autonomy on infant growth. One reason might be that it takes time for the effects of the poor feeding strategies to be observed after birth on growth outcomes. Based on our study, more research is needed on understanding the linkages between household environment, level of financial autonomy and the exercise of this autonomy towards better child care practices and child health.

Our results show that, when a mother experiences domestic violence, it is likely to negatively affect appropriate feeding behaviors. In line with this finding, a recent research review links poor mental health of the mother on improper breast feeding behaviors (Patel, Rodrigues, & DeSouza, 2002). Related literature identified that domestic violence has an impact on infant and neonatal morbidity and mortality (Ahmed et al., 2006; Shireen J. Jejeebhoy, 1998), with increasing the risk of malnutrition in mothers and children (Sethuraman, Lansdown, & Sullivan, 2006). At the same time, it is possible that experience

of domestic violence is representing some other unmeasured characteristic of mothers that is also correlated with infant feeding behaviors.

Comparing the results of our analyses, we find that in the presence of inter-correlation between the dimensions of domestic violence and financial autonomy, the overall impact of financial autonomy is insignificant on the child feeding behavior. When financial autonomy and domestic violence are uncorrelated, each of them has their independent effect on breast feeding outcomes. However in the presence of domestic violence, the impact of financial autonomy now becomes insignificant because these two dimensions are significantly correlated. Thus, the impact of domestic violence is strongly related to feeding behavior after partialling out the effect of financial autonomy (Pedhazur, 1991). This suggests that the breast-feeding behavior is strongly linked closely to the mental and psychosocial state of a mother more than her ability to have freedom with usage of money or her capacity to move freely in the society. This may be because the decisions within the family can also be made by others in the household, masking the effect of low financial autonomy on infant growth (Desai & Johnson, 2005).

Further, we did not find any association between other dimensions of autonomy namely decision-making (both household and childcare), freedom of movement, permission needed for mobility and perception of domestic violence on the introduction of foods or liquids by mothers. While freedom of movement for mothers is a recognized autonomy dimension, and is shown to impact health outcomes and behaviors, such as contraception usage (Al Riyami, Afifi, & Mabry, 2004) and child mortality (Shireen J. Jejeebhoy, 1998), it is not significantly associated with child feeding and child health outcomes. One of the reasons could be that we investigate health and feeding behavior of infants between 3-5

months of age. To see benefits from the freedom of movement, we may need to investigate child health outcomes over a longer time span since the effects may kick in after a time lag.

In addition, maternal autonomy did not have significant association with the growth outcomes. This is contrary to other research that suggests that decision making autonomy impacts the nutritional status of children (Desai & Johnson, 2005; Doan & Bisharat, 1990; Johnson & Rogers, 1993; Jones, Schultink, & Babilie, 2006). One of the reasons that decision-making autonomy is not playing a role in our study is because the infants in our sample are very young for the environmental or socio-cultural factors to impact growth trajectory. This could be because of the protective immunity from the mother and breast milk as well as appropriate nutrition from Breastfeeding at this age. Further, decision-making autonomy in rural settings of Indian villages can be masked by either participative decision making with elders – particularly in the context of child care – or by the existing cultural norms for feeding behavior dictated by the surrounding environment. This can be a possible reason why we do not see any association with child health outcome because her decisions regarding children are happening as somebody from the household performs the appropriate behaviors (Desai & Johnson, 2005) or difference may reflect different methods of analysis. Our study assumes that the relationship between the dependent variable and the independent (latent autonomy dimensions) in our model is linear. Second, we assume that mothers are ideal self reporters and we rely on true self reporting of the concept of autonomy that may not necessarily be the case. However, most of the current work measuring autonomy also use self reported scores of autonomy (Agarwala & Lynch, 2006; Sharon J. Ghuman, Lee, & Smith, 2006). Future work can be extended in many directions. First, our study was based on a sample from a single state of India. To strengthen the generalizability of our results, future

research needs to be done in different states of India and possibly in different countries. Second, culture has been identified by some of the prior studies to influence infant feeding behavior in India (Laroia & Sharma, 2006). While our study considered autonomy devoid of the cultural context, one could examine the overall influence of cultural norms on the exercise of autonomy. Lastly, to understand long term benefits of maternal autonomy on child health outcomes, cohort studies need to be examined to observe the change overtime with autonomy and also how it operates to influence child health outcomes.

To conclude, we examined the impact of multiple dimensions of maternal autonomy on feeding behavior and health outcome of the infants in a rural setting of Andhra Pradesh, India. From a theoretical perspective, we believe that this work has advanced our overall understanding of how different autonomy dimensions have impacted infant feeding behavior and growth outcomes by considering these dimensions in a simultaneous manner. From a policymaker's perspective, our results would suggest that, to improve child health, incorporating women's empowerment issue as a component in health and nutrition programs may yield better infant and child health outcomes. Further, the idea of certain dimensions of autonomy to be more important than others, may help in prioritizing resource allocations to planners.

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Table 8: Baseline characteristics of mother's and children from the 60 villages in Andhra Pradesh, India

Variables	n	Percentage	Mean	SD
Houhsehold characteristics				
<i>Religion</i>				
Hindu	592	97.69	-	-
Muslim	13	2.15	-	-
<i>Caste</i>				
Schedule Caste/Tribe	157	25.91	-	-
Backward Class	393	64.85	-	-
Forward Class	56	9.24	-	-
<i>Family type</i>				
Nuclear	272	45.03	-	-
Joint	332	54.97	-	-
<i>Standard of living index(score)*</i>	-	-	26.60	7.53
Mother's characteristics				
<i>Age (years)</i>	-	-	22.14	3.35
<i>Height (cms)</i>	-	-	151.46	5.54
<i>Weight (kgs)</i>	-	-	45.30	6.78
<i>BMI[†]</i>	-	-	19.72	2.55
<18.5	194	32.01	-	-
≥ 18.5 and <25	369	60.89	-	-
≥25	43	7.10	-	-
<i>Education</i>				
No schooling	229	37.85	-	-
Primary	204	33.72	-	-
Secondary	137	22.64	-	-
Higher	35	5.79	-	-
<i>Work status</i>				
Non-working	282	46.53	-	-
Working	324	53.47	-	-
<i>Parity</i>				
1 child	227	37.46	-	-
2 child	247	40.76	-	-
> 2 child	132	21.78	-	-

Infant's Characteristics				
<i>Age (months)</i>		-	-	
<i>Sex</i>				
Boys	301	49.67	-	-
Girls	305	50.33	-	-
<i>Birth weight(kgs)</i>				
<=2	44	7.26	-	-
>2 & <2.5	36	5.94	-	-
>=2.5	526	86.80	-	-
Infant Anthropometry				
<i>Height (cms)</i>	593		59.059	2.559
<i>Weight (kgs)</i>	592		5.525	0.814
<i>Height-for-Age z-score</i>	592		-1.191	1.068
<i>Weight-for-Age z-score</i>	591		-1.188	1.105
<i>Weight-for-height z-score</i>	591		-0.343	1.178
Outcome: Feeding Practices				
<i>Introduction of foods/liquids at or before the date of survey (i.e.between the ages of 2-5 months)</i>				
No	455	75.08	-	-
Yes	151	24.92	-	-

* Standard of living index- score created based on the weighted index created by NFHS (Demographic Health Survey, India)

† $BMI = ((weight * 1000) / (height)^2)$

Table 8 Quantitative study: Sample Description

Figure 3: Pictorial representation of the Structural Equation Model with latent autonomy variables, measured covariate and outcome

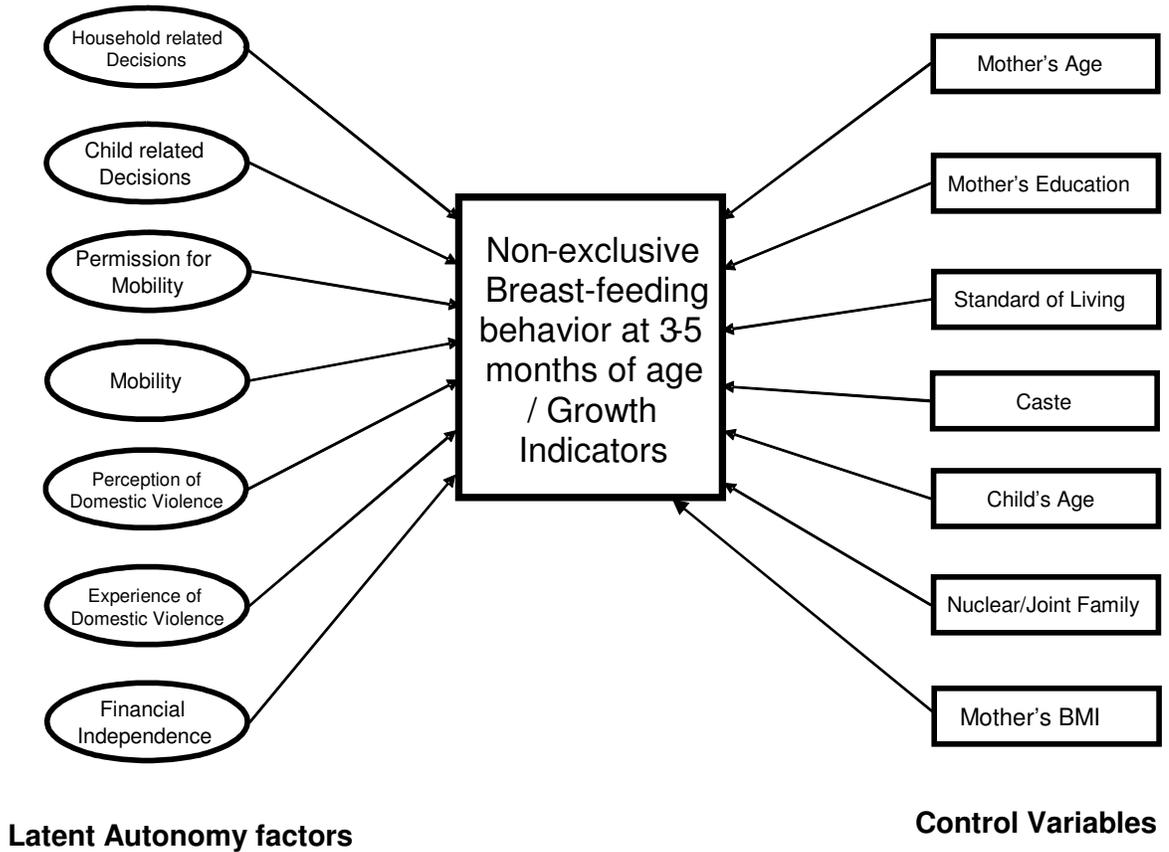


Figure 3 Structural Equation Model(Pictorial)

Figure 4: Pictorial representation of one factor model of the Confirmatory Factor Analysis – an example

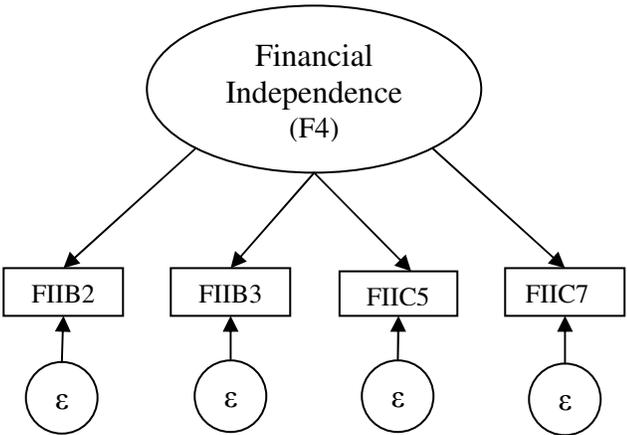


Figure 4 CFA model: Example of one factor

Table 9: Responses of mothers on the autonomy questions administered at the baseline among 606 mothers from 60 village in Andhra Pradesh, India

Table 9.1: Participation in decisions regarding Household matters				
Who in your family decides the following:	Others in household (1)	Jointly with others in household (2)	Respondent (3)	Total
1. What food to buy for family meals?	399	113	94	606
2. Whether to purchase small household items such as a table, utensils?	390	126	90	606
3. What gifts to give when relatives marry?	358	221	27	606
4. Whether or not you should work outside the home?	198	43	151	392
5. Inviting guests to your home?	339	211	52	602
6. Your going and staying with parents or siblings?	503	69	29	601
7. Obtaining health care for yourself?	377	184	39	600
1. Whether to purchase major goods for the household such as a TV?	460	138	5	603
2. Whether to purchase or sell animals?	302	78	3	383
3. Whether to purchase or sell gold/silver jewelry?	394	181	20	595
4. How your earnings are spent?	221	101	63	385
5. On whether money can be spent on health care for the child?	376	191	39	606

*(1=Low Autonomy; 2 or greater =Higher Autonomy)

Table 9.2: Participation in decisions regarding the child

Who in your family decides the following:	Others in household (1)	Jointly with others in household (2)	Respondent (3)	Total
1. Not feeding the new born baby colostrums?	78	29	473	580
2. Exclusive breast feed newborn for 6 months?	21	14	568	603
3. Immunization of the infant	86	98	421	605
4. What to do if the child falls sick?	235	161	58	454

Table 9.3 : Control and access over finances (Financial independence)

	No (1)	Yes (2)	Total
2. If you wanted to buy yourself a dress, would you feel free to do it without consulting your husband?	369	231	600
3. If you wanted to buy yourself a small item of jewelry, such as a pair of earrings or bangle, would you feel free to do it?	395	204	599
4. If you wanted to buy a small gift for your parents or other family members, would you feel free to do it?	496	99	595

	Never (1)	Some of the time (2)	All the time (3)	Total
5. Are you allowed to have some money set aside that you can use as you wish?	173	217	213	603
6. When you earn money, do you usually give all of it to your husband? (Reverse code)	188	111	77	376
7. Do you and your husband ever talk alone with each other about what to spend money on?	143	273	190	606
8. Do you have a say in how the household's overall income is spent?	167	345	94	606
9. Do you get any cash in hand to spend on household expenditure?	256	230	101	587

Table 9.4 : Permission for Mobility

Do you have to ask your husband or senior family members for permission to go to	Always (1)	Some of the time (2)	Never (3)	Total
1. Any place outside your house or compound?	400	48	132	580
2. To the local market?	169	25	68	262
3. To the local health center?	490	54	54	598
4. Fields outside the village?	247	27	102	376
5. Community center in the village?	402	58	116	576
6. Home of relatives or friends in the village?	155	31	54	240
7. A nearby fair?	411	54	46	511
8. The next village?	520	48	25	593

Table 9.5 : Mobility

Can you go to any of the following by yourself:	Never allowed to go (1)	Sometimes when I choose to (2)	Always when I choose (3)	Total
1. Local market?	92	24	188	304
2. Local health center?	239	37	329	605
3. Fields?	40	13	335	388
4. Community center in?	29	18	204	251
5. Home of relatives or friends in the village?	104	42	435	581
6. Temple?	181	56	353	590
7. Next Village?	341	41	142	524
8. Fair?	175	106	304	585

Table 9.6: Perception of Domestic Violence (DV)

Sometimes a wife can do something that bothers her husband. Please tell me if you think that a husband is justified in beating his wife in each of the following situations:	Always (1)	Some of the time (2)	Never (3)	Total
1. If he suspects her of being unfaithful?	10	227	366	603
2. If her natal family does not give expected money, jewelry, or other items?	4	49	553	606
3. If she shows disrespect for in-laws?	4	269	331	604
4. If she goes out without telling him?	1	176	428	605
5. If she neglects the house or children?	8	343	254	605
6. If she doesn't cook food properly	2	102	502	606

Table 9.7.: Experience of Gender-base Domestic Violence (DV)

	Yes (1)	No (2)	Total
2. Are you afraid to disagree with your husband because he will be angry with you and beat you?	370	236	606
3. Does your husband ever hit or beat you?	149	454	603

Table 9 Frequency distribution of Autonomy variables

Table 10: Results from the Confirmatory Factor Analysis - with Factor loadings and Model fit*

Household Decision (F1)	Variables in the model	Factor loadings	Std Factor loadings
6. Your going and staying with parents or siblings?	FIA16	1	0.326
1. Whether to purchase major goods for the household such as a TV?	FIA1	2.772	0.905
4. Whether or not you should work outside the home?	FIA14	0.493	0.161
2. Whether to purchase or sell animals?	FIA2	2.304	0.752
Child care Decisions (F3)			
4. What to do if the child falls sick?	FIB4	1	0.749
3. Immunization of the infant (who decides)	FIB3	1.178	0.882
Financial Independence (F4)			
2. If you wanted to buy yourself a dress, would you feel free to do it without consulting your husband?	FIIB2	1	0.902
3. If you wanted to buy yourself a small item of jewelry, such as a pair of earrings or bangle, would you feel free to do it?	FIIB3	1.057	0.953
5. Are you allowed to have some money set aside that you can use as you wish?	FIIC5	0.624	0.562
7. Do you and your husband ever talk alone with each other about what to spend money on?	FIIC7	0.725	0.654
Permission (F5)			
4. Fields outside the village?	FIIA4	1	0.701
6. Home or relatives of friends in the village?	FIIA6	1.156	0.81
7. A nearby fair?	FIIA7	1.156	0.811
8. The next village?	FIIA8	1.333	0.934
Freedom of movement (F6)			
1. Local market?	FIIB1	1	0.876
2. Local Health Center	FIIB2	1.013	0.888
5. Home of relatives or friends in village?	FIIB5	0.964	0.845

6. Temple	FIIIB6	1.038	0.909
Perception of Domestic violence (F7)			
1. If he suspects her of being unfaithful?	FIVA1	1	0.629
2. If her natal family does not give expected money, jewelry, or other items?	FIVA2	0.939	0.591
3. If she shows disrespect for in-laws?	FIVA3	1.132	0.712
5. If she neglects the house or children?	FIVA5	1.213	0.763
6. If she doesn't cook food properly	FIVA6	0.869	0.547
Experience of Domestic violence (F8)			
2. Are you afraid to disagree with your husband because he will be angry with you and beat you?	FIVB1	1	1
3. Does your husband ever hit or beat you?	FIVB2	0.57	0.57

* Model fit indices: CFI – 0.945, TLI – 0.947, RMSEA- 0.046

Table 10 Factor loadings from CFA model

Table 11: Correlation between the various dimensions of autonomy obtained from the Confirmatory Factor Analysis

	F1	F3	F4	F5	F6	F7	F8
F1	1.000						
F3	0.013	1.000					
F4	0.053	0.046	1.000				
F5	-0.017	0.121	-0.097	1.000			
F6	0.000	0.229	0.120	0.054	1.000		
F7	0.007	0.033	-0.066	-0.052	0.007	1.000	
F8	-0.003	-0.050	0.307	0.029	-0.060	0.131	1.000

Table 11 Correlation between autonomy factors

Table 12: Results from the Structural Equation Model presenting probit coefficients of Breast feeding behavior in mothers with infants 3-5 months of age, Andhra Pradesh, India

Introduction of Foods/Liquids till the time of survey (Outcome)	Unconstrained Model		Unconstrained Model with Covariates		Partially constrained Model with Covariates	
Model Fit						
CFI	0.945		0.928		0.91	
TLI	0.946		0.927		0.908	
RMSEA	0.046		0.043		0.048	
Probit coefficients						
<i>Autonomy factors</i>		<i>z-value</i>		<i>z-value</i>		<i>z-value</i>
Financial Independence	-0.062	-0.638	-0.068	-0.636	-0.155	-1.923
Experience of Domestic Violence	-0.166	-1.713	-0.184	-1.636	-0.321	-2.103
Permission	0.263	2.057	0.162	1.191	0.13	1.005
Mobility	-0.071	-0.863	-0.055	-0.688	-0.046	-0.572
HH Decision	-0.876	-1.226	-2.038	-0.669	-1.669	-0.708
Child care decision	0.108	0.96	0.149	1.232	0.167	1.376
Perception of Domestic Violence	0.173	1.392	0.159	1.188	0.153	1.216
<i>Covariates</i>						
Mother's Age			0.008	0.448	0.008	0.448
Mother's Education			-0.012	-0.157	-0.012	-0.157
Mother's Body Mass Index			-0.022	-1.040	-0.022	-1.040
Child's Age			-0.134	-1.419	-0.134	-1.419
Standard of living			0.001	0.062	0.001	0.062
Nuclear / Joint Family			0.035	0.258	0.035	0.258
Caste			0.173	1.581	0.173	1.581

Table 12 SEM results for Infant feeding practice

Table 13: Results from the Structural Equation Model presenting probit coefficients of Nutritional Status indicators of infants 2-5 months of age, Andhra Pradesh, India (only Partially constrained Model with Covariates)

Outcomes	Weight-for-Height Z-Score (Wasting)		Weight-for-Age Z-Score (underweight)		Height-for-Age Z-Score (stunting)	
Model Fit						
CFI	0.925		0.907		0.906	
TLI	0.923		0.905		0.904	
RMSEA	0.045		0.049		0.049	
Probit coefficients						
<i>Autonomy factors</i>		<i>z-value</i>		<i>z-value</i>		<i>z-value</i>
Financial	-0.037	-0.492	0.039	0.566	0.070	1.015
Experience of Domestic Violence	-0.049	-0.381	-0.120	-0.975	-0.093	-0.744
Permission	-0.2	-1.505	-0.017	-0.148	0.151	1.224
Mobility	-0.075	-1.097	0.007	0.099	0.079	1.263
HH Decision	0.404	0.424	0.666	0.651	0.472	0.527
Child care decision	0.054	0.559	0.015	0.173	-0.002	-0.021
Perception of Domestic Violence	-0.041	-0.380	-0.074	-0.754	-0.039	-0.400
<i>Covariates</i>						
Mother's Age	-0.038	-2.581	-0.019	-1.276	0.008	0.522
Mother's Education	-0.065	-0.958	-0.009	-0.146	0.042	0.667
Mother's Body Mass Index	0.075	4.021	0.043	2.479	-0.001	-0.077
Child's Age	-0.090	-1.058	-0.118	-1.567	-0.149	-2.103
Standard of living	0.007	0.963	0.012	1.613	0.012	1.619
Nuclear / Joint Family	-0.226	-2.146	-0.117	-1.126	0.027	0.262
Caste	-0.037	-0.401	0.057	0.628	0.087	1.075

Table 13 SEM result for Infant growth

CHAPTER 5

5. Conclusion

Child malnutrition is a world-wide concern and several determinants are identified at the household and societal level that may influence child health outcomes either positively or negatively. For example, lack of adequate quality or quantity of food, poor dietary diversification and high rates of infection are major determinants of under-nutrition in the majority of developing countries like India (Bloss, Wainaina, Bailey, & Grantham-McGregor, 2004; Gillespie & Haddad, 2001; Mosley & Chen, 1984). However, there is increasing attention given to factors that are related to the environment – physical and social – within which child caring decisions and behaviors occur (Caulfield et al., 1999; P. L. Engle, M. Bentley et al., 2000). Among these, the role of maternal autonomy has been hypothesized to be an important determinant of child health outcomes. A recent report from UNICEF “The State of the World’s Children” suggests that “Eliminating gender discrimination and empowering women will have a profound and positive impact on the survival and well-being of children.” There is a substantial literature that shows that when women have higher levels of autonomy at the household level for decision-making, access to resources, physical freedom, etc., they are more likely to have higher rates of contraceptive use (S. J. Jejeebhoy, 2002; Perianayagam Arokiasamy, 2002), lower levels of infant mortality (Ahmed et al., 2006), and health seeking behaviors (Bloom et al., 2001; Hindin, 2004). However, there is a dearth of research to show how maternal autonomy might improve infant and child health outcomes, particularly in the first months of life. The main emphasis of this

dissertation was to explore the linkage between maternal autonomy and child feeding practices and child growth through a mixed-methods approach.

The three papers that comprise this dissertation addressed this objective by drawing on three different data sources and methods: (1) the first essay examines the role of women's autonomy as an independent indicator on child stunting by using secondary data from the state of Andhra Pradesh, India, (2) the second paper is a qualitative study that explores beliefs and practices related to infant feeding and examines the role of maternal autonomy and other factors, among a purposive sample of 43 mothers-child pairs residing in 3 rural villages of Andhra Pradesh, India, and (3) the last paper addresses the multi-dimensional nature of maternal autonomy and examines the independent effect of various dimensions of autonomy on infant feeding practices and infant growth among 602 mother-infant dyads living in 60 villages of rural Andhra Pradesh, India.

Through these three papers and with the ability to triangulate the data, the dissertation explores the role of maternal autonomy in several ways: (a) by identifying the independent nature of women's autonomy on child growth indicators, especially stunting, (b) by understanding the qualitative nature of maternal autonomy and the interaction with household level factors such as income and family structure, (c) by identifying the multiple dimensions of maternal autonomy and proposing a methodology to analysis the concept of autonomy, and (d) by providing evidence of the role of maternal autonomy in child well-being.

The first research study examines the association between various indicators of maternal autonomy and child stunting. A secondary dataset from the National Family Health Survey 1998-99 was analyzed to evaluate the association through logistic regression models.

We studied the association between single indicators of autonomy and child stunting, an indicator of long-term changes in social and environmental effects on child health. The study results indicate an independent effect of two indicators of autonomy, one representing the permission needed for the mother to go to the market and the financial independence the mother experience with regard to spending money as she wishes to use, on child stunting. This association was observed on adjusting for various socio-economic and demographic variables, especially mother's education and standard of living index of the mother's household. In conclusion, this study provides empirical support for the influence of certain indicators of maternal autonomy to influence a long term indicators of infant growth. This result can be generalizable to various communities in the India that are similar to the communities in the state of Andhra Pradesh.

The second and the third research study was embedded in a larger intervention trial aimed at testing whether a more responsive feeding style and developmental stimulation will directly influence child growth and development of children in the rural district of Andhra Pradesh, India. The second research study explores the nature of maternal autonomy and qualitatively investigates its influence on child feeding practices. This study is a follow-up to the first essay where now we used the mix-methods approach and wanted to understand in-depth the perceptions, beliefs and reasons behind maternal autonomy and infant feeding practices. The sample in this study was a purposive sample of 43 mother-child pairs from three rural villages and the children were in the age range of 3 to 15 months. Data from in-depth interviews conducted with the help of vignettes was analyzed through matrix analyses. Several themes emerged with respect to the various dimensions of autonomy and this confirmed the multi-dimensional nature of women's autonomy. In addition, we did cross

thematic analyses to find that the levels of autonomy for mothers in the joint family household has a greater influence on child feeding practice than a mother in the nuclear family household. There is a lot more influence of elders and other family members in terms of introduction of foods and liquids before 6 months of age but there is a universal influence of deep-rooted tradition and culture behind initiation of breastfeeding and colostrums feeding right after birth of the infant in these rural settings of Andhra Pradesh, India.

In the third research study, the exposure of interest was maternal autonomy. We investigated the independent effect of multiple dimensions of autonomy on infant feeding practice, especially introduction of foods or liquids before 6 months of age. We used structural equation modeling approach to model autonomy as a several latent dimensions. In addition, we also explored the effect of these latent autonomy dimension on the three growth indicators, namely the weight-for-height, height-for-age and weight-for-age z score variables. Results indicated that among various dimensions of autonomy financial autonomy and experience of domestic violence influenced the behavior of “introduction of foods and liquids” by the mother to their infants below 6 months of age. There was no influence of maternal autonomy on the growth indicators but the structure of family – joint versus nuclear family household – has an impact on the levels of “wasting” among the children. This study is one of the first analyses of maternal autonomy and early infant feeding practice by using the structural equation modeling approach.

This investigation differs from the investigation in the first research study in following ways. (1) Though the sample for this study is smaller than the sample observed in the first study, our outcome of interest is a specific behavior of “non-exclusive breastfeeding” before the infant is 6 months of age, (2) The data collected for this study was a prospective

data collection unlike using a secondary dataset for the first study. Due to the prospective nature of data collection we were able to collect a lot more information on maternal autonomy with many more indicators measuring different dimensions of autonomy and (3) The methodological approach was different for the two studies with the usage of Structural Equation Modeling with latent autonomy variables for the later study as oppose to using Logistic regression with single indicator autonomy variable.

5.1. Synthesis

Overall, the three essays contribute our understanding towards the association of maternal autonomy with child growth and feeding practices. The UNICEF Child Survival Framework recognizes maternal autonomy and control over resources as an underlying determinant of child growth and survival. But there is lack of in-depth empirical validation to support their suggestion. This dissertation fills the gap by showing the independent effect of autonomy on child well-being using data from a specific state (Andhra Pradesh) in India. The concept of autonomy seems to be conceptualized as a single concept in this framework. Our study shows the importance of multi-dimensionality of the concept of autonomy and thus contributes to the understanding of how different dimensions of autonomy impact child survival and growth. We study the role of autonomy not only quantitatively but consistent with the UNICEF framework, we also gain qualitative understanding of cultural influences and the role of family on the exercise of autonomy towards child care and child feeding.

In the context of India, our work is the first to investigate multiple dimensions of autonomy and show its independent effect on child feeding and child growth in India. Our study finds financial autonomy to be an important influence on the mother – this is consistent

observation across the three essays. However our research also reveals that domestic violence is an important issue in this context – in the second and third essays –and we find that in the presence of domestic violence, financial autonomy may not necessarily have an impact on child well-being.

Further, in the context of India (in particular Andhra Pradesh), our study demonstrates that mothers may have different levels of autonomy within different dimensions. In the qualitative essay we find that while a mother possess high autonomy on one dimension, she does not necessarily possess high autonomy on another. For example, our data showed a large number of mothers possess autonomy in making child care decisions and to a great extent be a part of decision making process for household level matters. But this did not necessary mean that these mothers also possess high financial autonomy and had high freedom of movement.

We did not find a significant impact of decision making autonomy on child care and child growth. This is despite the high level of decision making autonomy that mothers possessed in the qualitative study. One of the explanations for this can be found based on the Indian context in the role of society and culture within a family. Consistent with this, Desai et al (Desai & Johnson, 2005) suggest that with regard to child care, mother's decision-making ability may not directly impact child growth because this dimension could be influenced more by the community level effects rather than individual level autonomy. In the context of India and our sample, mother's decision-making autonomy may not have an impact on child health outcomes because over all decisions are done in the context of surrounding elders and the community. Many mothers engaged in participative decision-making, but constrained in their physical movements outside the house. This was consistent with finding from other

studies conducted in this region of the world (Dharmalingam, 1996; Shireen J. Jejeebhoy, 1997; L. C. Smith, 2003).

In India, child health is not neglected by any member of the household but there seems to be power dynamics on who finally makes the decision or carries out the duty of child care. The mother is not always the one to make a decision but there is a high possibility that the decision that is taken (probably by other household members) is always in the favor of child health. Thus measuring decision-making ability of a mother may not be the right dimension to measure when it comes to child care and feeding behaviors in this context of India. Our results suggest that in this community of Andhra Pradesh, India, there is a lot more influence and involvement of elders and other family members affecting child feeding practices and growth. Future researchers and intervention studies need to take this aspect into account while developing intervention programs and involve not only the mothers but the immediate family surrounding the mother.

The multi-dimensionality of autonomy is also important to understand as not all dimensions seem to be operating in a similar way to influence child growth and care. In our last two essays, we observed the dimension of financial autonomy to lose its importance in presence of domestic violence. It suggests that a mother who is experiencing domestic violence will be more likely to have poor early infant feeding practices than her possessing financial independence. This finding finds validation in the literature, stating that for early infant feeding behavior which is exclusive breastfeeding, the mother should be able to physically and mentally healthy to carry out this practice. Experience of domestic violence influences mothers ability to breastfeed, and therefore it is a significant predictor of early infant feeding (Kendall-Tackett, 2007; Klingelhafer, 2007). For this reason, it is possible that

for early infant feeding behaviors it is likely that mother's physical status deemed more important than her access to financial resources or her physical movement.

Finally, in this state of Andhra Pradesh, we observe the society and community to play a substantive role in child well-being. As we observed in our first study, permission to go to the market did impact child stunting and in the third study the family structure (joint or nuclear) was significantly associated with early wasting in infants. In India, where family system are deeply rooted in culture and traditions, formal and informal system of information seem to be predicting the knowledge and behaviors the mothers possess. It was evident through the qualitative study that mothers with high autonomy did not solely rely on the information from the elders within the household but seek information and guidance from local health care workers in the community. The mothers in the nuclear family did listen to their husbands to a great extent for child care practices but also relied on advice from the doctors and other formal information through TV.

Overall, our results suggest that interventions in the future need to have a holistic approach and intervention strategies needs to be tackled at multiple levels. First, at the individual level, the mothers need to be aware of their rights and a support system needs to be built where mother can potential seek professional help and talk about their problems, primarily on experience of domestic violence. Second, at the household and community level there needs to be a wide spread of awareness regarding the importance of maternal health and the impact it could have on child well-being. Further, any intervention strategy at this level needs to consider cultural aspects of families into perspective and cultural superstitions need to be taken into consideration while spreading education. One classic example we found during the qualitative study was the throwing away of colostrum. Other studies in this

context also talk about the idea that throwing away of colostrum is a practice that is prescribed in certain ancient literature (Laroia & Sharma, 2006). Finally, at the health care system level, infrastructure needs to be equipped with well trained local health care workers with updated information on preventive health care practices, such as appropriate infant feeding behaviors recommended globally by WHO and adapted by local maternal and child health advocates. This is also critical because mothers who have the required autonomy seem to seek information from local health worker such as anganwadi workers. Our qualitative analysis also found that in certain cases advice provided by the anganwadi workers was not consistent with the recommendations of the WHO on infant feeding practices.

5.2. Future Directions

The research conducted for this dissertation extensively used mix-methodologies and had some key insights into the association of maternal autonomy and infant and child feeding practices and growth. But this study does open up future avenues for further research:

- (i) The association under study was examined using cross-sectional databases. A longitudinal data analyses is needed to understand not only the temporal nature of the association but also to understand whether maternal autonomy and child feeding practice is a function of time. As the child gets older does the relationship between feeding behavior or child growth remain the same with maternal autonomy. Infant feeding behaviors are valid for short duration of time especially in the first few months of life. The behaviors thus could present different relationship with maternal autonomy later in infancy or childhood.

(ii) Autonomy is a single concept but there is wide consensus among researchers from the sociology and demography field on the multi-dimensionality nature of the concept. This dissertation was limited in the modeling of this multiple dimensions of autonomy and further pathway analyses could lead to deeper understanding of the different mechanism through which maternal autonomy might operate to influence child feeding practices and child growth.

(iii) Our study was limited because of the use of pre-existing questions that has been used before to capture information regarding women's autonomy. Thus we were probably restricted with not clear dimensions of autonomy, for example, the dimension of child care decisions probably did not have culturally appropriate question that were incorporated in the latent dimension of autonomy. Future studies should look at developing culturally appropriate questionnaire that would capture the concept of maternal autonomy representative of that society.

(iv) This dissertation recommends researchers to incorporate formative studies or detail qualitative studies before administering questionnaires in the community. It is very important to understand community nuances and terminologies used with regard to child feeding and care practices in order to capture close enough information about the behaviors under study. Reliability of the questionnaires is an important aspect to be considered before validating the data collected from the questionnaires.

(v) Lastly, an intervention study is called for to examine whether empowering mothers in a community will lead to better infant and child feeding practices and improve children's nutritional status. It will be important to emphasize on certain dimensions of autonomy than the others, for which in-depth qualitative research is important to develop a strong content of intervention material. This evidence could provide a valid argument to policy-makers and women's empowerment advocates and can truly vouch for the statement in the recent UNICEF report – which states that “When women are empowered to lead full and productive lives, children and families prosper.”

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6. Appendices

Appendix 1: Topic Guide to collect information on Infant feeding behaviors among mothers with infants 3-15 months of age

Name of child (call her/him by her name when asking about her feeding patterns etc.)

BREASTFEEDING, children 3 – 5 months

Do a modified recall for breast-milk and other liquids or foods consumed yesterday to learn of current feeding pattern.

Initiation of breastfeeding:

Where was your baby born?

How soon after giving birth did the baby first receive breast-milk, first put your baby to the breast? Reasons for this. How did you know when to start giving your baby breast-milk?

Did your baby receive anything else before receiving breast-milk?

What did he/she receive?

Did the baby receive the first milk (colostrums)? If received colostrum, what did you feel about giving colostrum? If not, could you tell me the reasons for this? (Probe) What do you think about colostrums? (probe: qualities, positive and negative, etc.)

What could happen if the baby is given this?

Did your baby receive any other food or liquid after birth? If yes, what did you give him/her? From what age? What were the reasons for giving these?

If you gave only breastmilk to your baby after birth, how did you decide that?

Maternal diet and breastfeeding

Are there any special foods that mothers should eat after giving birth? For how long?

Are there any foods that mothers should not eat after giving birth? For how long?

Do lactating mothers follow any restrictive diet? (Probe: Reasons & should/should not eat)

Are there any special foods that mothers can eat which will help her produce more milk?

Are there any foods that may affect or reduce mother's milk production?

(Explore reasons for all.)

If currently breastfeeding:

How do you know when to breastfeed your baby? (probe, who initiates the breastfeed, baby crying, etc)

Do you breastfeed every time the baby cries? ~~What do you do?~~

If your baby doesn't cry, how do you know when to feed her?

Do you give both breasts at each breastfeed? Reasons.

How do you know whether your breasts are empty or not?

How long do you plan to continue to breastfeed? Reasons.
What do you think about the qualities of breastmilk? (Probe, qualities of breastmilk, how important is it, is it a food?)
Are there any circumstances, or moments, when you can't give breastmilk to your baby?
How do you know whether the baby is satisfied when breastfeeding?
How long do you think a baby should be breastfed? Could you tell me your reasons for that?
Do you think that breastmilk changes as the child gets older? How?

If not breastfeeding:

How long did you breastfeed for? How long have you breastfeed the child?
What were your reasons for stopping breastfeeding?
What did you think about breastfeeding? What do you think about breastmilk (probe, qualities, positive and negative, etc.)
Do you/have you ever used a baby feeding bottle?
What have you used it for? Could you tell me your reasons for giving this?

When did you start to use it?
When you are feeding do you use any utensils? (Probe: such as a spoon)

On the basis of feeding patterns reported in the dietary recall: explore around the present feeding patterns:

If not receiving other foods/liquids (exclusive breastfeeding):

Can you describe to me the reasons why you are giving only breastmilk?
When do you think you will start giving other foods or liquids to your baby? Which foods will you start with? Reasons.

If receiving other liquids or foods:

When (what age) did you start giving other liquids or food to your baby?
Can you tell me the reasons for this?
Why did you choose those particular foods or liquids? (Probe: how do you know?)

If only receive other liquids/foods occasionally: (i.e. not yesterday but during the past week)

Can you tell me the reasons when you give your baby other liquids/foods? Probe.

Generality:

How do other mothers with babies of your infant's age, feed their babies?
Do they breast feed? Do they give other liquids or foods to their babies at this age? Can you tell me why you think they do this?
Can you tell me why different mothers do things differently? Explore
You have told us y do they do this?

Advice

What have you heard/advice has been given to you about breastfeeding?

Who has talked to you about breastfeeding? What did they say? What did you think of their advice?

Has a health worker (include AWW) ever given you advice about how to feed your baby?

What did they say?

What did you think of their advice?

Appendix 2: Topic Guide to collect information on Autonomy

Today I would like to understand and learn from you the various beliefs, attitude and perceptions the villagers have about a role of a mother/woman in your community?

In your community/village what are the responsibilities and ambition of a woman? What are the expectations and why?

What do think about young mother's role in a household?

Could you tell me the different situations that she might face in order to run a household?

SAY:

Can you tell me how much of a say does a woman have in a household?

How much of say she should have in a household? Will this differ for women with different roles in a certain household? In different communities how does this differ?

DECISION:

Can you tell me about how you made various decisions pertaining to your child, for example when to feed the child, when to take her to the doctor, when to let her play in the backyard, etc.? Does this get influenced by anyone or anything?

How much control do you think a mother should have on child's upbringing? Does this apply to the way you care and feed the child?

PERMISSION:

Are you allowed to go out of the house without permission? Do you need permission to take your child out? What are the restrictions laid on you as a mother?

ACCESS TO FINANCIAL RESOURCES:

Can you tell me about the access to financial resources within your household? How much freedom do you have to use the money as you wish? How does this work in your village community?

NATAL CONNECTION:

How much of natal contact is she allowed to keep? Does that become an issue if she is newly married and if she has a child?

DOMESTIC VIOLENCE:

I have heard that in our community and in other parts of the country, women/ mothers experience some kind of domestic violence (verbal as well as physical), What do you have to say to that?

SUPPORT SYSTEM:

Can you tell me about the different sources of support you have to bring up your child, including financial, social and emotional? Do you have friends with whom you talk about your daily lives? Can you tell me about the support system you already have? Reasons

behind the way you feel about it? Do you feel that women's organization in a community help women in any ways? Can you tell me more about the different ways you mentioned?

In light of what we have discussed before, does the role of a mother depend at all on how a woman is treated in a society or a household?

ADVICE:

Can you tell me about the various sources of information/advice a mother receives in your village? Does this also apply to you? Do you follow all of them? Why or why not?

Us of Vignette:

I will begin with a short story about a woman called Laxmi. I would like you to describe to me your opinions about different situations that she is going through.

Laxmi is 23 year old woman. Laxmi was married to Ram 5 years ago. She has a 3 year old girl named Rani and a 7 month boy Raja. Ram works in a factory in the big city. Laxmi on the other hand takes care of the house and the children. Ram's mother and father also live in the same house. Ram gives money for food and other necessary items in the home, but Laxmi also works in local shop and earns some money.

A. END WITH THE STORY WITH SHE EARNS MONEY

1. What do you think about Laxmi and Ram's way of life?
2. How would you describe the relationship of Laxmi, her husband and her in-laws? The reasons behind the situation described?
3. What do you think about the situation of Laxmi?

-usual answer with good relationship with the in-laws and husband

-overworked because looks after the children and in-laws and effect on her health

B. AFTER THESE QUESTIONS INTRO THE SITUATION ABOUT RANI FALLING SICK – TALK ABOUT SAY, DECISION MAKING, PERMISSION ALSO QUESTIONS RELATED TO CHILD CARE

4. If Rani fell ill, had high fever and became very weak, what do you think the family will do? (Probe: who and what kind of decisions will be taken? What will be Laxmi's role?)
5. How much of a say do you think Laxmi has in child care – take the baby to the doctor, to allow baby to play with others, the foods that are being feed to the baby, etc.

6. Do you think that Laxmi's decision-making choices affect the child upbringing? How and why? What influences this?

7. What kind of permission do you think Laxmi requires to carry out day to day activities related to household matters, other special occasions or festivities, to keep natal connection?

8. How much of the control do you think Laxmi has on the finances of the house?

9. How important is the role of Laxmi in the household? What is it and why? Does that affect Laxmi's health or the child's health in any way? Why?

- it seems that the situation is not leading to the life of the mother, may be we will have to ask direct probes and questions regarding her life.

- if you are smart you might be able to get the way around

-the say matter differs in different HH, it depends on how the family think of living.

-living away from in-laws does decrease social support and the other way it does reduce in living alone, positive about staying together – joint family,

-natal connection is there but the parent has to have responsibilities of the of taking care the children, the more you are refused to go the more bond is created and one missing the parents much more, even after yor parents are not there, you can still go and specially during the festivals, here the relationship between the respondents and SIL , has more affection towards natal family

- the child birth make the natal connection much better and the daughters' family feels that she is not been taken care of and she is not suppose to work. Sometimes the in-laws are not there then the mother will come and stay with them and will also ask the daughter and her husband to come stay with them

- there were other women in Laxmi's interview, it was good to see how everything worked out, if there is young marriage and the relationship of MIL AND DIL depends on how MIL has treated the DIL in young days, if treated well and like daughter there is respect

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C. NOW TALK ABOUT THE DRINKING SCENARIO – TALK ABOUT FINANACIAL SITUATION, DOMESTIC VIOLENCE

Scenario:

One day Laxmi came home from work, she had just received her pay from the shop (is it true that women in these communities might work in a shop?). When she returned, Ram asked her for her wages. What do you think Laxmi would do? or something like that.

D. LASTLY TALK ABOUT NATAL CONNECTION – PUT IN DURING WHEN THERE IS A OPPORTUNITY IN IT -SUPPORT SYSTEM AND ADVICE

Appendix 3: Codes and sub-codes related to Breastfeeding and Introduction to Foods

Breastfeeding Advice

- 065. What have you heard or what advice have you received about breastfeeding?
- 066. Who has talked to you about breastfeeding?
- 067. What did they say?
- 068. What did you think of their advice?
- 069. Has the ANM or AWW ever given you advice about how to feed your baby?
- 070. If Yes, what did they say?
- 071. What did you think of their advice?

Putting to the breast

- 002a. Was your child put to breast right after the birth?
- 002b. How soon after giving birth did the baby first receive breast-milk?
- 002c. Was the baby nursed by somebody else? Who?
- 003. Reasons for giving breast milk at that particular time
- 004. How did you know when to start giving your baby breast-milk?
- 005. Did your baby receive anything else before receiving breast-milk?

Colostrum

- 006. Did the baby receive the first milk (colostrums)?
- 007. If yes, what did you feel about giving colostrum?
- 008. If no, could you tell me the reasons for this? (Probe)
- 009. What do you think about colostrums?
- 010. What could happen if the baby is given colostrum?

Breast milk

- 037. What do you think about the qualities of breast milk?
- 042. Do you think that breast milk changes as the child gets older?
- 043. If yes, in what way?

Right after birth in addition to breast milk

- 011. Did your baby receive any other food or liquid other than breast milk after birth?
- 012a. What other food or liquid other than breast milk after birth did your child receive?
- 012b. Who told u about other fluids to be given in the first few days of life?
- 013. From what age your baby receive any other food or liquid other than breast milk after birth?
- 014. What were the reasons for giving the food/liquid after birth

Breast-feeding pattern

- 015. If you gave only breast milk after birth, how did you decide that?
- 035. How long do you plan to continue to breastfeed?
- 036. Reasons mother will continue BF?
- 040. How long do you think a baby should be breastfed?
- 041. Could you tell me your reasons for that?
- 044. For how long have you breastfeed the child?

- 045a. When did you stop breastfeeding?
- 045b. What were your reasons for stopping breastfeeding?
- 045c. Why would you stop breastfeeding?
- 046. What did you think about breastfeeding?
- 052. Can you describe to me the reasons why you are giving only breastmilk?

Already began with Introduction of foods

- 056a. At what age did you start giving other liquids or food to your baby?
- 056b. What were the foods you started with?
- 057. Can you tell me the reasons for this?
- 058. Why did you choose those particular foods or liquids?
- 059. Can you tell me the reasons when you give your baby other liquids/foods occasionally? Probe.
- 072. When did you (or when will you, if not already giving) first give other foods to your child?

Appendix 4: Codes related to the concept of Autonomy

Code Family Decision-making autonomy

"Woman's say" in different communities

"Women's say" in a house

Decision in terms of "say"

Decision power in different households

Perceptions behind Decision Power

Reason behind decision power

Reasons behind decisions

Reasons behind perception of decision

Reasons behind the "say"

Code Family Financial autonomy

Access to money

Access to money for other HH people

Perceptions behind access to money

Reason behind financial matter

Strategies for obtaining money

Code Family Freedom of movement

Freedom of movement

Perceptions behind Freedom

Reasons behind Freedom of Movement

Code Family Permission

Perception of permission

Reason behind permission

Requirement of Permission

Code Family Emotional autonomy

Experience of domestic violence

Perceptions about Domestic violence

Reason for domestic violence

Code Family Child decision

Decision regarding children

Reasons behind Child Decision

Reasons for other caregivers

Situations with Child Decisions