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UNIVERSITY OF ALBERTA

Rural-Urban Differentials in Lactation in the Philippines: Social, Cultural and Health Factors

BY

MARIA TERESA ABADA 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Arts

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Maria Teresa Abada
18710-62B Avenue
Edmonton, Alberta
T5T 2T9

University of Alberta

Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "Rural-Urban Differentials in Lactation in the Philippines: Social, Cultural and Health Factors" submitted by Maria Teresa Abada in partial fulfillment of the requirements for the degree of Master of Arts in Demography.

Dr. Frank Trovato

Dr. Parameswara Krishnan

Dr. Lory Laing

Date: July 24/97

ABSTRACT

This study examines the rural-urban differentials in the determinants of lactation in the Philippines. The effects of health sector, socioeconomic, demographic and supplementary food variables on breast-feeding are analyzed among the rural and urban samples. It is proposed that differential access to modern health care and differences in educational, occupational and demographic characteristics of the two residential strata will result in different outcomes regarding incidence and duration of breast-feeding. Logistic regression is used to analyze the incidence of breast-feeding, whereas multiple regression is applied to analyze the duration of breast-feeding.

The results indicate that traditional cultural food supplements are used as complements, whereas infant formulas are used as substitutes to breast-feeding. Lower incidence and shorter durations of lactation were noted among the following: women with higher levels of education, high parity, women who work away from home, seeking prenatal care advice from a medical doctor, and delivery in a health institution. Policy implications that arise from the results of the study suggest that the role played by health institutions and medical professionals, a work environment that encourages breast-feeding and educational campaigns that stress the benefits of lactation remain important pathways of intervention to enhance the incidence and duration of breast-feeding.

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Chapter 1. Introduction

The importance of breast-feeding in affecting a child's nutritional health and well-being cannot be stressed enough. Lactation plays a particularly important role in child survival in developing countries, because it contributes to the child's immunologic defense system, hence increasing its resistance to disease. It can also facilitate child survival through postpartum annovulation and postpartum abstinence, as these increase the intervals between births (Huffman and Lamphere, 1984). Breast-feeding is particularly vital to the health of infants in poor countries, where the lack of clean water, sewage disposal system and adequate fuel supply increases the risk of exposure to diarrheal disease. In the industrialized countries, the efficient sewage disposal and supply of clean water may help to reduce the infant's exposure to the hazards of bottle-feeding, but the mortality from gastrointestinal diseases are not negligible (Cunningham, 1995). In North America, breast-feeding contributes to the reduction in infant mortality by four per 1000. Lactation, therefore, can play a significant role in controlling fertility and reducing infant mortality in both developed and developing countries.

According to Williamson (1988), breast-feeding incidence and duration in the Philippines have declined since 1973. The reported decreases in lactation have generated much concern among health professionals in many low income countries (Stewart et al. 1991). In many developing countries breastfeeding contributes more to lowered fertility and longer birth intervals than the use of contraception. There is also the consensus that breast-feeding provides 98% protection against pregnancy in the first six months postpartum (Mangahas, 1991; Ebrahim, 1991). For the Philippines, this indeed remains a

major concern where most family income is low, child nutrition is often inadequate, and there is little use of modern family planning methods.

In response to the downturn in the incidence and the prevalence of breast-feeding, the Philippine government has instituted programs designed to promote this practice. One example of such a program was presented at the 1981 initiation of the National Movement for the Promotion of Breast-feeding. As part of the five-year health plan, this movement encouraged the implementation of a wide range of policies, including the improvement of hospital practices and education programs for women designed to encourage the continuation of breast-feeding practices.

The concern for the reported declines in breast-feeding has facilitated the resurgence of research on the determinants of lactation in both developed and developing countries. Because substantial differences have been noted to exist in the mother's decision to initiate, continue, or terminate breast-feeding both between and within societies, an understanding of these distinguishing factors is essential for policies of intervention and guidance that seek to promote longer durations of lactation.

Many of the efforts in trying to understand the determinants of lactation stem from the concern about potential shifts in infant feeding that occur during the process of socioeconomic development. In the 1981 analysis of the World Fertility Survey of 19 developing countries[1] M. Kent (1981) has noted that the decline in the initiation and duration of breast-feeding is an inevitable component of the modernization process and that:

"Generally, the initiation and duration of breast-feeding in a country varies inversely with the level of economic development. This suggests that breastfeeding will decline as these countries continue to modernize. This trend will be modified and tempered by cultural norms and traditions about infant feeding within the individual countries" (p.1).

Theoretically, as a country advances from a traditional rural to a modern urban society, demographic changes also take place concomitant to economic development. These include: a fall in the birth and death rates, improvements in life expectancy, growth of cities as a result of rural-urban migration, and a shift from a subsistence agriculture to a market-oriented economy. In a sense, modernization can be conceptualized as the process of urbanization which then influence the social factors such as education, and the access to both private and public technologies. The access to modern technology affects the use of modern health services and supplementary foods available to infants, which ultimately impact the incidence and the duration of breast-feeding.

Although the changes associated with the modernization process tend to be incremental, they do not assume a linear progression. In analyzing the successive stages of demographic and economic development, Fredericksen (1969) states that improvements in the standard of living, decreases in the mortality and fertility rates, and increases in urbanization are a "concurrent, circular, and cumulative causation." In particular, the transformations that are taking place in developing countries occur at a more complex level whereby the model of economic development is marked by deep social inequality, thus contributing to a diversity of living conditions (Frenk et al. 1993). Such is the case of the Philippines and many developing countries. The diversity of living conditions is reflected in the substantial rural urban differentials in patterns of demographic behavior, including breast-feeding practices.

One index of economic development that is considered to be sensitive to the general standards of living and the degree to which the "average person" participates in the modernization process is rural/urban residence. Urban residence has been consistently shown in previous research to be negatively related to the practice of breast-feeding. In fact, it is regarded by a number of studies as the most important determinant of breast-feeding behavior for many societies (Akin et al. 1986; Knodel Kamnuansilpa and Chamratrithirong, 1982; Mott, 1984; Jain and Bongaarts, 1981; Smith and Ferry, 1984).

While previous research has provided valuable information on the role of the health sector and supplementary feeding patterns, these determinants of breast-feeding have often been analyzed separately from other socioeconomic and demographic factors (Simpson-Hebert and Makil, 1986; Stewart et al. 1991; Popkin, Yamamoto and Griffin, 1985). Our knowledge regarding lactation, hence, remains far from complete.

This thesis attempts to make up for these deficiencies by employing an integrated approach to the social determinants of lactation in a large representative cohort of women in the Philippines. Specifically, health sector, socioeconomic, demographic variables, and supplementary foods variables will be analyzed among two groups of women: the less-modern subgroup, defined as those women who reside in rural areas; and the modern subgroup, defined as those women who reside in urban areas. It is proposed that modernization cannot be viewed as a process that involves a direct shift from breast to bottle-feeding. While modernization can lead to the adoption of western behaviors, traditional cultural values can also prevail, resulting in the rejection of certain aspects of modernity. As such, some determinants of breast-feeding behavior can take on both

modern and traditional aspects simultaneously. This study then will show how the process of modernization vis-a-vis rural-urban residence influence the determinants of lactation between the less modern and the more modern subgroups and how that results in the different outcomes in the incidence and the duration of breast-feeding. The results of the analysis should prove useful for recommending effective measures in promoting and prolonging lactation in the Philippines and elsewhere.

Chapter 2. Theoretical Orientation

Breast-feeding, like other types of behaviors is governed by meanings and values consistent with a person's culture and by the social and economic environments of the mother and infant. Over time, in the Philippines, infant feeding practices have undergone some dramatic shifts primarily due to the process of modernization.

Modernization as a Social Process

There are several perspectives on modernization. One such perspective is that of Inkeles and Smith (1974) who define modernization as the readiness for new experiences and openness to innovation and change. This is a general process which can take a variety of forms. For the Philippines, openness to change would constitute in part, the acceptance of Western breast-feeding practices i.e., the adoption of modern breastmilk substitutes, the participation of men and women in the monetized economy and a preference and reliance on modern health practitioners as opposed to traditional health care systems.

Openness to western influence regarding infant feeding is highly dependent on the mass media. According to Lerner (1958), "no modern society functions efficiently without a developed system of mass communication" (p.46). The degree to which mass media exerts its influence within a society is one of the key elements that classifies society as either traditional, transitional or modern. A more modern society is more likely to be characterized by a strong reliance on international newspapers, radio and

movies, whereas a more traditional society is more likely to rely on traditional sources of information, such as local community newspapers.

From a historical and cultural point of view, the Philippines has been considered one of the more "westernized" Asian nations (Kent, 1981). Much of this can be attributed to nearly 400 years of Spanish and American rule.[2] The Spanish occupation opened up the Philippines to world trade in the 19th century resulting in the rise of foreign establishments and the development of banking institutions. Further western influence is also attributed to the American occupation. The American administration established the educational system on the impetus that every child be given the opportunity to finish school at least at the elementary level. English also became the medium of instruction and specific attention was given to adult literacy programs and the education of cultural minorities (Navarro et al. 1985). Moreover, the development of transportation and communication systems introduced various means of communication such as the wireless telegraph, mail services and telephone. The increased availability and variety of communication facilities led to improved contact with the outside world, especially exposure to western ideas regarding infant feeding practices.

Following WWII, the Philippines experienced its greatest economic advancement that ranged from the introduction of modern methods of agriculture to further expansion of industries, commerce and trade. The increase in volume of commerce and trade during this period has provided the Filipinos more options of foreign goods, including infant formulas. The increased availability of modern objects, especially infant formulas, played a significant role in Philippine mothers' decision concerning breastfeeding

(Simpson-Hebert, 1986). As noted by Kent (1981), extended exposure to western influence has played a significant role in changing breast-feeding behaviors - namely, a decline in the incidence and duration of breast-feeding.

The Rural-Urban Dimension

If the determinants of lactation are to be discussed and analyzed from the vantage point of the social process of modernization, then we need to understand the structural and cultural changes that arise from such a process. In developing countries, increasing urbanization is highly associated with the process of economic and social modernization (Hauser 1957; Hoselitz 1960; Lerner 1958; Sjoberg 1964; Smelser and Lipset 1966). In this regard, the Philippines has further progressed towards modernity over the last two decades. Since 1970, urbanization has increased from 32.9% to its current level of 43% (Demographic Health Survey, 1993).

It should be noted, however, that developments brought about by modernization have created wide social and economic differences between rural and urban areas. This point is reinforced by Schnaiberg (1970):

> "One of the mechanisms by which the changes in the structure of rural and urban communities may affect individuals' level of modernism is through the stratification process.... And it is the differential between rural and urban communities in the access to organizations which provide the means of attaining the educational and occupational components of social status which largely determine the differences in individual modernism between rural and urban dwellers" (p. 72).

In the case of the Philippines, increasing urbanization has resulted in an urban bias whereby government expenditures have been directed mainly toward the modern manufacturing and commercial sectors of urban areas. Bias is also reflected in education,

health, housing, and other social services, including infant and child services. The greater concentration of medical facilities, public health services, and opportunities for higher income are found in the major centers such as Manila, Central Luzon, and the Visayas.

In the urban areas, Filipino women are more exposed to modern lifestyles and greater availability of alternative infant foods. It is no surprise then, that the mean duration of breast-feeding is much shorter in the urban areas, averaging 5.9 months compared to 9.5 months in the countryside (Philippines National Demographic Health Survey, 1993). In the rural areas, traditional feeding practices are maintained, thereby prolonging the mean duration of breast-feeding. Thus, modernization and westernization of family roles, ideals, and behavior is evident in the metropolitan areas of the Philippines and other urban areas that have greater contact with the outside world.

The wide social and economic differences between rural and urban areas will result in some determinants of breast-feeding behavior having a more significant effect in one residential strata while displaying little or no effect in another.[3] For example, "delivery away from home," (a proxy for access to the modern health care sector) may play a significant role in reducing duration of breast-feeding in the urban areas while in the rural areas, this factor may be inconsequential since deliveries are more likely to take place at home. Likewise, education (as a proxy for individual modernity), may exert a stronger influence on durations of breast-feeding in the urban areas, because urban women have higher levels of education and are therefore more likely to adhere to a more modern lifestyle than rural women. In assessing these differentials in breast-feeding

behavior, special consideration must be given to the rural-urban differences in socioeconomic, demographic, and health related factors.

Theoretical Framework for the Determinants of Lactation

Mosley and Chen's "Proximate Determinants Framework" for Infant and Child Survival

Because lactation plays a significant role in child survival and also fertility dynamics, the conceptual framework for the incidence and duration of breast-feeding has been adapted mainly from other conceptual schema in the areas of fertility and mortality. Mosley and Chen (1984) provide an analytical framework for the determinants of child survival in developing countries, incorporating both social and biological variables as determinants for the levels and patterns of child mortality. According to Mosley and Chen, socioeconomic determinants of child mortality (independent variables) operate through biological mechanisms or proximate determinants (intermediate variables) to influence directly the risk of morbidity and mortality (dependent variables). Within this framework, breast-feeding is an intermediate variable affected by individual, household, and community variables. For example, lack of income as a household variable influences the purchase of breastmilk substitutes and other infant foods, which then affects the child's nutrient deficiency. This intermediate variable then affects the probability of child survival through the availability of nutrients such as calories, protein, and micronutrients to the child and the mother. The incidence and duration of lactation in turn affect infant and child morbidity and mortality.

The Relationship Between Maternal Education and Child Survival

Ware (1984) has identified various mechanisms through which maternal education operates to reduce child mortality. One important link is the positive association between the level of education of mothers and the use of effective health services for their children. According to Ware, this occurs with the abandonment of fatalism and/or belief in the traditional remedies in favor of Western-style medical services. Rejection of traditional remedies is associated with increased use of modern breastmilk substitutes. This in turn promotes the shift to early bottle use, thereby affecting the duration of lactation.

It is thought that an interaction exists between economic activity and child care practices. According to Ware (1984), women's economic activities will have a negative impact on child survival only if the activities are incompatible with child-rearing or where the mother lacks access to another person to care for the child. As women are encouraged to play a more active role in the country's economic life, their increase in labor force participation results in a conflict between the work schedule and the child care role. The increase in women's status also results in the abandonment of some traditional practices, particularly breast-feeding.

Mahadevan's Life Affecting Variables (LAV'S)

Mahadevan (1984) developed an elaborate framework for the analysis of infant and child mortality. In his view, the determinants of mortality can be conceptualized as life affecting variables because they affect the life process of infants and children

encountered at various stages of their development. The life process is affected through the preconception stages of culture, family and marriage, parental variables, polity and policy. The influence of a variable can be positive in certain contexts and negative in other occasions, affecting the life process in varying degrees and resulting in either the prevention or inducement of premature mortality.

The determinants of lactation can be conceptualized in the same way as the factors that affect infant mortality. For example, cultural beliefs regarding infant feeding patterns may affect breast-feeding patterns positively in certain contexts and negatively in others. Specifically, cultural beliefs regarding infant's illness, especially diarrhea, are often attributed to the mother's breastmilk, which often leads the mother to discontinue breast-feeding. (Simpson-Hebert, 1986).

Increasing urbanization can lead to the abandonment of these beliefs regarding infant's illness, thus countering the mother's initial inclination to terminate breast-feeding. According to Mahadevan, cultural variables, program interventions, and perinatal variables that directly determine infant feeding patterns are influenced by macro-structural variables, namely rural-urban residence, education, and polity and policy which affect the chances of child survival. The priority of these variables may vary according to the societal context, and change with reference to technological and social developments of a country.

Based on these theoretical frameworks, it can be concluded that the socio-economic environment operates through certain proximate determinants or imminent variables to affect infant and child survival. In chapter three, we pursue current studies

on the determinants of lactation and its contributing effects to the variation in breast-feeding behavior.

Chapter 3. Literature Review

Concern over reported declines in breast-feeding and the implications this has for infants has generated much research on the determinants and differentials in breast-feeding behavior, especially in developing countries. Whether the focus of the research is on the cultural context of lactation, increasing urbanization, or the role of the health sector, the underlying premise of all these studies is that structural changes brought about by the process of modernization often facilitate the abandonment of breast-feeding in favor of bottle-feeding.

The Cultural Context of Lactation

Both incidence and duration of breast-feeding are related to the nutritional and health status of the mother, cultural practices, the lifestyle of the mother, and the role of the health sector (Mahadevan, 1989). Infant feeding patterns are widely influenced by indigenous cultural beliefs. One issue that is of great significance to a full understanding of women's choices about infant feeding is that in some instances cultural factors are not supportive of breast-feeding. Development planners often view cultural factors as obstacles to the implementation of programs related to maternal and child health, which can be overcome only with increasing education (Van Esterik, 1988). For example, there exists norms that dictate against colostrum, which can adversely affect the incidence of breast-feeding, or beliefs related to the age of introduction of supplemental foods that strongly influence the time of complete weaning. There is clear agreement that maternal attitudes towards breast and bottle feeding are culturally conditioned. Therefore, an

understanding of the cultural context is essential for the design of effective interventions and programs to promote the practice of breast-feeding.

In some cultures mothers are discouraged from providing infants colostrum, thus affecting the timing of initiation. Among the Nuaglik women of rural Java, a considerable proportion often postpone breast-feeding until the third day or later in order to avoid feeding the infants initial breastmilk as it is considered to be dirty, tastes bad, contains germs or causes stomach upset (Hull, 1985). It is further noted that many of these women, particularly younger ones, did not know the reasons for the customs but had accepted feeding advice from their elders or from traditional birth attendants. Thus, traditional birth attendants can have a significant influence on infant feeding behavior, especially for women in the rural areas.

In a study by Simpson-Hebert (1985) of 152 hospital-based urban women, 75% claimed that initial breastmilk was "dirty" or "spoiled" because some considered it "stocked up milk since the beginning of pregnancy", and hence not nutritious for infants. It is important to note, however, that the strong statements against colostrum do not necessarily indicate that infants are denied the initial breastmilk, but rather, that there are considerable differences in the attitudes and practice with regard to the importance of this anti-infective agent. For example, the beliefs regarding colostrum are more prevalent in the rural areas, as in northern Luzon or southern Mindanao; whereas in other metropolitan cities like Manila or Cebu, the increased awareness on the medical benefits of lactation encourages mothers to breastfeed their infants immediately after birth.

The timing and introduction of other foods can have a strong impact on the duration of breast-feeding. The episode of an infant's illness as well as the mother's

attitude towards the illness can influence her decision to continue or to terminate breast-feeding. When the infant has diarrhea, he/she is given prelacteal feedings that include rice-water, tea, and other brews in place of breastmilk. This practice can be detrimental since it denies infants the important nutrients when they are most needed (Simpson-Hebert, 1985). Similar observations were made for Bogota and Bangkok where breastmilk itself is believed to have caused the illness and must therefore be eliminated from the child's diet (Castle et al. 1988; Winikoff, Durongdej and Cerf, 1988). Likewise, Filipino women hold that if they have been away from their infants for several hours, the milk spoils in their breast, hence causing and providing a reason to terminate breast-feeding.

Declerque (1987) examined the role of the mother's attitudes and beliefs associated with infant diarrhea in 16 rural and 17 urban districts of the province of Cebu in the Philippines. It was found that certain kinds of diarrhea (whether it was "hot" or "cold") determined whether it was good to continue breast-feeding; that is hot diarrhea was considered to be bad thus providing a reason for early termination of breast-feeding; cold diarrhea on the other hand, was not as detrimental, which means that mothers can continue nursing their infants.

Certain foods, such as rice, are considered culturally important, and can affect the timing of the weaning process. In the Philippines, 'lugao' or rice porridge is the most common solid food given to infants because it is considered to be the most important food for babies (Simpson-Hebert, 1985). It is also used as a folk remedy for infant diarrhea. This prelacteal feeding is started once the baby is about 4 to 6 months. At one year of age, milk (whether breast or canned), is eliminated from the infant's diet and

replaced with a variety of other foods. These include bananas, rice, and different kinds of tea brews.

The 1993 Philippine National Demographic Health Survey reported that children are introduced to supplemental foods at a very young age. Among newborns under two months 31% were receiving supplementary foods and only four in 10 newborns were exclusively breastfed. At age 4-5 months, the receipt of weaning foods resulted in an increase of those not breastfed by one in four children, and the percent of children who were exclusively breastfed dropped to 13%. This suggests that early introduction of supplements to the infant's diet can have an lead to early termination of breast-feeding.

The ideal duration of breast-feeding also "centers around the child's health and development and the notion that a child has to reach a certain age and growth to ensure that complete weaning does not endanger his or her health" (Hull, 1985:81). One of the most common reasons given to terminate breast-feeding was that the child was old enough to be weaned. In Tepetlaontoc and Amanalco communities of Mexico, for example, the proper time of weaning a child depends upon specific physical and behavioral developments (Cassidy, 1980; Cravioto and De Licardie, 1976). Women in these communities share a number of cultural rules concerning weaning procedures. One rule is that breast-feeding should cease once a child has teeth or is mature enough to eat weaning foods. This of course allows for a considerable leverage of interpretation on the part of the mother since teeth start to develop around six months, continuing to around two and one half years, hence allowing them to complete weaning within this time span.

The Amele people in lowland Papua New Guinea also adhere to a nutritional philosophy that is directly linked to their concepts of growth and development, and health

and illness (Jenkins and Heywood, 1988). Cultural rules dictate what kinds of foods are appropriate at the different stages of development. For example, watery foods, preferably cooked, such as broths or juices, are preferred types of infant food in the early stages of development. When incisors emerge, soft solids may be introduced while the stage at which boiled taro and yams are also introduced, can be delayed until the child crawls, usually by 10 months.

In rural Java, Ngaglik women believe that early weaning is essential to avoid potential feeding problems at a later age. It is not uncommon to find infants in their first weeks of life being given weaning foods such as soft-cooked rice or banana, although a variation exists in the regularity and persistence with which the practice is carried out. In addition, some women believe that extensive nursing could make a child dull (Hull, 1985). Such beliefs strongly influence the timing of the introduction of supplemental foods, which in turn affect the duration of lactation. A mother who introduces milk supplements early may find her breast-milk decreasing, causing her to increase artificial milkfeeds and thus hasten the end of breast-feeding.

Increasing Urbanization

As discussed previously, increasing urbanization is an inevitable component that arises from the social, the economic and cultural process of modernization. It is also well established in the literature that urbanization is associated with lower incidence and shorter durations of breast-feeding. There are many reasons why the shift from breast to bottle-feeding is widespread in the urban areas. For some, the adoption of bottle-feeding

in the urban areas is widespread because it is considered to be more modern, sophisticated, and convenient, (especially if the mother works outside the home), and because there are fewer breast-feeding role models for urban women to emulate (Trussell et al. 1992).

In the rural environment, however, breast-feeding calls for little change in lifestyle. It has been shown, for example, that the presence of additional family members in the household can have a significant influence on feeding decisions by providing positive support to breast-feeding practices. In the Philippines, mothers who live with adult relatives (mothers, mothers-in-law) are more likely to initiate breast-feeding than are other women (Stewart et al. 1991; Butz, Habicht and Da Vanzo, 1981; Pelto, 1981; Bryant, 1978). With increasing urbanization, which is often the case in developing countries, the extended family and traditional practices, as well as close proximity of the mother and infant - factors that encourage breast-feeding - are diluted or lost. The lifestyle changes make breast-feeding difficult because a great deal of adaptation and even sacrifice is necessary.

Meldrum (1982) has also indicated that the shift to bottle-feeding is a powerful indicator of westernization. Mothers who are caught in the transitional period between traditional culture and western culture often do not understand that bottle-feeding, under improper hygienic conditions, increases the risks for infection, thus posing more danger to the health of the infant. The same study also reported that women who had education above primary school level or who held modern occupations had stopped breast-feeding by the time their children were one year old, compared with only 18% of uneducated women. It was also these same mothers who believed that artificial formula is better than

breastmilk for babies and viewed it as having medicinal qualities. Hence, the shift to bottle-feeding as an example of the acquisition of western material cultural values reflects a subconscious attempt to move from the traditional to the modern culture.

One of the key determinants of the decline in breast-feeding in urban areas is increasing education among women, a factor which plays a role in the adoption of modern ideas and orientations, and leads to an abandonment of traditional remedies regarding child care on the one hand, and increased utilization of western practices, on the other. According to Caldwell (1979), education gives women greater power over their circumstances and the confidence to take decision-making at the household management level into their own hands:

> "Education can lead to a reduction in fatalism in the face of children's ill health, a greater capacity in manipulating the world (e.g. knowing where facilities are, and a shift in traditional balance of family relationships that shift the focus of power away from the patriarch and the mother-in-law, and ensures that a greater share of available resources is devoted to children" (p. 194).

The shift in balance of family relations as a result of increasing education can manifest itself in the abandonment of traditional sources of influence namely, the influence of the mother-in-law resulting in shorter durations of breast-feeding.

Education may also play a role as a mediating factor between economic participation and child care activities. Because women with higher education have a greater likelihood of participating in the labor force, they are more likely to experience problems of conflicting schedules between work and motherhood. According to Huffman (1984), there are several factors that appear to influence the relationship between female employment patterns and breast-feeding prevalence. These include the location of the work setting (measured by the distance of the work setting from home), the type of

occupation, other alternatives available to child care and the income derived from employment.

Popkin and Solon (1976) have noted a negative relationship between the mother's labor force participation and the health and nutritional status of the young child, particularly among low-income households. The effect on the health and nutritional status of the young child are determined by a number of factors which include (a) the extent to which the job is compatible with child care, (b) the quality of child care provided, (c) the availability and extent to which market goods and services along with quality of social services substitute for the mother's time. Hence, the mother's participation in the wage sector results in a decline in the amount of time spent in household activities, especially time-intensive activities such as child care and breast-feeding.

Solimano, Winikoff, and Laukaran (1984) also outlined a number of factors that influence infant feeding practices in Thailand. A rural-urban difference was noted whereby mothers born outside Bangkok were more likely to initiate and continue breast-feeding. The work setting was also a determining factor. Working outside the home had a major effect on decreasing the duration rather than determining the initiation of breast-feeding. In a similar study among a low-income urban population in Mexico, it was found that urban residence was negatively associated with lactation at four months, and maternal employment outside the home was inversely related to breast-feeding at two months (Perez et al. 1993).

The type of occupation also determines the access of the child to the mother, hence influencing the duration of breast-feeding. For example, Popkin and colleagues

(1989) have found that the greatest decline in breast-feeding from 1973 to 1983 occurred among residents of Manila and Mindanao women with transitional occupations such as clerical and sales positions. Women with high education levels or professional occupations however, were more likely to breastfeed in 1983 than were similar groups in 1973 (Popkin et al. 1989).

According to Huffman (1984) child care is the activity that loses most of the mother's attention when she increases her market activities. In a study depicting women's working patterns in Malaysia, DaVanzo and Lee (1978) reported that women who were involved in professional occupations, management, clerical work, and service occupations were less likely to have children less than 10 years of age with them when they worked than were those involved in other types of activities; for example, part-time work, or work within the household. According to Ho (1979), work that is closer to home is more compatible with breast-feeding and child-care activities. Thus, certain occupations are more likely to promote breast-feeding than are other types of work by influencing the mother's access and the time available to the infant.

As many developing countries continue to modernize, increasing urbanization will indeed be beyond the control of policy-makers who seek to promote policies for increasing the durations of breast-feeding. The increase in education and women's labor force participation may bring desired results economically; but it will also lead to an abandonment of traditional values or practices regarding infant feeding patterns. Lifestyle changes as influenced by the mass media, the modern health sector and the increased availability of modern consumer goods, namely infant formulas, will continue

to play an important role in the mother's decision to initiate, continue or terminate breast-feeding.

The Role of the Health Sector

In virtually all developing countries, increasing urbanization has facilitated an increased use of modern health services. The expansion of both urban and rural health facilities that provide maternity services has resulted in an increasing number of births being delivered by modern health professionals. The worldwide trends to shorter average durations of breast-feeding have drawn considerable attention to the international public health community. Several aspects of the modern health system have been criticized for their negative contribution to successful breast-feeding.

Jellife and Jellife (1978) have implicated several factors that encourage the shift to bottle-feeding. These include certain hospital and clinic practices; health professionals' lack of knowledge of infants' nutritional needs which in turn encourages the mother's negative attitudes towards breast-feeding; and the implicit or explicit influence of the infant food industry on health personnel and practices. Because contact with the medical system and the receipt of advice from medical professionals may influence the decision to continue breast-feeding, the healthcare sector has been a major target of both breast-feeding promotion and infant-formula marketing activities. It is not uncommon for food manufacturers to contact hospital personnel and provide them with education and advertising materials along with free samples of infant formulas to be distributed to new mothers (Feinstein et al. 1986; Greiner, 1975; Jellife and Jellife, 1977; Popkin,

Yamamoto and Griffin, 1985; Reiff and Essock-Vitale, 1985). Health professionals who consider infant formulas to be better than breastmilk can adversely affect the mother's decision to continue breast-feeding by influencing her views regarding the adequacy of her breastmilk. On the other hand, traditional midwives who attend deliveries outside the modern health system are thought to be far more supportive of traditional practices, including breast-feeding. Hence, the delivery setting (whether at home or in a government hospital) and the type of attendant (traditional or medical doctor) affect the mother's decision to breastfeed by exposing her to the beliefs and practices of trained health professionals.

Solimano et al. (1985) examined the role of the health care sector on infant feeding practices in urban areas of Columbia, Indonesia, Kenya, and Thailand. This particular study found that women in Columbia were less likely to breastfeed if their infants were born in a private hospital than if they were born at home. In Indonesia women who were given advice by medical practitioners on breast-feeding were more likely to breastfeed than were those who were not given advice. Moreover, the receipt of a sample formula had a strong negative impact on breast-feeding and a positive impact on bottle-feeding. The results for Nairobi, Kenya, and Bangkok were similar in that home births and the receipt of breast-feeding advice were positively related to breast-feeding.

Mock, Franklin, Bertrand and O'Gara (1985) also examined the role of the health-care system and the duration of breast-feeding in different urban populations in Bolivia, Honduras, and the Philippines. It was found that prenatal care and institutional delivery were negatively associated with breast-feeding activities. In the Bolivian sample, women who received prenatal care from a medical professional, rather than a traditional birth

attendant breastfed an average of 3.4 months less than those who did not receive such care. For the Philippine sample, only 26.1% of infants between 7 and 17 months who were born in a hospital were still breast-feeding at the time of the survey, whereas over 69% of the infants born at home were still nursing. This suggests that the movement away from breast-feeding is partially a function of the replacement of traditional health care systems by the modern medical establishment.

The movement away from traditional health care systems can also mean an increased awareness on the benefits of lactation; hence the modern medical system can also encourage mothers to breastfeed for extended periods. Huffman (1984) noted that where women receive prenatal care during pregnancy, the attitudes and beliefs of the health professionals provide an increased opportunity to influence the woman's knowledge and decisions about breast-feeding. A 1985 Philippine survey of health professionals' breast-feeding knowledge, attitudes, and practices indicated that a decline in breast-feeding was possibly more related to contact with traditional rather than modern practitioners. The same study highlighted the fact that traditional birth attendants as a group "are the least knowledgeable about breast-feeding and have the most negative attitudes towards the practice"(Popkin, Yamamoto and Griffin, 1985:104). In particular, the specific question on the values of colostrum showed a clear distinction between the traditional and the modern practitioners. Nearly half of the traditional midwives believed that colostrum had no benefits, in contrast to only about 10% of the sample. The knowledge or lack thereof on the benefits of lactation can have an adverse effect on the mother's intention to breastfeed. Thus, exposure to the health care system and specific

practice such as certain feeding advice provide an increased opportunity to influence the woman's knowledge and decisions about breast-feeding.

Some developing countries have adopted changes in hospital routines that encourage a wide range of breast-feeding promotion activities as a means to overcoming the reported declines in breast-feeding. In the Philippines, the rooming-in procedure has been adopted by government and private hospitals as part of the policy of the National Movement for the Promotion of Breast-feeding. According to Huffman (1984), promoting breast-feeding immediately following delivery and allowing for rooming-in, whereby the infant is near the mother night and day and not kept separately in a nursery - allows the infant to be fed whenever he demands feeding rather than being fed according to hospital schedule. The hospital setting therefore, provides an environment that encourages breast-feeding practices, which in turn affects the duration of breast-feeding.

A study by Donovan (1992) indicated that the rooming-in policy at the Jose Fabella Memorial Hospital in Manila encourages breast-feeding practices. This policy ensures that every mother is informed by the health staff of the benefits and management of breast-feeding. In addition, mothers and infants are not discharged until breast-feeding practices are well established. The rooming-in policy resulted in a 94% reduction in incidences of diarrhea and a 95% reduction in the rate of death due to infection.

Another case study that illustrated increases in the prevalence of breast-feeding involved changes in hospital practices in the Philippine Baguio General (Relucio-Clavano, 1981). Such changes included allowing breast-feeding on demand (with rooming-in) and a shorter time period between delivery and initiation of breast-feeding. In addition, infant formula promotion was prohibited. The rooming-in policy resulted in

an increase in the prevalence of breast-feeding from about 50% to 93%. Such changes in hospital routines that provide information and support programs on breast-feeding would have a beneficial impact not only on the initiation, but also on the duration of breast-feeding. Klaus and Kendall (1978) have indicated in their Guatemalan study that the promotion of immediate suckling after birth has increased the proportion of breast-feeding from 17% to 53% at 6 months postpartum, and from 0% to 29% at 12 months postpartum.

Because the attitudes and beliefs of the health professionals have a greater opportunity to affect the woman's knowledge and attitude about breast-feeding, the health care sector is an important locus of intervention activities. Interventions that provide information and support on the benefits of lactation along with changes in hospital procedures that encourage more contact between the mother and the child can positively impact the incidence and the duration of breast-feeding.

For the Philippines, the expansion of modern health services, increase in formal education, and women's labor force participation are just one of the desired results brought about by improvements in the country's socioeconomic conditions. As mentioned earlier, however, much of these improvements have largely been uneven. The differential access to the health and occupational strata among rural and urban residents reflect the social inequality that persists in all levels of social organization. The varying degrees of modern lifestyles that result from the country's uneven distribution of health and economic resources will influence the underlying factors or determinants of lactation in different ways. The following chapter will explore how rural and urban residence affect infant feeding patterns.

Chapter 4. Rural-Urban Differentials in Breast-feeding: A Conceptual Model

In the Philippines as in many developing countries, substantial socioeconomic and demographic differences exist between rural and urban populations. Urban bias in government expenditures in the fields of education, housing and health has contributed to the increasing gap in the standards of living between both the urban and the rural areas and this fact relates to variations in infant feeding. The conceptual model for this study is adapted from Mosley and Chen's "Proximate Determinants Framework" for infant and child survival. We now examine some of the more relevant determinants of lactation and how they differ by rural-urban residence in the Philippine society.

Supplementary Foods

During the infant's first year, women may breastfeed exclusively for a certain time period, and then combine breast-feeding with other substitutes (liquids and/or solids) in the infant's diet. The introduction of breastmilk substitutes is associated with changes in infant growth and development, cultural factors, and maternal lifestyle, which can impact the incidence and the duration of breast-feeding. These underlying factors are influenced by rural/urban residence which then affect the type and the timing of introduction of these supplementary foods.

Several cultural beliefs that influence infant feeding patterns were discussed in the literature review. In the urban areas, the type of breastmilk substitutes provided to the

infant reflects the adoption of practices that are more compatible with the lifestyles of a modern city. The mass media, for example, has played an important role in promoting the marketing activities of food industry with regards to infant formulas in both rural and urban areas but to varying degrees. Women in the urban areas are more likely to be exposed to infant formula advertisements from diverse sources such as TV, radio and international newspapers and magazines; whereas in the rural areas, such exposure is limited to radio and local newspapers only. As Guthrie, Fernandez and Estrera (1983) have noted, the one major factor affecting women's infant feeding patterns was the accessibility of breastmilk substitutes. In their study of largely rural communities in the Philippines, the researchers found that the further the distance to a store selling breastmilk substitutes, the less likely were the women to terminate breast-feeding. The greater exposure to infant formula advertisements in the major cities results in more favorable attitudes towards these modern infant foods, thus facilitating the shift to bottle-feeding. Moreover, the increased accessibility to these modern substitutes alleviates the time constraints prompted by the changes in maternal lifestyle. The convenience then, provided by the alternative infant foods would prompt women to introduce supplements to their infants at a young age, which can replace breastmilk completely from the infant's diet. For women who breastfeed for a time period, the use of infant formula eventually leads to the replacement of breastmilk, which then hastens early termination of breast-feeding.

The limited access faced by women in the rural areas to such modern substitutes either due to lack of income or less exposure to infant formula advertisements, results in the fact that they may not be as open to such infant feeding alternatives, and hence are

less likely to use them as supplementary foods. Hence, the early introduction of modern substitutes would play a more significant role in breast-feeding patterns for women in the urban areas. For rural women, the more traditional types of infant foods, such as rice water, would play a more important role in the mother's decision to continue or terminate breast-feeding.

Besides breastmilk substitutes, other types of supplementary foods for example, solid or mushy foods may actually be compatible with breast-feeding. The 1993 Philippine National Demographic Health Survey reports that supplementary foods that are introduced initially at four to six months of infancy can greatly contribute to the nutritional needs of the growing child. As in most southeast Asian countries, including the Philippines, mashed banana, rice porridge, mashed apple, are introduced as early as two months of the infant's age (Simpson-Hebert, 1986; Winikoff et al. 1988). The reasons for early supplements range from the advice of the mothers-in-law, to increase strength, and remedy for infant's illness, or fussiness, as in the case of colicky babies. The infant's fatness is often a sign of successful breast-feeding, which may encourage the mother to breastfeed for longer durations (Adair et al. 1993). Hence, supplementary foods, as intended to promote the health of the infant, can encourage mothers to breastfeed for extended periods. The reasons for using solid or mushy foods and the type of influence that facilitates the choice for such use are a reflection of the traditional beliefs regarding infant feeding. Because rural women adhere more to tradition regarding infant feeding than urban women, the reliance on solid/mushy foods will play a more important role in their decision to continue or terminate breast-feeding.

Socioeconomic and Demographic Factors:

Education

Education is highly regarded by Filipino families. One of the mandates of the Philippine government was to establish education as a basic right of all Filipino children. Yet, substantial differences exist in all levels of education in both rural and urban areas. The 1993 Philippine National Demographic Health Survey reports that about three fourths of urban women have attained at least a secondary level education compared with only 54 percent of rural women. The difference increased at the post-secondary level whereby 34 percent of urban women attained a college or university education, compared with only 17 percent of rural women.

As noted earlier, education has been consistently shown to be a proxy for modernity. As Kent (1981) notes:

> "educated women are more aware of the alternatives which exist for them and for that reason are most likely to have lower measure of breast-feeding. Perhaps more important, they are participating most actively in the modernization process and are most anxious to identify themselves with that lifestyle" (p.27).

The impact of modernization manifests itself through increased education, which can cause a shift away from breast to bottle-feeding. In this regard, education would play a more significant role for women in the urban areas than for women in the rural areas. The 1981 report on the World Fertility Survey reports that substantial differences exist in the period of breast-feeding by levels of education. Philippine women with no education breastfeed their babies on average 9.5 months longer than women with a university degree or higher education. It was also expected that as the level of education improves, both the incidence and the duration of breast-feeding will continue to decline. Given the

rural-urban differentials in the levels of education, the shift away from breast-feeding as a result of increased education will have a more significant effect for women in the urban areas than for women in the rural areas.

The educational differences also affects infant feeding patterns through the cultural beliefs regarding episodes of infant's illness or mother's illness. Increasing education leads to the abandonment of cultural beliefs regarding colostrum, resulting in a decreased reliance of folk remedies. Likewise, the decreased reliance on folk remedies is also substituted for other modern types of breastmilk substitutes, namely infant formulas.

The rural-urban differentials in education affect the variations in breast-feeding behavior as it facilitates the mother's choice regarding the type of supplementary foods provided to the infant. Since rural women have lower levels of education the strong hold of traditional beliefs, in this case, the continuing reliance on folk remedies, would play a more significant role in reducing the duration of breast-feeding. On the other hand, women in the urban areas have a greater likelihood of using infant formulas as breastmilk substitutes. The reliance on modern substitutes among urban women would have a stronger impact on the duration of breast-feeding. Due to the fact that higher levels of education are more prevalent among urban women, we would expect the impact of modernization to cause an earlier shift from breastfeeding among this group of women than their rural counterparts.

Place of Employment

As developing countries modernize, more women are increasingly joining the ranks of professional, managerial, and clerical positions. While this brings desired results in terms of increasing the status of women, the increase in participation in the formal

sector has also resulted in an increased conflict between the work schedules of the maternal role, resulting in a decline in breast-feeding frequency (Huffman and Lamphere, 1984). This is particularly so where modern or formal work, including clerical, factory and professional jobs are more prevalent in the urban centers of Manila, Cebu City, and other metropolitan areas in the Philippines. Maternal employment can affect infant feeding most strongly if the mother has spent a considerable portion of her day away from the infant. Women who are involved in professional occupations, management, clerical work and sales are often required to work away from home, thus reducing their access to the child. As Butz et al. (1981) have concluded from their Philippine and Malaysian data, the impact of working status does conflict with breast-feeding patterns whereby mothers who work away from home are less likely to breast-feed than those who work closer to home.

In the rural areas, the type of work that women are engaged in does not necessarily conflict with their child care time. These include traditional or informal work, including agricultural activities, cottage industries and small scale marketing. Women who are engaged in agricultural work, particularly those who work on the family farm, have a greater opportunity to have their children with them during the day, hence increasing the likelihood of breast-feeding for longer durations. As Guthrie et al. (1983) have found, Philippine women who work in marketing or home industries have more flexible schedules which allows them to nurse their infants often, thus maintaining the period of lactation.

Rural-urban differentials exist in the types of work Philippine women are engaged in. The 1993 Philippine National Demographic Health Survey reports that 35% of urban

women are engaged in professional, managerial and clerical positions, compared to only 20% of rural women. Likewise, 30% of rural women are engaged in traditional types of work, compared to only 21% of urban women. The place of work then, plays an important role in infant feeding variations among women in the urban areas, whereas this may not have such an influential role among women in the rural areas. That is, work away from home, especially in the cities places greater constraints on the mother's time resulting in greater conflict with childcare time, and resulting in shorter durations of breast-feeding.

Age

The transition of traditional to modern societies has prompted the trend of turning away from initiation of breast-feeding, particularly among young women. For older women, the stronger attachment to traditional customs and the experience of raising many children results in a more rigid and fixed view regarding infant feeding patterns. As a result, they are more likely to reject modern breast-milk substitutes and to rely on traditional forms of infant feeding, including breast-feeding (Kent, 1981). At the same time, younger women, especially those who reside in urban areas, have the opportunity to attain formal education which allows them to recognize other alternatives to infant feeding besides exclusive breast-feeding. Similarly in another study, Adair et al. (1993) found that increased maternal age results in longer durations of any breast-feeding (whether exclusive or with supplemental feeding), but shorter durations of exclusive breast-feeding. In other words, older mothers may have supplemented their infants food earlier, but fully weaned them later. In comparing the rural-urban differential influence

of maternal age on breast-feeding, we would expect that increased maternal age would have a stronger effect on infant feeding behavior for women in the rural areas. The stronger hold of traditional beliefs among older women in the rural areas would exert a stronger influence in terms of greater initiation and longer duration of breast-feeding.

It is also well-established that parity is closely related to maternal age (Smith and Ferry, 1981). The fact that an older woman is more likely to have a greater number of children, the demands on her time are also considerable which may lead to no initiation or shorter durations of breast-feeding. Moreover, poor nutritional status, particularly among older women can diminish the volume as well as the fat and vitamin content of breastmilk (Jellife and Jellife, 1978). The result is that not enough adequate breastmilk will be provided to the infant which then hastens early termination of breast-feeding. Since in the Philippines there is a greater percentage of malnourished women in the rural areas, increasing maternal age may also have a negative effect on the incidence and duration of breast-feeding.

Parity

Rural-urban differentials in desired and actual family size are evident in the Philippines. The 1993 Philippine National Demographic Health Survey reports that the total fertility rate for women in the urban areas is at least one child less (3.5) compared with women in the rural areas (4.8). When assessing the impact of parity on the incidence and the duration of breast-feeding, the time costs involved in child care needs to be considered. According to Becker (1981), the time costs represents the opportunity foregone when time is spent on childcare. The mother's market wage has often been used

as an indicator of the value of the mother's time, where the time spent on childcare represents the income foregone that she normally would have earned from employment.

Rural-urban differentials exist when analyzing the time costs involved with childcare. In the urban areas, increasing involvement of women in the market economy also results in greater opportunity costs in terms of the mother's value of time, thus facilitating her adoption of low fertility norms. In the rural areas, the preference for relatively large families is quite prevalent. According to Miralao (1989), the poverty conditions encountered by rural families are manifested in the economic utility of children, by perceiving them as a valuable source of labor and income, particularly as a source of security to parents in old age and times of crisis.

The effect of the total number of children on the incidence and the duration of breast-feeding depends for the most part on the question of who substitutes for the mother's child care time. When assessing the key substitutes for the mother's time, Uyanga (1980) states that "older children and maids can either release the mother from home needs, so she can work or replace the mother in the market by working themselves" (p.24). Given the economic disadvantage faced by rural households, the responsibility of the mother's child care time will more likely be allocated to older siblings or adult relatives. This reduces the conflict between the mother's work role and maternal role, and thus the time costs involved with childcare. This then facilitates longer durations of breast-feeding. In the urban areas, such support is not readily available; hence the presence of additional children places more constraint on the mother's time, increasing the time costs involved with childcare, which then leads to early termination of breast-feeding.

The Role of the Health Sector

Prenatal Care Provider

As noted earlier, the type of prenatal care provider during pregnancy can influence the mother's knowledge and decisions about breast-feeding. Health practitioners who are aware of the benefits of lactation can encourage mothers to breastfeed for longer durations. Despite the expansion of the modern health sector in the Philippines, a wide disparity within the health care system still prevails. The 1993 Philippine National Demographic Health Survey reports that physicians and doctors are the most common prenatal care providers in Manila and the metropolitan areas of the Philippines, whereas midwives and nurses are more common in the rural areas. The lack of highly trained physicians and modern health facilities in the rural areas indicates that mothers in these areas are faced with the disadvantage of the lack of education on the benefits of breast-feeding. This may not always be beneficial in terms of encouraging breast-feeding practices, particularly if the local midwives have very little background pertaining to health care. It cannot be discounted, however, that the traditional values and attitudes regarding infant feeding practices can also encourage women to breast-feed for longer durations.

When assessing the effect of prenatal care provider between the two residential strata, we expect that the increased knowledge of the modern practitioner on the benefits of lactation would have a more significant influence in encouraging more women to breast-feed as well as to continue nursing for longer durations. On the other hand, the adoption of western influence regarding infant feeding practices can also affect the type

of prenatal care advice provided to women; that is openess to alternative infant foods can encourage women to use supplementary foods at an early age, which can result in early termination of breast-feeding. In the rural areas midwives and nurses play a more important role in the mother's decision to continue or terminate breast-feeding. The strong hold on tradition among midwives will have an important influence in encouraging pregnant women, especially rural women, to practice breast-feeding.

Place of Delivery

The place of delivery is another variable that represents the role of the health sector. As indicated in the research presented earlier, the rooming-in policy in government health centers and private hospitals provide an environment wherein hospital staff may encourage and educate mothers to breastfeed their children immediately after birth, which can positively affect the incidence and the duration of breast-feeding.

The effect of the place of delivery on breast-feeding patterns would also differ by residential strata. The greater concentration of medical facilities and public health services in the major cities explains why in developing countries, deliveries in the urban areas are more likely to take place in hospitals, whereas deliveries held at home are more common in the rural areas. Urban women therefore, have the advantage of being exposed to an environment that encourages breast-feeding practices. Rural women, on the other hand, lack the advantage of having access to modern health facilities, and therefore, the lack of awareness on the benefits of lactation. Hence, delivery that takes place in a hospital would play a more important role in greater initiation and longer durations of breast-feeding for women in the urban areas.

The effect of institutional delivery can also be negative for breast-feeding. As noted in previous studies, prenatal care from medical professionals, namely physicians and doctors, and delivery in a hospital were significantly and negatively associated with breast-feeding practices. This can be explained by the fact that health facilities have often been used by food manufacturers as a pathway to introduce and promote infant formulas. Health practitioners who are involved in the prenatal care and the delivery of babies are often provided by educational and advertising materials as well as free samples of infant formula to be distributed to new mothers (Stewart et al. 1991). Adair et al. (1993) found that distribution of free samples had important effects on breast-feeding. Receipt of free formula resulted in cessation of breast-feeding 1.4 months earlier than those mothers who did not receive any sample. Because the nature of the advice provided by the medical practitioners may be affected by industry marketing activities, institutional delivery can have an adverse effect on the duration of breast-feeding. The negative effect on breast-feeding also reflects the replacement of traditional health care systems by the modern medical establishment (Mock and Franklin, 1985; Solimano et al. 1985). It is not surprising then, that women who give birth in hospitals are also more likely to be from urban areas, have higher education and are also employed in the wage sector. Hence, institutional delivery and prenatal care from a medical doctor, as a reflection of the shift from a traditional to a modern lifestyle can have a negative effect on the incidence and the duration of breast-feeding, displaying a stronger effect for women in the urban areas.

Chapter 5 Hypotheses, Data and Methods of Analysis

Hypotheses

So far, it has been proposed that the determinants of lactation will have different outcomes for breast-feeding behaviors among the rural and the urban strata. Based on the conceptual model, the following hypotheses for the incidence and the duration of breast-feeding have been formulated: (see p. 45).

1) ***Supplementary Foods*** - The early introduction of supplemental foods can result in a reduction in the breast-feeding frequency, which then hastens its early termination. It is hypothesized that the later introduction of these substitutes (or supplements) into the infant's diet, the longer the duration of breast-feeding. There are three types of supplementary foods that will be considered for the study. *Other liquids* are considered to be the more traditional types of infant foods and consist mainly of rice water, tea, fruit juice, and water (Philippine National Demographic Health Survey, 1993). It is expected that *other liquids* will have a stronger effect for women in the rural areas than for women in the urban areas. *Infant Formulas* are the modern substitutes that will be considered. The greater exposure to the infant formula industry for women in the urban areas increases the likelihood for using these substitutes early into the infant's diet which can result in shorter durations of breast-feeding. The use of infant formula immediately after birth can also replace breastmilk completely from the infant's diet, thus affecting the mother's decision to initiate breast-feeding. It is hypothesized as well that their effect

will be stronger for women in the urban areas than for women in the rural areas. One of the most common reasons for early termination of breast-feeding was that the child was old enough to be weaned. This facilitates the introduction of semi-solid foods early into the infant's diet, thus leading to shorter durations of breast-feeding. It is hypothesized that the later introduction of *solids* into the infant's diet will have a positive effect on the duration of breast-feeding both for rural and for urban women. On the other hand, the early introduction of non-milk products can also promote the health of the infant, which may supplement rather than substitute breastmilk, thus leading to longer durations of lactation. In this case the effect of solid foods can also be in the negative direction, such that early use of these types of supplements will result in longer duration of breast-feeding. It is also hypothesized that its effect will be stronger for rural women than for urban women.

2) ***Education*** - The impact of modernization manifests itself through increased education, which can cause a shift away from breast-feeding to bottle-feeding. The higher the level of maternal education, the greater the likelihood of participating in the wage sector, thus increasing the likelihood of working away from home. The mother's participation in the labor force, especially the wage sector competes with child care time, thereby reducing the access of the child to the mother. Their participation in the wage sector also allows them the means to purchase breastmilk substitutes thus encouraging the early use of supplementary foods. Because women in the urban areas have more formal education than women in the rural areas and hence are more likely to participate in the wage sector, it is hypothesized that education will have a negative effect on the incidence

and duration of breast-feeding, with a stronger effect for the urban sample than for the rural sample.

3) ***Increasing Maternal Age*** - As pointed out in the previous chapter, the hold of traditional beliefs among older women, particularly in the rural areas, indicates a reluctance to use modern breast-milk substitutes, thus increasing the likelihood of greater initiation and of longer duration of breast-feeding. For women in the urban areas, increasing maternal age also indicates attachment to traditional customs, but the greater exposure to modern breast-milk substitutes in the cities indicates a more openness to other alternative infant-feeding. It is hypothesized then, that increasing maternal age will have a positive effect on the incidence and the duration of breast-feeding, displaying a stronger effect for women in the rural areas. Conversely, increasing maternal age can also affect breast-feeding in the negative direction. As noted earlier, increasing maternal age is also associated with high parity. Since older women also have the highest number of children, the demands of childcare can also place more constraints on her time, thus providing them a reason for early termination of breast-feeding. In addition, the mother's nutritional status (which is closely related to age) can also affect the sufficiency of breastmilk. Because older women are more likely to have insufficient milk, it can also be hypothesized that increasing maternal age will have a negative effect on the incidence and the duration of breast-feeding. It is also hypothesized that the negative effect will be stronger for urban women than for rural women.

4) ***Parity*** - Since children are often perceived as a source of economic security in old age, a larger family size can be beneficial for the household. This is particularly so, for rural families, especially if other children can assume the role of childminder, thus

reducing the conflict between the mother's time and childcare time. In the urban areas, however, a large family size may not be compatible with the modern lifestyle in the city. The demands of childcare, coupled with the demands of a highly structured employment only increases the conflict between the maternal role and the work role, which in turn reduces the duration of breast-feeding. It is hypothesized that the total number of children will have a negative effect on the incidence and duration of breast-feeding for women in the urban areas; in the rural areas, the presence of additional children may not necessarily hinder the mother's ability to breastfeed due to the presence of extended family, hence its effect on breast-feeding will not be significant.

5) ***Work away from home*** Since women in the urban areas are more likely to be involved in the wage sector, thus requiring them to work away from home, their access to the child is reduced, which results in a reduced opportunity to breastfeed. Hence, *work away from home* will have a negative effect on the duration of breast-feeding for women in the urban areas. Women in the rural areas, however, are more likely to have their child with them during the day, even if they work away from home. It is hypothesized, therefore, that the effect of *work away from home* on duration of breast-feeding for rural women will not be significant.

6) ***Prenatal Care Provider*** - If the mother receives prenatal care from a doctor, his/her increased knowledge on the benefits of lactation can influence the mother to breastfeed for longer durations. On the other hand, this also indicates the movement away from a traditional lifestyle, including breast-feeding practices, thus displaying a negative effect on incidence and duration of breast-feeding. Since the most common prenatal care provider in the urban areas is a physician/doctor, it is hypothesized that prenatal care

from a doctor will have a stronger effect (whether positive or negative) on the incidence and duration of breast-feeding for urban women than for rural women. In the rural areas, nurses and midwives are the most common prenatal care providers. It is hypothesized that its effect will be positive for rural women, but not significant for urban women.

7) ***Place of Delivery*** - The place of delivery can have either a positive or negative effect on breast-feeding. If delivery takes place away from home for example, a government-public or private hospital, the mother is more likely to be exposed to an environment that is likely to promote breast-feeding practices (such as the rooming-in procedure). It is hypothesized then, that place of delivery will have a positive effect on the incidence and the duration of breast-feeding. On the other hand, those who choose a hospital for place of delivery have the monetary means to use such modern health facilities, and hence are also more likely to be exposed to the modern lifestyle. It is hypothesized then that place of delivery will have a negative effect on the incidence and the duration of breast-feeding with a stronger effect for urban women than for rural women.

HYPOTHESIZED EFFECTS OF PREDICTOR VARIABLES ON INCIDENCE AND DURATION OF BREAST-FEEDING BY RESIDENCE

	RURAL		URBAN	
	Incidence	**Duration**	**Incidence**	**Duration**
PREDICTOR				
Other Liquids	NA	+ +	NA	+
Infant Formula*	-	+	- -	+ +
Solid/ Mushy Foods	NA	+ + or - -	NA	+ or -
Education	-	-	- -	- -
Age of Mother	+ + or -	++ or -	+ or - -	+ or - -
Parity	NS	NS	-	-
Work Away From Home	NA	NS	NA	-
Prenatal Care (Doctor)	+ or -	+ or -	++ or - -	++ or - -
Prenatal Care (Nurse/Midwife)	+	+	NS	NS
Place of Delivery	+, or -	+ or -	+ + or -	+ + or - -

Note: - means negative relationship; + means positive relationship;
- -means strong negative relationship; + + means strong positive relationship
NS means not significant, NA means not applicable
*Infant formula is measured in infant's age in months in which the mother started to use it on a regular basis, hence it could not be included in the incidence analysis.

Data and Methods of Analysis

This study is based on data from the 1993 Philippines National Demographic Health Survey which was conducted between April and June, 1993. The main idea behind the 1993 Philippines NDS was to allow analysis for the following: sociodemographic characteristics like fertility, family planning, and health and mortality variables and to allow for separate analysis of these variables between rural and urban areas for 14 of the 15 regions in the country.[4] The maternity history contains a maximum number of six entries relating to births in the five years preceding the interview. If the respondent had more than six births in the last five years then only the last six are included in the maternity history.

The Integrated Survey of Households (ISH) developed in 1980, comprised of samples of primary sampling units (PSU's) and was employed to generate information on employment and socioeconomic characteristics among a nationally representative sample of women aged 15-49 years. The PSU's were reselected in 1991, based on the 1990 Population Census data on population size with the same number of PSU's selected in 1980 (NDS, 1993). A total of 2100 samples of primary sampling units (PSU's)[5] was systematically selected for the ISH, 750 of which were selected for the 1993 DHS, with a probability of selection inversely proportional to the baranggay's size. Baranggays are considered to be the smallest political subdivisions that corresponds to a census enumeration area. The PSU selection, which was self-weighted in each of the 14 regions, was carried out separately for the rural and urban areas, utilizing a two stage sampling design. The first selection consisted of baranggays, and the second selection consisted of

households within the baranggay. A total of 15,029 households[6] were successfully interviewed.

Data

This study uses data from the Individual Women's Questionnaire.[7] Information was collected on topics that included background characteristics (education, age) reproductive behavior and intentions, availability of family planning supplies and services, breast-feeding and child health and maternal mortality. The total sample was divided into two sub-samples. For the purpose of this thesis the rural sample represents the less modern subgroup, and the urban sample represents the modern subgroup. Since the focus of the study is to evaluate how the effect of modernization has altered or maintained attitudes towards breast-feeding behavior, separate analyses will be carried out for the rural and the urban samples. Two separate multiple regression analyses will be carried out for the duration of breast-feeding: one for the sub-sample that excludes currently breast-feeding women; and another for the sub-sample that includes women who are currently breast-feeding. When selecting only those who are not currently breast-feeding, a total of 735 and 879 valid cases were obtained for the rural and the urban samples, respectively. For the sample that includes currently breast-feeding women, the total number of 969 and 1007 respondents were obtained for the rural and the urban samples, respectively.

Measurement of Variables

Dependent Variables

In this study, there are two dependent variables: (1) incidence and (2) duration of breast-feeding. Each are analyzed separately. Both dependent variables are based on information pertaining to the last child of respondents. Potential errors may arise concerning the data, particularly for respondents who breastfed for a short time only, and may fail to report this. But since the study focuses on the last child born in the last five years, this would minimize the recall error regarding this particular concern.

Incidence of breast-feeding - A dichotomous variable was created to represent the incidence of breast-feeding. Those mothers who reported as 'never breastfed the last child' were assigned a value of 0 and those mothers who breastfed (and who were still breast-feeding at the time of the survey) are assigned a score of 1.

Duration of breast-feeding[8] - This dependent variable was analyzed in two stages. First, women who are still breast-feeding (at the time of the survey) are excluded, thus including only those who have completed breast-feeding. Second, the analysis is repeated for the sub-sample that includes those women still breast-feeding as well as those who have completed nursing. The reasons for the dual analysis will be explained later in this section of the thesis. Duration of breast-feeding was calculated as the number of months that the mother has breastfed the child as reported by her. The values range from 0 months for women who never breastfed, to 40 months. A value of .5 was assigned if the duration was less than one month.

Independent Variables

Supplementary Food Variables - Age for infant formula, Age for liquids, Age for solids. These three variables represent the age in months of the last child at which the mother started to use food supplements on a regular basis. The values range from 0 months if supplements were started at less than one month of age to 30 months of age.

Maternal Demographics - Age, Parity, Place of Work, and Highest Level of Education. The age of the mother is measured as a categorical variable consisting of four ten year age groups (15-24, 25-34, 35-44, 45-49). The 15-24 age group is the reference category and is assigned a score of 0. The 25-34, 35-44 and 45-49 age groups are assigned scores of 1, 2, and 3 respectively. The total number of children ever born is operationalized to represent parity. Since the study focuses on women who have had at least one child, the lowest possible value assigned to parity is one. Education represents the highest level of education attained by the mother and is measured as a categorical variable: no education, primary, secondary and post-secondary. The reference category is "no education." Primary, secondary and post-secondary education are assigned the scores of 1, 2, and 3 respectively. Place of work is measured as a dummy variable, with 0 denoting that the mother works at home, and 1 that the mother works away from home.

Health Sector Variables - Prenatal Care-Doctor, Prenatal Care-Nurse/Midwife, and Place of Delivery

The reference category for the two prenatal variables is no assistance from this prenatal care provider (coded 0) . The type of prenatal care provided by the specified health professional (medical doctor or nurse/midwife) was coded as 1. A score of 0 for place of delivery indicates that delivery took place at home, whereas a code of 1 denotes delivery

away from home (i.e. institutional delivery, namely government or public or private hospitals, and maternity clinics).

Descriptive statistics will be computed to provide a general overview of the rural-urban differences that exists in the various dependent variables and predictors, followed by a presentation of correlation coefficients in order to discern the zero-order relationship between the predictors and the dependent variables. Determining the incidence of breast-feeding is relatively straightforward. Because there are only two possible values (breastfeeding versus not breast-feeding), one can model the probability of breast-feeding. Hence, logistic regression is applied to analyze the incidence of breast-feeding.[9] The predictors that will be used for this analysis are education, age, parity, prenatal care-doctor, prenatal care-nurse/midwife, and place of delivery. The following equation represents the logistic regression model that will be used to analyze the incidence of breast-feeding:

$$\ln [p/(1-p)] = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + E$$

where p is the expected proportion of women breast-feeding and (1-p) is the expected proportion not breast-feeding;

a is the intercept term (the value of ln [p/1-p] when all predictors are set to zero;

x_1 ,....., x_6 are the independent variables where:

x_1= age of the mother;

x_2= parity;

x_3=education of the mother;

x_4= prenatal care (doctor);

x_5= prenatal care (nurse/midwife);

x_6=place of delivery (away from home)

E = error term

and the corresponding coefficients b_1, b_2 ,...., b_6 represent the change in the logged odds of breast-feeding for a one-unit change with its associated independent variable. The direction of the slopes, as indicated by a positive or a negative sign, should be consistent with the hypotheses stated earlier. For example, if b_1 is positive, x_1 (age) will have a positive effect on the incidence of breast-feeding; likewise, if b_6 is negative, then x_6 (place of delivery) will have a negative effect on the incidence of breast-feeding.

Measuring the duration of breast-feeding is more complicated, and there are issues that need to be addressed. One such issue relates to the problem of censoring. For example, the completed duration of breast-feeding will be unknown for mothers still breast-feeding at the time of the survey, especially for those women who started breast-feeding immediately before the survey. Women who have had recent births close to the time of survey are more likely to continue breast-feeding beyond the date of the interview. The reported months of breast-feeding duration for these women will result in a serious underestimate of the actual mean duration of nursing. Moreover, the characteristics of the mothers still breast-feeding may be different from those of the women who have completed nursing. Some predictors that reflect the mother's choices, for example the age in which the mother started to use food supplements on a regular basis, can be influenced by the same factors that affect the mother's decision to continue or terminate breast-feeding. As indicated earlier, in order to minimize this potential bias, two separate dependent variables will be analyzed for the duration of breast-feeding: one

that includes women who have completed breast-feeding plus those who are still breast-feeding; and one that includes only those who have completed breast-feeding, hence excluding those who are still breast-feeding. Ordinary least squares regression is used to analyze the duration of breast-feeding. The independent variables for this part of the analysis are age, education, place of work, parity, place of delivery, prenatal care (doctor), prenatal care (nurse/midwife), age for infant formula, age for liquids, age for solids.[10]

Chapter 6. Results

(a) Descriptive Statistics

Among Philippine women, urban dwellers are less likely to initiate breast-feeding than their rural counterparts. Tables 1A and 1B show that 23.5 and 20.4 percent of urban infants respectively were never breastfed compared to only 14.2 percent and 10.8 percent of rural infants. When examining the differences in the duration of breast-feeding between rural and urban areas, it is evident that women in the urban areas are more likely to terminate and complete breast-feeding much earlier than women in the rural areas. A greater percentage (23.9% and 23.5%) of urbanites breast-feed for less than three months compared with only 10.8% and 12.0% of rural women. Likewise, a greater percentage of rural infants (22.5% and 20.5%) are breastfed between 12-14 months compared to only 12.6% and 12.3% of urban infants. The mean duration is only 5.87 months for urban infants compared to 9.47 months for rural infants for the sample that 'excludes currently breast-feeding women; for the sample that 'includes currently breast-feeding women, the mean duration of breast-feeding was 6.13 and 9.31 for urban and rural infants respectively.

To understand some of the factors that contribute to the rural-urban differentials in the incidence and the duration of breast-feeding, it is imperative to obtain a general sense of the differences in the demographic, health sector and supplementary food indicators that exists between the two residential strata. Tables 2A and 2B show that nearly 58% of urban women gave births in a hospital or a maternity clinic compared with only 25% of rural women. The prenatal care provider also differs by residential strata. The most

common prenatal care provider in the urban areas are medical doctors (66%) whereas nurses and midwives (61%) are more prevalent in the rural areas.

It is also evident that women in the urban areas are more likely to wean their babies to infant formula and other liquids earlier than women in the rural areas. The results show that urban infants start using infant formula on a regular basis, around six months of age while rural infants start much later, around ten months of age. Both rural and urban infants are weaned to solid foods at around six months of age. It should also be noted that when comparing the two samples; the one that "excludes women still breast-feeding" and the one that "includes women still breast-feeding"; the weaning age for supplementary foods is slightly later for the first group. Infants who are still being breastfed may be too young to be weaned to supplementary foods regularly. This helps to explain, for example, why age for infant formula in the 'still breast-feeding' group is later as noted around 11.63 months compared with the group which 'excludes women who are currently breast-feeding' (10.28 months).

The socioeconomic and demographic characteristics also differ between the two residential strata. The mean age of the mother for the sample that excludes currently breast-feeding women is 24.7 and 26.2 for the rural and urban areas respectively. For the sample that includes currently breast-feeding women, the mean age of the mother is 24.4 and 25.8 for the rural and the urban samples respectively. The average total number of children ever born does not differ significantly; it is only 1.66 and 1.79 for urban and rural areas respectively.[11] There is also a huge difference in the place of work between the two samples. Table 2A reveals that 71 percent of women in the urban areas work away

from home, compared to only 47 percent of women in the rural areas. When taking women who are 'currently breast-feeding' into account (Table 2B) only 40 percent of rural women work away from home, compared to 66 percent of their urban counterparts. The difference in the results may reflect the fact that women who are currently breast-feeding may not be working on a regular basis, and therefore, are more likely to remain at home. Educational differences also exist between the two samples. The education of the mother is a categorical variable and has been assigned a score of 0 denoting no education, with the highest possible value of 3, denoting post-secondary education. The mean for the highest level of education attained by rural women is 1.8 indicating that the majority only attained primary to secondary levels of education. The mean for the level of education for urban women is 2.19, suggesting that most urban women have attained at least a secondary to post-secondary levels of education.

Zero-Order Correlations

The zero-order correlations between the health sector indicators, supplementary food variables, maternal demographics indicators and the duration of breast-feeding are presented in Tables 3A and 3B. All the predictors were significant either at the .01 or at the .05 level. The direction of the health sector predictors indicate that a reliance on the modern medical system is negatively associated with the duration of breast-feeding. Place of delivery and prenatal doctor were in the expected negative direction, showing a stronger association with breast-feeding for the urban sample. The less-modern medical practitioner, namely midwives, showed a positive association with duration of breast-feeding, although it was not significant for the rural areas (p=.447 for the sample

'excludes currently breast-feeding women; p=.120 for the sample 'includes currently breast-feeding women). The supplementary food variables, namely age for other liquids and age for other solids, showed a negative association with breast-feeding, contrary to the stated hypothesis. Age for other liquids was not, however, significant for the urban sample of "excludes currently breast-feeding" (p=.131). Age for infant formula showed a positive association with duration of breast-feeding, suggesting that the later the age at which infant formula is used, the greater the likelihood that the duration is lengthened. The maternal demographic characteristics also showed a negative association with duration of breast-feeding with the exception of: current age of respondent in the rural sample (includes currently breast-feeding women) and total children ever born in the urban sample (excludes currently breast-feeding women). Both these variables showed a positive association with breast-feeding although its relationships were not significant. Place of work for the rural areas was also not significant (p=.121 for the sample 'excludes currently breast-feeding women; p=.250 for the sample 'includes currently breast-feeding women'). Among the sample the 'excludes currently breast-feeding women', the strongest predictor for duration of breast-feeding was age for infant formula, followed by place of delivery for both rural and urban strata. Highest level of education was the third strongest predictor, but only for women in the urban areas. The results are slightly different for the sample that includes 'currently breast-feeding women.' Age for infant formula is still the strongest predictor for duration of breast-feeding, but only for women in the urban areas. The next strongest predictor is age for solids for rural women, followed by highest level of education for urban women. The zero-order correlations of

all the independent variables (Appendix 1A-3B) show that none of the variables indicate multicollinearity among themselves.[11]

Logistic Regression

The results for the logistic regression analysis are displayed in Tables 4A through 5B. The constants (provided on the left column) provides the log odds of the number of women who breastfeed that corresponds to the reference category for each categorical variable, or to the value of zero for the numerical variable. The coefficients (b) represent either an increase or a decrease in the logged odds of breast-feeding for a one unit change with in its associated predictor (depending on whether the sign is positive or negative). The exponent of b gives the amount by which the given predictor multiplies the expected probability of the incidence of breast-feeding. Consider for example the individual effect of parity on incidence of breast-feeding for the rural sample. Table 4A shows that an increase in one additional birth results in an increase in the odds of breast-feeding by a multiplicative factor of 2.7853. Among those with only one child, the log odds of the number of rural women who breastfeed is 1.2555. Given this condition, the expected odds of breast-feeding for those with one child can be calculated as follows:

$p/(1-p) = e^{1.2555} = 3.5096;$
and the corresponding probability would be:
$p = \text{odds}/1+\text{odds} = 3.5096/(1 + 3.5096) = .7645$

Because the direction of the coefficient is positive, each additional child results in an increase in the probability of breast-feeding as denoted by a 1.0243 increase in the

logged odds of breast-feeding. For women with four children, the expected log odds for the incidence of breast-feeding can be calculated as follows:

constant + b_1x_1;
That is, 1.2555 + 4(1.0243) = 5.3527. Therefore, the expected odds will be
$e^{5.3527}$ = 211.1777, and the corresponding probability is
211.1777/(1+ 211.1777) = .9952

The results for the urban sample differ from that of the rural sample. Table 4B shows that an increase in one additional child results in a decrease in the odds of breast-feeding by a multiplicative factor of .8627 (14%). The decrease is also not significant.

The effect of parity among the rural sample is consistent with the findings from a similar study in Kenya whereby oldest and the most highly parous mothers were most likely to initiate breast-feeding (Latham, Agunda, and Elliott 1988). This supports the hypothesis that high parity, denoting a strong hold on traditional beliefs and customs, result in a higher incidence of breast-feeding. Since rural women have higher parity than urban women, their strong hold of tradition would have a significant and positive effect on the incidence of breast-feeding, as compared to the urban sample.

Age shows a positive effect on all age groups among rural women. At the 25-34 the odds increase by a multiplicative factor of .3936 (60%). The odds further increase by the multiplicative factors of 1.6055 and 4.9751 for the 35-44 and the 45+ age groups respectively. Among urban women, the effect of age is negative and significant only at the 15-24 age group. This supports the hypothesis that older and rural women are also more traditional than their urban counterparts, and hence are more likely to initiate breast-feeding.

When the prenatal care provider is a medical doctor, the odds for initiating breast-feeding among rural infants decreases by a multiplicative factor of .3896 (61%). Prenatal care with a nurse/midwife also results in a reduction in the odds by .9813, although the decrease is not significant. Among urban infants, the effect of both prenatal care providers on the incidence of breast-feeding is not significant. It should be noted however that since prenatal:doctor is highly correlated with place of delivery, the effect of the proximate variable (in this case, place of delivery) would have a more significant effect on the initiation of breast-feeding. For rural infants, delivery away from home shows an increase in the initiation of breast-feeding by a multiplicative factor of 8.1346. For urban infants, however, the odds are reduced by a multiplicative factor of .5713 (43%). The individual effect of education on the incidence of breast-feeding shows a positive effect for rural and urban women with no education, followed by a decrease in the odds as the level of education goes up. However, among rural women, the effect is significant and negative only for those with post-secondary education, showing a decrease in the odds of .1648 (16%). For the urban sample, the effect is positive and significant only for those women with no education. This again lends some support to the hypothesis that the trend away from breast-feeding are more likely to occur among women who have the highest level of education, and are therefore, the most modern. The willingness to adopt infant feeding alternatives encourages bottle-feeding over breast-feeding, and hence completely eliminating breastmilk from the infant's diet. However, this only seems to apply to rural women.

The logistic regression results of the independent variables on the incidence of breast-feeding are displayed on Tables 5A and 5B. For the rural sample, the direction of

the coefficients for the variables age and parity changed from a positive to a negative sign, when all other variables were included in the equation. The decrease in the odds for both predictors were also not significant. Among urban infants, the direction of the coefficient for age and parity also changed from a positive to a negative sign. The odds for the 15-24 age group loses its significance, once other variables were included in the equation. Instead, the age group 25-34 is now significant showing a decrease in the odds of .6921 (31%). This can be explained by the fact that women in this age group are also more likely to have younger children, which places constraint on the mother's time, especially if they live in the urban areas, thus decreasing the probability of breast-feeding. Laukaran, Post, Esterik and Winikoff (1988) found that increasing age and urban birthplace were independently, significantly associated with lower likelihood of initiation of breast-feeding. The relationship, however, showed a non-linear relationship, "whereby much of the effect can be attributed to the fact that younger mothers are least likely to initiate breast-feeding - and not that older mothers are most likely to do so. This lends some support to the hypothesis that since maternal age is associated with parity, the presence of younger children among younger women plays an important role in the mother's decision to initiate breast-feeding, particularly among women in the urban areas.

It was expected that prenatal nurse/midwife would have a significant effect among rural infants. It was found, however, that the only health sector variable that was significant was prenatal care (doctor). The odds also decreased by a multiplicative factor of .7750 (23%), meaning the probability of breast-feeding is reduced to .9952.

The individual effect of place of delivery was positive and significant, but once other predictors were included in the model the direction of the coefficient changed from

a positive to a negative sign; the effect was also no longer significant. The change in the direction of the coefficient can be explained by the relationship between prenatal care (doctor) and place of delivery. The zero-order relationship between the two predictors was .410, suggesting that women who are more likely to consult with medical doctors, are also more likely to use a health facility for place of delivery. The close relationship between these two predictors suggests that the negative effect of prenatal care (doctor) on breast-feeding would also influence the effect of place of delivery on the incidence of breast-feeding in the negative direction. The change in the direction of the coefficient suggests that the effect of prenatal care (doctor) was stronger than the effect of place of delivery on the incidence of breast-feeding.

It was hypothesized that place of delivery would have a positive or negative effect on the incidence of breast-feeding. The results show a negative effect with a decrease in the odds of .6665 (33%). This finding is consistent with that of Winikoff, Durongdef and Cerf (1988) whereby incidence of breast-feeding among women in Bangkok, Thailand was highest among mothers who gave births at home (96%) compared to those who delivered in hospitals (84%).

Multiple Regression

The multiple regression equations for the sample that excludes currently breast-feeding women are presented on tables 6A and 6B and the equations that includes currently breast-feeding women are presented on tables 7A and 7B. The coefficient or slope (b) on the left column measures the extent to which a one unit change in its associated predictor results in either shorter or longer durations of breast-feeding

(depending on whether the coefficient is positive or negative), net of all other variables in the equation. The equations for the sample that excludes currently breast-feeding women explains 27 and 23 percent of the variance (R^2) for urban and rural samples respectively. The equations for the sample that includes currently breast-feeding women explains 26 percent of the variance for the urban sample, and 19 percent of the variance for the rural sample.

Supplementary Foods

Among the supplementary food variables, age for infant formula, and age for other solids were statistically significant. Age for other liquids has a negative effect on duration of breast-feeding, although it was not significant. The positive effect of age for infant formula was in the hypothesized direction. The coefficients for the sample that includes currently breast-feeding women were .140 and .225 for the rural and the urban areas respectively; for the sample that excludes currently breast-feeding women, the coefficients were .212 and .280 for the rural and the urban areas respectively. This finding is consistent with other studies whereby introduction of breastmilk substitutes is associated with relatively rapid cessation of breast-feeding (Winikoff et al. 1988; Castle et al. 1988). Similar to these studies, it would appear that "for most children, milkfeeding involves either breastmilk or breastmilk substitutes, but rarely breastmilk and breastmilk substitutes together. When mixed milk feeding is seen, it is likely part of a transitional phase leading to the cessation of breast-feeding" (p. 23).

The slightly greater coefficients for the urban sample again reflects the different degrees of exposure to the modern lifestyle. In the urban areas, the greater exposure to

alternative infant foods (either through infant formula advertising or through the influence of the modern health sector that promote and distribute breastmilk substitutes) facilitates early bottle-feeding; whereas in the rural areas, such influences are not as prevalent, thus encouraging the continuous reliance on traditional feeding practices, especially breast-feeding.

The effect of age for solids was in the negative direction. The coefficients for the sample that includes currently breast-feeding women were -.292 and -.225 for the rural and the urban areas respectively. For the sample that 'excludes currently breast-feeding women', the coefficients were -.284 and -.232 for the rural and the urban areas respectively. The results show that supplementation with other foods seems quite compatible with continued breast-feeding. This finding is consistent with that of Winikoff et al. (1988), whereby "introduction to a variety of foods is often viewed as essential to proper integration of the young child into society" (p. 24). This reflects the traditional cultural beliefs that are unique and specific to each country. In the Philippines, supplementary foods are introduced at a very early age. Among breast-feeding children aged 3-4 months, 36 percent are being supplemented with solid foods, increasing to 80 percent by the time the infant is six months old. The rural-urban differentials in the coefficients can also be explained by the need of the rural mothers to use supplementary foods earlier, especially if the nutrition of the mother is poor. In addition, the timing of the use of supplementary foods are influenced by cultural beliefs and the advice of the extended kin; the stronger hold on tradition among rural women would encourage them to use supplements early, as a complement to continued breast-feeding.

Maternal Demographics

The effect of age on duration (for both excluded and included currently breast-feeding women samples) was in the hypothesized positive direction, with the exception of the rural sample (Table 6A), where it is showing in the negative direction. The effect of age on all samples was also not significant. This can be explained by the close relationship between age and parity. Since older women also have high parity, the effect of parity would have a more significant effect than maternal age on duration of breast-feeding. As hypothesized, the effect of parity for the urban sample was in the negative direction (b = -1.035 for the sample 'excludes currently breast-feeding women; b= -1.031 for the sample 'includes currently breast-feeding women'). For the rural sample, it was hypothesized that its effect would not be significant; however, the results showed a significant negative effect on breast-feeding (b= -1.009 for the sample 'excludes currently breast-feeding women; b= -.938 for the sample 'includes currently breast-feeding women'). The negative effect can be explained by the fact that both rural and urban households may consists mainly of younger instead of older children. The 1993 NDS reports that the rural household population consists of a greater percentage (30%) of children under ten years of age compared to only 23% of older children aged 10-19 years of age. The urban household population consists of 25% of children under ten years of age and 23% of older children aged 10-19 years of age. The presence of younger children in the household would place more constraints on the mother's time thereby increasing the conflict between work and motherhood. This then reduces the mother's ability to breastfeed for longer durations. As predicted, the coefficients for the urban samples were slightly larger than that of the rural sample, lending support to the analysis of time costs

of childrearing. Because urban women are more likely to be engaged in the market economy and hence are more likely to be wage earners than rural women, the time spent on childcare would incur greater opportunity costs for urban women. As noted earlier, the effect of the total number of children on breast-feeding also depends on who substitutes for the mother's childcare time. In the urban areas, extended family support is not as prevalent, and mothers often have to rely on hired domestic help. The support provided by extended family members in the rural areas helps to reduce the conflict between chilcare and maternal role, thereby reducing the time costs incurred on childcare. This allows the mother to allocate her time more on childcare, which then encourages her to breast-feed for longer durations. Hence, parity is negatively related to breast-feeding for both samples, but the rural-urban differences in the coefficients suggest that the time costs incurred on childcare for women in the rural areas in not as great as that of women in the urban areas.

The effect of place of work was also in the hypothesized direction. That is, work away from home results in shorter durations of breast-feeding, but significant only for the urban samples (-.471 for the sample that excludes currently breast-feeding women; -.440 for the sample that includes currently breast-feeding women). This finding is consistent with other studies regarding maternal work and compatibility with childrearing (Van Esterik and Grenier, 1981). As Ho (1979) aptly indicates:

> "when the economic activity is performed at home or close to home, the presence of young children may not significantly reduce the time available for employment since joint production of home and market activities is possible. In addition, the elimination of the fixed costs of travel to and from work and of the often rigid hours of more formal employment allows greater flexibility in the allocation of time to various activities" (p.645).

The regular sustained separation between mother and infant in the urban areas results in shorter durations of breast-feeding, whereas in the rural areas maternal work does not always conflict with breast-feeding and other types of childcare. The effect of education on the duration of breast-feeding was also in the hypothesized direction, suggesting that higher education results in shorter durations of breast-feeding. As predicted, the coefficients were stronger for women in the urban areas than for women in the rural areas, but only for the sample that 'includes currently breastfeeding women' (b = -.718 for rural women; b = -.948 for urban women). In the sample that 'excludes currently breast-feeding women', the magnitude of the coefficient was only slightly greater for rural women (b = -.852) than for urban women (b = -.797). This finding is consistent with patterns found in other developing countries, whereby women with more than a primary education are associated with shorter durations of breast-feeding (Akin et al. 1981; Dow, 1977). This suggests that the lifestyles in the modern city are somehow not compatible with breast-feeding, which facilitates early bottleuse, leading to early termination of breast-feeding.

As noted earlier, education can affect the duration of breast-feeding through the types of supplementary foods provided to the infant. Women (especially urban women) with more education are also more likely to be involved with formal or modern work. The rigid hours associated with such types of employment coupled with the increased awareness of convenient substitutes, namely infant formulas, can encourage the mother to use such supplements early into the infant's diet. Table 8A shows that for the rural sample, 65.0 percent of women with post secondary education use infant formula when the infant is less than three months old, compared to only 13.3 percent of women with

less than a primary education. Table 8B shows that a greater percentage of urban women (46.1) with no education start using infant formula when the infant is less than three months old, compared to 43.7 percent of women with post secondary education. The early use for infant formula among urban women, even for those with less than a primary education reflects the subconscious attempt to move from the traditional to the modern culture, thus encouraging the shift from breast to bottle-feeding.

Health Sector Variables

The results show that among the health sector variables, place of delivery was the only predictor that was statistically significant for both samples. Prenatal:doctor and prenatal: nurse/midwife were not significant. The effect was also in the hypothesized negative direction. For the sample that includes currently breast-feeding women, the coefficients were -1.431 and -1.661 for the rural and the urban areas respectively. For the sample that excludes currently breast-feeding women, the coefficients were stronger for the rural sample (-2.245) than for the urban sample (-1.661). This finding is consistent with recent studies (Adair et al. 1993; Stewart et al. 1991). According to the authors, this negative effect can be attributed to "the confluence of an array of the unmeasured knowledge, attitudes, and practices of practitioners in those facilities; alternatively, it may relate to the structure of the hospitals or to the socioeconomic status of the women using them" (p. 195).

What should be noted is that this study is limited to measuring place of delivery as taking place either at home or away from home. We cannot test specifically how the type of delivery practices or the structure of hospital environments differ between the two residential areas and how they in turn affect the duration of breast-feeding. For one thing,

private hospitals are more common in the urban areas than the rural areas. Moreover, private hospitals are easily targeted by food manufacturers as a means to promote their products. These range from provision of infant formula samples, sponsor of infant feeding seminars, and even donations of facilities and equipment to health care providers (Stewart et al. 1991). The structure of the hospitals and hence policies regarding rooming-in (if any) will differ between the rural and the urban areas, and will therefore differ in the kind of infant feeding advice provided to the women who use them. The socioeconomic status of the women also affect the choice for place of delivery. Women who choose to deliver away from home are also more likely to be educated, more urban and therefore, be exposed to the lifestyles of the modern city. In addition, they have greater exposure to the marketing activities of the infant formula industry, thus facilitating early use of breastmilk substitutes.

SUMMARY OF RESULTS OF PREDICTOR VARIABLES ON INCIDENCE AND DURATION OF BREAST-FEEDING BY RESIDENCE

	RURAL		URBAN	
	Incidence	**Duration**	**Incidence**	**Duration**
PREDICTOR				
Other Liquids	NA	NS	NA	NS
Infant Formula	NA	+	NA	++
Solid/ Mushy Foods	NA	--	NA	-
Education	NS	-1, --2	NS	--1, -2
Age of Mother	NS	NS	-***	NS
Parity	NS	-	NS	--
Work Away From Home	NA	NS	NA	-
Prenatal Care (Doctor)	-	NS	NS	NS
Prenatal Care (Nurse/Midwife)	NS	NS	NS	NS
Place of Delivery	NS	-1, --2	-	--1, -2

Note: - means negative relationship; + means positive relationship;
- -means strong negative relationship; + + means strong positive relationship
NS means not significant, NA means not applicable
1 from sample 'includes currently breast-feeding women'
2 from sample, 'excludes currently breast-feeding women'
*** only for the 25-34 age group

Chapter 7. Discussion and Conclusion

This present study has attempted to investigate and compare rural-urban differentials in incidence and duration of lactation during 1993. The theoretical framework, adapted from Mosley and Chen's "Proximate Determinants Framework" for infant and child survival, showed how the sociocultural environment, operated through the proximate determinants (predictors) to influence directly the incidence and the duration of breast-feeding. It was proposed that the determinants of lactation would have different outcomes for the breast-feeding behavior among the rural and the urban strata. The results show that incidence of breast-feeding is high for both samples, and as expected the percentage of rural women who breastfeed is higher than that of urban women. That is, over 90% of rural women initiated breast-feeding as compared to only 80% of urban women. Rural women also breastfed on average 3 months longer than their urban counterparts. Because the incidence of breast-feeding is high for both samples and there is little variation by demographic and social characteristics of women in terms of breast-feeding, the effects of the predictors were generally weak. When all predictors were included in the equation for the rural sample, prenatal care-doctor was the only variable that was significant, showing a negative effect on the incidence of breast-feeding. For the urban sample, place of delivery was found to have a negative effect on the incidence of breast-feeding. This suggests that the movement away from breast-feeding is partially a function of the replacement of the traditional health care systems by the modern medical establishment. It was also found that the maternal age group 25-34

had a negative effect on the incidence of breast-feeding. Since women in this age group are also more likely to have younger children, they also encounter greater conflict between work and childcare activities, especially if they reside in the urban areas. This then encourages the use of bottle-feeding over breast-feeding.

The significant variables that result in either the shortening or the lengthening the duration of breast-feeding in order of importance are age for infant formula, age for solids, place of delivery, total children ever born, and place of work (only for the urban sample). The negative effect of place of delivery on duration of breast-feeding was in the hypothesized direction, whereas the effects of prenatal care (doctor) and prenatal care (nurse/midwife) were not significant. When comparing the rural-urban differences in the coefficients of place of delivery for the sample that 'includes currently breast-feeding women, the effect was greater for the urban sample than for the rural sample. However, the sample that 'excludes currently breast-feeding women' showed a greater effect for the rural sample than for the urban sample. Although the rural-urban differences in the coefficients are small, it cannot be discounted that the structure of the hospital environment and the sentiments of the health care workers differ between the two residential strata and will therefore affect the kind of feeding advice provided to the mother. The limitations imposed by the DHS does not allow for further investigation regarding specific hospital routines, the influence of marketing infant formula in the hospital setting or the type of prenatal care provided by the health professionals. Nevertheless, the negative effects of the prenatal care (doctor) on incidence of breast-feeding and place of delivery on incidence and duration of breast-feeding suggests that medical professionals and institutions appear to be an important source of social

influence. The attitudes and the practices of the modern health care system indeed is an important pathway that can affect the mother's value regarding their own reproductive and child care practices.

The effect of the maternal demographic variables were also in the hypothesized direction, with the exception of maternal age which was not significant. High parity was associated with shorter durations of breast-feeding, with a greater negative effect for women in the urban areas than for women in the rural areas. Unexpectedly, it was found that for rural women, high parity was not compatible with breast-feeding. As noted earlier, the effect of additional children on breast-feeding depends for the most part on who substitutes for the mother's childcare time. The limitations of the study could not allow further investigation on childcare inputs, if any, provided by older siblings. Since a greater percentage of younger children than older children was noted for both rural and urban populations, it can be inferred that the presence of young children in the household can incur greater opportunity costs to the mother's time, thus resulting in early termination of breast-feeding. The negative effect of place of work was also in the hypothesized direction, but significant only for urban women. Work away from home, particularly for urban women does not appear to be compatible with breast-feeding. It should be noted that the limitations imposed by the DHS does not allow further examination on the work environment between the two residential strata and its effect on lactation. Currently, the study does not determine who these women are who work away from home and their reasons for doing so. If the women working away from home have lower education and come from low income families, and hence lack the awareness of adequate nutrition and means to purchase good food supplements, then the location of the

work setting can be detrimental to the health of the infant. On the other hand, if women working away from home have higher education and hence the increased awareness regarding child health and nutrition as well as the adequate income to purchase healthy substitute foods, then employment away from home would be less detrimental. We can only infer from the study that women who work away from home are more likely to reside in the urban areas and are more likely to be involved in the wage sector. The involvement in the wage sector results in greater opportunity costs in terms of the mother's value of time. The time constraints imposed by work and motherhood facilitate early use of breastmilk substitutes which then leads to early termination of breast-feeding. Education effect was also in the hypothesized negative direction. This finding is consistent with other studies whereby education as a proxy for modernity leads to shorter durations of breast-feeding. The negative effect was also greater for the urban sample than for the rural sample, but only for the sample that 'includes currently breast-feeding women'. The greater awareness of alternatives that exists among educated women suggest that they are more likely to adopt modern breastmilk substitutes in favor of breast-feeding.

Supplementary foods had different effects on the duration of breast-feeding. Age for other liquids was in the negative direction, although its effect was not significant. The early use of solid foods results in longer durations of breast-feeding, suggesting that these types of supplements are used more as complements rather than substitutes to breast-feeding. This suggests that rural women are more likely than urban women to rely on foods that are considered to be culturally important as an important source of the infant's diet. As predicted, the early use of infant formula results in shorter durations of breast-

feeding, suggesting that such supplements are used more as substitutes rather than complements to breast-feeding. It is also evident that women in the urban areas are more likely to rely on modern types of supplements than women in the rural areas.

Policy Implications

While the objective of this research was to explore the effects of a wide variety of socioeconomic, health sector and supplementary food factors, the potential policy implications that arise from the results of the analysis are important. Polices that attempt to promote the incidence and the duration of breast-feeding can be discussed on several levels which include: educational, labor force and health related policies.

Educational Policies

The cultural context underlying infant feeding decisions is an integral part of policy development and strategies geared towards finding solutions to infant feeding problems. If breast-feeding promotion is meant to educate women on the benefits of lactation, then educational campaigns must be tailored specifically to the needs of urban and rural strata. What is prevalent in the literature on maternal and child health is the notion that "culture restricts the consumption of certain foods and dictates the consumption of others...culture is often blamed for generating attitudes and beliefs which are seen as by development planners as obstacles which must be overcome by education" (Esterik, 1988: p. 187). This study, however, has shown that reliance on traditional and cultural foods (as measured by regular use of solid/mushy foods) is quite compatible with continued breast-feeding. It is also clear from that the rural-urban differentials that the effect of traditional foods on duration of breast-feeding was stronger for women in the

rural areas than for women in the urban areas. This suggests that rural women are more likely to rely on traditional supplements as a complement to continued breast-feeding. If solid/mushy foods are used more as complements rather than substitutes to breast-feeding, then efforts should be geared to improve the safety and adequate preparation of supplementary foods. The poverty conditions encountered by low income rural and urban women subjects their infants to unhygienic preparation of these supplements, thus increasing the risks of infection to the child. The conditions, then under which foods are prepared becomes a significant factor in determining the impact of supplementary foods on child survival. Moreover, certain solid/mushy foods such as rice porridge are considered to be culturally important, because they are often used as folk remedies for infant's illness. Efforts, therefore, should be geared towards educating women on the nutritional components of supplementary foods. Hence, policy objectives regarding infant feeding must also focus on the overall improvement of the health and welfare of infants and children, and not just on how to encourage more women to breast-feed.

The influence of the infant formula industry in developing countries has been implicated as one of the contributing factors to the decline in breast-feeding. The availability of convenient substitutes has helped to reduce the time constraints associated with childcare and employment activities, especially for women in the urban areas. As the present study has shown, the early use of infant formula shortens the duration of breast-feeding. Much of the efforts in trying to reverse the reported declines in breast-feeding can only be achieved through the reorientation of the sociocultural environment. The 1981 International Code of Marketing of Breastmilk Substitutes have sparked promotional campaigns in many developing countries, including the Philippines, to

encourage breast-feeding among nursing women. One such activity relates to the restrictions on the promotion of the use of breastmilk substitutes or bottle-feeding to the general public and women directly. The mass media have helped to change attitudes and appropriateness of breast-feeding, via radio and television campaigns to stress the benefits of lactation. The results of the study show that intervention can be further expanded to the health sector and place of employment.

Labor Force Policies

It is generally known that women's work does not appear to reduce breast-feeding; rather the conditions surrounding women's work interfere with breast-feeding, thus providing a reason to wean infants early (Akin et al. 1981; Van Esterik and Grenier 1981). The implications for labor force policies require more information on the conditions surrounding the specified occupation, the time allocation to child care activities within the household and its overall impact on the health and development of infants and children.

Many women who work in situations that requires them to be separated from their infants during the day are faced with the complex task of managing lactation. Employment does not have to be an obstacle to lactating women so long as encouragement and support for the practice is provided in the workplace. According to Huffman (1984), any timesaving methods that can be promoted can increase the likelihood of breastfeeding for longer durations. Such methods include the improvement of transportation that takes women to and from their barrios to their place of employment. Providing an environment in the workplace that encourages breast-feeding can also promote longer durations of breast-feeding. These include provision for nursing breaks.

flexible working hours, and availability of creches (nurseries). It is also important to consider the type of maternity benefits within each society. According to Jellife and Jellife (1978), maternity benefits differ from each country and may include maternity leave with or without pay. Van Esterik and Grenier (1981) point to a study in Malaysia whereby "23 percent of working women who were bottle-feeding would have considered breast-feeding if they had been offered leave without pay, while 39 percent would have considered it if their working hours could be rearranged" (p.190). Although the effect of provision of maternity benefits cannot be examined in the present study, it would appear that the provision of adequate maternity benefits in the workplace can be an important locus of intervention when promoting the benefits of lactation.

Health Policies

The role played by institutions and health professionals remain an important locus of intervention to influence the mother's decision to breast-feed and to continue to breast-feed for extended durations. It has been shown in several studies that women who experience separation from their babies at birth and receive free samples of infant formula have a greater likelihood of introducing breastmilk substitutes early into the child's diet. As Castle and Winikoff note (1988), "such is the price of medical progress or the social cost arising from the introduction of consumer products" (p.147).

The breast-feeding promotion intervention must be guided by policies aimed at increasing breastmilk supply to the infant. The provision of information and support to women and the revision of hospital routines are just one of the specific steps than can enhance the incidence and the duration of breast-feeding. Restricting the availability and

promotion of infant formula in hospitals (except in circumstances where the mother cannot breastfeed strictly for medical reasons) can also establish lactation. The 1981 Population Reports on Breastfeeding, Fertility and Family Planning have indicated that "marketing representatives of infant food manufacturers often wore hospital uniforms when introducing free samples...maternal and child health wards have displayed posters advertising infant formula" (p.550). By closely monitoring and even eliminating such practices helps to avoid giving mothers the notion that the hospital environment favor bottle-feeding over breast-feeding. The sentiments of health care workers indeed provide an increased opportunity for mothers to initiate breast-feeding; they should therefore provide information about the importance of breast-feeding to pregnant women and to lactating women beginning during the lactation period. Such changes, of course can only be achieved by effective government intervention in the areas of medical training, public health and national legislation.

The reported declines in breast-feeding have generated much concern among health policymakers and much of the efforts in promoting the practice has focused exclusively on how to induce more women to breastfeed for longer durations. The reasons for promoting breast-feeding range from the health advantages to economic considerations. The purchase for example of breastmilk substitutes requires substantial out of pocket expenditures which can be a financial burden for low income families. The ideal duration will also vary between societies. As noted earlier, the Philippines has had greater contact to western influence regarding infant feeding practices than most Asian countries; hence the period of lactation will tend to be shorter than most developing countries. As the present study has shown, only 12% of urban infants are breastfed

beyond 12 months. For the Philippines where there is little use of modern family planning methods, breast-feeding can serve as a means of controlling fertility by increasing the intervals between births, if women can be encouraged to breastfeed to 24 months. Encouraging breast-feeding for extended durations can be achieved "through media campaigns, education, the health services available in work and industrial settings, and also the use of women's support groups" (Huffman, 1984:179).

What should be kept in mind when promoting breast-feeding practices is the improved health and welfare of children. Knowledge of women's perceptions of what constitutes her families' best interests is essential for understanding the factors involved in infant feeding practices. If employment away from home and the demands of childcare are detrimental to breast-feeding, then it cannot be discounted that bottle-feeding can indeed better serve the best interests of her family. Hence efforts to improve the safety of bottle-feeding will contribute immensely to child health and nutrition.

Another area of concern relates to the increasing risk of HIV and other sexually transmitted diseases. The 1993 Philippines National Safe Motherhood Survey reports that some women are exposed to the risks of STD's. Commercial sex among the husbands of respondents were particularly common in the urban areas, thus increasing the exposure to HIV infection which in turn increases the risk of infecting the mother and the infant. The United Nations has indicated that approximately one-third of all infants with HIV were infected through the mother's breastmilk. Since the AIDS virus can be transmitted by breastmilk, the benefits of lactation have been called into question especially in developing countries, where safe alternative feedings are not available (Cutting, 1992; Lederman, 1992). For HIV infected women, breast-feeding will be more

detrimental due to the risk of transmitting the virus to the infant. In many developing countries pregnant women are not tested for HIV, and given the sensitivity of the topic of AIDS and sexually transmitted diseases, most women are not even aware that they may be infected. The women who are aware of the risks that they and their infants face are forced to confront difficult choices: should they continue to breastfeed against their doctor's advice in fear of being discovered by their family and risk being treated as an outcast by their families, or should they continue to breastfeed to maintain traditional norms while increasing the risk of infecting their newborn?

The debate over breast-feeding and bottle-feeding has become even more complex for the public health community. The possibility of an increase use of infant formula as a means of combating HIV transmission would lead to an increase in potential negative effects associated with artificial feeding including respiratory and gastrointestinal diseases. Given their limited resources, developing countries must implement effective health policies in dealing with the issue of the AIDS pandemic and breast-feeding. The distribution of inexpensive infant formula and efforts to improve the safety of bottle-feeding are just one of the small scale steps to combat the risk of HIV transmission. Hence, efforts to improve child health and nutrition must continue to focus on the awareness of behaviors that places women at risk of HIV and other sexually transmitted diseases.

Directions for Future Work

It is already established that as developing countries continue to modernize, the incidence and the duration of breastfeeding will also decline. As previous studies have shown, increasing urbanization, an inevitable byproduct of the modernization process has been considered to be the most important determinant of breast-feeding behavior for many societies. The increasing contrast between the rural and the urban forms of organization will hence continue to be an integral part in the changes in the attitudes and behavior of individuals and families regarding infant feeding practices. It was proposed in the present study that the differential access in the modern health care system, and the differences in the educational, occupational and demographic characteristics of the two residential strata would result in different outcomes for the incidence and the duration of breast-feeding. While substantial differences were noted in the descriptive characteristics in the health, demographic and supplementary food variables, these predictors showed only slight effects on the incidence and the duration of breast-feeding. Much of this can be attributed to the limitations of the study, as imposed by the DHS and hence, the measurement of the variables could not fully capture the rural urban differences of the determinants of lactation. For example, the strongest predictor, place of delivery, could only be measured as whether delivery took place at home or away from home. Future work needs to address specifically how access to and structures of the health sector varies by residential strata. These include a comparative analysis of the structure of the hospital environments - whether the infant is separated from the mother after delivery or whether infant is kept near the mother day and night, which then dictates the type of infant feeding patterns, whether on demand or according to hospital schedules. Moreover, the specific

marketing activities of infant formula and food companies within the hospital setting should also be examined in order to discern its influence on duration of breast-feeding. More importantly, the knowledge, attitudes and beliefs of medical professionals towards breast-feeding should be explored to provide further insight into the type of prenatal advice provided to pregnant women.

This study has revealed that solid/mushy foods are considered more as complements whereas infant formulas are considered more as substitutes to breastfeeding. This study was however limited to measuring in months in which the mother started to use supplementary foods on a regular basis. In order to fully capture the effect of supplementary food variables on breastfeeding, future research should examine specifically the kind of solid/mushy foods provided to the infant, the reasons for its use, and any cultural significance attached to such supplements. As noted in the literature, certain foods are considered to be culturally important, because they are used more as folk remedies to infant's illness. Rural-urban differentials on the type of cure provided during the infant's illness, whether it was modern or folk medicine should be explored further to determine whether such episodes facilitate early termination of breast-feeding. The influence of the mass media, namely the exposure to infant formula advertising or conversely, the amount of exposure to breast-feeding promotion campaigns should also be examined as to whether such programs do impact the mother's decision to continue breastfeeding.

The study also revealed that work away from home for urban women was not compatible with breast-feeding. The conditions surrounding the work environment should be explored further to determine the kind of breast-feeding support, if any,

provided in the workplace. The kind of maternity benefits, and availability of nurseries or daycares in the workplace should also be examined in order to determine how work away from home does hinder the mother's ability to breastfeed. Education, as a proxy for modernity has consistently demonstrated a negative relationship with duration of breastfeeding. Education can also serve as a measure of the mother's increased awareness of the child's nutritional status. Evidence of a reversal in the reported declines in breast-feeding was noted between the period of 1973-1983 (Popkin et al.,1989). It was determined that the increase in the incidence and the duration of breast-feeding occurred among Philippine women with the highest levels of education and professional occupations. Future work can further examine the effects of the different levels of education; if indeed women with post secondary educations and professional occupations can be characterized as social innovators who can initiate the increase in the incidence and the duration of breast-feeding due to their economic position, social aspiration and access to information. As already mentioned, one issue in measurement of breast-feeding in this study was the problem of censored data. A suggestion for overcoming these censoring problems and instances in which breast-feeding duration was prematurely terminated due to an infant's death would be to use life table techniques to analyze the conditional probability of breast-feeding one's surviving children at given ages of mothers. This provides a measure of the probability of breast-feeding one's surviving children at given ages of mothers. The advantage of life table technique is that it provides estimates of the mean duration of breast-feeding as well as reliable estimates of the proportion of children who were breastfed at different time periods while also controlling for censoring and selectivity. This is particularly useful if one were interested

in examining the trends in the pattern of breast-feeding. A final suggestion for future research would be to examine the effects of the predictors on the different periods of lactation. Specifically, this would mean dividing the duration of breast-feeding by three month intervals, for example, 0-3 months, 4-6 months, 7-9 months and so forth. This would determine which of the predictors would have a major influence on the extended periods of lactation. By measuring the effects of predictors at different breast-feeding periods, it can be discerned as to which variable would have a major influence for policies and interventions that seek to promote longer durations of breast-feeding.

ENDNOTES

1) Of these countries analyzed, 10 were in Asia, including the Philippines, 8 in Latin America and the Caribbean and one in Africa (Kenya).

2) The Spanish occupation was from 1521-1898; the American occupation was from 1898-1945.

3) It is hypothesized in this study that delivery away from home has a negative effect on duration of breast-feeding. Likewise, higher education also leads to shorter durations of breast-feeding. Since urban women have higher levels of education, they are also more likely to breastfeed for shorter durations than their rural counterparts.

4) Because of the recent formation of the 15th region, the Autonomous Region in Muslim Mindanao, a separate estimate for this region was not included in the sample.

5) The PSU's were based on the 1990 Population Census Data.

6) There were originally identified a total of 15,332 women in the sample. A total of 15,029 were interviewed, generating a response rate of 98%. The respondents were identified as: those women of the sample household, or visitors present at the time of the interview, who had slept on the sample households the night prior to the time of the interview, regardless of marital status.

7) The other two questionnaires were the Household questionnaire designed to collect information such as sex, age, education, relationship to the household head, as well as information regarding household dwelling and ownership of various consumer goods. The Health Availability questionnaire was administered to collect information about health and family planning services available to the individual women respondents.

8) This study refers to <u>any</u> breastfeeding, whether full or partial.

9) In ordinary least squares (OLS) regression, the predicted values for the probability can range from minus infinity to plus infinity; therefore this regression method should not be used to analyze a dichotomous variable.

10) The difference between this model and the incidence of breastfeeding is that place of work, and supplementary food variables are added for the duration of breast-feeding. Place of work is related more to duration rather than incidence of breast-feeding. Women who work away from home will still breast-feed but may only do so for shorter durations. Supplementary food variables could not be included in the logistic regression model because it is measured in age (in months) of the infant by which supplements were used on a regular basis. Supplementary food variables would have been included in the model if the incidence of breast-feeding and supplements were measured in days instead of months.

11) The Variance Inflation Factor for all the independent variables were not larger than 1.5.

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TABLE 1A
PERCENTAGE DISTRIBUTION OF INCIDENCE AND DURATION OF BREAST-FEEDING BY RESIDENTIAL STRATA IN THE PHILIPPINES, 1993
(EXCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	RURAL	URBAN
INCIDENCE AND DURATION OF BREAST-FEEDING (months)		
never breastfed	14.2	23.5
.5 - 2	10.8	23.9
3 - 5	8.6	11.9
6 -8	11.5	9.2
9 - 11	10.9	8.5
12 - 14	22.5	12.6
15 - 17	7.6	4.2
18 - 20	6.0	3.0
21 - 23	1.4	0.5
24 and over	6.3	2.7
Average Duration	9.5	5.8
Standard Deviation $\bar{x}$	7.5	6.7
Median Duration	9.0	5.0
Modal Duration	12.0	3.0

Source: In this and Subsequent Tables, computed from 1993 Philippines National Demographic Health Survey

TABLE 1B
PERCENTAGE DISTRIBUTION OF INCIDENCE AND DURATION OF BREAST-FEEDING BY RESIDENTIAL STRATA IN THE PHILIPPINES, 1993
(INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	RURAL	URBAN
INCIDENCE AND DURATION OF BREAST-FEEDING (months)		
never breastfed	10.8	20.4
.5 - 2	12.0	23.5
.3 - 5	12.2	13.1
6-8	13.3	10.4
9-11	11.1	9.1
12-14	20.5	12.3
15-17	7.5	4.8
18-20	5.5	3.1
21-23	1.6	0.7
24 and over	5.2	2.7
Average Duration	9.3	6.1
Standard Deviation $\bar{x}$	7.4	6.6
Median Duration	9.0	4.0
Modal Duration	12.0	3.0

TABLE 2A
MEANS AND STANDARD DEVIATIONS OF PREDICTOR VARIABLES BY RURAL AND URBAN RESIDENCE (EXCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	RURAL		URBAN	
	MEAN	STD DEV	MEAN	STD DEV
INDEPENDENT VARIABLES				
Age of Mother	24.7	4.5	26.2	4.9
Education of Mother	1.83	0.81	2.24	0.76
Parity	1.79	0.71	1.66	0.71
Place of Delivery (Away from Home)	0.25	0.43	0.58	0.49
Prenatal Care (Doctor)	0.37	0.48	0.66	0.47
Prenatal Care (Nurse/ Midwife)	0.62	0.49	0.45	0.50
Age for Infant Formula (months)	10.28	11.98	6.00	9.86
Age for other Liquids (months)	8.47	9.34	6.46	7.87
Age for Solid/Mushy Foods (months)	6.19	5.91	6.43	6.66
Place of Work (Away From Home)	0.47	0.79	0.71	0.92

TABLE 2B
MEANS AND STANDARD DEVIATIONS OF PREDICTOR VARIABLES BY RURAL AND URBAN RESIDENCE (INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	RURAL		URBAN	
	MEAN	STD DEV	MEAN	STD DEV
INDEPENDENT VARIABLES				
Age of Mother	24.4	4.6	25.8	5.0
Education of Mother	1.79	0.80	2.19	0.77
Parity	1.60	0.70	1.57	0.70
Place of Delivery (Away From Home)	0.26	0.44	0.57	0.50
Prenatal Care (Doctor)	0.35	0.48	0.64	0.48
Prenatal Care (Nurse/ Midwife)	0.63	0.48	0.46	0.50
Age for Infant Formula (months)	11.63	12.72	6.97	10.75
Age for other Liquids (months)	10.03	10.69	7.45	9.03
Age for Solid/Mushy Foods (months)	7.84	8.32	7.36	7.98
Place of Work (Away From Home)	0.40	0.74	0.66	0.90

TABLE 3A
ZERO-ORDER CORRELATIONS BETWEEN PREDICTOR VARIABLES AND DURATION OF BREAST-FEEDING IN THE PHILIPPINES, 1993
(EXCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	RURAL	URBAN
Age of Mother	-0.0900*	-0.0890*
Education of Mother	-.0310*	-.2350*
Parity	-.2300	0.0070
Prenatal Care (Doctor)	-.1960*	-0.1920*
Prenatal Care (Nurse/Midwife)	0.0050	0.1260*
Place of Delivery (Away From Home)	-.2330*	-0.2560*
Age for Infant Formula (months)	.3440*	0.4210*
Age for other Liquids (months)	-.0630**	-0.0380
Age for Solid/Mushy Foods (months)	-.1780*	-0.1490*
Place of Work (Away From Home)	-.0430	-0.1400*

* $P \leq .01$
** $P \leq .05$

TABLE 3B
ZERO-ORDER CORRELATIONS BETWEEN PREDICTOR VARIABLES AND DURATION OF BREAST-FEEDING IN THE PHILIPPINES, 1993
(INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	RURAL	URBAN
Age of Mother	0.0080	-.0940*
Educational Level of Mother	-.1690*	-0.2480*
Parity	-0.0150	-0.0210
Prenatal Care (Doctor)	-0.1180*	-0.1950*
Prenatal Care (Nurse/ Midwife)	-0.0150	0.1190*
Place of Delivery (Away From Home)	-0.1530*	-0.2440*
Age for Infant Formula (months)	0.2090*	0.3620*
Age for other Liquids (months)	-0.1750*	-.0630
Age for Solid/Mushy Foods (months)	-0.2980*	-0.1840*
Place of Work (Away From Home)	-0.0220	-0.1330*

* $P \leq .01$

TABLE 4A
LOGISTIC REGRESSION OF INCIDENCE OF BREAST-FEEDING; ZERO- ORDER EFFECTS OF PREDICTOR VARIABLES RURAL SAMPLE (INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

Independent Variables	Constant	b	exp (b)	Significance
Parity	1.2555	1.0243	2.7853	0.0000*
Prenatal Care (Doctor)	2.5383	-0.9427	0.3896	0.0000*
Prenatal Care (Nurse/ Midwife)	2.1386	-0.0183	0.9813	0.9318
Place of Delivery (Away From Home)	2.4053	2.0961	8.1346	0.0000*
Education of Mother				
(ref no educ)	4.6488			
primary		-0.0604	0.9413	0.9347
secondary		-1.1635	0.3124	0.1099
post-secondary		-1.803	0.1648	0.0135**
Age of Mother (ref 15-24)	3.9075			0.0000*
25-34		0.9325	0.3936	0.0000*
35-44		0.4734	1.6055	0.0486**
45+		1.6044	4.9751	0.0004*

* $P \leq .01$
** $P \leq .05$

TABLE 4B
LOGISTIC REGRESSION OF INCIDENCE OF BREAST-FEEDING; ZERO-ORDER EFFECTS OF PREDICTOR VARIABLES URBAN SAMPLE (INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

Independent Variables	Constant	b	exp (b)	Significance
Parity	1.5950	-0.1477	0.8627	0.1730
Prenatal Care (Doctor)	1.5639	-0.3111	0.7326	0.0636
Prenatal Care (Nurse/ Midwife)	1.2362	0.2743	1.3156	0.0824
Place of Delivery (Away From Home)	1.7004	-0.5598	0.5713	0.0007*
Education of Mother (ref no educ)				0.0273**
primary	2.4701	-0.8281	0.4369	0.4318
secondary		-0.9765	0.3766	0.3488
post-secondary		-1.3646	0.2554	0.1837
Age of Mother (ref 15-24)	-5.1941			0.0073*
25-34		6.8821	974.6707	0.6102
35-44		6.3552	575.4687	0.6378
45+		6.1592	473.0580	0.6483

* $P \leq .01$

TABLE 5A
LOGISTIC REGRESSION OF INCIDENCE OF BREAST-FEEDING FOR RURAL SAMPLE

Independent Variables	b	exp (b)	Significance
Parity	-0.0930	0.9112	0.5434
Prenatal Care (Doctor)	-0.7162	0.7750	0.0067*
Prenatal Care (Nurse /Midwife)	-0.3530	0.4886	0.1420
Place of Delivery (Away From Home)	-0.3587	0.7025	0.1487
Education of Mother (ref no educ)			
primary	0.1905	1.2098	0.8067
secondary	-0.0375	0.9632	0.9616
post-secondary	-0.2549	0.7750	0.748
Age of Mother (ref 15-24)			0.00470*
25-34	-0.2509	0.7781	0.5773
35-44	-0.8642	0.4214	0.1722
45+	-1.6896	0.1846	0.0671
constant	3.2954		

Initial L^2 (Baseline) 668.735
-2 Log Likelihood 629.010
Model χ^2
Improvement 39.725* (10 d.f.)

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* $P \leq .01$
** $P \leq .05$

TABLE 5B
LOGISTIC REGRESSION OF INCIDENCE OF BREAST-FEEDING FOR URBAN SAMPLE

Independent Variables	b	exp (b)	Significance
Parity	-0.1971	0.8211	0.0793
Prenatal Care (Doctor)	0.0469	1.0480	0.8309
Prenatal Care (Nurse/ Midwife)	0.1551	1.1678	0.4199
Place of Delivery (Away From Home)	-0.4056	0.6665	0.0324**
Education of Mother (ref no educ)			0.4868
primary	-0.9132	0.4013	0.3947
secondary	-1.0483	0.3505	0.3236
post-secondary	-1.1989	0.3015	0.2599
Age of Mother (ref 15-24)			0.2442
25-34	0.3680	0.6921	0.0375**
35-44	-0.5828	0.5584	0.0806
45+	-7.3790	0.0006	0.5847

constant 3.1400
Initial L^2 (Baseline) 1025.8959
-2 Log Likelihood 998.079
Model χ^2 Improvement 31.367**
10 d.f.

** $P \leq .05$
** $P \leq .05$

TABLE 6A
MULTIPLE REGRESSION ON DURATION OF BREAST-FEEDING FOR RURAL WOMEN (EXCLUDES CURRENTLY BREAST-FEEDING WOMEN)

Independent Variables	b	SEb	Beta	t	Sig of t
Age of Mother	-0.271	0.540	-0.017	-0.502	0.6160
Education of Mother	-0.852	0.356	-0.092	-2.391	0.0170**
Parity	-1.009	0.355	-0.096	-2.844	0.005*
Prenatal Care (Doctor)	-0.742	0.635	-0.048	-1.167	0.2440
Prenatal Care (Nurse/ Midwife)	-0.510	0.545	-0.033	-0.936	0.3500
Place of Delivery (Away From Home)	-2.245	0.638	-0.131	-3.521	0.000*
Age for Infant Formula (months)	0.212	0.022	0.341	9.515	0.000*
Age for other Liquids (months)	-0.044	0.031	-0.056	-1.440	0.1500
Age for Solid/Mushy Foods (months)	-0.284	0.048	-0.225	-5.883	0.000*
Place of Work (Away From Home)	-0.119	0.317	-0.012	-0.374	0.7090
Constant	14.268	1.190		11.1991	0.000*

R .477
R^2 .277
Adjusted R^2 .217
Std Error of Regression 6.5958

* $P \leq .01$
** $P \leq .05$

TABLE 6B
MULTIPLE REGRESSION ON DURATION OF BREAST-FEEDING FOR URBAN WOMEN (EXCLUDES CURRENTLY BREAST-FEEDING WOMEN)

Independent Variables	b	SEb	Beta	t	Sig of t
Age of Mother	0.345	0.346	0.031	0.998	0.3190
Education of Mother	-0.797	0.295	-0.090	-2.706	0.0070*
Parity	-1.035	0.284	-0.110	-3.649	0.000*
Prenatal Care (Doctor)	-0.091	0.532	-0.006	-0.172	0.864
Prenatal Care (Nurse/Midwife)	0.479	0.465	0.035	1.031	0.3030
Place of Delivery (Away From Home)	-1.661	0.461	-0.122	-3.600	0.000*
Age for Infant Formula (months)	0.280	0.022	0.411	12.909	0.000*
Age for other Liquids (months)	-0.019	0.032	-0.022	-0.591	0.5550
Age for Solid/Mushy Foods (months)	-0.232	0.038	-0.230	-6.155	0.000*
Place of Work (Away From Home)	0.471	0.228	-0.064	-2.069	0.0390**
Constant	10.227	1.004		10.182	0.000*

R 0.521
R^2 0.272
Adjusted R^2 0.263
Std.Error of Regression 5.7765

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* $P \leq .01$
** $P \leq .05$

TABLE 7A
MULTIPLE REGRESSION ON DURATION OF BREAST-FEEDING FOR RURAL WOMEN (INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

Independent Variables	b	SEb	Beta	t	Sig
Age of Mother	0.852	0.448	0.058	1.901	0.0580
Education of Mother	-0.718	0.318	-0.078	-2.260	0.024**
Parity	-0.938	0.315	-0.089	2.976	0.003*
Prenatal Care (Doctor)	-0.729	0.567	0.047	-1.284	0.2560
Prenatal Care (Nurse/Midwife)	-0.551	0.485	-0.036	-1.136	0.5120
Place of Delivery (Away From Home)	-1.431	0.561	-0.084	-2.553	0.0110**
Age for Infant Formula (months)	0.140	0.019	0.241	7.547	0.000*
Age for other Liquids (months)	-0.046	0.025	-0.066	-1.820	0.069
Age for Solid/Mushy Foods (months)	-0.292	0.032	-0.327	-8.976	0.000*
Place of Work (Away From Home)	-0.354	0.297	-0.035	-1.191	0.2340
Constant	13.437	1.028		13.069	

R .441
R^2 .194
Adjusted R^2 .186
Std. Error of Regression 6.7014

* $P \leq .01$
** $P \leq .05$

TABLE 7B
MULTIPLE REGRESSION ON DURATION OF BREAST-FEEDING FOR URBAN WOMEN (INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

Independent Variables	b	SEb	Beta	t	Sig
Age of Mother	0.333	0.325	0.030	1.026	0.3050
Education of Mother	-0.948	0.268	-0.110	-3.544	0.000*
Parity	-1.031	0.266	-0.109	-3.877	0.000*
Prenatal Care (Doctor)	-0.265	0.487	-0.019	-0.546	0.5850
Prenatal Care (Nurse/Midwife)	0.390	0.430	0.029	0.906	0.7300
Place of Delivery (Away From Home)	-1.652	0.421	-0.123	-3.923	0.000*
Age for Infant Formula (months)	0.225	0.019	0.364	12.053	0.000*
Age for other Liquids (months)	-0.025	0.031	-0.034	-7.272	0.376
Age for Solid/Mushy Foods (months)	-0.225	0.028	-0.271	-0.885	0.000*
Place of Work (Away From Home)	-0.44	0.216	-0.060	-2.039	0.042**
Constant	11.125	0.896		12.423	0.000*

R .506
R^2 .256
Adjusted R^2 .249
Std. Error of Regression 5.7496

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* $P \leq .01$
** $P \leq .05$

TABLE 8A
PERCENTAGE DISTRIBUTION OF USE OF INFANT FORMULA BY HIGHEST EDUCATIONAL LEVEL (RURAL SAMPLE)* PHILIPPINES, 1993

	AGE FOR INFANT FORMULA (months)					
HIGHEST EDUCATIONAL LEVEL	0-3	4-6	7-9	10+	Total	(N)**
No education	13.3	NA*	3.3	83.3	100.0	(30)
Primary	29.3	11.4	8.3	51.0	100.0	(351)
Secondary	90.1	11.8	6.8	35.4	100.0	(398)
Post-Secondary	65.0	11.8	5.5	17.7	100.0	(203)
Column %	43	11	7	39	100.0	(982)

* includes currently breast-feeding women
** sample size
* not applicable

TABLE 8B
PERCENTAGE DISTRIBUTION OF USE OF INFANT FORMULA BY HIGHEST EDUCATIONAL LEVEL (URBAN SAMPLE)* PHILIPPINES, 1993

	AGE FOR INFANT FORMULA (months)					
HIGHEST EDUCATIONAL LEVEL	0-3	4-6	7-9	10+	Total	(N)**
No education	46.1	15.4	NA*	38.5	100.0	(13)
Primary	33.5	33.0	12.4	21.1	100.0	(185)
Secondary	34.1	39.4	9.0	17.5	100.0	(412)
Post-Secondary	43.7	43.0	2.2	11.1	100.0	(404)
Column %	63	9	5	23	100.0	(1014)

* includes currently breast-feeding women
** sample size
* not applicable

APPENDIX 1A
INCIDENCE OF BREAST-FEEDING : INTERCORRELATION MATRIX (RURAL SAMPLE)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7
X_1	1.000	-0.519*	0.405*	0.191*	0.316*	-0.116*	-0.058
X_2		1.000	-0.258*	-0.094*	-0.159*	0.016	0.055
X_3			1.000	0.221*	0.359*	-0.101*	0.108*
X_4				1.000	-0.083*	0.453*	-0.113*
X_5					1.000	-0.338*	-0.092*
X_6						1.000	-0.043
X_7							1.000

Note: x_1 = Prenatal (Doctor).
x_2 = Prenatal (Nurse).
x_3 = Incidence of Breast-feeding.
x_4 = Place of Delivery.
x_5 = Education of Mother.
x_6 = Age of Mother.
x_7 = Parity.
*$P \leq .05$.

APPENDIX 1B
INCIDENCE OF BREAST-FEEDING: INTERCORRELATION MATRIX (URBAN SAMPLE)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7
X_1	1.000	-0.334*	-0.147*	0.412*	0.407*	0.165*	-0.081*
X_2		1.000	-0.003	-0.094*	0.011	-0.013	-0.049
X_3			1.000	0.177*	-0.104*	0.116*	0.149*
X_4				1.000	-0.048*	0.479*	0.421*
X_5					1.000	-0.094*	-0.316*
X_6						1.000	0.519*
X_7							1.000

Note: x_1 = Prenatal (Doctor).
x_2 = Prenatal (Nurse).
x_3 = Incidence of Breast-feeding.
x_4 = Place of Delivery.
x_5 = Education of Mother.
x_6 = Age of Mother.
x_7 = Parity.
* $P \leq .05$.

APPENDIX 2A
DURATION OF BREAST-FEEDING: INTERCORRELATION MATRIX, RURAL SAMPLE
(EXCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}
X_1	1.000	-.092*	-.233*	-.028	-.197*	.007	-.233*	.345*	-.064	-.177*	.055
X_2		1.000	-.133*	.577*	.203*	-.028	.529*	-.126*	-.135*	-.070*	.177*
X_3			1.000	-.316*	.407*	.011	-.048*	-.325*	-.138*	-.042	.052*
X_4				1.000	-.081*	-.049	.421*	-.010	-.090*	-.134*	.092*
X_5					1.000	-.334*	.412*	-.256*	-.113*	-.078*	.071*
X_6						1.000	-.094*	-.012	-.024	.028	-.040
X_7							1.000	-.179*	-.071*	.005	.122*
X_8								1.000	.217*	.204*	-.069*
X_9									1.000	.588*	-.075*
X_{10}										1.000	-.086*
X_{11}											1.000

Note: x_1 = Duration of Breast-feeding.
x_2 = Age of Mother.
x_3 = Education of Mother.
x_4 = Parity.
x_5 = Prenatal Care (Doctor).
x_6 = Prenatal Care (Nurse).
x_7 = Place of Delivery.
x_8 = Age for Infant Formula (months).
x_9 = Age for Other Liquids (months).
x_{10} = Solid/Mushy Foods (months)
x_{11} = place of work.
* $P \leq .05$

APPENDIX 2B
DURATION OF BREAST-FEEDING: INTERCORRELATION MATRIX, URBAN SAMPLE (EXCLUDES CURRENLTY BREAST-FEEDING WOMEN)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}
X_1	1.000	-.088*	-.237*	.014	-.192*	.124*	-.257*	.420*	-.038	-.150*	-.143*
X_2		1.000	-.086*	.486*	.221	-.120*	.204*	-.188*	-.134*	-.067*	.191*
X_3			1.000	-.338*	.316*	-.159*	.359*	-.278*	-.144*	-.059	.181*
X_4				1.000	-.116*	016	-.101*	.052	-.086*	-.137*	-.031*
X_5					1.000	-.519*	.405*	-.247*	-.109*	-.007	.180*
X_6						1.000	-.258*	.100*	.080*	.024	-.122*
X_7							1.000	-.230*	.098*	-.022	.153*
X_8								1.000	.291*	.221*	-.171*
X_9									1.000	.671*	-.122*
X_{10}										1.000	-.077*
X_{11}											1.000

Note: x_1 = Duration of Breast-feeding.
x_2 = Age of Mother.
x_3 = Education of Mother.
x_4 = Parity.
x_5 = Prenatal Care (Doctor).
x_6 = Prenatal Care (Nurse).
x_7 = Place of Delivery.
x_8 = Age for Infant Formula (months).
x_9 = Age for Other Liquids (months).
x_{10} = Age for Solid/Mushy Foods (months).
x_{11} = place of work.
* $P \leq .05$.

APPENDIX 3A
DURATION OF BREAST-FEEDING: INTERCORRELATION MATRIX, RURAL SAMPLE (INCLUDES CURRENTLY BREAST-FEEDING WOMEN)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}
X_1	1.00	.006	-.172*	-.013	-.119*	-.013	-.153*	.210*	-.176*	-.298*	-.035
X_2		1.00	-.133*	.577*	.203*	-.028	.529*	-.126*	-.135*	-.070*	.177*
X_3			1.00	-.316*	.407*	.011	-.048*	-.325*	-.138*	-.042	.052*
X_4				1.00	-.081*	-.049	.421*	-.010	-.090*	-.134*	.092*
X_5					1.00	-.334*	.412*	-.256*	-.113*	-.078*	.071*
X_6						1.00	-.094*	-.012	-.024	.028	-.040
X_7							1.00	-.179*	-.071*	.005	.122*
X_8								1.00	.217*	.204*	-.069*
X_9									1.00	.588*	-.075*
X_{10}										1.00	-.086*
X_{11}											1.00

Note: x_1 = Duration of Breast-feeding.
x_2 = Age of Mother.
x_3 = Education of Mother.
x_4 = Parity.
x_5 = Prenatal Care (Doctor).
x_6 = Prenatal Care (Nurse).
x_7 = Place of Delivery.
x_8 = Age for Infant Formula (months).
x_9 = Age for Other Liquids (months).
x_{10} = Age for Solid/Mushy Foods (months).
x_{11} = place of work.
* $P \leq .05$.

APPENDIX 3B
DURATION OF BREAST-FEEDING: INTERCORRELATION MATRIX, URBAN SAMPLE (INCLUDES CURRENLTY BREAST-FEEDING WOMEN)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}
X_1	1.000	-.094*	-.249*	-.015	-.195*	.117*	-.244*	.362*	-.063*	-.185*	-.135*
X_2		1.00	-.086*	.486*	.221*	-.120*	.204*	-.188*	-.134*	-.067*	.191*
X_3			1.00	-.338*	.316*	-.159*	.359*-	.278*	-.144*	-.059	.181*
X_4				1.00	-.116*	.016	-.101*	.052	-.086*	-.137*	-.031*
X_5					1.00	-.519*	.405*	-.247*	-.109*	-.007	.180*
X_6						1.00	-.258*	.100*	.080*	.024	-.122*
X_7							1.00	-.230*	-.098*	-.022	.153*
X_8								1.00	.291*	.221*	-.171*
X_9									1.00	.671*	-.122*
X_{10}										1.00	-.077*
X_{11}											1.00

Note: x_1 = Duration of Breast-feeding.
x_2 = Age of Mother.
x_3 = Education of Mother.
x_4 = Parity.
x_5 = Prenatal Care (Doctor).
x_6 = Prenatal Care (Nurse).
x_7 = Place of Delivery.
x_8 = Age for Infant Formula (months).
x_9 = Age for Other Liquids (months).
x_{10} = Age for Solid/Mushy Foods (months).
x_{11} = place of work.
* $P \leq .05$.