# MATERNAL EDUCATION AND CHILD HEALTH IN THAILAND

By

Sirimon Wilairat

A Sub-thesis submitted as a partial requirement for the degree of
Master of Arts in Demography

March 1987

# DECLARATION

Except where otherwise indicated
this thesis is my own work.

Sirimon Wilairat

March 1987

## ACKNOWLEDGEMENTS

I am very grateful to Dr. Siew-Ean Khoo, my supervisor and Dr. Kim Streatfield, my adviser for their guidance, encouragement and invaluable suggestions in the successful completion of this thesis. Thanks are due to Mrs. Christine McMurray for correcting language and other help.

I would like to thank Dr. Nanta Auamkul of the Family Health Division, Department of Health, Thailand for allowing me to use the survey data on "The Study of Health Problems of the Under Five" for my thesis work. I am indebted to Miss Chantarat Rabiabloke, Chief of the Projects and Technical Section, Family Health Division who always encouraged me to study further. My sincere thanks are also due to Mrs. Sodsuay Kanavacharakul and Mrs. Prapapan Eiampha for their help in providing additional information from Thailand.

I would also like to thank Mr. Apimuk Sukprasit, Mr. A.K. Majumder and his wife, Dilara Pravin for their constant inspiration, friendly understanding and assistance throughout my stay in Canberra.

Finally, I am thankful to members of my family for their emotional support and love.

## ABSTRACT

This study examines the relationship between maternal education and child health in Thailand by looking at breastfeeding practices, the introduction of supplementary food, food taboo practices, the nutritional status of children, and the use of health services such as well baby clinics, immunization, and family planning. The study is based on data from the survey on the "Health Problems of the Under Five" which was conducted in eight different provinces of Thailand between November 1982 and March 1983.

The educational level of mothers was found to have a positive effect on child nutritional status, acceptance of immunization, use of well baby clinics and also the use of family planning. Children of mothers with higher education had better nutritional status than those whose mothers had no education or less education. Nutritional status was measured by three different indicators: weight for age, height for age and weight for height. It was also observed that, since more educated mothers were more likely to know about the availability and importance of immunization and well baby clinics, they were more likely than less educated mothers to utilize these health services for their children.

TABLE OF CONTENTS

# LIST OF FIGURES

# LIST OF TABLES

# CHAPTER 1

# INTRODUCTION

## 1.1 Background and Objectives of the Study

Levels of infant and child mortality have been widely used as indicators of the health and development of a population. The World Fertility Surveys conducted in many developing countries show that infant and child mortality levels range widely from country to country. For example, the infant mortality rate varies from 46 deaths per 1000 live births in Panama to 262 in Senegal (Rutstein, 1983:15). The levels of infant and child mortality in Latin American countries and the three English speaking Caribbean countries are lower than those of African and Asian nations. Most of the countries with high mortality levels are in South Asia (Nepal, Pakistan, Bangladesh), the Middle East (Yemen Arab Republic, Egypt) and Sub-Saharan African (Lesotho, Benin) (Chidambaram et al., 1985:19). These countries have infant mortality rates well above 100 per 1000 live births.

The causes of death of infants and children vary from country to country. Although data on the causes of death are often unavailable or unreliable in most developing countries, it is generally accepted that infectious, parasitic and respiratory diseases play a major role. These diseases, combined with nutritional deficiency, are the major contributors to infant and child deaths in developing countries (United Nations, 1982:128). Hull and Rohde (1980:31) estimated that the synergistic triad of malnutrition, diarrhoea, and acute respiratory infection accounted for 64-68 per cent of all infant deaths and 73-80 per cent of all deaths under age five in Java. In Tropical African countries nearly all children suffer from malaria and at least one million children die from it each year (United Nations, 1982:111).

The mother is the person mainly responsible for the survival of her child because she is responsible for her health during pregnancy as well as for the care of her child when it is in the vulnerable early stages of life. Many studies investigating the relationship between social, economic and demographic variables and the levels of infant and child mortality have found that maternal education is one of the most important variables in explaining mortality differentials (Caldwell, 1981). Education of the mother can have an influence on the choices and skills in health care practices related to hygiene, preventive care, nutrition and disease treatment (Mosley and Chen, 1984:35).

A conceptual framework for the study of child survival in the developing countries has been proposed by Mosley and Chen (1984). This framework is based on the proposition that all social and economic determinants of child mortality unavoidably operate through a number of proximate determinants to influence the health, growth and mortality of the child. These proximate determinants have been grouped into five categories:-

- Maternal factors: age; parity; birth interval;
- Environmental contamination: air; food/water/fingers; skin/soil/inanimate objects; insect vectors;
- Nutrient deficiency: calories; protein; micro-nutrients (vitamins and minerals);
- Injury: accident; intentional;
- Personal illness control: personal preventive measures; medical treatment.

The first four categories of proximate determinants affect the incidence of illness in a healthy child and the last category affect not only the rate of illness through prevention but also the rate of recovery through treatment.

The present study is designed to examine the relationship between maternal education and two of the above proximate determinants,

nutrient deficiency and personal illness control. More specifically, the study has the following objectives:-

1. To examine the relationship between mothers' education and child health or child nutritional status.

2. To examine the relationship between mothers' education and mothers' behavior in rearing and taking care of their children through breastfeeding, introduction of supplementary food and the use of health facilities and services such as well baby clinics and immunization against certain childhood diseases.

## 1.2 Causes of Infant and Child Deaths in Thailand

Like most other developing countries, the general mortality condition in Thailand has improved considerably over the last three decades. The infant mortality rate in Thailand decreased by two-thirds between 1940 and 1970 (NESDB et al., 1974:7) and has fallen to around 50 per thousand live births in 1982 from 100 per thousand live births in 1960 (Grant, 1983:77). Existing estimates show that the probability of dying before reaching exact age five has declined from 123 per thousand live births in 1964 to 97 per thousand live births in 1975 (National Research Council, 1980:22).

Adequate and reliable information on the causes of death in developing countries are scarce. Thailand is not an exception. The quality of the diagnosis of the cause of death is largely dependent on the attendent at the death. As few deaths are attended by trained health workers or medical personnel, information on the causes of death are inadequate. Under-registration of deaths seems very high. Under-registration of deaths was found to be as high as 62 per cent for deaths occuring to children under age one and as high as 54 per cent for deaths among children aged one to four (Rachapaetayakom, 1976:50).

During the first half of the twentieth century, malaria,

Table 1-1: Leading causes of death (rate per 100,000 population) among infants and during early childhood, Thailand, 1977-1982

| | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|
| Under age 1 | | | | | | |
| Certain conditions originating in the perinatal period | 240.2 | 302.2 | 266.3 | 306.0 | 290.0 | 278.1 |
| Upper respiratory infections | 211.5 | 213.8 | 146.4 | 52.5 | 34.9 | 38.0 |
| Pneumonia | 146.9 | 130.7 | 105.9 | 86.4 | 95.7 | 89.5 |
| Diseases of the digestive system other than oral cavity, salivary glands and jaws | 119.3 | 108.1 | 90.9 | 75.8 | 66.3 | 70.1 |
| Diarrhoeal diseases | 110.6 | 132.4 | 97.1 | 74.5 | 63.5 | 47.5 |
| Convulsions | 38.9 | 32.6 | - | 16.9 | - | 19.7 |
| Viral diseases | 22.4 | 16.9 | 14.0 | 20.1 | 16.3 | 12.3 |
| Congenital anomalies | 20.4 | 23.1 | 43.0 | 45.3 | 38.0 | 45.7 |
| Diptheria | 14.8 | 13.9 | 12.7 | 11.4 | 9.7 | 9.7 |
| Age 1-4 | | | | | | |
| Upper respiratory infections | 88.8 | 80.3 | 67.2 | 20.0 | 19.1 | 17.4 |
| Diarrhoeal diseases | 30.5 | 29.9 | 27.3 | 19.6 | 18.2 | 16.2 |
| Accidents, poisonings and violence | 26.4 | 30.0 | 26.4 | 30.9 | 27.1 | 25.4 |
| Pneumonia | 22.8 | 21.9 | 20.8 | 18.4 | 15.8 | 17.1 |
| Malaria | 14.5 | 12.8 | 11.8 | 9.2 | 10.0 | 9.6 |
| Convulsions | 7.8 | 7.3 | 6.7 | 5.1 | 3.4 | 4.6 |
| Diptheria | 7.9 | 7.3 | 6.7 | 5.1 | 2.6 | 4.1 |
| Diseases of the stomach and duodenum | 6.9 | 6.8 | 6.8 | 5.2 | 5.1 | 4.7 |
| Nutritional deficiency | 3.1 | 2.6 | 3.4 | 2.7 | 2.5 | 2.4 |
| Diseases of the heart | 0.7 | 0.4 | 6.3 | 7.8 | 6.2 | 9.0 |

Note: Rate of under one year of age is calculated per 100,000 livebirths.

Sources: Porapakkham and Prasartkul, 1986:227, Table 10.

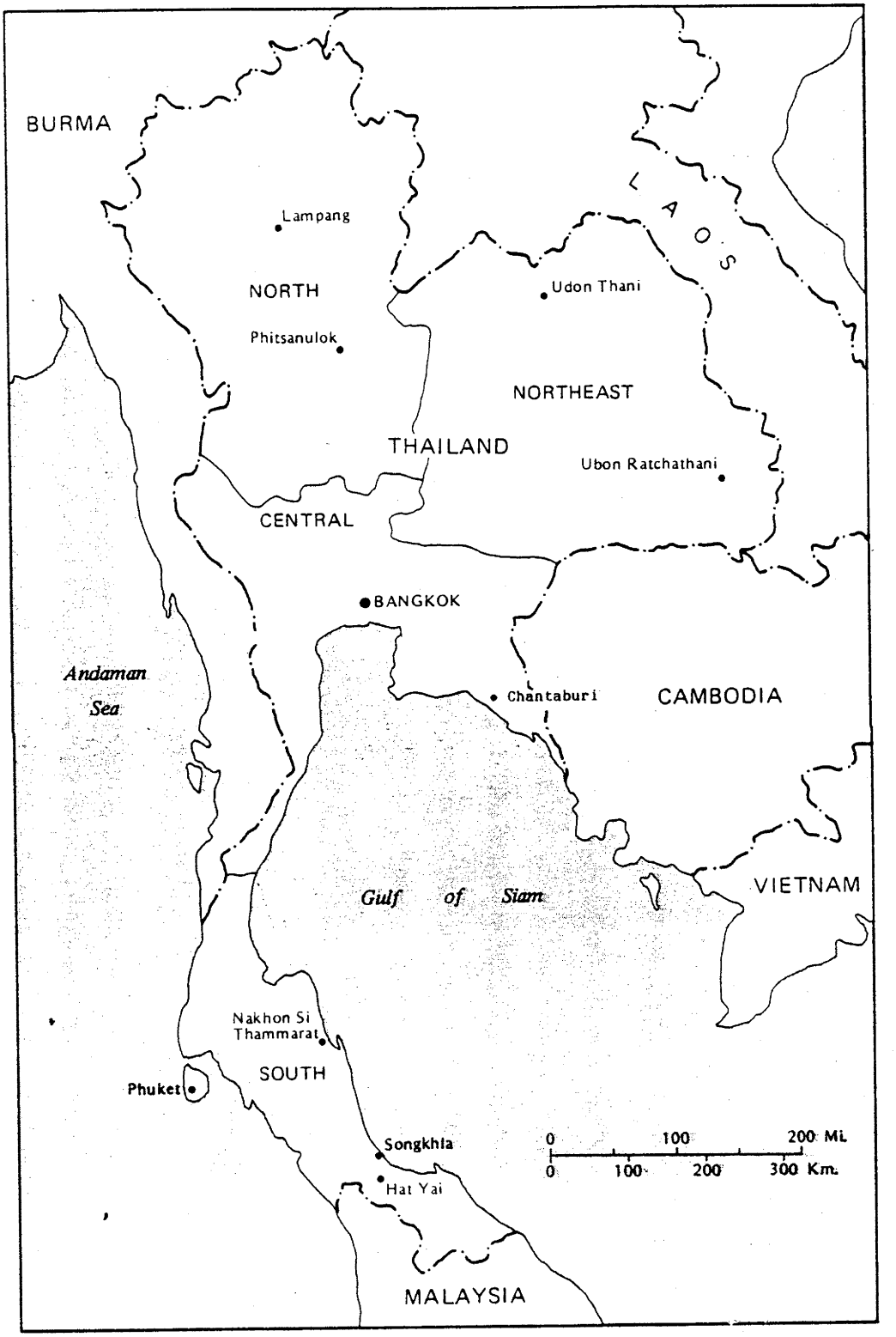
tuberculosis, small pox, parasite infection, and nutritional deficiency were reported as the major causes of mortality and morbidity in Thailand (NESDB et al., 1974:6). Though malaria and small pox are no longer important causes of deaths, infectious diseases still play a major role. Table 1-1 presents the leading causes of death among infants and children aged 1-4 in Thailand for the period 1977-1982. Undoubtedly, these data on the causes of death are not perfect but special measures have been taken to make the data as reliable as possible (see Porapakkham nd Prasartkul, 1986:211).

It appears that most infant deaths are caused by infectious diseases and congenital anomalies. Certain conditions originating in the perinatal period are the major killers of early neonatal babies. The death rate from these causes was as high as 278 per 100,000 live births in 1982. Pneumonia and disease of the digestive system also play a major role in infant deaths. At ages 1-4, pneumonia, upper respiratory infections, diarrhoeal diseases, accidents and heart diseases appeared as the major causes of death. The majority of these infant and child deaths are due to exogenous causes resulting from poor living conditions. These causes, such as diarrhoeal diseases, pneumonia, diptheria, respiratory infections could be reduced if the mothers or the parents had proper knowledge about these diseases and the preventive measures to be taken against these diseases. Further reduction could be expected if the mothers or parents had adequate knowledge about the child's nutritional status and nutritional requirements.

## 1.3 Source of Data

The data used in this study come from "The Study of the Health Problems of the Under Five" which was conducted by the Family Health Division, Department of Health, Ministry of Public Health, Thailand, between November 1982 and March 1983. The survey respondents were the parents, relatives or guardians of 1600 children aged under five who were admitted to eight provincial hospitals with at least 40 inpatient pediatric beds.

Figure 1-1: Map of Thailand Showing the Four Regions and the Location of Sampling Areas




Source: Arnold et al., 1972:2

Since each geographic region has its own culture which affects child growth and development, including the acceptance of public health services, two hospitals were selected from each region by simple random sampling. These hospitals are:-

| | | |
|---|---|---|
| Central region | : | The Children's Hospital, Bangkok |
| | | The Pra Pokkloa Hospital, Chantaburi |
| Nothern region | : | The Lampang Hospital, Lampang |
| | | The Putthachinnaraj Hospital, Phitsanulok |
| Northeastern region | : | The Supprasitprasong Hospital, |
| | | Ubon Ratchathani |
| | | The Udon Thani Hospital, Udon Thani |
| Southern region | : | The Maharaj Hospital, |
| | | Nakhon Si Thammarat |
| | | The Hat Yai Hospital, Songkhla |

Two hundred pediatric in-patients who were admitted to the hospitals during the first three months of the study were selected from each hospital, irrespective of their sex and causes of admittance. Therefore, 400 cases were selected from each of the 4 regions. The parents were interviewed by residents or ward nurses who had been trained by Family Health Division staff. The questionnaire connsisted of 10 parts:-

Part 1 - Patient characteristics:- age, sex, place of residence, education and occupation of parents

Part 2 - Patient's history during fetal and neonatal periods:- gestational age, birth weight

Part 3 - Pregnancy and obstetric history of mother:-number of children, stillbirths, abortions

Part 4 - Siblings' history:- age of siblings, health status, dead

siblings

Part 5 - Breastfeeding and supplementary food

Part 6 - Patient's history of attending well-baby clinic and having immunizations

Part 7 - Child growth/teeth and eye condition

Part 8 - History of patient's sickness

Part 9 - Current illness

Part10 - Parents' family planning practices

## 1.4 Limitations of the Data

The "Study of Health Problems of the Under Five" was designed to identify the pattern of illness of young children and the underlying causes of such illness, and also to study the growth and development, nutritional status and immunization of children under age five years who were admitted to hospitals. Therefore, the data provide information on a special group of children, in most cases severely sick children since it is not likely that slightly sick children would go to hospitals. Therefore, the findings from this study may not be generalized to the whole population.

In the questionnaires, the respondents were asked about BCG, DPT and polio immunization of their children. The answers depend on the knowledge and memory of the respondents - whether they really know about or remember the specific immunization. For example, some children may have received one or two kinds of immunization but the mothers or other respondents may not know or remember what type of immunization. Therefore some inaccuracies can be expected in the responses on immunization.

The sample was selected from provincial hospitals with at least 40 in-patient pediatric beds so it does not cover other provincial hospitals with less than 40 in-patient pediatric beds and also district hospitals and regional Maternal and Child Health hospitals.

Moreover, due to some proxy reporting (6.7 per cent of the total) by other persons i.e. fathers, relatives, and guardians, information about children such as breastfeeding and supplementary food, attendance at well baby clinics and having immunizations may not all be correct.

Mothers in the sample were mainly women with 1-4 years of education (71 per cent of the total number), while 8 per cent had no education, 13 per cent had 5-10 years of schooling, and 8 per cent had 11 years and over. The mothers were aged between 16 and 49 years. To determine whether the mothers in the sample are representative of the Thai population in terms of their education, the distribution of the mothers in the sample by their level of education was compared with the distribution of the female population in the eight provinces according to the 1980 Census. Since the education data in the Census are available by single year of age to only 44 and then 45 and over, mothers aged 16-49 are compared with women aged 16-44 years. This should not be a problem because there were only 16 mothers in the sample who were aged 45-49.

Table 1-2: Distribution of mothers in the sample and women in the Census by education (percentages)

| | Years of education | | | | Total | Number of cases |
|---|---|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 | | |
| Sample | 8.1 | 70.5 | 13.0 | 8.3 | 100.0 | 1,599 |
| Census (8 provinces) | 6.3 | 60.2 | 16.6 | 16.9 | 100.0 | 2,664,098 |

Chi-square = 120.63, d.f.= 3, $p < 0.005$

Source: 1. National Statistics Office, 1983.

2. Original analysis of the "Study of Health Problems of the Under Five" Datatape

From Table 1-2, it can be seen that the distribution of mothers in the sample is significantly different from the distribution of women in the Census ($p < 0.005$). The percentages of mothers with no education and 1-4 years of education were higher whereas the percentage of those with 5-10, and more than 10 years of schooling were lower in the sample when compared with those in the census. This may be due to a number of reasons. First, mothers with more education may be less likely than less educated mothers to have sick children. Second, the higher educated mothers may be more likely to take their children to private hospitals which are available in big cities, especially in Bangkok. Third, as less educated women tend to marry at younger ages than higher educated women, so a group of mothers is likely to be, on average, less educated than a group of women which includes both single and married women. Finally, the number of mothers in each region in the sample is the same but this is not so with the female population in each region. Also, the two sets of data are not strictly comparable since the Census was conducted in 1980 and the sample survey was conducted in 1982-1983. However, it is highly unlikely that the distribution of women by educational level would have altered significantly in three years.

Table 1-3 shows the percentage distributions of children by age and by mothers' educational status, place of residence and region. It can be seen that there is a significant association between age of children and the level of mothers' education. The mothers with higher education were more likely to have younger children (under age 12 months) than were mothers with lower education. Such an uneven distribution of young children by mothers' education can affect the results of the analysis in this study. Attempts will be made to control for the age of children in the data analysis in the later chapters. The distribution of children in each age group varies little with the regions and, as shown by the chi-square value, there is no significant difference in the age distribution of children by region. Similarly, differences observed in the distribution of children by age and by rural-urban place of residence are small.

Table 1-3: Percentage distribution of children by age and by mothers' education, place of residence, and region

| | Age of children(months) | | | | | Total | Number of cases |
|---|---|---|---|---|---|---|---|
| | 1-12 | 13-24 | 25-36 | 37-48 | 49-60 | | |
| Education of mothers | | | | | | | |
| 0 | 43.5 | 19.8 | 15.3 | 16.8 | 4.6 | 100.0 | 131 |
| 1-4 | 47.2 | 21.9 | 15.9 | 10.7 | 4.3 | 100.0 | 1128 |
| 5-10 | 52.9 | 26.5 | 9.6 | 6.7 | 4.3 | 100.0 | 208 |
| >10 | 62.9 | 20.5 | 8.3 | 5.3 | 3.0 | 100.0 | 132 |
| Chi-square = 30.01, d.f.= 12, p = 0.00 | | | | | | | |
| Place of residence | | | | | | | |
| Urban | 45.4 | 24.5 | 13.2 | 11.0 | 5.9 | 100.0 | 491 |
| Rural | 50.5 | 21.2 | 14.9 | 9.9 | 3.5 | 100.0 | 1109 |
| Chi-square = 9.01, d.f.= 4, p = 0.07 | | | | | | | |
| Region | | | | | | | |
| North | 48.5 | 23.3 | 14.0 | 10.5 | 3.8 | 100.0 | 400 |
| Central | 47.5 | 20.8 | 14.0 | 12.8 | 5.0 | 100.0 | 400 |
| Northeast | 52.3 | 22.8 | 15.0 | 6.8 | 3.3 | 100.0 | 400 |
| South | 47.5 | 22.0 | 14.5 | 11.0 | 5.0 | 100.0 | 400 |
| Chi-square = 11.78, d.f.= 12, p = 0.46 | | | | | | | |

Source: Original analysis of the "Study of Health Problems of the Under Five" Datatape

## 1.5 Organization of the Study

This study is divided into five chapters. Chapter 2 reviews the literature on maternal education, nutrition, personal illness control and child survival. Chapter 3 analyses the relationship between mothers' education and the nutritional status of children by examining breastfeeding, the giving of supplementary food and food taboo practices. In Chapter 4, the relationships between education of mothers and use of health facilities for their children as well as parents' contraceptive use are examined. Finally, Chapter 5 presents a summary and the conclusions of the study.

# CHAPTER 2

# MATERNAL EDUCATION, NUTRITION, PERSONAL ILLNESS CONTROL AND CHILD SURVIVAL - A LITERATURE REVIEW

As mentioned in the previous chapter, there are five categories of proximate determinants which directly influence the risks of morbidity and mortality of infants and children. Maternal education, as one of the socio-economic determinants, must operate through these proximate determinants to affect child survival (Mosley and Chen, 1984). In this chapter the effects of two of the proximate determinants, nutrient deficiency and personal illness control on child health are reviewed. First, the relationship between mothers' education and infant and child mortality is examined.

## 2.1 Maternal Education and Infant and Child Mortality

There are numerous studies showing a clear negative relationship between maternal education and infant and child mortality (Caldwell, 1979; Arriaga, 1979; Dyson, 1977; Simmon and Bernstein, 1982; DaVanzo, 1985; Suchindran and Adlaka, 1985). All the studies show that the higher the mother's education, the lower the infant and child mortality. Data from the World Fertility Survey of seven African countries (Egypt, Sudan, Senegal, Cameroon, Kenya, Lesotho and Nigeria) have indicated that infants born to educated mothers have a greater chance of survival than those born to illiterate mothers (Ayeni, 1985:268). Children of uneducated mothers have a mortality rate that is about twice as high as that of children whose mothers have secondary or higher levels of education. For example, in Kenya, the infant mortality rate of children whose mothers had secondary education was 57 deaths per 1000 live births whereas the rate for children whose mothers were uneducated was 117. A similar pattern was observed in the Asian

countries (for example, in Bangladesh, Pakistan, Indonesia and Sri Lanka), where infant mortality rates for children whose mothers had no education were substantially higher than for children whose mothers had completed primary school (Arriaga and Hobbs, 1982:167).

It is observed in the data from Nigeria that infant and child mortality rates of children of literate women were lower than those of children of illiterate women, even when controlled for other socio-economic factors such as rural-urban residence, mother's occupation and father's occupation (Caldwell and McDonald, 1981:790). In a study in Thailand it was observed that in both municipal (urban) and non-municipal (rural) areas, infant and child mortality of children whose mothers had no schooling was many times higher than that of children whose mothers had at least some secondary education. Such results were clearly observed even when the effect of place of residence was controlled (Chamratrithirong, 1982). Martin et al.,(1983) in their analysis of WFS data also observed that after controlling for father's education, mother's education was strongly and negatively related to infant and child mortality in Pakistan and the Philippines.

Though most studies show that maternal education has a major impact on infant and child mortality, there has been no clear explanation as to how mother's education changes practices which affect child health and mortality. Caldwell (1979) considered that education affects mothers in three different ways. Firstly, education makes women less "fatalistic" about illness. An educated mother is more likely to adopt many of the alternatives in child care and in treatment in sickness which are available in a rapidly changing society. Secondly, education makes women more capable of manipulating the modern world: "she is more likely to be listened to by doctors and nurses. She can demand their attention even when their reluctance to do anything more would completely rebuff an illiterate. She is more likely to know where the right facilities are and to regard them as part of her world and to regard their use as a right and not a boon." (Caldwell, 1979:410). Thirdly, education also makes women change the

traditional balance of familial relationships with a great affect on child care. In traditional societies where women play major roles in family decision making, the mother-in-law is more likely to have an influence on child care. Mothers usually have to ask their mothers-in-law for advice. A woman with schooling is more likely to challenge her mother-in-law and the mother-in-law is likely to be much less apt to fight the challenge. Thus, an educated mother is more likely to have the authority to get appropriate treatment when her children are sick and also to manipulate her family to get equal distribution of food by volume and type, which can affect infant and child mortality.

As the evidence on how maternal education changes mother's behavior that affects child survival is scarce in demographic literature, the issue remains debated. Contradicting to Caldwell's (1979) arguements, Lindenbuam's study (1983 as cited in Ruzicka and Kane, 1986:288) in a rural and area of Bangladesh, found that there was no difference in the use of modern health interventions. However the study showed that education promoted "upward social mobility" behavior such as a clean house, neatness and better personal hygiene, which is also passed forward to the children. Ruzicka and Kane (1986) argued that the upward social mobility behavior patterns have at least two dimensions, one which serves the purpose of conveying higher social status while the other is indirectly beneficial to health promoting and protecting effects. Though the channels through which mother's education relates to child mortality are debatable, there appears no controversy on the lower mortality rate of children of educated mothers than those of uneducated mothers.

## 2.2 Maternal Education and Children's Nutrition

Nutrition is essential for the growth and development of children. The survival of the child in the first stage of life is influenced by the nutritional status of mothers during pregnancy (Venkatacharya, 1985:243). Pregnant women need more proteins, calories, and micro-nutrients (vitamins and minerals) because of the biological

association between the mother's health and the child's development. In Guatemala, it has been observed that a moderate increase in the daily caloric intake of pregnant women increases the average birth weight of the baby (Habicht et al., 1974:134). On average, women should gain about 12.5 kg. in pregnancy which results in a birthweight of 3.3 - 3.5 kg. (Hytten and Leitch, 1971). Improved maternal nutrition during pregnancy has been found to lower child mortality caused by low birth weight (Venkatacharya, 1985:245). Data from both developed and developing countries showed that neonatal mortality rates of infants with birthweight 2,500 grams or less were much higher than those of infants whose birthweight were more than 2,500 grams (Puffer and Serrano, 1973: 49). Some studies have found that dietary intakes have a positive relationship with level of women's education. Musaiger (1977 as cited in Musaiger, 1982:44) found in Bahrain that highly educated housewives consumed more high protein foods and fruits than those with lower education. They are more likely to have better nutritional status during the pre- or post-pregnancy period and so are more likely to have higher birth weight babies who have a better chance of survival than the children of uneducated women.

It has been estimated that nearly half the children in the world grow and develop under conditions of protein or protein-calorie malnutrition which inhibit their physical development (Kallen, 1973:133). Evidence from many studies shows that the level of education of the mother has an impact on the nutrition intake of children. In a study of the determinants of dietary intake and adequacy of pre-school children in Bangladesh, Chaudhury (1984) found that mother's education had a positive effect on calorie intake, protein intake, and the protein adequacy ratio of children of all ages and particularly in the first year of life. In another study of nutrition among children in a rural area of Bangladesh, Bairagai (1980) noted that education of mothers had an impact on the nutritional status of the children in both the two seasons, November-January, which is thought to favour the nutritional status of children due to food availability and May-July, which is believed to be unfavourable for the nutrition of children. The Study further shows that for some unknown

reasons, illiterate mothers who had a high income were likely to have less ability to utilize their resources for the welfare of their children than were literate mothers. It is possible that literate women gave better food and better care to their children. Studies in Varnasi (India), Lima (Peru), and Nicaragua have also shown that the education of mothers has an effect on the nutritional status of children (Becker et al., 1986:252).

The nutritional status of children depends on feeding practices which include breastfeeding and giving supplementary food, especially in the first year of life. Improper feeding can lead to nutrient deficiency which influences the health and survival of children.

### 2.2.1 Breastfeeding

Breastmilk is the best food for infants because it contains all the nutrients needed for health during the first six months of life, and provides immunologic substances against bacterial infection of the gastrointestinal tract, allergies, obesity, and certain metabolic and other disorders (Buchanan, 1975:J49). DaVanzo et al.(1983) found in their study of Malaysia that longer durations of full breastfeeding substantially decreased infant mortality, especially in the first month of life. In Chile, Plank and Milanesi (1973) noted that bottle feeding was related to death rates three times higher than those among infants who were fully breastfed. Moreover, Kanaaneh (1972) found that 30 per cent of bottle-fed infants were malnourished whereas malnutrition among those who were breastfed was nearly absent. However, the differences between the effect of breastfeeding and artificial feeding on infant mortality result from the nutritional quality and sanitary conditions of substitute foods, and the overall health conditions of the infant's environment (Knodel, 1982:72).

Various studies have shown a negative relationship between maternal education and breastfeeding practices. Data from the World Fertility Survey from 28 countries indicated that the duration of breastfeeding decreased with education of mothers except in Fiji (Ferry and Smith, 1983:23). In other countries, for example, Egypt, Lebanon,

and Nigeria, it was found that the duration of breastfeeding was longer among uneducated mothers than among educated mothers and the duration of breastfeeding decreased with increasing educational attainment (El-Mougi et al., 1981; Mudambi, 1981). Using data from the Malaysian Family Life Survey, 1976-1977, Haaga (1984) noted that mothers with more than primary education were less likely to breastfeed their newborn infants exclusively than mothers with little or no education and also were more likely not to breastfeed at all.

Education may generally be accepted as an indicator of economic conditions, income level, occupation, lifestyle, diet and nutrition, and quality of housing (Puffer and Serrano, 1973:294). So, even though literate mothers are less likely to breastfeed their children than illiterate women, they can substitute other foods which have an adequate nutritional value, because of their knowledge, income, and environment. Mosley and Chen (1984) also noted that if both rich and poor mothers have to use bottle feeding, the impact on child survival for the two groups may be remarkably different.

Buchanan (1975:J55) has noted some problems related to bottle feeding which may influence the child's health, as follows: "a mother who finds cow's milk or formula expensive may dilute the preparation to a point where it is no longer nutritionally adequate or may use other liquids such as rice water instead. Clean water for formulas may not be available. Some mothers may have difficulty following written instructions for preparing formulas. Hygienic facilities for sterilizing bottles and nipples may be lacking."

These problems are usually found among mothers rather than educated mothers. In Nigeria, Cherian (1981) found that 48 per cent of the mothers who used milk formulas did not follow the instructions on the milk powder tin, and most were illiterate. In Chittoor District, Andhra Pradesh, India, Indira Bai and Ratnamalika (1981) observed that college educated women were more likely to boil feeding bottles than less educated mothers and illiterate mothers were more likely to use only hot water to wash feeding bottles. Washing feeding bottles with

hot water instead of boiling them is linked to a high incidence of diarrhoea among the infants.

2.2.2 Supplementary Feeding

A number of studies have indicated that growth faltering of breastfed children starts between 3 and 4 months of life and in many cases earlier than this period (Waterlow et al.,1980:1177). It thus appears that children need nutritious foods other than milk for the body to grow and develop. Supplementary feeding is recommended not earlier than four to six months after birth (Harfouch, 1980:162). Both the early or late introduction of supplementary food may lead to health problems.

Introduction of foods before 4 months of age may increase mortality whereas introducing foods too late leads to malnutrition and makes the child more vulnerable to other common childhood diseases (World Federation of Public Health Associations, 1984 as cited in Grant, 1985:84). Early introduction of semi-solid foods is very common among rural families in Thailand, Indonesia, China, and Burma (Tuchinda, 1984:70). In the rural areas of Northeastern Thailand, roasted, chewed rice was given to babies only a few days old. This has been blamed as one of the causes of the high child death rate in that region (Worapongsatorn et al., 1984:58). In Indonesia, Hull (1979) noted that diarrhoea was found to occur four times more often among babies receiving supplementary food in the first few months of age than among exclusively breastfed infants. This may be due to unhygienic preparation of food supplements which increases the child's exposure to pathogens causing gastrointestinal illness (Nabarro, 1984:19). Late introduction of supplementary feeding was found in India and Ethiopia. It has been observed that at ages 12 and 13 months, 40 per cent and 15 per cent of children of the urban poor in India and Ethiopia respectively were still being breastfed with no other food given. The data from the WHO Collaborative Study have shown that among the urban poor and the rural population of India, infants who received low rates of supplementary foods after 6 months of age had a lower rate of growth than average (WHO, 1981:131).

### 2.2.3 Food Taboos

Food taboos and food restrictions are the results of culture, tradition, and beliefs which the people in each society carry forward from generation to generation. Some food taboos can also be determinants of child health and survival, especially during pregnancy, lactation, weaning and illness.

Extra food during pregnancy substantially decreases low birth weights (Grant, 1984:104). However, pregnant women in many countries are not allowed some foods, especially protein foods which are essential for the growth of the fetus. In Oman, fish is believed to harden the fetal bones and cause trouble at birth so pregnant women refrain from eating it (Baasher et al., 1983:71). A similar belief exists in Papua New Guinea. It is believed that eating too much fish will make the infant grow too large and lead to a difficult delivery (Lepowsky, 1985:65). In Tamil Nadu, South India, pregnant women do not eat meat because they believe that pork causes skin diseases, and chicken causes deformity and would induce abortion (Ferro-Luzzi, 1973:260). In Burma, it was found that pregnant women restrict their diet to avoid a big baby and complications at delivery (Jelliffe, 1969:65). Chen (1979) also noted that diet restrictions generally result in the fetus not receiving sufficient nutrients from its mother.

During lactation, many mothers in Usino, Papua New Guinea, restrict their food to protect the health of their babies. They believe that the child will develop a negative idiosyncracy of the food through the breastmilk: "To eat crocodile or fish that have scales will give ringworm to the infant. To eat wallaby will give the child crooked legs, and its ability to stand up will be impaired. If the mother or child eats crayfish the child will fall back on its buttocks, `like a crayfish'. Opossum meat will likewise cause the child to sit down all the time." (Conton, 1985:110). In the North and Northeastern parts of Thailand, fresh food is taboo for lactating women and the most common food is fermented fish (Tuchinda, 1984:71).

The first milk, "colostrum", is a yellow fluid containing antibodies which help to protect the intestine of the infant against infection (Helsing and King, 1982:27). But women in many countries discard it. For example, in Papua New Guinea, among the Usino women, colostrum is referred to as sick and contaminated milk and it is believed that it will poison the child because it is related to pregnancy (Conton, 1985:104). Mothers in Maisin, Papua New Guinea, believe colostrum is inside the mother during pregnancy so it is old and will make the baby sick (Tietjen, 1985:128). In rural Java, many women think that colostrum is "dirty" or "tastes bad", contains "germs" or causes stomach upset and is therefore detrimental to the baby (Hull, 1985:84). Chen (1979) noted that the deprivation of colostrum, with its rich anti-infective properties, by the poorer population makes their babies vulnerable to infections.

Miller and Noyes (1984) state: "When the child is removed entirely from breastfeeding, his need for a high protein diet is critical". Taboos play a major role in food prohibitions for children in many societies, particularly when they have an increased need for protein and other foods. The children below weaning age in Vanatinai, Papua New Guinea, may not have animal protein foods, fruits, greens, or any sweet or greasy food (Lepowsky, 1985:67). Eating meat in Kenya or fish in Java is believed to cause worms (Hull and Simpson, 1985:3). In some parts of central Sudan, it is believed that eggs will delay the speech of children (Baasher, 1983:74). The intake of carotein-rich foods, which are the sources of vitamin A is strictly prohibited for young children in Indonesia (Van Veen, 1971:36).

Denial of certain foods to sick children may also be a harmful practice. In Senegal, a sick child is not given rich protein foods and fat, but only a thin millet gruel which is continued as long as the child has a fever. This is likely to make the child weaker and susceptible to pulmonary complications (De Garine, 1973:148). In Egypt, a child with a respiratory tract infection is not allowed to have fish and eggs and a child with measles can have only molasses for 15 days (Baasher, 1983:74). Imperato (1969:780) pointed out that deprivation in

the dietary intake of a child with measles enormously enhances morbidity and mortality. In Ulu Trengganu, West Malaysia, green or yellow vegetables, citrus fruits, papaya, some types of fish and hen's eggs are believed to aggravate specific illness, for example, eggs, many types of fish, and meat are believed harmful for skin infections (McKay, 1971). Eggs, meat, desserts, and the drinking of a lot of water is prohibited among sick children in the northeastern part of Thailand; they are allowed to have only boiled rice and salt (Jureemas and Achavanidkul, 1980:151).

## 2.3 Maternal Education and Personal Illness Control

Education directly determines an individual's behavior, belief about illness, and the way they act to prevent diseases or to care for the child or other members of the family when they are sick. "Education increases the individual's and the family's understanding of the disease process and thereby leads to an increased capacity to prevent or treat illness" (Daly et al., 1979:19). Mosley and Chen (1984) stated that one of the most powerful influences of education is the transmission of the concept of modern medicine.

Different types of beliefs about sickness have been found to exist in rural or illiterate societies in the developing countries. For instance, in rural India, it is believed that diarrhoea results from "heat" in the body. Sugar is one component of oral dehydration therapy, but as sugar is believed to be "hot", it is avoided in treating the patient/child with diarrhoea (Lozoff, et al. 1975). In Turkey, diarrhoea is considered as a cold disease which has to be treated with "hot" foods so fluids are withheld from the child (Merdol, 1981:274). Due to these or other types of beliefs, people sometimes do not use modern health facilities when these facilities exist. This is evident in a study of rural Nigeria. It was observed that even when modern medical facilities were available, only half the patients used it at the onset of sickness (Orubuloye and Caldwell, 1975).

Education of mothers has been found to influence the use of modern

health facilities. In one study in Kenya, maternal education appears to have some impact on the type of care preferred for measles. Mothers with at least primary education (8 years or more) were likely to use modern care more frequently than mothers with less education. Furthermore, the study shows that education influences the practice of withholding fluids during measles. The percentage of mothers denying milk and water to children with measles decreased with increasing education (Maina-Ahlberg, 1984). In Andhra Pradesh, India, it was observed that more educated mothers were more likely to use modern health facilities than less educated women. The study shows that most mothers with college education preferred to deliver their babies in the hospital and had regular ante-natal check-ups. On the other hand, illiterate mothers were more likely to have ante-natal check-ups only when there was trouble (52 per cent) and among illiterate mothers a significant portion thought that check-ups were not necessary (30 per cent). Only half of illiterate mothers preferred hospital delivery while the rest had home delivery and used the hospital only when trouble arose (Indira Bai and Ratnamalika, 1981).

Caldwell (1979) argued that educated mothers were less "fatalistic" about illness and so were likely to treat their children with modern medicine. Therefore, reduced child mortality among the children of educated mothers results from the positive association between the level of education and the use of effective medical services to treat sick children (Ware, 1984) and also to protect children from illness. Such health services include immunization which can prevent the children from mortality and disability, and also the use of contraception even though it has an indirect effect on child health and mortality.

### 2.3.1 Preventive Measures

#### 2.3.1.1 Immunization

Immunization can reduce childhood morbidity and mortality from the six most common, dangerous, and preventable diseases: diptheria, pertussis, tetanus (DPT), measles, polio and tuberculosis. In 1984

less than 20 per cent of children in the developing countries were immunized against all or most of these diseases, which resulted in the deaths of five million children while another five million were physically or mentally disabled in that year (Grant, 1984:31). Of all these diseases, measles was the major cause of child deaths. In 1980, measles accounted for about 44 per cent of total child deaths (5,055,000) in developing countries from immunizable diseases, excluding tuberculosis (Grant, 1983:42). During the measles outbreak in the Gambia, 5 per cent of children who contracted measles died as a direct result of the disease. A further 10 per cent died nine months later from other causes (Grant, 1984:45). Therefore, immunization against measles increases the survival rate of children from both measles and its consequences.

Parents, especially the mother because she spends more time in rearing the child, should realize the necessity of immunization and bring the child to receive immunization at the correct time and also should complete the doses. In 1983, it was estimated that of the children aged under one year in the world, only 30 per cent had received a third dose of DPT immunization and a smaller proportion had received a third dose of polio or measles vaccination (Henderson, 1984:2). The present rates of immunization could be doubled and tripled in many cases if the parents took advantage of existing immunization services and if those whose children received the first dose came back again for the second and third doses (Grant, 1984:33).

Education of mothers was found to influence the knowledge and acceptance of child immunization. In Chittoor District, Andhra Pradesh, India, all women in the highest educational group (college) knew about all kinds of immunization (smallpox, DPT, polio, BCG) whereas most of the women with lower levels of education knew only about smallpox (Indira Bai and Ratnamalika, 1981:253). In Thailand, Ungthavorn et al. (1984) observed that more educated mothers were more likely to have their children immunized than mothers with less education. In Malaysia, it was found that the proportion of mothers whose children were immunized increased with the level of education

(Muda, 1986:6). Muda (1986) also noted that the higher proportion of mothers who had their children immunized may indicate a greater understanding about the advantages of immunization, and also the utilization of available services.

2.3.1.2 Contraceptive Use

One of the important factors that have been found to exert a tremendous effect on child survival is child spacing. Data from developing countries suggest that children born at a shorter interval after the termination of the preceding pregnancy or birth, suffer higher mortality than children born after a longer interval (see for example, Omran, 1976; International Statistical Institute, 1981; Maine, 1981; Gubhaju, 1984). Analysing the World Fertility Survey data from 26 developing countries, Hobcraft et al. (1983) observed that the survivorship of an index child born within two years of its older sibling is significantly lower than that of a child born after 2-6 years of the preceding sibling's birth. Such a result was true for almost all the countries they studied and for all the early childhood periods - neonatal and postnatal periods; at age between one and two; and at age between two and five. The study showed that the adverse effects of poor child spacing were fairly independent of mother's education (Hobcraft et al., 1983:609). In a later study by the same authors with the World Fertility Survey data for 39 developing countries, it has been demonstrated that child spacing was such an important factor influencing child survival that once its effects were considered, the effects due to mother's age at birth and birth order became quite weak or disappeared (Hobcraft et al., 1985).

A rapid succession of pregnancies is hazardous for the health status of mothers and their intra-uterine condition can lead to abortion or stillbirth or increased risk of low birth weight (Boerma and Vianen, 1984). Short birth intervals (less than 2 years) have been found to be linked with premature births and low birth weight babies which decrease survival chances in the early years of life (Wolfers and Scrimshaw, 1975; Winikoff, 1983). Data from the United States show that all kinds of birth defects are more common among children born

within one year of the last birth (Population Information Program, 1984 :J-688). The high rate of mortality among infants born with a short pregnancy interval or birth interval has sometimes been explained by the "maternal depletion syndrome" which is caused by the lack of time for the mother's body to recover health after the last pregnancy, especially among mothers who are malnourished and who breastfeed their children for a long time (International Statistical Institute, 1984:28).

It appears that infants or children have a better chance of survival if mothers lengthen their pregnancy or birth intervals. One possible route for lengthening the pregnancy interval is through the use of contraception. Maternal education is likely to affect infant and child mortality through contraceptive use. It has been observed that increased contraceptive use results from education which improves knowledge of and attitudes towards contraception (Cochrane, 1981). There are numerous studies which show a positive relationship between mother's education and contraceptive use (see for example Freedman et al., 1977; Cochrane, 1979; Jain, 1981). More educated mothers are more likely to use contraception than less educated or uneducated mothers. Data from the World Fertility Survey in 28 developing countries show that the longer women are educated, the higher the prevalence of contraception, even though the magnitude varies from country to country. Fiji is the only country where the level of women's education did not influence their use of contraception (Sathar and Chidabaram, 1984:17).

As more educated mothers are more likely to use contraception, it is likely that the interval between births for these mothers would be longer than those of less educated or uneducated mothers. On the other hand, studies show that more educated mothers are less likely to breastfeed for a longer duration than less educated or uneducated mothers (Ferry and Smith, 1983), which is likely to shorten the interval between births. Studies showing the differences in birth intervals by educational status of mothers seem almost non-existent in the demographic literature. A contrasting result to the expectation of

longer birth intervals for educated mothers appears in Bangladesh. Majumder (forthcoming) in his study using WFS data for Bangladesh found that shorter birth intervals were more common among mothers who had at least some primary education compared with mothers who had no education, even though both infants and children aged one to five of educated mothers had less chance of dying than children born to uneducated mothers. This result may be due to that Bangladesh is mainly a non-contracepting society. As educated mothers are less likely to breastfeed for a longer duration than uneducated mothers, in the absence of contraceptive use, they were more likely than uneducated mothers to have shorter birth intervals.

### 2.3.2 Curative Measures

The mother's behavior also has an impact on child survival through curative measures when the child is sick, whether the mother uses modern scientific medicine or traditional practices. This is evident in Streatfield et al.'s (1986) analysis of Indonesian data. Based on a hypothetical question as to where parents would seek assistance if the child was seriously ill, the study shows that highly educated mothers were likely to use the more highly trained and more expensive doctors or hospitals rather than either public or private health clinics. Surprisingly, the use of self treatment or traditional treatment was also greater for highly educated mothers. It has been suggested that the highly educated mothers may have more medical knowledge and they may be more confident to treat certain illness themselves rather than use professional services.

To summarize, it appears from the above studies that maternal education is one of the most important factors in determining child survival. Mothers' education acts vigorously through these two proximate determinants: nutrient deficiency and personal illness control. Since education is a proxy for socio-economic status, it is also related to the nutrient intake of mothers and their children which affects the nutritional status and growth of children. Education also affects women's beliefs about diseases and sickness, the use of health facilities and contraception, which ultimately lead to better child survival and child health.

# CHAPTER 3

# MATERNAL EDUCATION AND THE NUTRITIONAL STATUS OF CHILDREN

## 3.1 Introduction

Nutritious food is necessary for the health, growth and development of children. Patterns of breastfeeding and supplementary feeding are among the important determinants of child survival (Mosley and Chen, 1984:36). This chapter examines the relationship between education of mothers and the nutritional status of children by looking at the patterns of breastfeeding, supplementary feeding, food taboos and child growth.

## 3.2 Breastfeeding Practice

Breastmilk is the best possible food for infants because it contains nutrients and provides immunity which can protect the infant from common infections during the first six months of life (Grant, 1984:3). In the present study, 87 per cent of the children had been or were being breastfed and the remaining 13 per cent were never breastfed. Among the children who were breastfed (N = 1389), 41 per cent also received supplementary milk formula.

The relationship between mothers' education and milk feeding practice is shown in Table 3-1. The chi-square value and the corresponding probability level p indicate that there is a strong association between mothers' educational level and feeding practice. It appears from the Table that the more educated mothers were much more likely to bottle feed their children than the less educated mothers. The percentage of children who received only bottle feeding decreased from 24 per cent among the children whose mothers had more than 10 years of education, to 17 per cent among those with mothers having 5-10

Table 3-1: Percentage distribution of children by feeding practice and by education of mothers

| Feeding practice | Education of mothers(years) 0 | 1-4 | 5-10 | >10 | Number of cases | % |
|---|---|---|---|---|---|---|
| Bottle fed only | 13.7 | 11.2 | 16.8 | 24.2 | 211 | 13 |
| Breastfed & bottle fed | 29.8 | 32.4 | 43.8 | 59.9 | 575 | 87 |
| Breastfed only | 56.5 | 56.4 | 39.4 | 15.9 | 813 | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | | |
| Number of cases | 131 | 1128 | 208 | 132 | 1599 | |

Chi-square = 92.19, d.f.= 6, p = 0.00

Source: Original analysis of the "Study of Health Problems of the Under Five" Datatape

Note: The number of cases did not add up to 1600 due to one non-response on the level of mothers' education

years of schooling, to 11 per cent among those whose mothers had 1-4 years of schooling, and finally to 14 per cent among those whose mothers had no education. These findings seem to agree with other studies in Thailand as well as in other developing countries. It was found from the World Fertility Survey data for Thailand that mothers with 1-4 years of education were less likely to use bottle feeding than mothers in other educational groups (Institute of Population Studies and Population Survey Division, 1977:90). Cosminsky (1980:40) observed in Kenya that with the increase in education of mothers, the use of milk formula also increased. Again, the same pattern was observed among the children who were partially bottle fed. The more educated mothers were more likely than the less educated mothers to both breastfeed and bottle feed. The proportion decreased continuously from 60 per cent for children whose mothers had the highest level of education to only 30 per cent for children whose mothers had no education.

Among children who were only breastfed, a negative relationship between maternal education and breastfeeding can be seen. The less educated mothers were more likely to exclusively breastfeed their children than the more educated mothers. The proportion decreased from 56 per cent of children whose mothers had no education and whose mothers had 1-4 years of education, to 16 per cent among the children whose mothers had more than 10 years of schooling.

As mentioned in Chapter 1, the more educated mothers in the sample were more likely to have younger children of ages 1-12 months than the less educated mothers. Therefore, the age distribution of children is likely to affect the relationship between mothers' education and breastfeeding practices observed here. Therefore, it is plausible to look at the distribution of the children by mothers' education and feeding practice, controlling for the children's age. When only data for children aged 1-12 months were examined separately, it was observed that the pattern of feeding practice was the same as before. The more educated mothers were more likely to bottle feed and less likely to breastfeed their children than the less educated mothers.

It has generally been observed that urban mothers are more likely to feed their children with milk formula than rural mothers and rural mothers are more likely to breastfeed only than urban mothers. In the present data set, 31 per cent of the children were from urban places and 69 per cent from rural places. Table 3-2 presents the percentage distribution of children by breastfeeding status and by education of mothers according to place of residence.

It appears that urban mothers were more likely to bottle feed than rural mothers. At each level of education, the proportion of children who were bottle fed was higher for urban mothers than rural mothers. A similar finding was also observed in a study in Northeast Thailand (Kamnuansilpa and Knodel, 1985:23). Again, the results in the table show that the proportion of children who were both breastfed and bottle fed was higher among urban mothers than rural mothers at each level of mothers' education. Therefore, urban mothers were more likely to both

Table 3-2: Percentage distribution of children by breastfeeding status and by education of mothers and place of residence

| Feeding practice | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Urban | | | | |
| Bottle fed only | 15.6 | 18.3 | 18.1 | 26.7 |
| Breastfed & bottle fed | 46.9 | 40.7 | 51.4 | 62.7 |
| Breastfed only | 37.5 | 41.0 | 30.5 | 10.6 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 32 | 278 | 105 | 75 |
| (Chi-square = 25.88, d.f.= 6, p = 0.00) | | | | |
| Rural | | | | |
| Bottle fed only | 13.1 | 8.8 | 15.5 | 21.1 |
| Breastfed & bottle fed | 24.3 | 29.8 | 35.9 | 56.1 |
| Breastfed only | 62.6 | 61.4 | 48.6 | 22.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 99 | 850 | 103 | 57 |
| (Chi-square = 41.42, d.f.= 6, p = 0.00) | | | | |

Soure: As in Table 3-1

Note: The number of cases did not add up to 1600 due to one non-response on the level of mothers' education.

bottle feed and breastfeed their children. On the other hand. the proportion of children who were breastfed only was higher for rural mothers than urban mothers at each level of mothers' education. The differences are quite considerable for all groups of mothers. However, the table also clearly shows that higher educated mothers were more likely to bottle feed and less likely to breastfeed than mothers with less education in both urban and rural places.

### 3.3 Supplementary Feeding

Although breastmilk is the most suitable food for children, it provides complete nutrition for growth and development for only the first three months of life. Some studies have found that approximately one out of five infants who received only breastmilk beyond four months of life showed a reduction in growth velocity because infants need energy and protein that may not be met by breastmilk (Chandra, 1979:15). Thus, supplementary food is necessary after three months to fulfil infants' growth requirement.

In the present study, information about the age at which supplementary food was given is available. No information was available about the definition of supplementary food, or about the type and volume of supplementary food which the children received, so the analysis is quite limited. The recommended time to start supplementary food is when the child is 4-6 months old. Too early an introduction can induce diarrhoea and maramus especially in places which lack pure water, other hygienic conditions and adequate utensils (Soysa, 1979:42). On the other hand, too late an introduction can lead to malnutrition and growth retardation.

Of the total of 1,600 children in the sample, 65 per cent received supplementary food at age 0-3 months, 18 per cent at age 4-6 months, 7 per cent at ages more than 6 months, and 10 per cent had not yet received any supplementary food. This shows that most of the children were introduced to supplementary food too early. This may be because of the "tradition" that mothers usually give certain kinds of food

other than breastmilk to children when they are less than 3 months. Many studies have supported this result. In a study in Bang Chan, Thailand between 1952 and 1954, Hauck (1959) found that at about one month, some children were given a little rice mixed with crushed or baked banana and by 3 months of age about half of the infants were given this kind of supplementary food. In the Northeast region, nearly 76 per cent of children were frequently fed with roasted chewed rice as their first supplementary food shortly after birth (Kammuansilpa and Knodel, 1985:34). Furthermore, in urban areas, as in Bangkok, 67 per cent of sampled children aged less than 3 months were receiving supplementary food (Durongdej et al.,1983:294). Introducing supplementary feeding to the children at a very early age cuts across the rural-urban division of Thai society (Knodel et al., 1982:312).

Normally, rice or rice mixture is given as the first supplementary food to children in Thailand. Data from the 1981 Contraceptive Prevalence Survey indicated that the most common supplementary food introduced to children was rice mixed with fruit, eggs or some other ingredients (Kamnuansilpa and Chamratrithirong, 1982). Thanangkul et al.(1975) found in their study in Chiang Mai that most parents felt that rice and banana could be introduced to a baby's diet in the first month of life.

The percentage distribution of children by the age at which supplementary food was introduced is shown in Table 3-3. It can be seen that more than half (57 per cent) the children aged 1-3 months had already received supplementary food. Among the children aged 4-6 months, 71 per cent received supplementary food at age 0-3 months and 16 per cent received supplementary food at age 4-6 months. The same pattern appears for children aged more than 6 months; 66 per cent started supplementary food at age 0-3 months, 21 per cent started at age 4-6 months, and 4 per cent had not yet started supplementary food at all, even though they were more than 6 months old. The late introduction of supplementary food was also found in Chiang Mai where 8 per cent of mothers in the study had not yet give any supplementary

Table 3-3: Percentage distribution of children by age and age at which supplementary food was introduced

| Age at which supplementary food was introduced | Age(months) | | |
|---|---|---|---|
| | 1-3 | 4-6 | > 6 |
| 0-3 months | 57.1 | 70.6 | 65.9 |
| 4-6 months | 0.0 | 15.6 | 20.8 |
| > 6 months | 0.0 | 0.0 | 9.5 |
| Did not receive | 42.9 | 13.8 | 3.8 |
| Total | 100.0 | 100.0 | 100.0 |
| Number of cases | 233 | 167 | 1200 |

Source: As in Table 3-1

food to their children who were older than five months (Teinboon and Surabenjawong, 1982:325).

Table 3-4 presents the percentage distribution of children by maternal education and age at which supplementaty food was introduced. Maternal education seemed to have no effect on the age at which supplementary food was introduced. Differences were minimal. The proportions of children who received supplementary food at aged 0-3 months were nearly the same for the three educated groups but the proportion was higher for the uneducated group. It appears that uneducated mothers were slightly more likely than educated mothers to start supplementary feeding before their children were 4 months. However, the cumulative percentages of children who received supplementary food by 6 months of age (0-3 months + 4-6 months) were about the same for all education groups (82.4 - 84.7 per cent). Hence, the time at which supplementary feeding is started is independent of

Table 3-4: Percentage distribution of children by education of mothers and age at which supplementary food was introduced

| Age at which supplementary food was introduced | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| 0-3 months | 71.0 | 64.8 | 63.0 | 65.1 |
| | 84.7 | 82.4 | 82.7 | 83.3 |
| 4-6 months | 13.7 | 17.6 | 19.7 | 18.2 |
| > 6 months | 9.9 | 7.8 | 5.8 | 3.8 |
| Did not receive | 5.4 | 9.8 | 11.5 | 12.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 131 | 1128 | 208 | 132 |

Chi-square = 11.46, d.f.= 9, p = 0.25

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to one non-response on the level of mothers' education.

the educational status of mothers. This is also evident from the value of chi-square and the significant level p, which shows that mothers' education and the age at which supplementary food was introduced are independent. A similar result appears in a study in Nigeria (Kazimi and Kazimi, 1979). The study showed that the average age at which children were introduced to supplementary food was approximately the same for all levels of mother's education.

Since the age distribution of children may affect this result, data for children aged 1-12 months were examined separately. It was also observed that there is no significant association between mothers' education and the age at which supplementary food was introduced ($p > 0.10$).

Table 3-5: Percentage distribution of children by age at which supplementary food was introduced and by regions

| Age at which supplementary food was introduced | Region | | | |
|---|---|---|---|---|
| | North | Central | Northeast | South |
| 0-3 months | 80.5 | 71.2 | 69.8 | 39.0 |
| 4-6 months | 10.5 | 15.8 | 16.7 | 27.3 |
| > 6 months | 5.5 | 6.0 | 5.8 | 12.2 |
| Did not receive | 3.5 | 7.0 | 7.7 | 21.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 400 | 400 | 400 | 400 |

Chi-square = 186.84, d.f.= 9, p = 0.00

Source: As in Table 3-1

Each region in Thailand has its own culture which can influence the feeding practices of the mothers. Table 3-5 shows the percentage distribution of children by age at which supplementary food was introduced and by region. The chi-square value in the table indicates an association between age at which supplementary feeding was introduced and region of residence. The data show that most of the children in the North, Central and Northeast regions were given supplementary foods in the first three months of life while the children in the South region first received supplementary food after age three months. It can be observed that the proportion of children who received supplementary feeding at the appropriate time (4-6 months) was highest in the South (27 per cent), and the proportion of children who had not yet received supplementary food was also higher in the South than in other regions. On the other hand, the proportion of children who were given supplementary food earlier than the recommended

time (0-3 months) is highest in the North, and the proportion of children who first received supplementary feeding at age 4-6 months was lowest in this region as well. Slight differences were observed in the proportion of children in Central and Northeast regions at all age groups at which supplementary food was introduced.

Since the age distribution of children in each region was nearly the same (see Table 1-2), it is unlikely to affect the relationship between age at introduction of supplementary food and region of residence.

### 3.4 Food Taboos

One factor which can influence child nutrition is beliefs of mothers that some foods are bad or not suitable for the health of their children. In some cases these foods are nutritious and are beneficial to the child. In the present study, only the parents of children aged over 12 months were asked about food which they usually would not allow their children to eat. Parents of 90 per cent of children aged over one year (N = 865) answered that there was no food which they did not allow their children to eat, and 10 per cent of the children's parents answered that there were some kinds of food that they did not allow.

Table 3-6 shows the percentage distribution of children aged over 12 months by education of mothers and whether some foods were allowed or not. The chi-square value and the significant level p indicate that there was a significant relationship between the level of mothers' education and the practice of food taboos. The proportion of children whose mothers believed that some foods were not suitable for their children was higher among less educated mothers. No evidence appears regarding food taboos among mothers who had more than 10 years of education.

The survey asked specifically about protein foods such as fish, pork, beef, chicken and certain kinds of beans and vegetables. In most

Table 3-6: Percentage distribution of children aged over 12 months by education of mothers and whether some foods were allowed or not

| | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| All foods were allowed | 84.2 | 89.2 | 94.3 | 100.0 |
| Some foods were not allowed | 15.8 | 10.8 | 5.7 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 76 | 628 | 105 | 56 |

Chi-square = 11.73, d.f.= 3, p = 0.0084

Source: As in Table 3-1

cases the reasons which parents gave for the belief that some foods were not suitable for their children were quite reasonable. For example, parents did not give fish because they were afraid of the danger of choking on fishbones, and children were not allowed to have pork because of religious (Islamic) objections.

## 3.5 Child Growth

Normal growth and development are indicators of healthy children. Food is an essential factor. Anthropometry, the measurement of body size, weight and proportions, is one of the most commonly indicated child health and nutritional screening procedures (Moore and Roche, 1983:4). The data used as reference data for a comparison of nutritional status were collected by the United States National Center for Health Statistics (NCHS). These data were recommended by the World Health Organization for use as an international reference population (WHO, 1983:61). The reference data are available as two separate sets of tables for the age groups 0-36 months and 2-18 years separately for

each sex. The height and weight of the former group (0-36 months) were measured in the recumbent body position and those of the latter group (2-18 years) were measured while standing. Therefore, the observed weight, height and age of children aged 0-24 months from the present study were compared with the reference data of the group aged 0-36 months and those of the children aged 25-60 months were compared with the older group separately for each sex and presented in percentiles of the three indicators:- weight for age (W/A), height for age (H/A), and weight for height (W/H).

Each indicator shows a different situation of nutritional status. W/A indicates current feeding status. Low W/A can be sensitive to short term or acute weight loss such as diarrhoeal diseases and measles. H/A indicates past nutritional status of children (Seone and Latham, 1971: 102). The degree of deficiency in height for age can be considered as a measure of the duration of malnutrition. W/H indicates the present state of nutrition. Low W/H can be due to short term food shortage. W/H is nearly independent of age between 1-10 years and probably independent of ethnic group, especially at ages 1-5 years (Waterlow et al., 1977:491). The ratio weight for height may be the most suitable age-independent index to use in places where parents may not know the exact ages of their children (Lloyd-Still, 1976:109).

The cut-off points for classifying low W/A, H/A, and W/H may vary in each study, depending on some factors such as the expected prevalence of protein-energy malnutrition in the population, and the frequency of severe malnutrition. In general, low W/A, H/A and W/H can be established as more than 1 standard deviation below the median point of the reference data (WHO, 1983:25). Thus in the present study, the cut-off point for W/A, H/A, and W/H selected was the 20th percentile of the reference data, which is approximately equal to 1 standard deviation below the median. That is, children below the 20th percentile for any of these measures were considered as having low W/A, H/A or W/H. Children with indicators less than the 3rd percentile of the reference data have been classified as "severely malnourished", children with indicators between the 3rd and the 19th percentiles have

been classified as "mildly/moderately malnourished", and children with indicators greater than or equal to the 20th percentile have been classified as "normal".

3.5.1 Weight for Age (W/A)

Table 3-7: Percentage distribution of children by age and weight for age

| Nutritional status | Age of children(months) 1-12 | 13-24 | 25-36 | 37-48 | 49-60 | % |
|---|---|---|---|---|---|---|
| Severely malnourished | 28.2 | 52.5 | 58.1 | 55.5 | 47.1 | 41 |
| Mildly/moderately malnourished | 33.3 | 29.7 | 24.9 | 28.0 | 36.8 | 31 |
| Normal | 38.5 | 17.8 | 17.0 | 16.5 | 16.1 | 28 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 781 | 354 | 229 | 164 | 68 | 1,596 |

Chi-square = 138.74, d.f.= 8, p = 0.00

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to some non-response on the weight of children.

The results from weight for age show that 41 per cent of children in the sample were severely malnourished, 31 per cent were mildly/moderately malnourished, and 28 per cent were normal. Table 3-7 shows the percentage distribution of children by weight for age and age of children in months. A significant relationship appears between the age of children and their nutritional status (p = 0.00). It can be observed that the proportion of children who were severely malnourished was less in the age group 1-12 months than in other groups. This means

that children aged under one year were less likely to be severely malnourished than older children. The proportion increased from 28 per cent among children aged 1-12 months to about 50 per cent among children aged 1-5 years.

Table 3-8: Percentage distribution of children by weight for age and education of mothers

| Nutritional status | Education of mothers(years) 0 | 1-4 | 5-10 | >10 | % |
|---|---|---|---|---|---|
| Severely malnourished | 54.2 | 44.4 | 32.5 | 18.2 | 41 |
| Mildly/moderately malnourished | 27.5 | 30.8 | 35.9 | 27.3 | 31 |
| Normal | 18.3 | 24.8 | 31.6 | 54.5 | 28 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 131 | 1126 | 206 | 132 | 1,595 |

Chi-square = 74.66, d.f.= 6, p = 0.00

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to some non-response on the level of mothers' education and the weight of children.

The educational status of mothers seems to have a significant effect on the nutritional status of children. This is evident from the chi-square value and the corresponding level p in Table 3-8 which show the percentage distribution of children by weight for age and education of mothers. The percentage of children who were severely malnourished decreased with increasing level of mothers' education. Children of more educated mothers were more likely to have better nutritional status and were less likely to be severely malnourished than children of less educated mothers. This was also found in Colombia and Nigeria

(Wray and Aguirre, 1969; Gans, 1963). The reason may be that educated mothers are better off than uneducated mothers and as such they are more likely to provide their children with adequate nutrition than the mothers with no education. Another reason may be that more educated mothers seek medical help for their children (for example, go to the hospital) at an earlier stage of sickness than uneducated mothers. Therefore, the children of more educated mothers were not so malnourished at the time they went to the hospital.

### 3.5.2 Height for Age (H/A)

In the present study, 32 per cent of all children were severely malnourished according to their height for age, 24 per cent were mild/moderately malnourished, and 44 per cent were normal. This means that more than half the children in the sample were stunted.

Table 3-9 presents the proportion of children by age and by height for age. As in weight for age, a significant relationship appears between the age of children and height for age. It can be observed that the lowest proportion of children who were severely malnourished and the highest proportion of children who were normal were among children aged 1-12 months. On the other hand, the highest proportion of children who were severely malnourished and the lowest proportion of children who were normal appear among children aged 37-48 months. These show that children aged 37-48 months in this study were relatively more stunted than children in other age groups and children aged less than one year had a better nutritional status than the older children. However, at each level of height for age, differences among the age groups 13-24 months, 25-36 months, and 49-60 months were small. For example, the proportion of children who were normal was 42 per cent among children aged 13-24 months, 40 per cent among those who were aged 25-36 months, and 43 per cent among those in age group 49-60 months. It can also be seen that the proportion of children who were normal was slightly higher than the proportion of children who were severely malnourished in these three age groups.

Table 3-9: Percentage distribution of children by age and height for age

| Nutritional status | Age of children(months) 1-12 | 13-24 | 25-36 | 37-48 | 49-60 | % |
|---|---|---|---|---|---|---|
| Severely malnourished | 24.6 | 38.6 | 37.0 | 41.5 | 39.7 | 32 |
| Mildly/moderately malnourished | 26.6 | 19.2 | 22.6 | 23.8 | 17.6 | 24 |
| Normal | 48.8 | 42.2 | 40.4 | 34.7 | 42.7 | 44 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 781 | 355 | 230 | 164 | 68 | 1,598 |

Chi-square = 41.10, d.f.= 8, p = 0.00

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to some non-response on the height of children.

The proportions of children by mothers' education and height for age are shown in Table 3-10. Education of mothers appeared to affect the growth of children as measured by height for age. This is indicated by the value of chi-square and the probability level p. The same pattern as for weight for age can be observed here. The proportion of children who were severely malnourished according to H/A decreased with increasing levels of mothers' education. The proportion decreased continuously from 37 per cent among children whose mothers had no education to 21 per cent among those whose mothers had more than 10 years of education. But for children who were normal, the proportion increased with education of mothers, from 31 per cent for children whose mothers had no schooling to 51 per cent for those whose mothers were in the highest educational group. Hence, higher educated

Table 3-10: Percentage distribution of children by height for age and education of mothers

| Nutritional status | Education of mothers(years) 0 | 1-4 | 5-10 | >10 | % |
|---|---|---|---|---|---|
| Severely malnourished | 37.4 | 33.6 | 25.6 | 21.2 | 32 |
| Mildly/moderately malnourished | 31.3 | 22.2 | 24.2 | 28.0 | 24 |
| Normal | 31.3 | 44.2 | 50.2 | 50.8 | 44 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 131 | 1127 | 207 | 132 | 1,597 |

Chi-square = 22.82, d.f.= 6, p = 0.0009

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to some non-response on the level of mothers' education and the height of children.

mothers were less likely to have severely malnourished children and more likely to have normal children than less educated mothers. The same relationship was found in Colombia and Lebanon (Christiansen et al., 1974; Al-Isi et al., 1975).

3.5.3 Weight for Height (W/H)

According to the W/H indicator, 31 per cent of children in the sample were severely malnourished, 27 per cent were mildly/moderately malnourished, and 42 per cent were normal. The results here suggest that there was a high rate of "wasting" among the children in this study.

Table 3-11 presents the percentage distribution of children by age

Table 3-11: Percentage distribution of children by age and weight for height

| Nutritional status | Age of children(months) 1-12 | 13-24 | 25-36 | 37-48 | 49-60 | % |
|---|---|---|---|---|---|---|
| Severely malnourished | 23.7 | 39.8 | 38.0 | 35.4 | 35.3 | 31 |
| Mildly/moderately malnourished | 24.6 | 27.1 | 29.3 | 36.6 | 26.5 | 27 |
| Normal | 51.7 | 33.1 | 32.7 | 28.0 | 38.2 | 42 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 781 | 354 | 229 | 164 | 68 | 1,596 |

Chi-square = 72.01, d.f.= 8, p = 0.00

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to some non-response on weight and height of children.

group and the levels of weight for height. As for W/A and H/A, the lowest proportion who were severely malnourished and the highest proportion who were normal were in the age group 1-12 months. The W/H indicator suggests that children aged between 1-12 months were better nourished than children in the other age groups.

Among children aged 13 months and over, the proportion who were severely malnourished decreased slightly with increasing age. However, the highest proportion of children who were malnourished both severely and mild/moderately was for children aged 37-48 months. More than 70 per cent of children in this age group were malnourished.

The percentage distributions of children by W/H and educational status of mothers are shown in Table 3-12. Level of mothers' education

Table 3-12: Percentage distribution of children by weight for height and education of mothers

| Nutritional status | Education of mothers(years) 0 | 1-4 | 5-10 | >10 | % |
|---|---|---|---|---|---|
| Severely malnourished | 32.8 | 33.7 | 25.2 | 15.9 | 31 |
| Mildly/moderately malnourished | 36.6 | 26.5 | 26.2 | 25.0 | 27 |
| Normal | 30.5 | 39.9 | 48.5 | 59.1 | 42 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 131 | 1126 | 206 | 132 | 1,595 |

Chi-square = 36.07, d.f.= 6, p = 0.00

Source: As in Table 3-1

Note: The number of cases did not add up to 1600 due to some non-response on the level of mothers' education and weight and height of children.

also significantly influenced children's weight for height (p = 0.00). The data show that the children whose mothers had higher levels of education were less likely to be malnourished than those with less educated mothers. The same observation was made by Graves (1978) for Nepal where the proportion of mothers with no education was higher for malnourished children than well nourished children.

It can be concluded that children aged under one year were more likely to have better nutritional status than older children. Similar observations have also been documented in other studies in Thailand. Jongpiputvanich et al. (1986:263) found in rural areas of Chantaburi province that among malnourished children aged 5 years or less, only 12 per cent were under one year of age. Using the Harvard growth curve, Teinboon and Surabenjawong (1982) observed that the height and weight

of infants were within the normal standard up to six months of age and then began to taper off. These results may be because in the first year of life children receive breast milk or infant milk formula which contains all the required nutrients for good health. Another reason may be because late in the first year and in the second year of life, children, especially in poor societies, are more likely to get diarrhoeal diseases due to contaminated food and water when their immune system is not fully developed (Martorell, 1980). This is evident in the present study which shows that the drop in weight for age is higher than the drop in height for age. It is likely that children had acute malnutrition due to diarrhoea, measles or other infectious diseases.

In summary, education of mothers was found to affect children's weight for age, height for age, and weight for height. The more educated mothers were more likely than less educated mothers to have well nourished children. This is in accord with the findings of McLaren and Kanawati (1970) in Jordan, that the illiteracy rate was higher among mothers of malnourished children than those of well nourished children. It is noteworthy that more than half of the children whose mothers had more than 10 years of education were normal according to all the three indicators of nutritional status.

# CHAPTER 4

# MATERNAL EDUCATION AND USE OF HEALTH FACILITIES

## 4.1 Introduction

Immunization and use of well baby clinics are the preventive measures which are grouped under "Personal Illness Control", one of the proximate determinants of child survival (Mosley and Chen, 1984:33). Mothers are the key persons who take care of their children's health and take them to receive preventive health care. Many studies have found that education of mothers has an inverse relationship with infant and child mortality because education can influence their choices of modern health care services (Caldwell, 1979:409; Ware, 1984:200). This chapter will examine the relationship between maternal education and use of health facilities i.e. immunization and well baby clinics, including use of family planning.

## 4.2 Immunization

For Thailand, the estimated number of annual deaths from neonatal tetanus, measles and pertussis (whooping cough) in 1983 amounted to 77,000 (Foege, 1984:105). In this study immunization refers to three types of vaccination: DPT (against diptheria, pertussis, and tetanus), BCG (against tuberculosis), and polio. Questions about immunization were asked of the parents of children aged under 18 months and those of children aged 18 months and above separately. Information on DPT, BCG and polio immunization were asked of parents of children aged under 18 months and information on booster doses of DPT and polio were asked of parents of children aged 18-60 months.

Of all children in the sample aged under 18 months (N = 968), 29

per cent had never received BCG immunization, 44 per cent had never received DPT vaccination and 45 per cent had never received anti-polio immunization. Of these three kinds of immunization, BCG had the highest acceptance. This is similar to the finding of Ungthavorn et al. (1984) that the acceptance of BCG in Bangkok was the highest among the three vaccines BCG, DPT, and polio. This may be because BCG is given to children soon after birth, so children born in hospitals or health centers are more likely to receive BCG vaccine. For full protection, these children should get 3 doses of DPT and anti-polio vaccine, and 1 dose of BCG. Levels of mothers' education have been shown to affect the coverage of immunization.

Table 4-1 shows the percentages of children aged under 18 months who did or did not receive all three types of immunization by educational status of mothers. Educational status of mothers seems to have had a significant effect on the immunization status of children ($p = 0.00$). Forty-eight per cent of those children whose mothers had no schooling have never received BCG immunization. This percentage decreased continuously to 8 per cent for children whose mothers had more than 10 years of schooling. Therefore, there was an inverse relationship between maternal education and the percentage of children who had never been immunized. Children should have BCG immunization soon after birth, so, in this study, the proper time should be at less than 3 months of age. As such one would expect a positive relation between the percentage of children being immunized within the proper time and the level of mothers' education. This is shown in the Table also. The percentage of children who were vaccinated with BCG within 3 months of birth increased continuously from 48 per cent for those whose mothers had no education to about 92 per cent for children whose mothers had more than 10 years of education. Among children who were immunized, no children of women with more than 10 years of education received BCG at ages later than 3 months.

The percentage of children who have never received DPT immunization was 71 among those whose mothers had no schooling compared

Table 4-1: Percentage distribution of children aged under 18 months according to whether received immunization and education of mothers

| | Education of mothers(Years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| BCG | | | | |
| Did not receive | 47.7 | 35.2 | 15.4 | 8.4 |
| Received at age 3 months or more | 4.6 | 5.6 | 5.9 | 0.0 |
| Received at age <3 months | 47.7 | 59.2 | 78.7 | 91.6 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 65 | 630 | 136 | 95 |
| Chi-Square = 62.29, d.f.= 6, p = 0.00 | | | | |
| DPT | | | | |
| Did nor receive | 70.6 | 48.2 | 32.4 | 24.7 |
| Incomplete doses (<3 doses) | 17.6 | 26.8 | 29.5 | 25.8 |
| Complete doses (3 doses) | 11.8 | 25.0 | 38.1 | 49.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 68 | 652 | 139 | 97 |
| Chi-Square = 56.64, d.f.= 6, p = 0.00 | | | | |
| Polio | | | | |
| Never | 70.6 | 49.2 | 34.0 | 21.2 |
| Incomplete doses (<3 doses) | 22.1 | 25.7 | 28.3 | 30.3 |
| Complete doses (3 doses) | 7.3 | 25.1 | 37.7 | 48.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 68 | 654 | 138 | 99 |
| Chi-Square = 61.22, d.f.= 6, p = 0.00 | | | | |

Source: Original analysis of the "Study of Health Problems of the Under Five" Datatape

Note: Number of cases do not add up to 968 due to some non-response on the level of mothers and receiving immunization of children.

to 25 per cent among those whose mothers were in the highest educational group. The proportion of children who received complete doses of DPT immunization also increased with the level of education of mothers. It rose from 12 per cent for children whose mothers had no education to 50 per cent of those whose mothers had more than 10 years of education.

As in the case of DPT, a similar association appears between the proportion of children who received polio immunization and the level of maternal education. The percentage of children who had never received this kind of immunization decreased from 71 per cent of those whose mothers had no schooling to 21 per cent of children whose mothers were in the highest group of education. The children who received complete doses of polio immunization also decreased with increasing levels of maternal education. However, for both DPT and Polio immunizations, not much differrences are observed in the proportions of children who had incomplete doses at all levels ofmothers' education.

Table 4-2 presents the percentage distribution of children under 18 months of age by number of immunizations received and educational level of mothers. The chi-square value and the associated probability level p show that there is a significant association between maternal education and immunization status. It can be observed that the proportion of children who had never received any of the three types of immunization (BCG, DPT and polio) declined with increasing levels of maternal education. Nearly half (47 per cent) of the children whose mothers had no schooling had not received any kind of immunization while the proportion was only 12 per cent for the children whose mothers had more than 10 years of education. On the other hand, the percentage of children who received all 3 types of immunization increased with the level of mothers' education. The finding was similar in Lagos, Nigeria, where the higher the educational level of mothers, the higher the proportion of fully immunized children (Akesode, 1982:312).

Table 4-2: Percentages of children under 18 months of age who did not receive any kind of immunization and who received 1, 2 or 3 kinds of immunization by education of mothers

| Immunization | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Did not receive | 47.0 | 34.4 | 15.6 | 12.1 |
| Received 1 kind | 25.8 | 19.1 | 18.5 | 14.2 |
| Received 2 kinds | 3.0 | 4.9 | 5.2 | 2.0 |
| Received 3 kinds | 24.2 | 41.6 | 60.7 | 71.7 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 66 | 651 | 135 | 99 |

Chi-square = 64.99, d.f.= 9, p = 0.00

Source: As in Table 4-1

Note: The number of cases did not add up to 968 due to some non-response on the level of mothers' educatiion and immunization of children.

When a child receives 3 doses of DPT and polio immunization which should be finished within one year, an additional dose or booster dose can be given in the second year of life for stronger immunity. Among the children aged 18-60 months in the sample (N = 632), 25 per cent had already received a DPT booster dose, 30 per cent had never received DPT immunization at all, and 24 per cent had already received a booster dose of polio while 34 per cent had never received polio immunization.

The percentage distribution of children aged 18-60 months according to whether they had received immunization or a booster dose

Table 4-3: Percentage distribution of children aged 18-60 months by whether received immunization and education of mothers

| | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| DPT | | | | |
| Never | 54.2 | 32.0 | 20.6 | 9.1 |
| No booster dose | 25.4 | 44.8 | 39.7 | 42.4 |
| Booster dose | 20.4 | 23.2 | 39.7 | 48.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 59 | 444 | 68 | 33 |
| Chi-Square = 35.54, d.f.= 6, p = 0.00 | | | | |
| Polio | | | | |
| Never | 57.9 | 36.0 | 20.9 | 6.5 |
| No booster dose | 22.8 | 41.5 | 41.8 | 41.9 |
| Booster dose | 19.3 | 22.5 | 37.3 | 51.6 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 57 | 436 | 67 | 31 |
| Chi-Square = 38.77, d.f.= 6, p = 0.00 | | | | |

Source: As in Table 4-1

Note: The number of cases did not add up to 632 due to some non-response on the level of mothers' education and immunization of children.

is shown in Table 4-3. It can be seen that mothers' education also significantly influenced immunization of these children (p = 0.00). The proportion of children who had never received DPT or polio immunization decreased when the level of mothers' education increased. Again, the proportion of children who had received a booster dose of DPT or polio increased with the level of mothers' education.

4.2.1 Reasons for Not Having BCG Immunization

Table 4-4: Percentages of children under aged 18 months who did not receive BCG immunization by reason and education of mothers

| Reason | Education of mothers(years) | | |
|---|---|---|---|
| | 0 | 1-4 | > 4 |
| Do not know it exists | 48.4 | 50.5 | 34.5 |
| Not necessary | 19.4 | 29.3 | 10.3 |
| Do not know the place of services | 12.9 | 14.0 | 17.2 |
| Inconvenient | 25.8 | 19.4 | 10.3 |
| Vaccine not available | 0.0 | 1.4 | 0.0 |
| Lack of interest by health personnel | 9.7 | 6.3 | 10.3 |
| Unable to afford | 9.7 | 0.9 | 6.9 |
| No appointment from health personnel | 3.2 | 11.8 | 27.6 |
| N of cases | 31 | 222 | 29 |

Note: Respondents could mention more than one reason

Source: As in Table 4-1

Table 4-4 shows the reasons given by parents for not taking their children for BCG immunization by education level of mothers. In this Table, mothers who had more than 10 years of education were combined with mothers who had 5-10 years of schooling due to too few cases in the former category of mothers' education. The most common reason was "Lack of knowledge about this kind of immunization or do not know it exists". About 50 per cent of mothers with no education or less than primary education had no knowledge about the existence of BCG. Mothers with 5 or more years of education were more informed about BCG vaccination than mothers with lower education.

Another common reason for not obtaining BCG immunization is the inconvenience felt by the mothers or parents about taking their children to the nearest health center or hospital. A negative relationship appears between mothers' education and the proportion of children whose mothers gave this reason. In this case, the percentage decreased continuously from 26 per cent for children whose mothers had no education to 10 per cent for children whose mothers had more than 4 years of education. It was observed in the present study that mothers with lower level of education tended to work in jobs where they were paid daily. If they wanted to take their children to receive immunization , they would have had to spend at least half a day travelling and waiting for the service, which means they would lose the wages for that day. Another reason is that less educated mothers, if not in any paid employment, had to look after their children and worked in the house. If they had to take any one child to be immunized, they would have to find someone to take care of the other children. Hence, these mothers felt more reluctant to go for such services.

Differences by educational status of mothers can be observed for the reason "Lack of interest by health personnel". This means parents while visiting hospitals or health centers did not receive any encouragement or interest from the health personnel regarding the immunizing their children. The percentage giving this reason increased from 10 among mothers with no schooling to 25 per cent among the highest educational group.

### 4.2.2 Reasons for Having or Not Having DPT Immunization

Table 4-5 shows the reasons for not receiving DPT immunization by maternal education. "Do not know it exists" or unawareness is again one of the most common reasons for not bringing the child to have DPT immunization. Educational differences are evident. 33 per cent of children whose mothers had no schooling were not immunized because the mothers did not know about DPT immunization, compared with 4 per cent of those whose mothers had the highest level of education.

The percentage of children not immunized because their mothers

Table 4-5: Percentages of children under aged 18 months by reason for not receiving DPT immunization and education of mothers

| Reason | Education of mothers(Years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Do not know it exists | 33.3 | 29.9 | 13.3 | 4.2 |
| Not necessary | 29.2 | 26.8 | 20.0 | 4.2 |
| Do not know the place of services | 8.3 | 8.9 | 8.9 | 0.0 |
| Inconvenient | 31.3 | 27.4 | 24.4 | 0.0 |
| Vaccine not available | 2.1 | 1.6 | 0.0 | 4.2 |
| Lack of interest by health personnel | 6.3 | 4.5 | 0.0 | 4.2 |
| Unable to afford | 12.5 | 4.5 | 2.2 | 0.0 |
| No appointment from health personnel | 4.2 | 7.6 | 0.0 | 8.3 |
| Appointment schedule not due | 12.5 | 23.2 | 44.4 | 70.8 |
| Sick on the due date | 6.3 | 1.3 | 6.7 | 0.0 |
| Number of cases | 48 | 314 | 45 | 24 |

Note: Respondents could mention more than one reason

Source: As in Table 4-1

thought immunization was not necessary decreased from 29 per cent among those whose mothers had no education to 4 per cent among those whose mothers had more than 10 years of schooling. This pattern obviously indicates better knowledge of immunization among the higher educated mothers. This also supports the finding of Markland and Durand (1976) that higher educational levels of parents and high perception of disease seriousness and the risk of disease affect the immunization of children. A negative relationship also appears between mothers'

education and the reasons that parents or mothers gave for not taking children for immunization. Less educated mothers were more likely to feel it was "inconvenient" to take the children to the health center, and that they were unable to afford the cost of immunization. As more educated mothers tend to have higher socio-economic status than less educated mothers, they were more likely to be able to afford and more unlikely to feel that it was inconvenient to take their children to be immunized than less educated mothers.

"Appointment schedule is not due" was another reason given. Normally, a child should receive the first dose of DPT and polio immunization when it is 6 weeks old (minimum age) and thereafter receive the second and third doses at intervals of one month (at least). The proportion of children for whom such a reason was given increased continuously from 13 per cent for children whose mothers had no schooling to 71 per cent for those whose mothers had the highest level of education, showing a positive relationship . This result is likely to be due to a combination of the following two reasons. First, as has been mentioned in Chapter 1, children of more educated mothers were younger on average than children of less educated mothers. Therefore, it is likely that some or a considerable proportion of children of more educated mothers were too young at the time of the survey to receive DPT vaccine. Second, more educated mothers were more likely to have more knowledge than less educated mothers about different types of immunization and the proper age at which children are supposed to receive immunization. As such, the higher educated mothers were more likely to mention "appointment schedule is not due" (if it was so) than less educated mothers with no knowledge or less knowledge about the proper ages for receiving immunization.

The reasons for the children not having complete doses (3 shots) of DPT immunization are shown in Table 4-6. Almost similar results are observed as before. "Appointment schedule is not due" was the common reason for mothers having incomplete doses of DPT, especially mothers in the higher educational groups. The percentage of children whose

Table 4-6: Percentages of children under aged 18 months by reason for having incomplete doses of DPT and education of mothers

| Reason | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Do not know of 3 doses | 12.5 | 12.5 | 5.3 | 0.0 |
| Inconvenient | 43.8 | 27.9 | 18.4 | 4.2 |
| Lack of interest by health personnel | 6.3 | 3.4 | 0.0 | 0.0 |
| Unable to afford | 0.0 | 2.9 | 2.6 | 0.0 |
| Forgot the appointment | 12.5 | 8.7 | 7.9 | 0.0 |
| No appointment from health personnel | 12.5 | 11.6 | 5.3 | 0.0 |
| Appointment schedule not due | 29.4 | 52.0 | 73.7 | 95.8 |
| Number of cases | 16 | 172 | 38 | 24 |

Note: Respondents could mention more than one reason

Source: As in Table4-1

mothers were not aware of complete doses of DPT decreased with maternal education although the proportion was the same for the children whose mothers had no education and those with only 1-4 years of mothers' education (12.5 per cent).

Again, the proportion of children whose mothers felt it was inconvenient to take their children for DPT immunization decreased with mothers' education. Educated mothers were also less likely to forget the appointment made with the health personnel for immunization of their children.

Table 4-7: Percentage distribution of children by reasons for having complete doses of DPT and by education of mothers

| Reason | Education of mothers(years) | | |
|---|---|---|---|
| | 0-4 | 5-10 | >10 |
| Well informed about them | 45.6 | 52.8 | 62.0 |
| Easy access to service outlet | 47.8 | 52.8 | 62.0 |
| Active health personnel | 39.4 | 39.6 | 28.0 |
| Free of charge | 10.6 | 9.4 | 20.0 |
| Immuned against the disease | 26.1 | 30.2 | 32.0 |
| Health personnel made an appointment | 75.0 | 71.7 | 64.0 |
| Number of cases | 180 | 53 | 50 |

Note: Respondent could mention more than one reason

Source: As in Table 4-1

The percentages of children by reasons for having complete doses of DPT immunization and by maternal education are shown in Table 4-7. In this Table, mothers who had no education and mothers who had 1-4 years of education were added together due to a small number of cases in the group of mothers with no education. It seems that the most commonly mentioned reason for having complete doses for mothers in all educational levels is "Health personnel made an appointment". However, differences in the percentages by maternal education were small. A positive relationship between level of mothers' education and the reason "Well informed about them" can be observed. It can be expected that more educated mothers would be more likely to know the number of doses required for complete immunization. In relation to the reason

that "The child will be immune against the disease", differences by educational status of mothers were very small. It appears that maternal education has a positive relationship with the reason "Easy access to service outlet" and has an inverse relationship with the reason "Active health personnel". Active health personnel in this case refers to health workers who showed an interest or tried to influence parents to have their children immunized and also gave good service. Perhaps for the lower educated mothers, influence by health personnel is essential to make them understand the importance of their children having complete courses of vaccine.

### 4.2.3 Reasons for Having or Not Having Polio Immunization

Table 4-8 shows the percentages of children who had never received polio immunization by reasons for not receiving and by maternal education. Again, the reason most frequently given was that parents did not know that the immunization was available. Differences by educational level of mothers were substantial. Forty per cent of children whose mother had no schooling were not immunized for this reason compared to 10 per cent of those whose mothers were in the highest education group. The same pattern applied for the reason "Not necessary" and "Unable to afford". It can be said that less educated mothers were less likely than more educated mothers to know about polio immunization and its importance.

A positive relationship between educational status of mothers and the reason "Lack of interest by health personnel" can also be observed from this Table. There was a very small difference between the proportion of children whose mothers had no schooling and those whose mothers had 1-4 years of education.

The percentages of children who had not received complete doses and who had complete doses of polio immunization by reasons and by education of mothers follow the expected patterns as for DPT immunization. In Table 4-9, the proportion of children whose mothers

Table 4-8: Percentages of children under aged 18 months who never received polio immunization by reasons and by education of mothers

| Reason | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Do not know it exists | 40.4 | 30.7 | 19.1 | 10.0 |
| Not necessary | 31.9 | 29.1 | 17.0 | 10.0 |
| Do not know the place of service | 10.6 | 10.8 | 6.4 | 5.0 |
| Inconvenient | 36.2 | 31.3 | 31.9 | 10.0 |
| Vaccine not available | 6.4 | 2.2 | 2.1 | 0.0 |
| Lack of interest by health personnel | 17.0 | 15.8 | 23.4 | 40.0 |
| Unable to afford | 12.8 | 6.6 | 4.3 | 0.0 |
| No appointment from health personnel | 6.4 | 8.2 | 2.1 | 10.0 |
| Number of cases | 47 | 316 | 47 | 20 |

Note: Respondent could mention more than one reason

Source: As in Table 4-1

gave the reasons "No information about complete doses" and "Inconvenient" for not taking their children for complete doses decreased with increasing maternal education.

"Health personnel made an appointment" again was a reason frequently given by mothers with every level of education for their children receiving complete doses of polio immunization (Table 4-10). The number of mothers with no education and with 1-4 years were added together due to a small number of cases in the "no education" group.

Table 4-9: Percentages of children under aged 18 months by reasons for having incomplete doses of polio immunization and by education of mothers

| Reason | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| No information about complete doses | 17.6 | 14.4 | 3.8 | 2.7 |
| Inconvenient | 47.1 | 22.6 | 15.1 | 2.7 |
| Lack of interest by health personnel | 0.0 | 15.9 | 17.0 | 24.3 |
| Unable to afford | 0.0 | 2.6 | 3.8 | 2.7 |
| Forgot the appointment | 11.8 | 6.2 | 1.9 | 5.4 |
| No appointment from health personnel | 17.6 | 8.2 | 7.5 | 0.0 |
| The appointment schedule not due | 29.4 | 45.1 | 60.4 | 71.1 |
| Number of cases | 17 | 195 | 53 | 37 |

Note: Respondents could mention more than one reason

Source: As in Table 4-1

In relation to the reason for having complete doses, it is clear that educated mothers knew that the children can be immunized against polio. Highly educated mothers are more likely to know of the efficacy of vaccines, which can influence the acceptance of child immunization (Markland and Durand, 1976:169).

## 4.3 Use of Well Baby Clinics

Questions about the use of well baby clinics in the last twelve months were asked of respondents having children aged under 18 months only. Of all children aged under 18 months (N = 968), 44 per cent had

Table 4-10: Percentages of children under aged 18 months by reasons for having complete doses of polio immunization by education of mothers

| Reason | Education of mothers(years) | | |
|---|---|---|---|
| | 0-4 | 5-10 | >10 |
| Well informed about doses | 46.5 | 54.7 | 66.0 |
| Easy access to service outlets | 47.1 | 49.1 | 61.7 |
| Active health personnel | 40.1 | 39.6 | 29.8 |
| Free of charge | 9.3 | 11.3 | 19.1 |
| Can be immunized against the disease | 25.6 | 32.1 | 38.3 |
| Health personnel made an appointment | 77.3 | 71.7 | 63.8 |
| Number of cases | 172 | 53 | 47 |

Note: Respondents could mention more than one reason

Source: As in Table 4-1

never visited a well baby clinic, 27 per cent had visited 1-2 times, and 29 per cent had visited for 3 or more times. In a well baby clinic, the health and growth of a child is monitored regularly. Immunization services are also available. If the child is under one year of age, parents are supposed to take the child to the well baby clinic once a month. If the child is between one and two years, it should to be taken to the well baby clinic once every three months.

Education of mothers seems to affect the number of visits to well baby clinics. Table 4-11 shows the percentage distribution of children according to visits to a well baby clinic and educational status of

Table 4-11: Percentage distribution of children according to visits to well baby clinics and maternal education

| No. of visits | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| 0 | 64.7 | 47.9 | 34.0 | 21.0 |
| 1-2 | 20.6 | 26.5 | 28.3 | 31.0 |
| >2 | 14.7 | 25.6 | 37.7 | 48.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| N of cases | 68 | 661 | 138 | 100 |

Chi-Square = 49.27, d.f.= 6, p = 0.00

Source: As in Table 4-1

Note: The number of cases did not add up to 968 due to one non-response on the level of mothers' education.

mother. It can be observed that there was a significant association between education of mothers and the number of visits to well baby clinics (p = 0.00). An inverse relationship between the proportion of children who had never visited a well baby clinic and the level of maternal education can be observed. The proportion of children who had visited a well baby clinic increased with the level of mothers' education. Differences by maternal education were considerable, especially for children who visited a well baby clinic 3 or more times. The percentage rose from 15 per cent of children whose mothers had no education to 48 per cent of those whose mothers were in the highest educational group.

### 4.3.1 Reasons for Not Visiting a Well Baby Clinic

Of the children who had never visited a well baby clinic (N = 428), 26 per cent had not visited because the parents did not know about the availability of well baby clinics, 25 per cent had not

visited because the parents thought that it was not necessary to visit well baby clinics since their children were not sick, 24 per cent had not visited because the schedule was not due, 22 per cent had not visited because parents thought it was not convenient to take their children to well baby clinics, and finally, 3 per cent had not visited because the children were sick on the visiting day.

Table 4-12: Percentage distribution of children who have never visited a well baby clinic by reasons and by maternal education

| Reason | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Don't know | 31.8 | 29.1 | 8.5 | 14.3 |
| Not necessary | 25.0 | 26.6 | 21.3 | 14.3 |
| Inconvenient | 31.8 | 21.8 | 17.0 | 4.8 |
| Schedule not due | 11.4 | 19.6 | 42.6 | 66.6 |
| Sick on the visiting day | 0.0 | 2.9 | 10.6 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Number of cases | 44 | 316 | 47 | 21 |

Source: As in Table 4-1

The percentage distribution of children who had never visited a well baby clinic by reasons and by maternal education are shown in Table 4-12. An inverse relationship between the reason "Inconvenient" and mothers' education can clearly be seen.

For the reason "Not necessary", the percentage of children with mothers having no education and 1-4 years of education were almost the same but this decreased to 21 per cent and 14 per cent for children

with 5-10 years of mothers' education and with more than 10 years of maternal education, respectively.

A similar pattern appears for the reason "Don't know", with differences in the proportion of children with mothers having no education and mothers with 1-4 years of education being very small. This proportion declined to 14 per cent for children whose mothers had more than 10 years of education.

A positive relationship between the reason "Schedule not due" and educational level of mothers can be observed. The percentage rose from 11 per cent for children whose mothers had no education to 67 per cent for those whose mothers had more than 10 years of schooling. This pattern is likely to be affected by the young age distribution of children of more educated mothers. It has been observed in the data that the percentage of children who were under one month of age increased continuously with level of mothers' education; from 3 per cent for mothers with no education to 13 per cent for mothers with 1-4 years of schooling, to 15 per cent for mothers with 5-10 years of education and finally to 16 per cent for mothers who had more than 10 years of education. This means a considerable proportion of children of more educated mothers were too young to be taken to well baby clinics.

### 4.3.2 Reasons for Visiting a Well Baby Clinic

Table 4-13 shows the percentages of children who had visited a well baby clinic by reason and education of mothers. The most common reason for mothers or parents using well baby clinics is that they were advised by health personnel to do so. Differences by education of mother were small. However, a clear pattern can be seen from the reason "Parents know" about the availability of this kind of health service and the importance of it. The proportion increased from 9 per cent for children whose mothers had no education to 48 per cent for those whose mothers were in the highest educational group. This indicates that the more educated mothers were more likely to know about this kind of health service and to use it more than less educated mothers.

Table 4-13: Percentages of children who visited well baby clinics by reasons and by maternal education

| Reason | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-10 | >10 |
| Health personnel advised | 79.2 | 84.0 | 74.7 | 79.7 |
| Parents know | 8.3 | 16.6 | 25.3 | 48.1 |
| Relatives advise | 4.2 | 3.8 | 3.3 | 1.3 |
| Friends advise | 4.2 | 4.1 | 4.0 | 0.0 |
| Other personnel advise | 12.5 | 9.3 | 6.6 | 5.1 |
| Number of cases | 24 | 344 | 91 | 79 |

Note: Respondents could mention more than one reason

Source: As in Table 4-1

Note: The number of cases did not add up to 540 due to some non-response on the level of mothers' education and visiting a well baby clinic.

For the reason "Other personnel advised", it seems that other personnel such as administrative personnel had some influence on the use of well baby clinics by less educated mothers but not by more educated mothers.

## 4.4 Use of Family Planning

The parents of the children were asked whether they currently used any family planning methods. Of the total of 1600 cases, 55 per cent responded "Yes". Education of mothers has found to be related to the use of family planning but differences among different maternal education groups were small. The proportion was 50 per cent of mothers

with no education, 56 per cent of mothers with 1-4 years of schooling, 62 per cent of mothers having 5-10 years of education, and 63 per cent of mothers in the highest educational group.

Use of family planning by parents seems to have had some relationship to the use of immunization and well baby clinics at every level of mothers' education. This is evident in Table 4-14 which shows the percentage of children aged under 18 months who received immunization and used well baby clinics, by education of mothers and use of family planning by parents. It can be seen that the proportions of children who had ever received any of the three kinds of immunization and who ever visited well baby clinics were much higher for children whose parents currently used family planning than those whose parents did not use family planning and this appears for all groups of mothers' education. The data show that parent's use of family planning methods was related to immunization of children and visits to well baby clinics. This finding supports the hypothesis of Reinke and Parker (1983) that the use of health services contributes to the use of family planning.

It can be concluded that maternal education had an impact on the use of health facilities. More educated mothers were more likely than less educated mothers to have their children immunized at the proper time and with complete doses. They were also likely to visit well baby clinics more often than less educated mothers. More educated mothers were more likely than less educated mothers to know about immunization, well baby clinics, and the importance and utilization of these services.

Table 4-14: Percentage of children aged under 18 months who received immunization and visited well baby clinics by education of mothers and use of family planning by parents

| Use of family planning by parents | Education of mothers(years) | | | |
|---|---|---|---|---|
| | 0 | 1-4 | 5-7 | >10 |
| | % ever received BCG | | | |
| Yes | 73.0 | 74.3 | 88.9 | 90.3 |
| (Number of cases) | (26) | (314) | (81) | (62) |
| No | 37.5 | 50.1 | 74.6 | 81.1 |
| (Number of cases) | (40) | (333) | (55) | (37) |
| | % ever received DPT immunization | | | |
| Yes | 39.3 | 62.4 | 70.4 | 82.2 |
| (Number of cases) | (28) | (316) | (81) | (62) |
| No | 22.5 | 39.8 | 61.4 | 56.7 |
| (Number of cases) | (40) | (339) | (57) | (37) |
| | % ever received Polio immunization | | | |
| Yes | 42.8 | 62.0 | 70.0 | 88.5 |
| (Number of cases) | (28) | (313) | (80) | (61) |
| No | 13.0 | 39.9 | 59.0 | 62.1 |
| (Number of cases) | (40) | (334) | (56) | (37) |
| | % ever visited well baby clinics | | | |
| Yes | 50.0 | 63.4 | 70.4 | 85.5 |
| (Number of cases) | (26) | (314) | (81) | (62) |
| No | 27.5 | 41.4 | 58.2 | 67.6 |
| (Number of cases) | (40) | (333) | (55) | (370 |

Source: As in Table 4-1

# CHAPTER 5

## SUMMARY AND CONCLUSION

This study is based on data from a survey of the "Health Problems of the Under Five" in Thailand which was conducted by the Family Health Division of the Department of Health between November, 1982 and March, 1983. The objective of this study is to examine the relationship between educational level of mothers and the health status of children by looking at breastfeeding practices, introduction of supplementary food, food taboo practices, nutritional status, and use of health facilities such as well baby clinics, immunization and family planning. This study shows how the education of mothers affected these aspects of child health.

The education of mothers was found to have a negative relationship with breastfeeding and food taboo practices. More educated mothers were more likely to bottle feed their children than less educated mothers. A small number of parents were found not to allow some kinds of food to be fed to their children and the proportion of such parents decreased with increased maternal education. Maternal education was found to have a positive relationship with the nutritional status of children and the use of health facilities. The children of more educated mothers were more likely to have a better nutritional status and less likely to be malnourished than children of less educated mothers according to the three indicators:- weight for age, height for age, and weight for height. More educated mothers were more likely to have their children immunized against such diseases as tuberculosis, diptheria, pertussis, tetanus, and polio. The children of more educated mothers were also more likely to have complete courses of these vaccines and they were also more likely to attend a well baby clinic than children of uneducated or less educated mothers. It was also found in this study that the children whose mothers currently used

contraception were more likely to receive all kinds of immunization and to attend well baby clinics than children of mothers who did not use contraception.

Mothers' educational status was found to be neutral in the timing of the introduction of supplementary feeding to children. Most children of both educated and uneducated mothers received supplementary food at age 0-3 months, which seems quite early.

The positive effect of maternal education on the nutritional status of children improves their survival prospects to adulthood. Since malnutrition weakens the baby's defense mechanisms, malnourished children have more chance of catching infections and they are more likely to suffer severely from diseases than normal children. Findings from a study in rural Guatemala showed that the severity of measles, chicken pox, mumps, and rubella was greater in children who were severely malnourished (Salomon et al., 1968). So children whose mothers have more education are less likely to suffer from either malnutrition or infections or both.

Mothers' education, as observed in the study, was positively related with child immunization, use of a well baby clinic, and parents' contraceptive use. It seems that education makes mothers realize the importance and necessity of immunization which can prevent the children from common and dangerous diseases, which are the major killers of children in developing countries. At a well baby clinic children have their growth monitored, and receive normal health checks and immunization at scheduled times. Contraceptive use of parents prolongs the interval between successive births, which has been found to increase the probability of child survival (Internation Statistical Institute, 1984; Wolfers and Scrimshaw, 1975).

All these aspects of mothers' behaviour are likely to improve child health, leading to better chances of survival. Education of mothers was found to have an impact on these behaviours, so the children of educated mothers are more likely to have a higher chance of survival than those of uneducated mothers.

Although maternal education was found to have a negative influence on breastfeeding practices, breastfeeding is not a major factor in determining the survival of children of educated mothers. Educated mothers can substitute milk formula and other foods which have adequate nutritional value, and they are likely to prepare these in hygienic conditions. Breastfeeding is more important for the survival of the children of uneducated mothers, particularly in poor societies.

## 5.1 Suggestions for Further Research

Although a positive association between maternal education and nutritional status and use of health facilities was observed, it remains controversial whether mothers' education *per se* is responsible for the positive effect on child health or whether it is the quality of life, such as good housing conditions and high income, which is associated with female education, that generates this effect. It is likely that educated mothers are economicially and socially better off than uneducated mothers. This is an area that needs further investigation.

One of the limitations of the present study is that the children in the sample are not representative of all children in Thailand. Rather, they are a sample of sick children who came for hospital treatment. Thus, the indicators of nutritional status may be biased downward because the children were sick. However, this issue should not affect the results of the study since the focus of the study was on differences in child health status by maternal education and not on the absolute levels of the indicators. It would be useful if further research could be carried out which covers normal children - a true representative sample of all Thai children. Moreover, the distribution of mothers in each educational group in the sample was not the same as the distribution of women by education in the whole population. So future studies should use more representative data on the educational status of women in Thailand.

## 5.2 Policy Implications

The findings of this study may be useful for planning purposes. Maternal education seems to be a major determinant of child health through its effects on children's nutrition, immunization, and the use of well baby clinics. While improvements in female education could bring desired changes in the long run, specific short term programs should be launched. It would be useful to develop and promote programs of child health education for mothers.

The main reasons which the parents gave for not taking the children for immunization or for not obtaining complete courses were lack of knowledge about these kinds of immunization and the number of doses required; thinking that immunization was not necessary for their children; and seeing it as inconvenient. The government should try to reduce these problems. The IEC (Information, Education, and Communication) programs should be promoted through the mass media to give parents knowledge about these diseases and their severity for children, and to make them realize the necessity of immunization. The programs should be emphasized to reach less educated mothers. Mobile units should be set up to offer immunization services, especially in remote areas, so that parents can get access to the services easily.

As the health personnel were found to have some influence on parents regarding the use of health facilities for the children, the government should utilize this available resource to improve the coverage of child immunization. Further, initiatives should be taken by the government to educate mothers, particularly uneducated and less educated mothers, about nutritious food and supplementary food for children. Focus should be given to locally available food resources. Training in nutrition and food demonstration programs should also be provided to improve knowledge of nutrition.

The strategies suggested here should go along with the priority areas of the government's plan. It is expected that the health of children, especially children of uneducated mothers, can be improved if some of the measures suggested above are implemented.

# REFERENCES

AKESODE, F.A.
1982 "Factors Affecting the Use of Primary Health Care Clinics for Children", *Journal of Epidemiology and Community Health*, Vol. 36, pp. 310-314.

AL-ISI, I.J., A.A. KANAWATI and D.S. McLAREN
1975 "Formal Education of Mothers and Their Nutritional Behavior", *Journal of Nutrition Education*, Vol. 7, No. 1, pp. 22-24.

ARNOLD, F., R.D. RETHERFORD and A. WANGLEE
1977 *The Demographic Situation in Thailand*, Papers of the East-West Population Institute No. 45, East-West Center, Honolulu.

ARRIAGA, E.
1979 "Infant and Child Mortality in Selected Asian Countries", *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, Mexico, pp. 98-118.

ARRIAGA, E.E. and F. HOBBS
1982 "Infant Mortality Differentials in Selected Asian Countries", *Mortality in South and East Asia: A Review of Changing Trends and Patterns, 1950-1975*, Report and Selected Papers Presented at Joint WHO/ESCAP Meeting Held in Manila, 1-5 December, 1980, pp. 157-176.

AYENI, S.
1985 "Geographic and Socio-economic Differentials Characteristic of Infant and Child Mortality in Africa", *International Population Conference*, Florence, Vol. 2, International Union for the Scientific Study of Population, pp. 261-273.

BAASHER, S., T. BAASHER and R. COOK
1985 "Traditional Practices for Women and Young Children in the Eastern Mediterranian Region: Recent Developments", *Advances in International Maternal and Child Health*, Vol. 3, eds. D.B. Jelliffe and E.F.P. Jelliffe, pp. 63-89. Oxford: Oxford University Press.

BAIRAGAI, B.
1980 "Is Income the Only Constraint on Child Nutrition in Rural Bangladesh?", *Bulletin of World Health Organization*, Vol. 58, No. 5, pp. 767-772.

BECKER, S., R.E. BLACK, K.H. BROWN and S. NAHAR
1986 "Relationship between Socio-economic Status and Morbidity, Food Intake and Growth in Young Children in Two Villages in Bangladesh", *Ecology of Food and Nutrition*, Vol. 18, No. 4, pp. 251-264.

BOERMA, J.T. and H.A.W. van VIANEN
1984 "Birth Interval, Mortality and Growth of Children in a Rural Area in Kenya", *Journal of Biosocial Science*, Vol. 16, No. 4, pp. 475-486.

BUCHANAN, R.
1975 "Breast-feeding: Aid to Infant Health and Fertility Control", *Population Reports*, Series J, No. 4, pp. 49-67.

CALDWELL, J.C.
1979 "Education as a Factor in Mortality Decline: an Examination of Nigerian Data", *Population Studies*, Vol. 33, No. 3, pp. 395-413.

———
1981 "Maternal Education as a Factor in Child Mortality", *World Health Forum*, Vol. 2, No. 1, pp. 75-78.

CALDWELL, J.C. and P. McDonald
1981 "Influence of Maternal Education on Infant and Child Mortality: Level and Causes", *International Population Conference*, Vol. 2 Manila: International Union for the Scientific Study of Population, pp. 79-96.

CHAMRATRITHIRONG, A.
1982 "Mortality Trends and Differentials in Thailand 1950-1975", *Mortality in South and East Asia: A Review of Changing Trends and Patterns, 1950-1975*, Report and Selected Papers Presented at Joint WHO/ESCAP Meeting Held in Manila, 1-5 December 1980, pp. 177-193.

CHANDRA, R. K.
1979 "Immunology of Human Milk" *Proceedings of Workshop on Breastfeeding and Supplementary Foods*, eds. A. Valyasevi and J. Baker pp. 41-43. Bangkok: United Production Press.

CHAUDHURY, R.H.
1984 "Determinants of Dietary Intake and Dietary Adequacy for Pre-school Children in Bangladesh", *Food and Nutrition Bulletin*, Vol. 6, No. 4, pp. 24-42.

CHEN, P.C.Y.
1979 "Nondietary Factors and Nutrition" *Nutrition and Growth*, eds. D.B. Jelliffe and E.F.P. Jelliffe pp. 47-64. New York: Plenum Press.

CHERIAN, A.
1981 "Attitudes and Practices of Infant Feeding in Zaria, Nigeria", *Ecology of Food and Nutrition*, Vol. 11, pp. 75-80.

CHIDAMBARAM, V.C., J.W. McDONALD and M.D. BRACHER
1985 "Infant and Child Mortality in the Developing World: Information from the World Fertility Survey", *International Family Planning Perspectives*, Vol. 11, No. 1, pp. 17-25.

CHRISTIANSEN, N., L. VOURI, J.O. MORA and M. WAGNER
1974 "Social Environment As It Relates to Malnutrition and Mental Development", *Early Malnutrition and Mental Development*, eds.

J. Cravioto et al. pp. 186-199. Stockholm: The Swedish Nutrition Foundation.

COCHRANE, S.H.
1979 *Fertility and Education: What Do We Really Know?*, World Bank Staff Occasional Paper No. 26, Baltimore: John Hopkins University Press.

———
1981 "The Relationship between Education and Fertility", *Women, Education and Modernization*, ed. H. Ware pp. 154-172. Canberra: The Australian National University.

CONTON, L.
1985 "Social, Economic and Ecological Parameters of Infant Feeding in Usino, Papua New Guinea", *Infant Care and Feeding in the South Pacific*, ed. L.B. Marshall pp. 97-120. New York: Gordon and Breach Science Publishers.

COSMINSKY, S.
1985 "Infant Feeding Practices in Rural Kenya", *Breastfeeding, Child Health and Child Spacing: Cross Cultural Perspectives*, eds. V. Hull and M. Simpson pp. 35-54. London: Croom Helm.

DALY, J.A., J.H. DAVIS and R. ROBERTSON
1979 "Determinants of Health and Nutritional Status", *Evaluating the Impact of Nutrition and Health Programs*, eds. R.E. Klein et al. pp. 7-37. New York: Plenum Press.

DaVANZO, J.
1985 "Infant Mortality and Economic Development: the Case of Malaysia", *International Population Conference*, Florence, Vol. 2 International Union for the Scientific Study of Population, pp. 79-90.

DaVANZO, J., W.P. BUTZ and J.P. HABICHT
1983 "How Biological and Behavioral Influences on Mortality in Malaysia Vary during the First Year of Life", *Population Studies*, Vol. 37, No. 3, pp. 381-402.

DE GARINE, I.
1973 "The Socio-Cultural Aspects of Nutrition", *Ecology of Food and Nutrition*, Vol. 2, pp. 143-163.

DURONGDEJ, S., C. PRAWAHANAWIN, D. MUANGMAN and A. HIRUNRAK
1983 "A Study of Breastfeeding and Feeding Practice in Urban Area, Bangkok", *Journal of Nutrition*, Vol. 18, No. 4, pp. 291-301.

DYSON, T.
1977 "Levels, Trends, Differentials and Causes of Child Mortality - A Survey", *World Health Statistics Report*, Vol. 30, No. 4, pp. 282-292.

EL-MOUGI, M., S. MOSTAFA, N.H. OSMAN and K.A. AHMED
1981 "Social and Medical Factors affecting the Duration of Breast Feeding in Egypt", *Journal of Tropical Pediatrics*, Vol. 27, No. 1, pp. 5-11.

FERRO-LUZZI, G.E.
1973 "Food Avoidances of Pregnant Women in Tamilnad", *Ecology of Food and Nutrition*, Vol. 2, pp. 259-266.

FERRY, B. and D.P. SMITH
1983 "Breastfeeding Differentials", *WFS Comparative Studies: Cross-National Summaries*, No. 23 International Statistical Institute, Netherlands.

FOEGE, W.F.
1984 "Protecing the World's Children: Strategies for Attaining the Goal", *Protecting the World's Children: Vaccine and Immunization with Primary Health Care*, A Bellagio Conference, March 13-15, 1984 Rockefeller Foundation, pp. 84-116.

FREEDMAN,R. T. FAN, S. WEI and M.B. WEINBERGER
1977 "Trends in Fertility and the Effects of Education on Fertility in Taiwan, 1961-74", *Studies in Family Planning*, Vol. 8, No. 1, pp. 11-18.

GANS, B.
1963 "Some Socio-economic and Cultural Factors in West African Pediatrics", *Archives of Disease in Childhood*, Vol. 38, No. 197, pp. 1-12.

GRANT, J.P.
1983 *The State of the World's Children 1984*, United Nations Children's Fund (UNICEF). New York: Oxford University Press.

———
1984 *The State of the World's Children 1985*, United Nations Children's Fund (UNICEF). New York: Oxford University Press.

———
1985 *The State of the World's Children 1986*, United Nations Children's Fund (UNICEF). New York: Oxford University Press.

GRAVES, P.L.
1978 "Nutrition and Infant Behavior: A Replication Study in Kathmandu Valley, Nepal", *American Journal of Clinical Nutrition*, Vol. 31, pp. 541-551.

GUBHAJU, B.B.
1984 *Demographic and Social Correlates of Infant and Child Mortality in Nepal*, Unpublished Ph.D. Thesis, The Australian National University, Canberra.

HAAGA, J.G.
1984 *Infant Feeding and Nutrition Policy in Malaysia*, Unpublished Ph.D. Thesis, University Microfilms International, Ann Arbor.

HABICHT, J.P., C. YARBROUGH, A. LECHTIG and R.E. KLEIN
1974 "Relation of Maternal Supplementary Feeding During Pregnancy to Birth Weight and Other Sociobiological Factors" *Nutrition and Fetal Development*, ed. M. Winick pp. 127-145. New York: John Willey and Sons.

HARFOUCHE, J.K.
1970 "The Importance of Breast-feeding", *Journal of Tropical Pediatrics*, Vol. 16, No. 3, pp. 133-175.

HELSING, E. and F.S. KING
1982 *Breast-feeding in Practice: A Manual for Health Workers*, New York: Oxford University Press.

HENDERSON, R.H.
1984 "Vaccine Preventable Diseases of Children: The Problem", *Protecting the World's Children: Vaccine and Immunization with Primary Health Care*, A Bellagio Conference, March 13-15, 1984, Rockefeller Foundation, pp. 2-15.

HOBCRAFT, J., J.W. McDONALD and S. RUTSTEIN
1983 "Child-Spacing Effects on Infant and Early Child Mortality", *Population Index*. Vol. 49, No. 4, pp. 585-618.

---
1985 "Demographic Determinants of Infant and Early Child Mortality: A Comparative Analysis", *Population Studies*, Vol. 39, No. 3, pp.363-385.

HUACK, H.M.
1959 *Maternal and Child Health in a Siamese Rice Village: Nutritional aspects Studies in Bang Chan, 1952-1954*, Data Paper No. 39, Southeast Asia Program, Department of Far Eastern Studies, Cornell University, New York.

HUll, T.H. and J.E. ROHDE
1980 *Prospects for Rapid Decline of Mortality Rates in Java: A Study of Causes of Death and the Feasibility of Policy Interventions for Mortaltiy Control*, Working Paper Series No. 16, Population Studies Center, Gadjah Mada University, Yogyakarta.

HULL, V.J.
1979 *Women, Doctors, and Family Health Care: Some Lessons from Rural Java*, Working Paper Series No. 20, Population Studies Center, Gadjah Mada University, Yogyakarta.

---
1985 "Breastfeeding, Birth Spacing, and Social Change in Rural Java", *Breastfeeding, Child Health and Child Spacing: Cross-cultural Perspectives*, eds. V. Hull and M. Simpson pp. 78-108. London: Croom Helm.

HULL, V. and M. SIMPSON
1985 "Breastfeeding, Child Health and Child Spacing: An Overview", *Breastfeeding, Child Health and Child Spacing: Cross-cultural Perspectives*, eds. V. Hull and M. Simpson pp. 1-10. London: Croom Helm.

HYTTEN, F.E. and I. LEITCH
1971 *The Physiology of Human Pregnancy*, Oxford: Blackwell.

IMPERATO, P.J.
1969 "Traditional Attitudes Towards Measles in the Republic of Mali", *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. 63, No. 6, pp. 768-780.

INDIRA BAI, K. and D.P.N.V. RATNAMALIKA
1981 "Attitudes and Beliefs Concerning Child Care among Women of Tirupati, Chittoor District, Andhra Pradesh, India", *Journal of Tropical Pediatrics*, Vol. 27, No. 5, pp. 250-254.

INSTITUTE OF POPULATION STUDIES and POPULATION SURVEY DIVISION
1977 *The Survey of Fertility in Thailand: Country Report*, Vol. 1, Chulalongkorn University and National Statistical Office, Bangkok.

INTERNATIONAL STATISTIC INSITIUTE (ISI)
1984 *World Fertility Survey: Major Findings and Implications*, Oxford: Alden Press.

JAIN, A.K.
1981 "Fertility Effects of Female Education: A Simple Explanantion", *Demography*, Vol. 18, pp. 577-596.

JELLIFFE, D.B.
1970 *Child Nutrition in Developing Countries*, Department of State, AID, Washington, D.C.

JONGPIPUTVANICH, S., P. UNGTHAVORN, T. ISRASENA, and P. POSHAKRISNA
1986 "Nutritional Pattern in Rural Thai Children", *Index of Maternal and Child Health Study/Research*, Thai Population Clearing-House/Documentation Centre, Family Health Division, Ministry of Public Health, Bangkok.

JUREEMAS, S. and K. ACHAVANIDKUL
1980 "Kalum: Taboos of the Northeastern People", *Theories and Studies in Sociology and Medical Anthropology*, eds. B. Yoddamnern et al. pp.134-154. Bangkok.

KALLEN, D.J.
1973 "Malnutrition, Learning, and Behavior", *Ecology of Food and Nutrition*, Vol. 2, pp. 133-141.

KANAANEH, H.
1972 "The Relationship of Bottle Feeding to Malnutrition and Gastroenteritis in a Pre-industrial Setting", *Journal of Tropical Pediatrics*, Vol. 18, No. 302-306.

KAMNUANSILPA, P. and A. CHAMRATRITHIRONG
1982 *A New Decade of Fertility and Family Planning in Thailand: 1981 Contraceptive Prevelence Survey*, Research Center, National Institute of Development Administration and Family Health Division, Ministry of Public Health, Bangkok.

KAMNUANSILPA, P. and J. KNODEL
1985 *Mortality, Health and infant Feeding Practices in the Northeast Thailand: Methodolical Issues and Substantive Results*, Research Center, National Institute of Development Administration, Bangkok.

KAZIMI, C.J. and H.R. KAZIMI
1979 "Infant Feeding Practices of the Igbo, Nigeria", *Ecology of Food and Nutrition*, Vol. 8, pp. 111-116.

KNODEL, J.
1982 "Breastfeeding" *International Encyclopedia of Population*, ed. J.A. Ross Vol. 1, pp. 71-76. New York: Free Press.

KNODEL, J., P. KAMNUANSILPA, and A. CHAMRATRITHIRONG
1982 "Breastfeeding in Thailand: Data from the 1981 Contraceptive Prevalence Survey", *Studies in Family Planning*, Vol. 13, No. 11, pp. 307-315.

LEPOWSKY, M.
1985 "Food Taboos, Malaria and Dietary Change: Infant Feeding and Cultural Adaptation on a Papua New Guinea Island" *Infant Care and Feeding in the South Pacific*, ed. L.B. Marshall pp. 51-82. New York: Gordon and Breach Science Publishers.

LLOYD-STILL, J.D.
1976 "Clinical Studies on the Effects of Malnutrition during Infancy on Subsequent Physical and Intellectual Development", *Malnutrition and Intellectual Development*, ed. J.D. Lloyd-Still pp. 103-159. Massachusetts: Publishing Sciences Group, Inc.

LOZOFF, B., K.R. KAMATH and R.A. FELDMAN
1975 "Infection and Disease in South Indian Families: Beliefs About Childhood Diarrhea", *Human Organization*, Vol. 34, No. 4, pp. 353-358.

MAINA-AHLBERG
1984 "Beliefs and Practices Related to Measles and Acute Diarrhoea", *Maternal and Child Health in Rural Kenya: An Epidemiological Study*, eds. J.K. Van Ginneken and A.S. Muller pp. 323-331. London: Croom Helm.

MAINE, D.
1981 *Family Planning: Its Impacts on the Health of Women and Children*, The Center for Population and Family Health, Columbia University.

MAJUMDER, A.K.
Forthcoming
*Determinants of Infant and Child Mortality in Bangladesh: A Logit Linear Model Analysis*, Unpublished.

MARKLAND, R.E. and D.E. DURAND
1976 "An Investigation of Socio-psychological Factors Affecting Infant Immunization", *American Journal of Public Health*, Vol. 66, No. 2, pp. 168-170.

MARTIN, L.G., J. TRUSSELL, F.R. SALVAIL and N.M. SHAR
1983 "Co-variates of Child Mortality in the Philippines, Indonesia, and Pakistan: An Analysis Based on Hazard Models", *Population Studies*, Vol. 37, No. 3, pp. 417-432.

MARTORELL, R.
1980 "Interrelationships between Diet, Infectious Diseases, and Nutritional Stutus", *Social and Biological Predictors of Nutritional Status, Physical Growth, and Neurological Development*, eds. L.S. Greene and F.E. Johnston pp. 81-106. New York: Academic Press.

McKAY, D.A.
1971 "Food, Illness, and Folk Medicine: Insights from Ulu Trengganu, West Malaysia", *Ecology of Food and Nutrition*, Vol. 1, pp. 67-72.

McLAREN, D.S. and A.A. KANAWATI
1970 "The Epidemiology of Protein-Calorie Malnutrition in Jordan", *Transactions of the Royal Society of Tropical Medicine and Hygiene*, Vol. 64, No. 5, pp. 754-768.

MERDOL, T.O.
1981 "Nutritional Traditions in Turkey (With Reference to Education Needs)", *Journal of Tropical Pediatrics*, Vol. 27, pp. 273-278.

MILLER, C.A. and R.W. NOYES
1974 "Priorities in Maternal and Child Health" *Community Medicine in Developing Countries*, ed. A.R. Omran pp. 227-255. New York: Springer Publishing.

MOORE, W.M. and A.F. ROCHE
1983 *Pediatric Anthropometry*, Ohio: Ross Laboratories.

MOSLEY, W.H. and L.C. CHEN
1984 "An Analytical Framework for the Study of Child Survival in Developing Countries", *Population and Development Review*, Vol. 10 Supplement, pp. 25-45.

MUDA, R.H.
1986 "Education and Preventive Health Services", *Research Note on Child Survival*, International Population Dynamics Program, No. 6CS.

MUDAMBI, S.R.
1981 "Breast-feeding Practices of Mothers from Mid-Western Nigeria", *Journal of Tropical Pediatrics*, Vol. 27, No. 2, pp. 96-100.

MUSAIGER, A.O.
1982 "Factors Influencing Food Consumption in Bahrain",*Ecology of Food and Nutrition*, Vol. 2, pp. 133-141.

NABARRO, D.
1984 "Social, Economic, Health, and Environmental Determinants of Nutritional Status", *Food and Nutrition Bulletin*, Vol. 6, No. 1 pp. 18-32.

NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT BOARD, NATIONAL STATISTICS OFFICE and INSTITUTE OF POPULATION STUDIES
1974 *The Population of Thailand*, Bangkok: Thai Wattana Panich Press.

NATIONAL RESEARCH COUNCIL
1980 *Fertility and Mortality Changes in Thailand, 1950-1975*, Washington, D.C.: National Academy of Sciences.

NATIONAL STATISTICAL OFFICE
1983 *1980 Population and Housing Census: Whole Kingdom*, Bangkok: Office of the Prime Minister.

OMRAN, A.R.
1976 "An Overview of the Study", *Family Formation Patterns and Health*, eds. A.R. Omran et al. pp. 507-535. The World Health Organization, Geneva.

ORUBULOYE, I.O. and J.C. CALDWELL
1975 "The Impact of Public Health Services on Mortality: A Study of Mortality Differentials in a Rural Area of Nigeria", *Population Studies*, Vol. 29, No. 2, pp. 259-272.

PLANK, S.J. and M.L. MILANESI
1973 "Infant Feeding and Infant Mortality in Rural Chile", *Bulletin of the World Health Organization*, Vol. 48, No. 2, pp. 203-210.

POPULATION INFORMATION PROGRAM OF JOHN HOPKINS UNIVERSITY (PIP)
1984 "Healthier Mothers and Children through Family Planning", *Population Reports*, Series J, No.27.

PORAPAKKHAM, Y. and P. PRASARTKUL
1986 "Cause of Death: Trends and Differentials in Thailand", *New Developments in the Analysis of Mortality and Causes of Deaths*, eds. H. Hansluwka et al. pp. 207-237. The World Health Organization and Mahidol University, Bangkok.

PUFFER, R.R. and C.V. SERRANO
1973 *Patterns of Mortality in Childhood*, Report of the Inter-American Investigation of Mortality in Childhood. Scientific Publication No. 262, Pan American Health Organization, Washington, D.C.

RACHAPAETAYAKOM, J.
1976 " Trends and Differentials in Mortality", *Population of Thailand*, ESCAP Country Monograph Series No. 3, Bangkok.

REINKE, W.A. and R.L. PARKER
1983 "Relations between the Use of Health Services and Family Planning", *Child and Maternal Health Services in Rural India: The Narangwal Experience*, Vol. 2, Integrated Family Planning and Health Care, eds. C.E. Taylor et al. pp. 109-128. World Bank Research Publication, Baltimore: The Johns Hopkins University Press.

RUTSTEIN, S.O.
1983 "Infant and Child Mortalty: Levels, Trends, and Demographic Differentials", *WFS Comparative Studies: Cross National Summaries*, No. 24.

RUZICKA, L.T. and P. KANE
1986 "Nutritional Deficiencies as a Factor in Differential Infant

and Child Mortality: The Experience of the Countries on the Indian Sub-continent", *New Developments in the Analysis of Mortality and Causes of Death*, eds. H. Hansluwka et al. pp. 257-294. The World Health Organization and Mahidol University, Bangkok.

SALOMON, J.B., L.J. MATA and J.E. GORDON
1968 "Malnutrition, the Common Communicable Diseases of Childhood in Rural Guatemala", *American Journal of Public Health*, Vol. 58, pp. 505-516.

SATHAR, Z.A. and V.C. CHAIDAMBARAM
1984 "Differentials in Contraception Use", *WFS Comparative Studies: Cross National Summaries*, No. 36, International Statistical Institute.

SEOANE, N. and M.C. LATHAM
1971 "Nutritional Anthropometry in the Identification of Malnutrition in Childhood", *Journal of Tropical Pediatrics*, Vol. 17, No. 3, pp. 98-104.

SIMMONS, G.B. and S. BERNSTEIN
1982 "The Educational Status of Parents and Infant and Child Mortality in Rural India", *Health Policy and Education*, Vol. 2, No. 3-4, pp. 349-367.

SOYSA, P.
1979 "Timing for Complementary Feeding", *Proceedings of Workshop on Breastfeeding and Supplementary Foods*, eds. A. Valyasevi and J. Baker pp. 41-43, Bangkok.

STREATFIELD, P.K., M. SINGARIMBUN, and I. SINGARIMBUN
1986 "The Impact of Maternal Education on the Use of Child Immunization, and Other Health Services", *Research Note on Child Survival*, No. 8CS

SUCHINDRAN, C.M. and A. LADLAKA
1985 "Determinants of Infant and Child Mortality in Tunisia", *International Population Conference*, Florence. Vol. 2, International Union for the Scientific Studies of Population, pp. 299-310.

TEINBOON, P. and A. SURABENJAWONG
1982 "A Study of Breastfeeding and Supplementary Foods at Well Baby Clinic", *Chiang Mai Medical Bulletin*, Vol. 21, No. 4, pp. 319-329.

TEITJEN, A.M.
1985 "Infant Care and Feeding Practices and the Beginnings of Socialization among the Maisin of Papua New Guinea", *Infant Care and Feeding in the South Pacific*, ed. L.B. Marshall pp. 121-136. New York: Gordon and Breach Science Publishers.

THANANGKUL, O., S. RUCKPAOPUNT, L. SUSKIND, D. DAMRONGSAK, C.D. MOREHEAD, G. SOOTHI-O-SOTH, and S. SUPRASERT
1975 "Malnutrition Problems in Thai Children", *Chiang Mai Medical Bulletin*, Vol. 14, No. 1, pp. 59-72.

TUCHINDA, P.
1984 "Infant Feeding in Asian Countries", *Human Nutrition: Better Nutrition Better Life*, eds. V. Tanphaichitr et al. pp. 67-72. Bangkok: Aksornsamai Press.

UNGTHAVORN, P., T. INTUSOMA, S. KUNGWARL-NOOVARAT, and P. VANICHSENEE
1984 "Immunization Acceptance in Infants", *Chulalongkorn Medical Journal*, Vol. 28, No. 10, pp. 1127-1135.

UNITED NATIONS
1982 *Levels and Trends of Mortality Since 1950*, New York, ST/ESA/SER.A/74.

VAN VEEN, M.S.
1971 "Some Ecological Considerations of Nutrition Problems on Java", *Ecology of Food and Nutrition*, Vol. 1, No. 1, pp. 25-36.

VENKATACHARYA, K.
1985 "An Approach to the Study of Socio-Biological Determinants of Infant and Child Morbidity and Mortality", *International Population Conference* Florence, Vol. 2, International Union for the Scientific Study of Population, pp. 237-250.

WARE, H.
1984 "Effects of Maternal Education, Women, Women's Roles, and Child Care on Child Mortality", *Population and Development Review*, Vol. 10 Supplement, pp. 191-214.

WATERLOW, J.C., R. BUZINA, W. KELLER, J.M. LANE, M.Z. NICHAMAN and J.M. TANNER
1977 "The Presentation and Use of Height and Weight Data for Comparing the Nutritional Status of Groups of Children Under the Age of 10 years", *Bulletin of the World Health Organization*, Vol. 55, No. 4, pp. 489-498.

WATERLOW, J.C., A. ASHWORTH and M. GRIFFITHS
1980 "Faltering in Infant Growth in Less Developed Countries", *The Lancet*, Vol. 2, pp. 1176-1177.

WINIKOFF, B.
1983 "The Effects of Birth Spacing on Child and Maternal Health", *Studies in Family Planning*, Vol. 14, No. 10, pp. 231-245.

WOLFERS, D. and S. SCRIMSHAW
1975 "Child Survival and Interval between Pregnancy in Guayaquil, Equador", *Population Studies*, Vol. 29, No. 3, pp. 479-496.

WORAPONGSATORN, T. S. ATHIPANYAKOM and W. SINGHAKACHEN
1984 *The Effect of Infant and Child Mortality on Fertility in Rural Developing areas, Northeast Thailand*, Department of Biostatistics, Faculty of Public Health, Mahidol University, Bangkok.

WORLD HEALTH ORGANIZATION
1981 *Infant and Young Child Feeding: Current Issues*, Geneva.

WORLD HEALTH ORGANIZATION
1983 *Measuring Change in Nutritional Status*, Geneva: World Health Organization.

WRAY, J.D. and A. AGUIRRE
1969 "Protein-calorie Malnutrition in Candelaria, Colombia: I Prevalence; Social and Demographic Causal Factors", *Journal of Tropical Pediatrics*, Vol. 15, No. 3, pp. 76-98.

# APPENDIX A

## QUESTIONNAIRE

"Study of Health Problems of the Under Five"

Respondent : Father

Mother

Guardian

Relative

Interviewer's name_____position_____

Date of interview: Day____Month_____Year_____

Place_____

Patient Identification

1. Hospital number_____ 2. Admission Date:

3. Patient's name_____ Day_____Month_____Year_____

4. Mother's name_____ 5. Father's name_____

6. Address_____

---

Circle appropriate choices and fill in blanks

Study Identification

1. Center name_____ 2. Patient order number _____

Patient characteristics

3. Residence

1. Urban 2. Rural

4. Age _____ (in complete months)

5. Sex

   1. Female  2. Male

6. Father's education (school year completed)

   1. 0  2. 1-4

   3. 5-7  4. 8-10

   5. 11-13  6. Vocational school

   7. University  8. Do not know

7. Mother's education

   1. 0  2. 1-4

   3. 5-7  4. 8-10

   5. 11-13  6. Vocational school

   7. University  8. Do not know

8. Father's occupation

   1. None  2. Gardener, Farmer

   3. Fisherman  4. Merchant

   5. Employee  6. Government official

   7. Dead  8. Others, specify _____

   9. Do not know

9. Mother's occupation

   1. None  2. Gardener, Farmer

   3. Fisherman  4. Merchant

   5. Employee  6. Government official

   7. Dead  8. Others, specify _____

   9. Do not know

10. Mother's age _____ (in complete year)

11. Parents' marital status

   1. Married  2. Widowed

   3. Divorced  4. Single

   5. Others, specify _____

Patient's history during fetal and neonatal periods

12. Mother's complications during pregnancy or delivery

    1. None  2. Yes, specify_____

13. Gestational age

    1. Less than 36 weeks  2. 36-42 weeks

    3. More than 42 weeks

14. Patient's birth weight

    1. Less than 2500 grams  2. 2500 - 3000 grams

    3. More than 3000 grams

15. Patient's condition at birth

    1. Normal  2. Weak

    3. Deformed

Pregnancy and obstetric history of mother

16. Total live births _____

17. Children now living _____ (If the answer is "one" skip to items 21-24)

18. Number of stillbirths _____

19. Number of abortions _____

Siblings' history

20. Patient's order among siblings _____

21. Next elder sibling's age _____ (in complete months)

22. Next younger sibling's age _____ (in complete months)

23. Health status of siblings

    1. All are healthy  2. Some are weak

    3. Some are sick

24. Dead siblings

    1. Died within one week after delivery

    2. Died within one month after delivery

    3. Died during 1-12 months after delivery

4. Died during 13-60 months after delivery

Breastfeeding and supplementary food

25. Was patient breastfed?

1. No.
2. Breastfed and bottle fed
3. Yes, still being breastfed
4. Yes, < 6 weeks
5. Yes, 6-24 weeks
6. Yes, < 6 months
7. Yes, 6-12 months
8. Yes, > 12 months
8. Others, specify _____

26. Age at which supplementary food was introduced

1. 0-3 months
2. 4-6 months
3. more than 6 months

(Items 27-28 are for patients over 12 months only)

27. Food usually not allowed by parents (ask leading questions)

1. None
2. Fish, because _____
3. Pork, because _____
4. Beef, because _____
5. Chicken, because _____
6. Beans, because _____
7. Certain kinds of vegetable, because _____
8. Fruits
9 .Others, specify _____
because _____

28. Food which patient avoided when he is well (ask leading question)

1. None
2. Fish
3. Pork
4. Beef
5. Chicken
6. Beans
7. Certin kinds of vegetable, because _____
8. Fruits
8. Others, specify _____

Patient's history of attending a well baby clinic and having immunization

(Items 29-41 are for patients under 18 months only)

29. Number of visits at a well baby clinic during last 12 months

    1. None (skip to item 30)  2. 1-2 times

    3. 3 or more times (skip to item 31)

30. Reasons for not attending a well baby clinic

    1. Do not know  2. Not necessary

    3. Inconvenient  4. Others, specify _____

    (skip to item 32)

31. Reasons for attending a well baby clinic (more than one answer is acceptable)

    1. Recommended by health personnel

    2. Parents know about it  3. Recommended by relatives

    4. Recommended by freinds  5. Recommended by personnel other

    6. Others, specify _____  than those at health office

32. Received BCG immunization

    1. None (skip to item 33)  2. Yes, at aged under 3 months

    3. Yes, at aged 3 months and over

    4. Uncertain/do not know

33. Reasons for not having BCG immunization (more than one answer is acceptable)

    1. Do not know it exists  2. Not necessary

    3. Do not know where to go for the service

    4. Inconvenient  5. Vaccine not available at clinic

    6. Lack of interst by health personnel

    7. Unable to afford it  8. No appointment made by health

    9. Others, specify _____  personnel

34. Received DPT immunization

    1. None (skip to item 35)

    2. Yes, but incomplete doses (less than 3 doses)

    3. Yes, complete doses (skip to item 37)

    4. Uncertain/do not know (skip to item 38)

35. Reasons for not having vaccination (more than one answer is acceptable)

    1. Do not know it exists
    2. Not necessary
    3. Do not know where to go for the service
    4. Inconvenient
    5. Vaccine not available at clinic
    6. Lack of interest by health personnel
    7. Unable to afford it
    8. No appointment made by health personnel
    9. Others, specify _____

36. Reasons for not having vaccination (more than one answer is accetable)

    1. Do not know of 3 shots
    2. Inconvenient
    3. Lack of interest by health personnel
    4. Unable to afford it
    5. Forget the appointment
    6. No appointment made by health personnel
    7. The appointment schedule is not due yet
    9. Others, specify _____

37. Reasons for having complete doses of vaccination more than one answer is acceptable)

    1. Well informed about them
    2. Easy access to service outlet
    3. Active health personnel
    4. Free of charge
    5. The child will immuned against the disease
    6. Appointment made by health personnel
    7. Others, specify _____

38. Received polio immunization

    1. None (skip to item 39)
    2. Incomplete doses (less than 3 doses) (skip to item 40)
    3. 3 complete doses (skip to item 41)
    4. Uncertain/do not know (skip to item 50)

39. Reasons for not having vaccination (more than one answer is

acceptable)

1. Do not know it exists
2. Not necessary
3. Do not know where to go for the service
4. Inconvenient
5. Vaccine not available at clinic
6. No interest by health personnel
7. Unable to afford it
8. No appointment made by health personnel
9. Others, specify _____

(skip to item 50)

40. Reasons for having incomplete doses of vaccination (more than one answer is acceptable)

1. Have no information about the complete doses
2. Inconvenient
3. No interest by health personnel
4. Unable to afford it
5. Forget the appointment
6. No appointment made by health personnel
7. The appointment schedule is not due yet
8. Others, specify _____ (skip to item 50)

41. Reasons for having complete doses of vaccination (more than one answer is acceptable)

1. Well informed about them
2. Easy access to the service outlet
3. Active Health personnel
4. Free of charge
5. The child will be immuned against the disease
6. Appointment was made by health personnel
7. Others, specify _____ (skip to item 50)

(Items 42-48 are for patients aged 18-60 months)

42. Received DPT immunization

1. None (skip to item 43)
2. No booster dose (skip to item 43)
3. Booster dose (skip to item 44)

4. Uncertain/do not know (skip to item 46)

43. Reasons for not having DPT immunization (more than one answer is acceptable)

1. Do not know it exists 2. Not necessary

3. Do not know where to go for the service

4. Inconvenient 5. No vaccine available at clinic

6. Lack of interest by health personnel

7. Unable to afford it

8. No appointment made by health personnel

9. Others, specify _____

44. Reasons for not having booster dose (more than one answer is acceptable)

1. Have no information about them

2. Inconvenient

3. Lack of interest by health personnel

4. Unable to afford it 5. Forget the appointment

6. No appointment made by health personnel

7. The appointment schedule is not due yet

8. Others, specify _____

45. Reasons for having booster dose (more than one answer is acceptable)

1. Well informed about them

2. Easy access to the service outlet

3. Active health personnel 4. Free of charge

5. The child will be immuned against the disease

6. Appointment was made by health personnel

7. Others, specify _____

46. Polio immunization

1. None (skip to item 47)

2. No booster dose (skip to item 48)

3. Booster dose (skip to item 49)

4. Uncertain/do not know (skip to item 50)

47. Reasons for not having vaccination (more than one answer is acceptable)

1. Do not know it exists 2. Not necessary

3. Do not know where to go for the service

4. Inconvenient

5. No vaccine available at clinic

6. Lack of interest by health personnel

7. Unable to afford it

8. No appointment made by health personnel

9. Others, specify _____

48. Reasons for not having booster dose (more than one answer is acceptable)

1. Do not know about them

2. Not easily access to go to the service outlet

3. Unable to afford it 4. Forget the appointment

5. No appointment made by heath personnel

6. The appointment schedule is not due yet

7. Others, specify _____

49. Reasons for having complete booster doses (more than one answer is acceptable)

1. Well informed about them

2. Easy access to the service outlet

3. Active health personnel 4. Free of charge

5. The child will be immuned against the disease

6. Health personnel made an appointment

7. Others, specify _____

Child growth/teeth and eyes' conditions

50. Weight _____ kilograms

51. Height _____ centimetres

52. Eyes

1. Normal 2. Night blindness

3. Bitot's spot 4. Corneal defects

5. Others, specify _____

53. Teeth

1. No dental caries 2. Dental caries

3. Others, specify _____

History of patient's sickness(last 12 months)

54. Number of diarrhea episodes _____

55. Number of common cold episoded _____

56. Parasitic infestation during last 12 months

1. No 2. Yes, specify _____

57. Sickness required treatment during last 12 months

epidoses _____ (not including this hospitalization)

58. Hospitalization during last 12 months _____ times

59. Disease ever contracted (more than one answer is acceptable)

1. Pertussis 2. Diptheria

3. Tetanus 4. Tuberculosis

5. Poliomyeletis 6. Measles

7. None of the above items 8. Ohters, specify _____

60. Number of accidents that required treatment during last 12 months

_____ times

Current illness

61. Number of hospital nights _____ (days)

62. Cause of illness/disease _____

63. Hemoglobin _____ gram per cent

or Hematocrit _____ per cent (at admission)

64. Patient at discharge

1. Recovered
2. Improved
3. Referred
4. Discharged without permission
5. Dead

Parent's family planning practice(for spouse currently living together only)

65. Number of additional chldren wanted _____

66. Currently used family palnning method

1. Yes (skip to item 67)
2. No (skip to item 68)

67. Contraceptive method used

1. None
2. Male sterilization
3. Female sterilization
4. IUD
5. Injectable contraceptive
6. Oral contraceptive
7. Condom
8. Others, specify _____

68. Reasons for using no contraceptive

1. Separated
2. Currently pregnant
3. Too old
4. Uncertainty in contraceptives' toxicity
5. Do not know of any contraceptive methods
6. Do not know where to receive the service
7. Need additional children
8. Others, specify _____