RELATIONSHIP BETWEEN CHILD REARING AND CHILD NUTRITIONAL STATUS DURING THE FIRST YEAR OF LIFE IN THAILAND

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I sincerely pray that Thai children will be happy and health.

Mai Beniko

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ABSTRACT

This descriptive study was conducted to determine the relationship between child rearing and child nutritional status during the first year of life.A total of 4,245 children born between July 2000 and June 2002 were enrolled consecutively bases on The Prospective Cohort of Thai Children project. Sixty twin infants and thirty five dead and abnormal children (including one of twin infant) were excluded. Then, the remaining 4,151 children were studied for data analysis. The statistics was used were Chi- square tests and Multiple Logistic Regressions and were used for identifying influential predictor and child nutritional status by the first year of age.

The finding showedthat 8.3% of the children were underweight (weight for age), 9.5% of the children were stunting (height for age) and 5.7% of the children were wasting (weight for height) according to The WHO reference. After adjusting the confounding factors in the final model, birth weight was the most significant risk factor related to all three child nutritional statucs such as underweight (AOR= 10.07, 95% CI= 2.87- 35.28), stunting (AOR= 4.49, 95% CI= 1.16- 17.39), and wasting (AOR= 3.94, 95% CI= 1.24- 12.49). For child rearing characteristics, motherly activities: singing (AOR= 0.31, 95% CI= 0.11- 0.87) and child rearing patternand control of sleeping time (AOR= 4.71, 95% CI= 1.16-19.10)were The most significant factors for underweight children.It can be concluded that child rearing among this population affects child nutritional status. Therefore, health policy toward child rearing needs to be promoted early in child the life.

KEY WORDS:CHILD NUTRITIONAL STATUS / CHILD REARING / UNDERWEIGHT, STUNTING AND WASTING

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NCHS	National Health examination Survey
WHO	World Health Organization
ANC	Antenatal care
OPV- DPT	Oral Polio Vaccine- Diphtheria, Pertussis and Tetanus
MDGs:	Millennium Development Goals
UNICEF	United Nations Children's Funds
PCTC	Prospective Cohort of Thai Children
HAZ	Height for Age Z- score
MCH	Maternal and Child Health
HIV	Human Immune-deficiency Virus
AIDS	Acquired Immune-deficiency Syndrome
WCC/ WBC	Well- being Child Clinic/ Well-being Baby Clinic

CHAPTER I
INTRODUCTION

1.1 Rationale and justification

Globally, about 10 million children under 5 years of age die every year from preventable diseases (1-3). At least half of these death are caused by malnutrition (1, 4, 5). In developing countries, malnutrition is the main health problem (1, 5). It is accepted that malnutrition is an important factor associated with the high morbidity and mortality rates observed in children under 5 years of age in developing countries (6). The Millennium Development Goals (MDGs) target is to reduce by half the proportion of people who suffer hunger between 1990 and 2015 (7).

The most recent estimate of the global burden of malnutrition in children under 5 years of age is that 99 million were underweight in 2012. According to the data about 67% of all underweight children live in Asia and 29 % in Africa. There are more than 162 million stunted children under 5 years of age in developing countries of which 56% were from Asia and 36% were from Africa in 2012. Around 8% of the world's children under 5 years of age, an estimated 51 million children suffered from wasting in 2012. 17 million children suffered from severe wasting as a result of acute under nutrition (8-10).

Malnutrition or growth failure is caused by multiple circumstances and determinants. The prevalence of malnutrition is due to the fact that it is deeply rooted in poverty and underprivileged social environments rather than biomedical causes (11). Stunting generally occurs before 2 years of age and is frequently associated with repeated exposure to adverse economic conditions, poor sanitation, interactive effects of poor energy and nutrient intakes and acquired infections. On the other hand, underweight and wasting is usually the result of acute significant food intake shortage and acquired disease. Furthermore, child stunting received little attention, because child stunting cannot be reversed and there is no immediate danger of dying. However, child wasting needs urgent medical attention to prevent death as acute disease. It is

commonly assumed that growth faltering starts at around 3 months of life (12). Therefore, malnutrition prevention measures and interventions needs to start in early life.

The nutritional situation of Thailand dramatically improved during the 1980s to middle 1990s, with the implementation of multi- sector policies and programs focusing on poverty reduction and primary health care. Economic improvements, better access to health care services, and effective community- based programs contributed to these positive trends. However, still remain underweight prevalence in children under 5 years of age remained at 10 – 15 % and 10 – 12 % for stunting over the past 20 years. Wasting has been comparatively low (5 %) (13).

The nutritional status of children has an impact on child growth and development. Therefore, the physical, mental, social and nutritional status of children, as well as other characteristics related to malnutrition should be evaluated periodically to monitor malnutrition, thereby enabling appropriate measures that can be implemented to prevent malnutrition (1).

Parental child rearing way or technique are important in influencing child growth and development. Parents, especially mother should have the proper knowledge, attitude and practice about child care (14). In the causal matrix of the malnourished, an important underlying determinant is care provided to children by the parents or caregivers. There is increasing awareness that cultural and behavioral practices with regards to child rearing practices influence child nutrition (15).

Parenting style is a psychological construct symbolizing standard strategies that parents use in their child rearing. There are many opinions and theories on the best way to rear children, as well as different levels of time and effort that parents are willing to invest. The construct parenting styles has been widely known by Baumrind's who published defining parenting style in four basic elements that are demanding controlling and undemanding low in control attempts versus accepting responsive and rejecting unresponsive as an shape successful parenting. Parenting style of three are referred conceptualization of authoritarian, permissive and authoritative by Baumrind's. It encompasses various characteristics such as communication style, maturity, nurturance, warmth and involvement (16-21). On the one hands, Maccoby and Martin were broaden parenting style into four categories

involving a combination of demand and control versus acceptance and responsiveness. These four style are identified to as authoritative, authoritarian, indulgent and neglectful (17, 18, 21, 22).

Parenting style need to be emphasized as an important aspect of prevention. Parental attitude are predictive for obesity, eating behavior, physical activity and hyperactivity problem in school children (23-26). Attachment parenting is a highly respected approach that promotes securely attached children, but baby parenting that have been known to include detachment leads to behavior disorders, dehydration, failure to thrive, irritability, infant anorexia and even infant death (27). The family is a socio- cultural- economic arrangement that exerts significant impact on children's behavior and development of their characters (28, 29). Any ignorance on the part of parents may occur to unwanted damaging effects on child growth and thereafter may create misbehavior problems in children (29). All the children have a temperament that will influence their emotional characteristics and how they adapt to change in their environments (30, 31). The kind of environment children live in during the first few years of life exerts a strong influence on the eventual outcome in development. Children need to grow physically and mentally through parental care, attention, support and love from parents and environment (14). As a child grow and develop, the child needs change, and with that parenting needs to change as well according to the needs of the child (30, 31).

It may be difficult to define "good" child rearing, because there are many strategies and changing according to child situation and environment. In addition, it is difficult to decide and judge what correct child rearing is. However, it is important to mention about appropriate child rearing for mothers and caregivers to make an effort to take proper care of their children. Most studies (32-35) focused on children at school age and adolescent years, however these limited of studies estimate child rearing with child nutritional status during the first year of life. Children especially infants often heavily favor the company of parents in the first years of life. The attachment bond responsible for this behavior is an emotional connection that helps children trust parents, which eventually aids in relationship development later in life. The degree to which children attaches to parents depend on parenting style. The information about child rearing patterns during the infancy period is limited.

Moreover, the procedure to verify the validity of the child rearing patterns have not been fully explored. Therefore, to reveal the relationship between child rearing and child nutritional status would support child development, growth and health. The benefit of this study will be to improve children health care through “good” child rearing and which will reduce nutritional and developmental problems in children. Thus, it will be improved the quality of life among Thai children.

1.2 Research questions

Does child rearing affect child nutritional status during the first year of life?

1.3 Research objectives

General objective

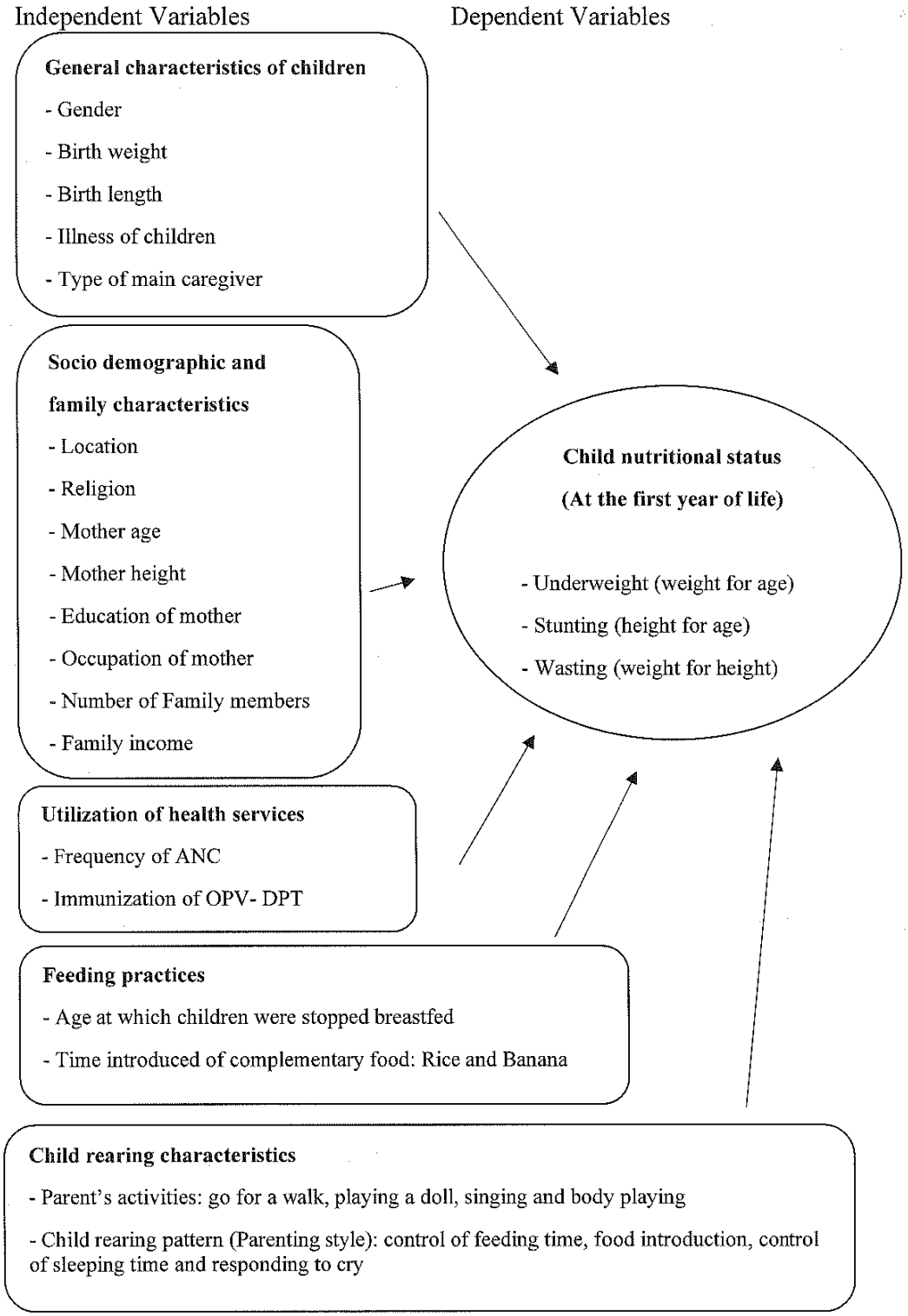
To determine the relationship between child rearing and child nutritional status during the first year of life in Thailand.

Specific objectives

1) To investigate the prevalence of child nutritional status at the first year of life in Thailand.

2) To examine an association between child rearing and child nutritional status during the first year of life in Thailand when considering other related factors.

1.4 Conceptual framework



1.5 Operational definition

1.5.1 Dependent variables

1.5.1.1 Child nutritional status

The nutritional status and well-being of children is measured on the basis of Weight-for-Age, Height-for-Age and Weight-for-Height indices below minus two standard deviations. The same cutoff point was used to define wasting, stunting and underweight for reference, New WHO reference. Child nutritional status divided in each of two categories, underweight or normal, stunting or normal and wasting or normal.

1.5.2 Independent variables

1.5.2.1 General characteristic of children

Gender: It was categorized into 2 groups; boy and girl

Birth weight: It was measured in grams then transformed into low birth weight using cut-off value at 2,500 grams; < 2,500 grams as low birth weight and ≥ 2,500 grams as normal

Birth length: It was divided using mean from data analysis by cut-off point at 50 centimeter; < 50 cm, and ≥ 50 cm

Illness within 12 months: It was interviewed whether the children who had sickness and had been admitted in the hospital and categorized into two groups; yes or no

Type of main caregiver: It was asked who is looking after the child mainly and divided 2 groups; 1st group is parents and 2nd group is relative such as grandfather, grandmother, uncle and aunt

1.5.2.2 Socio- demographic and Family Characteristics

Location: The data was classified into 5 categories. 1) Central area: Phanomtuan District, Khanchanaburi Province, 2) South area: Thepa District, Songkhla Province, 3) North East area: Kranuan District, Khon Kaen Province, 4) North area: Muang District, Nan Province and 5) Bangkok area: the capital city.

Religion: It was categorized into 2 groups; Group1 is Buddhism, group 2 is not Buddhism (Islam, Christian, Ghost and Others).

Mother age: It was categorized in to 2 groups using cut-off value at 20 years, the risk group was defined as mother age less than 20 years.

Mother height: It was classified by cut-off point at 145 in centimeter cm; <= 145 cm, and >145 cm.

Education of mother: the levels of education were proposed as dichotomous namely illiterate and literate or higher than grade 1 (grade 1- 6 and 7 - 12, college, or bachelor degree). For this study, this variable was categorized into 2 groups; Group 1 is higher than primary school and group 2 is lower and equal primary school.

Occupation of mother: It was modified from that of National Statistic Office, Thailand, and generated such as farmer, business, profession, agriculture labors, construction labors, clerk, and house wife or students or none paid work labors. For this study, this variable was categorized into 2 groups; Group 1 is employed, group 2 is unemployed.

Number of family members: It was divided using mean from data analysis by cut-off point from data analysis at 5 people; < 5 people and ≥5 people.

Family income: Annual income was difficult to be determined directly because most subjects are farmers so their regular income could not be guaranteed. In addition to salary for some, annual of family was calculated based on father or mother who had best income in the family. The total sum was then computed. To avoid small numbers in the multilevel analysis model, this variable was categorized based on its distribution into 2 level using quartiles. Family income was categorized into 2 levels; group 1 –the low income (income ≤ Percentile 25^{th}), and groups 2, -not low income group (income ≥ Percentile 25^{th}).

1.5.2.3 Utilization of health services

Frequency of ANC: It was divided by cut point at 4 times; < 4 times and ≥ 4tmes

Immunization status: OPV- DPT: It divided by cut point into complete immunization for age or not complete immunization at age. History of child health care service was interviewed and extracted from child health vaccination service record more than 3 times at age 12 months.

1.5.2.4 Feeding practices

Age at which children were stopped breastfed: It refers to feeding of breast milk direct from the maternal breast whether they stopped breast fed in months. Due to the fact that the available data of PCTC does not allow for specific estimation of exclusive breastfeeding and this will not be a factor and breast feeding classified into 2 groups under the following at age less than 6 months, longer and equal than 6 months.

Time introduced of complementary food (rice and banana): It refers to feeding of both breast milk and solid or semi-solid food. Duration of complementary feeding based on the number of months of feeding, for logistic model at 6 months. This two variables were classified into two groups under the following complementary feeding at age <6 months and ≥ 6 months.

1.5.2.5 Child rearing characteristics

Mother activities (parenting activities during the day time in the week) go for walk, playing a doll, singing and body playing: There are 4 questions and divided into 2 groups; Group 1 is Yes (always/ sometimes), group 2 is No (never).

Father activities (parenting activities during the day time in the week) go for walk, playing a doll, singing and body playing: There are 4 questions and divided into 2 groups; Group 1 is Yes (always/ sometimes), group 2 is No (never/ father is not here/ don't have a father).

Child rearing pattern; control of feeding time (Did you schedule time for feeding and how?): It was divided into 2 groups; 1st group is rational parenting style and 2nd group is control, over protection, neglect and other parenting style.

Child rearing pattern; food introduction (What did you do when your child refuse to new food?): It was divided 2 groups; 1st group is rational parenting style and 2nd group is control, over protection, neglect and others parenting style.

Child rearing pattern; control of sleeping time (When did you bring your child to bed?): It was divided into 2 groups; 1st group is rational parenting style and 2nd group is control, over protection, neglect and others parenting style.

Child rearing pattern; responding to cry (What did you do when your child cry or has a bad temper?): It was divided into 2 groups; 1st group is rational parenting style and 2nd group is control, over protection, neglect and other parenting style.

1.6 Limitation of the study

The study was only concerned child nutritional status such as underweight, stunting and wasting. Overweight or obesity are also problem currently in Thailand. However, the study did not assess so that overweight or obesity factor is deferent from these child nutritional status.

The study was not concern the knowledge of caregivers regarding child rearing.

The study was only concerned time introduced complementary food such as rice and banana. It was not assess frequency of food feeding or types of food.

CHAPTER II
LITERATURE REVIEW

This research aims to verify the relationship between child rearing and child nutritional status during the first years of life. This chapter present literature review will cover as bellow:

2.1 Global child nutritional status

2.2 Present the trend of child nutritional status in Thailand

2.3 Child growth description

2.4 Feeding practices in children

2.5 Child rearing

2.6 Theory of the study

2.7 Related study

2.1 Global child nutritional status

Underweight: The most recent estimated of the global burden of malnutrition in children under 5 years of age is that 101 million were underweight, or approximately 16% in 2011. 33% of highest underweight prevalence has in South Asia and 21 % in sub- Saharan Africa. South Asia has 59 million underweight children, while sub- Saharan Africa has 30 million. The prevalence of underweight children under 5 years of age is an indicator to measure progress towards MDGs 1, which aims to halve the proportion of people who suffer from hunger between 1990 and 2015.

Globally, underweight prevalence has declined, from 25% in 1990 to 16% recently. It means 37% deduction. The highest deductions have been achieved in Central and East Europe and the Commonwealth of Independent States, where prevalence has decreased by 87%, and in East Asia and the Pacific, where it dropped 73% (as with stunting, driven largely in the latter region by deductions made in China). Still slow in progress in sub- Saharan Africa underweight prevalence fell by 26% according to region (36).

Stunting: There were more than 165 million stunted children under 5 years of age in 2011. It means that more than one- quarter (26%) of children in worldwide. Sub-Saharan Africa and South Asia are home to three- fourth of the world's stunted children. There are 40% of children under 5year of age who were in sub- Saharan Africa and 39% of children were South Asia. Fourteen countries are home to 80% of the world's stunted children (Table 2.1).

The global prevalence of stunting in children under 5 years of age decreased 36% over the past two decades from an estimated 40% in 1990 to 26% in 2011. The highest decreases in stunting prevalence occurred in East Asia and the Pacific. This region experienced about 70% deduction in prevalence from 42% in 1990 to 12% in 2011.The major deduction was largely due to improvements made by China. Latin America and the Caribbean declined stunting prevalence by early half while the same time. The South Asia and Middle East and North Africa regions have both achieved more than a one- third deduction in stunting prevalence (36).

Table 2.1 80 percent of the world's stunted children live in 14 countries

Ranking	Country	Year	Stunting prevalence (%)	% of global burden (2011)	Number of stunted children (moderate or severe, thousands)
1	India	2005–2006	48	38	61,723
2	Nigeria	2008	41	7	11,049
3	Pakistan	2011	44	6	9,663
4	China	2010	10	5	8,059
5	Indonesia	2010	36	5	7,547
6	Bangladesh	2011	41	4	5,958
7	Ethiopia	2011	44	3	5,291
8	Democratic Republic of the Congo	2010	43	3	5,228
9	Philippines	2008	32	2	3,602
10	United Republic of Tanzania	2010	42	2	3,475
11	Egypt	2008	29	2	2,628
12	Kenya	2008–2009	35	1	2,403
13	Uganda	2011	33	1	2,219
14	Sudan	2010	35	1	1,744

Source: UNICEF Global Nutrition Database, 2012, based on MICS, DHS and other national surveys, 2007-2011, except for India (36)

Wasting: Around 8% of the world's children under 5 years of age, an estimated 52 million children suffer from moderately or severely wasting in 2011. Moderate ad serve wasting represents an acute from under nutrition, 11% decline from the estimated 58% million children under 5 years of age (5%) in 1990. More than 29 million children were serve wasting as result of acute under nutrition.

The highest wasting prevalence is in South Asia, where approximately or severely wasted. The burden of wasting is highest in India, which has more than 25 million wasted children (Table 2.2). In sub- Sahara Africa, nearly 1 in 10 children under 5 of age (9%) were wasted in 2011. Prevalence that has declined about 10% since 1990 in order to population growth but the region is now home to one- third more wasted children than it was in 1990. The number of sub- Saharan Africa as proportion of the world's total has in growing over the same time. South Sudan, Indian Timor- Lester, Sudan, Bangladesh and Chad have very high prevalence of wasting above 15% (36).

Table 2.2 Wasting: Burden estimates in the 10 most affected countries

Ranked by prevalence (2007–2011)	Country	Year	Wasting prevalence (%, moderate or severe)	Wasting prevalence (%, severe)	Number of wasted children, 2011 (moderate and severe, thousands)
1	South Sudan	2010	23	10	338
2	India	2005–2006	20	6	25,461
3	Timor-Leste	2009–2010	19	7	38
4	Sudan	2010	16	5	817
5	Bangladesh	2011	16	4	2,251
6	Chad	2010	16	6	320
7	Pakistan	2011	15	6	3,339
8	Sri Lanka	2006–2007	15	3	277
9	Nigeria	2008	14	7	3,783
10	Indonesia	2010	13	6	2,820

Source: UNICEF Global Nutrition Database, 2012, based on MICS, DHS and other national surveys, 2007-2011, except for India (36)

2.2 Presents the trend of child nutritional status in Thailand

Since 1987, monitoring nutritional status trends of underweight, stunting and wasting among children under 5 years of age in Thailand. According to The first National Health Examination Survey (NHIES) and The World Health Organization (WHO) growth standards, the prevalence of stunting and underweight have effectively decreased in 1987. No serve malnutrition among young children has been reported as publish health problem since the late 1980s (13). The situation greatly improved during the 1980s to 1990s, with the implementation of multi- sector policies and programs focusing on poverty alleviation and primary health care. Economic development, improved access to health services and effective community- based nutrition programs contributed to these positive trends. However, the prevalence of low birth weight at 8- 10%, while stunting and underweight declined to about 10% by the 1990s, with small change thereafter (13). Thailand having achieved marked reductions in protein- energy malnutrition and micronutrient deficiencies among children and women within two decades However, still remained at 10- 15 % for underweight and 10- 15 % for stunting over the past 20 years. Wasting has been comparatively low (5 %) (13). Figure 2.2 showed that percentage of child nutritional status aged 0-59 months in Thailand, 2005- 2006. It is starting growth faltering from 3 months of life and recommended with special attention to children under 2 years of age by UNICEF.

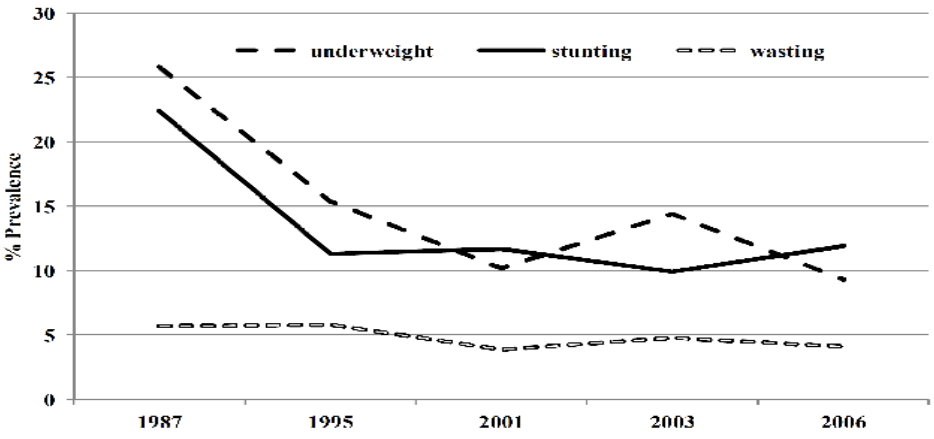


Figure 2.1 Trend of nutritional status of children under five in Thailand based on national representative survey using NCHS growth reference or WHO growth standard (13)

Sources: 1. Thailand Demographic and Health Survey 1987; 2. National Nutrition Survey, Thailand 1996; 3. Holistic Development of Thai children, 2001; 4. National Nutrition Survey, Thailand 2003; 5. Multiple Indicator Cluster Survey, Thailand 2006

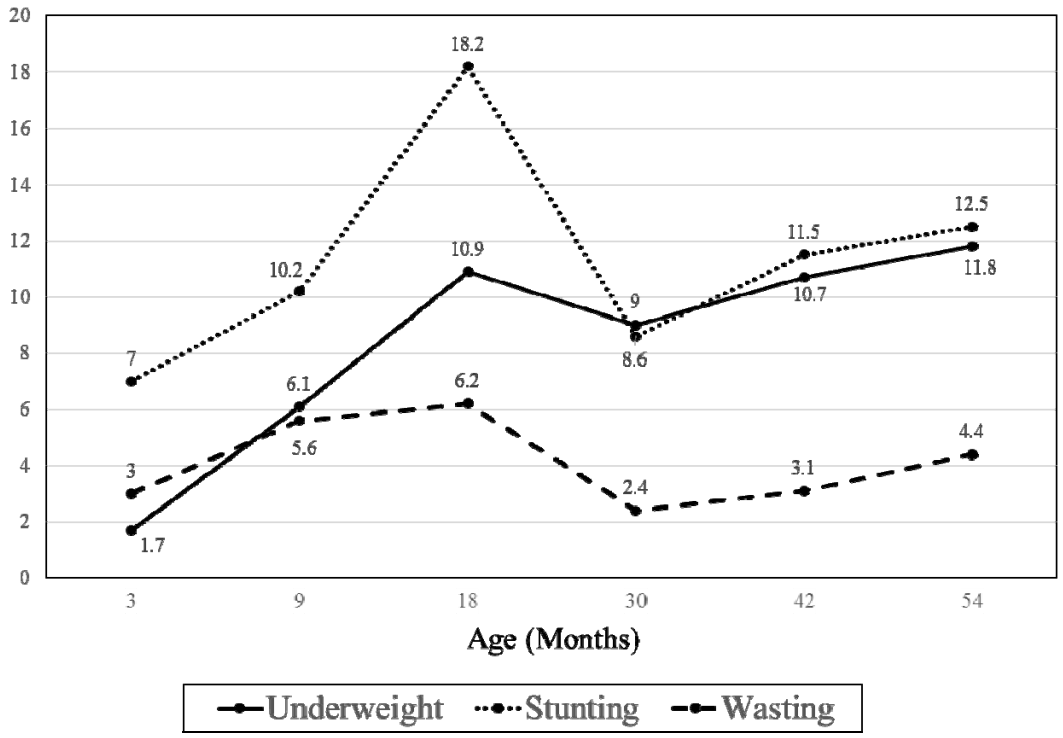


Figure 2.2 Percentage of child nutritional status aged 0- 59 months in Thailand, 2005-2006

Source: MICS, UNICEF (7)

2.3 Child growth description

The anthropometrics indices have three most commonly child growth indicators that assess child nutritional status are weight for age, height for age and weight for height. The meaning of these indices are as follows:

Low Weight-for-age: Weight-for-age is reflecting body mass relative to chronological age. In response to the influence of both the height of the child (height-for-age) and weight (weight-for-height), and its composite nature makes interpretation complex. For example, weight-for-age goes wrong in order to distinguish between short children of adequate body weight and tall, thin children. However, in the absence

of significant wasting in a community, similar information is provided by weight-for-age and height-for-age, in that both is reflecting the long-term health and nutritional experience of the individual or population. Especially reduction clarifies change of the weight-for-height by a short-term change in weight-for-height. Generally, a global change of low weight-for-age and its age distribution is the same as that of the case of low height-for-age (37).

Low Height-for-age: Stunted growth is reflecting the process of the failure which reaches linear growth potential as a result of the second best health and nutritional status. On a population basis, it is frequently related with the poor socioeconomic conditions of a high level of poor development, and disadvantageous conditions, such as a sick and unsuitable feeding practices, by the increase in the risk of early exposure. Similarly, the decline in a national stunting rate is a usual index of an improvement of the socioeconomic situation of the whole country. In developing countries, a global change of the prevalence of low height-for-age is considerable, and has reached to 5% to 65% (37, 38). By many of such setup, a prevalence begins to rise by the age for about three months, and after it means execution in parallel with the standard of height in process of stunting, it becomes slow down at the age of around three. Therefore, the age of the child changes the interpretation of results of an investigation. Low height-for-age probably reflects a continuing process of "failing to grow" or "stunting" for children in the age group below 2-3 years. It reflects a state of "having failed to grow" or "being stunted" for older children. It is important for it to distinguish length and height in two related terms. Length is how to be recommended for measuring by recumbent position and measuring with children below 2 years of age or less than 85 cm tall. On the other hand, height is how to be recommended for measuring by standing. Term height is used in the whole database which covers measurement of all the both for simplification (37).

Low Weight-for-height: Wasting or thinness indicates in most cases a recent and severe process of low weight, which is often related to acute starvation and serious disease. However, wasting may also be influence of chronic disadvantageous conditions. There is no prevalence of wasting which is usually less than 5% in the serious food shortage also even in the developing country. In the index of severity, the seriousness of the prevalence is between 10-14%, and critical is made into 15% or

more. Generally, the prevalence shows that low weight-for-height is a peak in the second year of life. Lack of the proof of wasting in a population does not mean that there is no problem of the present nutrition. Stunting and other deficits may exist (37, 39).

The three indices are used to identify the tree nutritional status are underweight, stunting and wasting. Based on the thresholds of WHO child growth standards about weight for age, length/ height for age and weight for length/ height (40). Child nutritional status will be categorized as follow:

Table 2.3 Weight for Age indices for child nutritional status

Z scores of weight for age	**Nutritional status**
≥ + 3 SD	Heavy
+ 2 SD- < + 3 SD	Overweight
- 2 SD - < + 2 SD	Average weight
- 3 SD - < - 2 SD	Under weight
< - 3 SD	Light

Source: WHO- Child guideline standards (40)

Table 2.4 Length/ Height for Age indices for child nutritional status

Z scores of length/ height for age	**Nutritional status**
≥ + 3 SD	Tall
+ 2 SD- < + 3 SD	Slightly tall
- 2 SD - < + 2 SD	Average height
- 3 SD - < - 2 SD	Slightly short
< - 3 SD	Short

Source: WHO- Child guideline standards (40)

Table 2.5 Weight for Length/ Height indices for child nutritional status

Z scores of length/ height for age	Nutritional status
≥ + 3 SD	Obese
+ 2 SD- < + 3 SD	Fat
+ 1 SD - < + 2 SD	Slightly fat
- 1 SD- < + 1 SD	Proportionate
- 2 SD- < - 1 SD	Slightly slim
- 3 SD - < - 2 SD	Slim
< - 3 SD	Skinny

Source: WHO- Child guideline standards (40)

2.4 Complementary feeding practices in children

Feeding practices in children are multidimensional and these change rapidly within short age intermissions in the first year of life (41). Breast feeding for the first few years of life protects children from infection, ensure the growth and health of children, provides an ideal source of nutrients, and is economical and safe (7). Furthermore, it is important to start complementary food for children during first year of life. It provides about one- half of an infant's energy needs up to the first year of life and up to one- third during the second year of life (42). However, only breast milk is no longer sufficient to meet the nutritional requirements of infants after 6 months of age. Therefore, other foods and liquids are needed to fill the gap between total nutritional needs of infant and the amounts provided by breast milk (41, 43). As frequency of meal for healthy breastfed infants, 2- 3 meals of complementary foods should be provided per day at 6- 8 months of age, 3- 4 meals per day at 9- 11 months and 12- 24 months of age, with additional nutritious snacks 1- 2 times per day. If energy density or amount of food per meal is low, or the child no longer breastfed, more frequent meals may be required (43, 44). Moreover, breastfed infants need more than 90% of the iron requirement in complementary foods and also need bioavailable iron (45). Both breastfeeding and food practice influence the quality of complementary feeding, and mothers and families should support to practice good complementary

feeding (42). Also, during feeding practice, need talking to children with eye and eye contact through periods of learning and love for infants (43).

2.5 Child rearing

Child rearing is mean that the process of promoting and supporting the physical, psychological, social and intellectual development to a child from birth to become an adult. Good nutrition and health, consistent loving care and encouragement to learn in the early years of life help children to do better at school, be healthier have higher earnings and participate more in society. This is especially important for children in poverty (46).

Globally over 20 million children do not reach their development potential in the first 5 years of age. The reasons were that children live in poverty, and have poor health services, nutrition and psychosocial care. WHO recommended that care for child development recommends play and communication activities for families to stimulate the learning of their children. Play and communication as well as good feeding, will help your child grow healthy and learn. These activities are especially important in the first year of life (46).

2.5.1 Theories of child rearing

Beginning in the 17th century, two of French independently wrote works that been broadly affect in child rearing, John Locke's 1693 book "Some Thoughts Concerning Education" is a familiar foundation for educational pedagogy from a Puritan opinion. Locke highlights the importance of experiences to a child's development, and mentions developing their physical habits first (47). The French philosopher Jean- Jacques Rousseau published a book on education, "Emile or on education" in 1762. He suggested that early education should be consequent fewer from books and more from a child's interactions with world (48). Of these, Jean-Jacques Rousseau is more concerned with slow parenting, and John Locke is more for determined cultivation.

Jean Piaget's theory of cognitive development make a description of how children signify and reason about the world. This is a developmental stage theory that

composes of sensorimotor stage, preoperational stage, concrete operational stage and formal operational stage. Piaget was a pioneer in the field of child development and continues to effect parents, educators and other theorists (49).

Frank Furedi is a sociologist with especially interest in parenting and family. He believes that the actions of parents are less make a description than others claim and he make a description the term infant determinism as the determination of a person's life expects by what happen to them during infancy, asserting that there is little or no evidence for its truth. During other commercial, governmental and other interests always try to parents to do more and worry more for children, he believes that children are ability of developing well in almost situations and environment (50).

In 1998, independent scholar Judith Rich Harris published "The Nurture Assumption" in which she asserting that scientific evidence, particular behavioral genetics, showed that all different forms of parenting do not have significant influences on children's development, small of cases of severe abuse or neglect. The purported effects of different forms of parenting are all illusions caused by heredity, the culture at large, and children's own influence on how their parents treat them (51).

2.5.2 Parental style defined

Parenting style is a psychological construct symbolize standard strategies that parents use in their child rearing. Parenting is a complex activities including many specific behaviors that individual work and together to influence child outcomes. Many writers have mentioned that specific parenting practices are less important in predicting child well- being than is the wide pattern of parenting (18). During the early 1960s, Diana Baumrind conducted about child care practices study on more than 100 preschool children for identified four important dimensions of parenting such as 1) Disciplinary strategies, 2) Warmth and nurturance, 3) Communication style, 4) Expectation of maturity and control (52).

Based on these dimensions, Diana Buumrind identified three major parenting style in early child development. These were Authoritarian, Authoritative and permissive. These parenting style were later extended by Maccoby and Martin who suggested addition of four parenting style including Neglectful. These four style

of parenting involve combinations of acceptance and responsiveness on the other hand and demand and control on the other.

Table 2.6 Parenting style defined

Dianna Baumrind's Four Parenting Style **Maccoby and Martin's Four Parenting Style**		
	Demanding **Controlling**	**Undemanding** **Low in control attempts**
Responsive **Accepting**	Authoritative/ Propagative	Indulgent/ Permissive
Unresponsive **Rejecting**	Authoritarian/ Totalitarian	Neglectful/ Involved

Authoritarian: The authoritarian parents are shape, strict, control and evaluate the behavior and attitude of the child in accordance with a set of standards of conduct, usually an absolute standard, theologically motivated and formulated by higher authority. The authoritarian parents fail to explain the reasoning behind these rules. These parents do not encourage verbal give and take, believing that the child should accept their words for what is right. These parents have high demands, but are not responsive their child. This parenting style places high demands on regard for child input. As result, the authoritarian rearing style is not necessarily conducive to positive child outcomes (18, 52).

Authoritative: The authoritative parents direct the child's activities but in a rational issue oriented way. The parents encourages verbal give and take, and shares with the child the resounding behind their policy. The parents can understand how their children are feeling and teach them how regulate feelings. The parents often help their children to find appropriate outlets to solve problem. The authoritative parents are not usually as controlling as authoritarian parents, allowing the child to explore more freely, thus children who are more independent and self- reliant. The authoritative style mainly results when there is high parental responsiveness and high

parental demands. The authoritative rearing style is considered to provide the most favorable adult outcome especially when dyadic parenting (18, 52).

Permissive: The permissive parents behave in an allowing and affirmative manner towards the child's desires, impulses and actions. The parents consults with the child about policy decisions and gives explanations for family rules. The Parents are responsive but not demanding. The parents are nurturing and accepting, and are responsive to the child's need and wished. The parents allow the child regulate their own activities as much as possible, avoids the exercise of control, and does not encourage them to obey externally defined standards. The parents attempt to use reason but not overt power to accomplish their ends (18, 52).

Neglectful: The neglect parents is ignorant or uninterested to their child's development needs, parents are inconsistent with emotion, affection, and discipline and range from not reacting at all to their child's behavior to marvelous overreaction. This style is low in both responsiveness and demandingness. In extreme cases, this parenting style may even involve both reject and neglect parents, although most parents of this type drop within the regular rage. Because parenting style is a typology, rather than a linear pairing of responsiveness and demandingness, each parenting style is more than dissimilar from the totality of its parts (18).

2.6 Theory of the study

Conceptual framework of the study is consisted based on the UNICEF conceptual framework of the Determinant of Nutritional status as part of nutritional strategy in 1990 (53). Figure 2.3 showed that malnutrition in children was attributed directly two intermediate determinants individual dietary intake and health status. These, in turn, depend on three underlying determinants such as household food security, the quality of care and healthy environment health. These underlying determinants need to be supported by resources. For child rearing, it can be apply in the quality of care depends on caregiver resource such as knowledge and education,

appropriate care skills, health and management ability. The other factors follow as below.

The outcome of the study: Child nutritional status (Underweight: Weight for Age below -2SD from WHO reference, Stunting: Height for Age below -2SD from WHO reference, Wasting: Weight for Height below -2SD from WHO reference)

Immediate factors: Feeding practice (Age at which children were stopped breastfed, Time introduction of complementary food), General characteristics of Children (Illness within 12 months).

Underlying factors: Child rearing (Parent's activities, Child rearing pattern), Socio-demographic and Family characteristics (Location, Religion, Mother age, Mother height, Education of Mother, Occupation of mother, Number of family member, Family income), Utilization of health services (ANC, Immunization of OPV-DPT), General characteristics of Children (Gender, Birth weight, Birth length, Type of main caregiver).

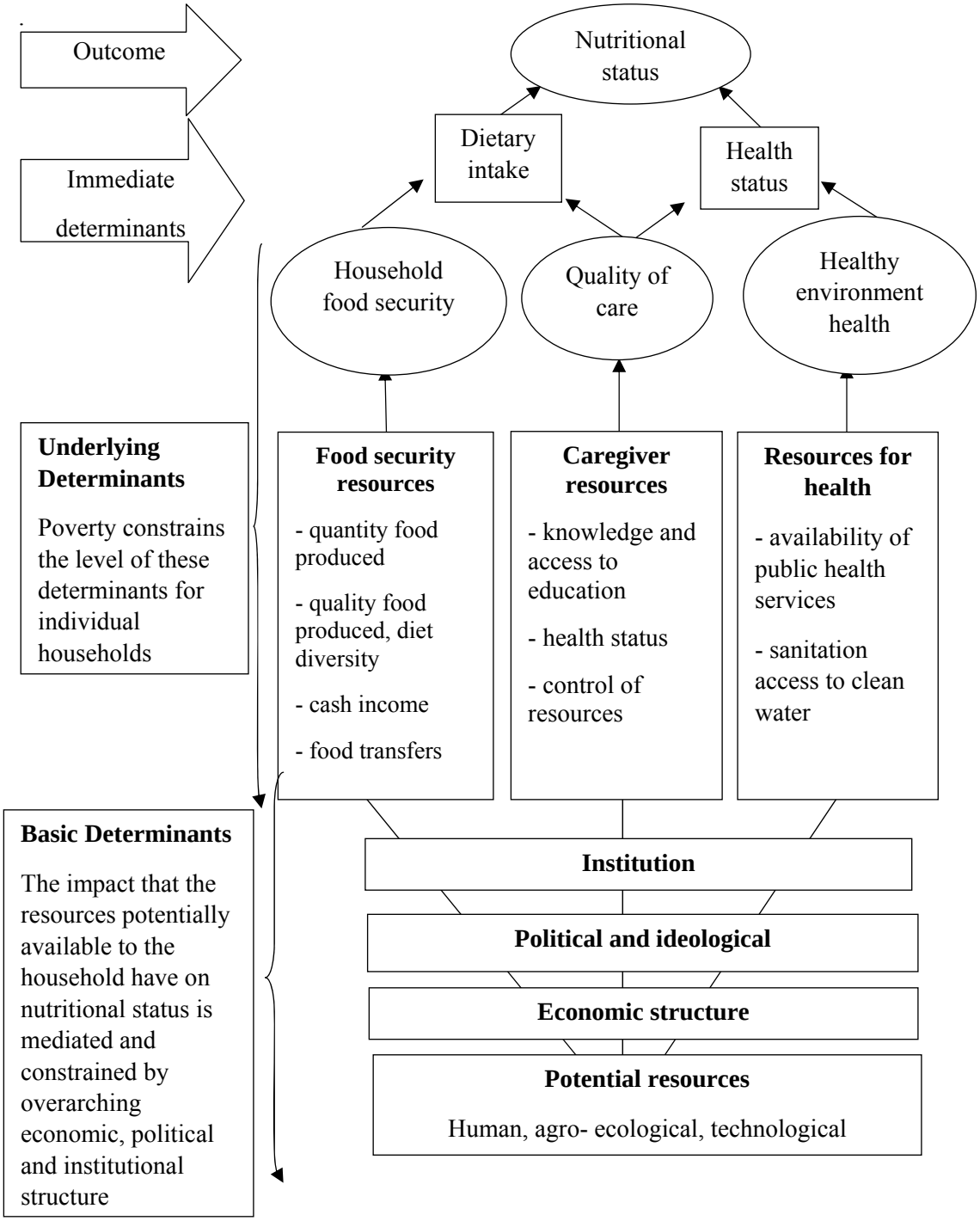


Figure 2.3 The UNICEF Conceptual Framework of the Determinants of Nutritional status

Source: Jonsson 1993: Smith and Haddad 2000: and UNICEF 1990 (54)

2.7 Related study

2.7.1 General characteristics of children associated to child nutritional status

Gender

The previous studies showed that revealed a higher prevalence of malnutrition in boy than girl (1, 55, 56). In case of Stunting, some studies showed that the prevalence of stunting among boys is higher than girls (57, 58). The other hands, the study of Bangladesh and Philippines showed that female children had worse nutritional status than male children. Possible reasons are that some parents look after male children treasures than female children in order to male children may be important source of labor on the family farm, expected to provide economic and social security for their parents and the family name is carried on by sons (59, 60).

Birth weight

Low birth weight was found to be the most important factor related to malnutrition, which is consistent with found of previous studies (61, 62).

Birth length

Children were very small or average size had respectively higher risk of being underweight, stunting and wasting than large in size at birth (63).

Illness within 12 months

Sick children often lose their appetite. Children stop or reduce eating end up with nutritional level. Adequal nutrition care during illness and severe malnutrition are very important because sick and malnutrition children have a higher risk of complications, disabilities and death if their nutrition care is neglected (64). Child care and feeding during illness are important determinants of the child nutritional status, however children directly affect dietary intakes and health status. Owing to increased losses of body stores, low absorption of food from gut, poor appetite and low intake, diarrhea often occurs leading to malnutrition. Moreover, the child is likely to have

repeated episode of severe diarrhea unless malnutrition is addressed. Most of the time, diarrhea is due to faulty infant feeding practices, particularly inadequate breastfeeding and contaminated weaning foods (13).

Type of main caregiver

In Thailand, number and percentage of children aged 0 - 4 years according to living arrangements by living with parents showed that number of children is 4,566,922, children living with both parents is 2,905,597 / 63.6 %, children living neither parents is 898,393 / 19.7 %, children living with mother only is 662.838 / 14.5 %, children living with father only is 100,094 / 2.2 % in 2008 (65). Number of Children 0- 4 years whom mother not stay in household by taking care showed that number of children is 977,661, by father is 111,495, by elder is 2,024, by grandparent (one's paternal) is 543,149, gland parent (one's maternal) is 224,521, by relative is 91,574, by others is 4,898 in 2008 (65). The study of UK found that Grandparents were the main child care arrangement for 35 % of families where the mother was working or studying when the child was 9 months of age, ahead of all other types of care (66).

2.7.2 Socio demographic and family characteristics associated to child nutritional status

Location

Residence seems to influence the occurrence of malnutrition. The overall nutritional status of preschool Thai children has improved, preschool children in Northern and North East regions are more likely to be malnourished than those in other regions. A previous study of PCTC also showed that the highest rate of incident and prevalence of stunting among children residence in Northern hill region (67). In many countries the nutritional status of lower socio-economic children is worse among all urban groups and poorer than the rural average (68). The study of Vietnam found that living in rural area and mountain area were factors for malnutrition. This may have occurred due to differences in economic level, and cultural and social security which result in poor accessibility to health care services and luck of educational (1).

The other hands, study of Libya found that most cases of malnutrition were among urban dwellers (69).

Religion

Thailand is a mostly Buddhist South East Asian nation, with small Muslim and Christian communities. According to the Thai Government's National Statistics Office, Thailand is 94.6% Buddhist, 4.6% Muslim, and 0.7% Christian, with another 0.1% adhering to various other religions (70). Religion is now projecting in scientific studies that consider its influence on health (71, 72).

Mother age

Mother age less than 20 years old were related the nutritional status of children (73). The previous study showed that a child born to mother under 20 years old is twice as likely to die in infancy as child born to mother in mid- twenties (74).

Mother height

Mother height and weight were found to have a significant association with the nutritional status of the infant. This could be attributed to the fact that maternal nutritional status is a determinant of lactation performance and therefore inevitably of the state of infant nutrition (75).

Education of Mother

The education level of mother was found to be one of the most important factors of malnutrition. Children whose mothers have a junior high school education were found to be 1.7 times more likely to be underweighted than children whose mothers have an educational level of senior high school or higher. In addition, Children whose mothers have a junior high school education were found to be 2.6 times more likely to show signs of wasting than children whose mothers have an educational level of senior high school or higher (1). Also, study of Iran showed that the relative risk for under nutrition was higher in children of both less and highly educated mothers compared with mothers with an intermediate level of education (31).

For study of India, a highly significant association with malnutrition was associated with mother's educational status (76).

Occupation of Mother

The study of Indonesia revealed that children of working mothers had significantly lower Height- for- Age Z-score (HAZ) than that of non-working mothers. This study identify that children of mothers who had informal work were group at risk of malnutrition (77). The study of Vietnam found that the prevalence of underweight, stunting and wasting among children who had a mother who was a famer was higher than that of mother who had a mother who was office worker or housewife (1). However, study of Iran showed that Mother's employment was negatively related to nutritional status of these children in day care centers (78). The study of India, the mothers of the most malnourished groups of children were all working outside the home (79). This can be explained as being due to the mothers' reduced time for child care.

Number of family member

In Thailand, the average size of household was 3.2 member in 2010 (65). The study of India, a highly significant association with malnutrition was associated with family structure (76). Other study of Vietnam showed that children from family with 5-6 members were found to be 0.2 times more likely to be underweight and 0.4 times more likely to be wasting than children from families 4 members and under. In addition, children from family with 7 members and over were 0.3 times more likely to be underweight and 0.2 times more likely to be wasting that those from family with 4 members and under (1).

Family income

Family income is an important characteristics of the home environment. The National Statistics Office showed that household nationwide earned on average 20,903 baht per month, and household nationwide spent on average 16,205 baht per month in 2009 (65). The number of socio- economic factors were significantly associated with nutritional status of the infancy. Income was significantly associated

with the nutritional status of children aged 6-36 months (79). Also, study of corroborates result showed that significant positive associations between high income and good nutritional status in pre-school children (60, 79, 80).

2.7.3 Utilization of health services associated to child nutritional status

Frequency of ANC

Accessibility, affordability, availability and utilization of health care services are main factors that impact on maternal and child health in developing countries. However, utilization of health care services is not only purpose to treatment of diseases services, also practicing disease prevention and health promotion behaviors to ensure prevention, early detection (81). Maternal and child health service is the one of health services that promote antenatal care, postnatal care though infant and child health care (82). In Thailand, the overall coverage for MCH services is over 90% [e.g. ANC, delivery care, Well Child Care (WCC), and immunization]. However the quality of care is not uniform at all health facilities providing these services. The study of Thailand, revealed that some MCH services are omitted and communication between patients and health providers is less than optimal (83). The study found that mothers who had attended more ANC visit were higher risk to being wasting and underweight. Possible reason suggests the significance of health care services in reducing the incidence of wasting and underweight (84). Therefore, it is expected that the number of ANC visit related to nutritional status.

Immunization status: OPV-DPT

Every children is required to receive all basic immunization for the age by each country. The child immunization in Thailand is presented in the table 2.7 below. Most recent Immunization coverage rates were 99% for BCG, 99% for DPT 3doses, 99% for OPV 3doses, 98% for Hepatitis B 3doses in 2012 by WHO and UNICEF estimates time series for Thailand (85). DPT vaccine protects children from three diseases such as diphtheria, pertussis and tetanus. The vaccine is given in three dosages within 6 months and a booster at 18 months and at 4-6 years of age. OPV is oral polio vaccine drops for protection against polio. Children aged 12 months were

supposed to complete Immunization OPV- DPT at least 3 doses each in this study. The study of Thailand, found that 10% of children in Bangkok congested area that had not received any immunization (86).

Table 2.7 The child immunization in Thailand

Age	Immunization
Newborn	BCG, HBV_1
1 month	HBV_2
2 moths	DPT_1, OPV_1
4 months	DPT_2, OPV_2
6 months	DPT_3, OPV_3, HBV_3
9 months	Measles or MMR
18 months	DPT_4, OPV_4, $JE_{1,2}$

2.7.4 Feeding practices associated to child nutritional status

Age at which children were stopped breastfed

WHO and UNICEF recommend that infants should be exclusively breastfed the first 6 months of life (7). In Thailand, adopted this guideline and changed its previous recommendation of exclusively breastfed from 4-6 months to 6 months in 2003 (87). For most mothers of Thailand, breastfeeding is the mode of feeding infants right after birth. About 85% of mothers breastfed their babies within one day of birth. However, the rate of exclusive breastfeeding was only 7.6% for 3 months and 5.4% for 6 months (13). The study of Bhutan showed that there is plenty evidence that appropriate infant feeding practices result in better growth for infants and young children in poor environments (88). It has been proved that the better nutritional status of infants is possibly due to being able to satisfy their nutritional needs thorough breast milk and some complementary foods (89). However, after the first year of life, when breast feeding no longer meets their nutrient needs and complementary food is inadequate, there is likely to be an increase in the prevalence of under nutrition (90).

Time introduced of complementary food: rice and banana

Complementary food means any food whether manufactured or locally prepared as a complement to breast milk usually after 6 months in order to satisfy the nutritional requirements of infants (91). Rice and animal source foods were both introduced at around 4 months in Bangkok and in northern district town in Thailand (13). The timing of introduction of different foods varied by location.

2.7.5 Child rearing associated to child nutritional status

Parents activities: go for a walk, playing a doll, singing, body playing

Mother- child and father- child play interactions are important for promoting parents- child relationship and child development. The another study found that Mothers and Fathers showed comparable levels of emotional availability within their play interactions with their child and their children had comparable emotional availability levels when interacting with both parents (92).

Child rearing pattern: control of feeding time

The study of India, there is now a growing realization that malnutrition can be function of behavioral determinants affecting child feeding and rearing (59, 89). The another Indian study showed that feeding on regular schedule was possible evidence for better child growth (15). Some study showed that laissez- faire feeding style is most frequency observed among families with a higher prevalence of malnourished children (93).

Child rearing pattern: food introduction

Parents provide food environments for their children's early experiences with food and eating. Several studies found that a child's eating behavior is strongly influenced by the family environment (94). Parents need to find suitable for the development of children's eating behaviors, behavior at mealtimes and child feeding practices (94, 95). Child feeding practices by Parents influences to children's eating behaviors, including specific eating styles, food selection and preferences (94, 96).

Child rearing pattern: control of sleeping time

Infant sleep is important child health, development and growth particularly during first year of life. The study of Israel, found that parental behaviors closely related to bedtime interactions and soothing routines to infant sleep (97).

Child rearing pattern: responding to cry

Being emotionally responsive to child's emotional needs is the base on attachment parenting. Infant children are showed way to crying because of can't tell what is unpleasant. Parents need to find cause and try to respond before child has need to cry (27).

CHAPTER III
RESEARCH METHODOLOGY

3.1 Study Design

The study conducted to determine the relationship between child rearing and child nutritional status during the first year of life by using data of the participants from the Prospective Cohort study of Thai Children (PCTC). The study is comprised community- based in four different rural areas (Central, South, North East and North) and hospital- based in an urban area (Bangkok). The PCTC is an observational prospective cohort study and designed to explore from about the 28 weeks of gestation to children born from their mothers until 24 years of age. Eligible districts had to be accessible year- round, to average between 800 and 900 births annually, and there was a hospital director and research assistants committed to the long- term management of the project. The PTCT project was expected to explore long term effects from the prenatal period to young adulthood in Thailand. This study focused on the possibility that the factors of child rearing to children affecting child nutritional status.

3.2 Study population

The PCTC project have participants a total of 4,245 children who were born from the 1st of July, 2000 to the 30th of June, 2002. The data population and sample size are from data of the PCTC, the population is based on this cohort study included all pregnant women in four community- based in rural areas and a hospital-based in urban area.

The design of the follow- up for the study population is this study as shown figure 3.1. A total of 4,245 children were born and 60 twin infants and 35 dead and abnormal children (including one of twin infant) were excluded. Then, the remaining 4,151 children were conducted for data analysis as shown in Figure 3.1.

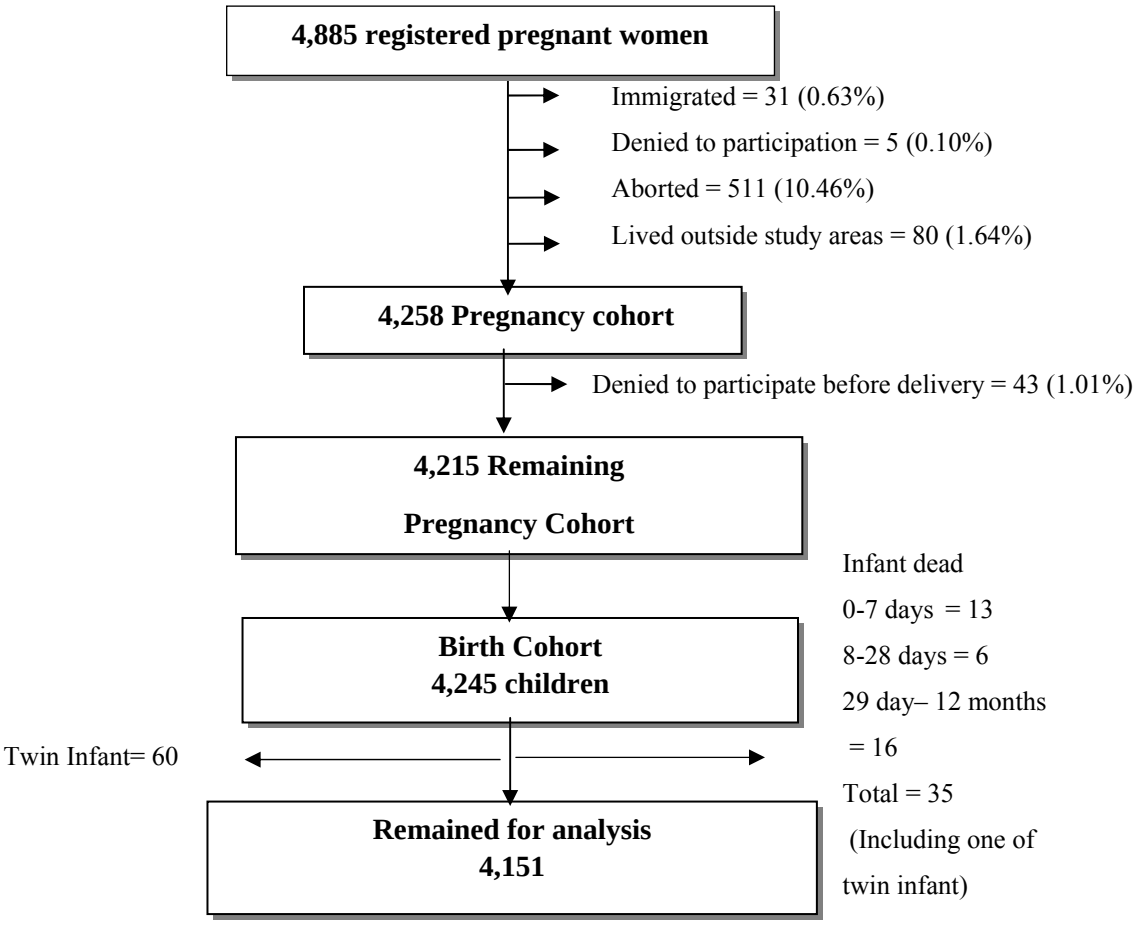


Figure 3.1 Design overview

3.3 Study area

The PCTC study areas were distributed in four parts of Thailand that consists in four rural areas and an urban area as shown in Figure 3.2.

1) Central: in Panomtuan district, Kanchanaburi province,

2) The South: in Thepa district, Songkhla province,

3) The North East: in Kranuan district, Khon Kaen province,

4) The North: in Nan district, Nan province and

5) Bangkok: the hospital-based in urban area was established in Ramathibodi University Hospital, Bangkok, and the capital of Thailand.

Figure 3.2 Study area

3.4 Criteria for selection of the study

Inclusion criteria

All 4,245 children from 5 areas in Thailand (Figure 3.2) who were born from the 1st of July, 2000 to the 30th of June, 2002. Total of 4,245 children who were eligible for the PCTC project by parental consent at pregnant period were sampled for inclusion in this study. There were 60 twin infant and 35 children dead and abnormal (including one of twin infant) after birth within 12 months. Total of 4,151 children were included in this study.

Exclusion criteria

- Children who had significant birth defects, any special illness and congenital disease.
- Children infected with HIV/ AIDS.
- Children have frequently migrated, and family of Burmese, Karen or Laotian
- Illiteracy mothers
- Abnormal and Dead infants and infants who died within 12 months after birth.
- Children who are twin Infant

3.5 Sampling technique

All participants residing in the five areas, who didn't plan to migrate at least for five years, were recruited in the PCTC. The eligible children were including parental consent in the PCTC.

3.6 Outcome Measurement

For the instruments of anthropometric, PCTC project growth instrument was developed locally at Nutrition Institute, Mahidol University of Thailand. Anthropometric measurements were taken according to recumbent length and was measured in all children using a graduate board with a fixed headboard and movable footboard (1 m/0.1 cm), and recorded to the nearest 0.1 cm. For weight measurement, an ordinary weighting machine with minimum 100g were used. All research assistants team members were trained to use standardized methods carefully of an anthropometric measurement and outcome collecting procedure which was rigorous standard of recording and simply to apply for physicians and research assistants recorded into case report form.

Each Child's nutritional status was expressed as a number of standard deviations (Z- scores) above or below the median for the reference population, taking into account age and gender. 2006 WHO- Anthro software (98) was used to process the data (age in days, weight and height) and generate Z- scores for each children. The software was developed to monitor growth and development in individuals and population for use in the WHO Child Growth Standards. The WHO Child Growth Standard confirm that children born anywhere in the world and given and optimum start in life have the potential to develop within the same range of height and weight (99). Thus, a cut-off point of -2 SD Z-score was used to assess the determinants of underweight, stunting and wasting.

3.7 Predictor variables

The data were collected from community and demographic variables. The determinant variables of children at first year of life were given by database of the PCTC Project that were collected from interviewing and hospital records. Research assistants got data from local midwives that went to home-visits within three days after delivery and made appointments for take physical examinations at pediatrics when children become a month. Mother can decide place that at home or the local hospital depending on their preference. Interviews for demographic and predictor variables were conducted children aged 28 days, 3 months and after that every 6

months. Database will be provided for the risk factors related to underweight, stunting and wasting as follows;

Part 1: General characteristic of children

Gender: It was categorized into 2 groups, boy and girl.

Birth weight: It was measured in grams then transformed into low birth weight using cut-off value at 2,500 grams. < 2,500 grams as low birth weight and ≥ 2,500 grams as normal.

Birth length: It was divided using mean from data analysis by cut- off point 50 centimeter. < 50 cm, and ≥ 50 cm.

Illness within 12 months: It was interviewed whether the children who had sickness and had been admitted in the hospital and categorized into two groups, yes or no.

Type of main caregiver: It was asked who is look after the child mainly.as categorized 2 groups, parents or relative such as grandfather, grandmother, uncle and aunt.

Part 2: Socio- demographic characteristic and family characteristic

Study area: The data was classified into 5 categories.

1) Central area: Phanomtuan District, Khanchanaburi Province. The district is located in the northwest of Bangkok covering around 536 km^2. 5) Bangkok: the capital city, the government, business and industrial centre. Bangkok was only hospital- based study site, Ramathibodi Hospital.

2) South area: Thepa District, Songkhla Province, the district is located in the far south of Bangkok covering around 978 km^2. This is the only site located next to the sea. Due to this is the only site where most people are Muslim (about 70%) and the rest was Buddhist.

3) North East area: Kranuan District, Khon Kaen Province. The district is located in the northeast of Bangkok covering around 433 km^2. Most areas are plain suitable for farming purposes. This site is quite dry compared to other part of the country.

4) North area: Muang District, Nan Province, the district is located in the far north of Bangkok covering around 919 km^2 of the town center. Most of high plains intermixed with some mountainous area. This site compound of two clusters, there was people who lived in the city and have been provided health care services by the Nan hospital with a 300-bed community hospital. Hill tribe people who live in were remote area for health care service.

5) Bangkok: the capital city, the government, business and industrial central. The large urban population may exceed 10 million. Bangkok was only hospital- based study site, Ramathibodi Hospital. All pregnant women are permanent resident of Bangkok which who accepted to participate in the entire longitudinal study were enrolled. Almost all of the residents lived in crowded area which is about half in a slum and half in a crowded apartment. The region was mostly Buddhism (94%) while other (2.6%) and Christian (2.2%).

Religion: It was categorized into 2 groups. Group1 is Buddhism, group 2 is not Buddhism (Islam, Christian, Ghost and Others).

Mother age: It was categorized in to 2 groups using cut-off value at 20 years, the risk groups was defined as mother age less than 20 years.

Mother height: It was classified by cut-off point at 145 in centimeter (cm). <= 145 cm, and >145 cm.

Education of mother: the levels of education were proposed as dichotomous namely, illiterate and literate or higher than grade 1 (grade 1- 6 and 7 - 12, college, or bachelor degree). For this study, this variables was categorized into 2 groups. Group 1 is higher than primary school and group 2 is lower and equal primary school.

Occupation of mother: It was modified from that of National Statistic Office, Thailand, and generated such as farmer, business, profession, agriculture labors, construction labors, clerk, and house wife or students or none paid work labors. For this study, these variables were categorized into 2 groups. Group 1 is employed, group 2 is unemployed.

Number of family member: It was divided using mean from data analysis by cut-off point at 5 people. < 5people and ≥ 5 people.

Family income: Annual income was difficult to be determined directly because most subjects are farmers so their regular income could not be guaranteed. In addition to salary for some, annual of family was calculated based on father or mother who had best income in the family. The total sum was then computed. To avoid of small numbers in the multilevel analysis model, this variable was categorized based on its distribution into 2 level using quartiles. Family income was categorized into 2 levels; group 1 –the low income (income ≤ Percentile 25^{th}), and groups 2, -not low income group (income ≥ Percentile 25^{th}).

Part 3: Utilization of health Services

Frequency of ANC: It was divided by cut point at 4 times. < 4 times and ≥ 4tmes.

Immunization status: OPV- DPT: It divided by cut point into complete immunization for age or incomplete immunization at age. History of child health care service was interviewed and extracted from child health vaccination service record more than 4 times at age 12 months.

Part 4: Feeding practice

Age at which children were stopped breastfed: It refers to feeding of breast milk direct from the maternal breast whether they stopped breast fed in months. Due to the fact that the available data of PCTC does not allow for specific estimation of exclusive breastfeeding and this will not be a factor and breast feeding classified

into 2 groups under the following at age less than 6 months, longer and equal than 6 months.

Time introduce of complementary food (rice and banana): It refers to feeding of both breast milk and solid or semi-solid food. Duration of complementary feeding based on the number of months of feeding, for logistic model at 6 months. This two variables were classified into two groups under the following complementary feeding at age <6 months and ≥ 6 months.

Part 5: Child rearing characteristics

Mother activities (parenting activities during the day time in the week; go for walk, playing a doll, singing and body playing): There have 4 questions and divided 2 groups, group 1 is Yes (always/ sometimes), group 2 is No (never).

Father activities (parenting activities during the day time in the week; go for walk, playing a doll, singing and body playing): There have 4 questions and divided 2 groups, group 1 is Yes (always/ sometimes), group 2 is No (never/ father is not here/ don't have a Father).

Child rearing pattern: control of feeding time (Did you schedule time for feeding and how?): It was divided 2 groups, 1 group is rational parenting style and 2 group is control, over protection, neglect and others parenting style.

Child rearing pattern: food introduction (What did you do when your child effuse to new food?): It was divided 2 groups, 1 group is rational parenting style and 2 group is control, over protection, neglect and others parenting style.

Child rearing pattern: control of sleeping time (When did you bring your child to bed?): It was divided 2 groups, 1 group is rational parenting style and 2 group is control, over protection, neglect and others parenting style.

Child rearing pattern: responding to cry (What did you do when our child cry or bad temper?): It was divided 2 groups, 1 group is rational parenting style and 2 group is control, over protection, neglect and others parenting style.

3.8 Instruments and data collection procedure

3.8.1 Data Collection

Decisions on the ways data should be collected depends on the nature of the information sought. This study involved considerable data collections because many variables need to be included. Interview questionnaires were the principal method of data collection because the high follow-up rate was expected. Data extracted from hospital records were also collected for health-related variables.

3.8.2 Outcome Instrument

For this study the outcome variables from PCTC project extracted from 1 instruments as following;

1) Physical Examination For Child at age of 1 year ± 1 week (D11): This instrument was provided in data collection for the physical examination of child at age of 1 year ± 1 week, and extracted variable in this study was child age, weight and length.

3.8.3 Determinant assessments and Instruments

Data were collected from all subjects within the selected sites, including data regarding community and demographic variables. Most assessments were got at home, but at some ages, special in-hospital assessments were administered, including physical examinations at one month. For this study from PCTC project have been extracted from 8 instruments as following;

1) Pregnancy Outcome Record Form (upon delivery) (B05); this instrument was provided for data collection of the history for child at birth health status in general, health history and illness at early period of birth. Extracted variable in this study were child gender, birth weight and birth length.

2) Demographic characteristics of the family (socioeconomics of the family) (K02): This instrument was provided for data collection of demographic characteristics of the family socioeconomics. It composed questionnaire and open-end-questionnaire part, including genogram of the family. Extracted variable in this

study was location, religion, mother age, education of mother and occupation of mother, family income and number of family member.

3) General Physical Examination of Pregnant Woman (B02a): This instrument was provided for data collection of general physical examination of pregnant woman. It composed pregnancy woman health history, and general information related to pregnancy. Extracted variable in this study was mother height.

4) Child's Hospitalization, Sickness age at 0- 1 years Questionnaire (D03): This instrument was provided for data collection of child's hospitalization, sickness age at 0- 1 year. Extracted variable in this study was illness at 12 months.

5) Child rearing at Aged 1 Years ± 1weeks Questionnaire (D02); This instrument was provided for data collection of child development. Interviewed principal caregiver who mostly take care the child in 1 year before. Extracted variable in this study was type of main caregiver.

6) Child feeding, Child Development and Vaccination at Age of 1 year ± 1 week Questionnaire (D05): This instrument was provided for data collection of child feeding, child development and vaccination at age of 1 year ± 1 week. It composed of 4 parts, part I collected child feeding practice, part II for child age at introduction complementary food intake, part III for child development and part V for child vaccination service history at 12 months. Extracted variable in this study was immunization of OPV-DPT at age of 1 year ± 1 week.

7) Practice during Pregnancy Questionnaire (K06); This instrument was provided for data collection of practice during pregnancy. Extracted variable in this study was frequency of ANC.

8) Feeding Pattern at Age of 6 Months ± 1 week: Feeding, Development, Sleeping, excretion, and Health Care Questionnaire (C08): This instrument was provided for data collection of feeding pattern at age of 6 months ± 1 week (follow as Appendix A): feeding, development, sleeping, excretion, and health care. It composed of 9 parts, part I collected child feeding practice, part II for child development, part III for child dental health, part IV for child sleeping pattern, part V for child excretion pattern, part VI for child health care, part VII for child rearing, part VIII for child rearing pattern and part VIIII for child physical growth development at 6 months. Extracted variable in this study were age at which children stopped breastfed

and time of introduced food: rice and banana from part I and child rearing from part VIIII.

3.9 Validity of the study instruments

The study was conducted secondary data, the inter-rater validity was checked among the different research assistants. Linguistic and religious variation in the presentation of information occurred among religions of Thailand. Hence, research assistants were selected and well-trained to be sensitive to these incidents. Monitoring and quality controls were set up from the beginning to ensure the study's validity. Re-interviews were conducted on a random sub-sample to check for consistency and to eliminate interviewer's bias.

3.10 Data analysis

4,151 children were included in the present study and remained with anthropometric measurement. Z- score for Weight for Age, Height for Age, Weight for Height were computed using WHO growth standards (World Health Organization, 2006) using WHO Anthro software, version 3.2.2. Secondly data were put into the SPSS version 16 were used for data analysis.

First, descriptive statistics include mean, median, standard deviation (SD), quartile deviation (QD), maximum and minimum, number and percentage of each independent and dependent variables.

Second, Chi-square tests and simple logistic regression were used for bivariate analysis to identify the association between each independent variable and dependent variable.

Lastly, multiple logistic regression analysis was used to determine the association between considering other related study factors for child rearing and child nutritional status at the first year of age. At first, the potential confounders were set in the model for predicting factors associated with child nutritional status. Then, all of child rearing characteristics were added in the model by Backward Wald method and Hosmer and Lemeshow Test was used for the best fitted model was obtained.

3.11 Protection of human subjects

The Prospective Cohort Study of Thai Children was approved by The National Ethics Committee, the Ministry of Public Health on the 29th of November, 2000.

CHAPTER IV
RESULTS

This study was conducted to determine the relationship between child rearing and child nutritional status during the first year of life in Thailand. The study was used secondary data from PCTC project. A total of 4,245 children were involved in this study. Sixty twin infants and thirty five dead and abnormal children (including one of twin infant) were excluded. Then, the remaining 4,151 children were conducted for data analysis. The results of the study are presented on this chapter as following.

1. The prevalence of child nutritional status of children at the first year of life according to WHO standard
2. Description of independent variables
3. The association between independent variables and child nutritional status during the first year of life.
4. The predicting factor for child nutritional status

4.1 The prevalence of child nutritional status of children at the first year of age according to WHO standard

WHO- Anthro software was used to process the data (age in days, weight and height) and generate z- scores for each child according to WHO standard respectively. The software was developed for the application of WHO Child Growth Standards in monitoring growth and development in individuals and population. Child nutritional status in Table 4.1 was determined by assessing weight for age, height for age and weight for height and calculating child nutritional status according to WHO standards. The cutoff point of less than - 2 Standard Deviation was used to determine child nutritional status.

Table 4.1 showed that 8.3% were underweight, 9.5% were stunting and 5.7% of children were wasting. In comparing gender, Figure 4.1 showed that all

nutritional status of boy are higher than girl. Stunting of boy is over 10%. In comparing location, Figure 4.2 showed that Bangkok was lowest prevalence in all nutritional status. However, highest prevalence was difference area in three nutritional status. Underweight was South area, stunting was North area, wasting was North East area were highest prevalence.

Table4.1 Percentage distribution of child nutritional status at the first year of life

Child nutritional status	Frequency	Percentage
Underweight (weight for age)		
Not underweight	3686	91.7
Underweight	334	8.3
Total	4081	100
Stunting (height for age)		
Not stunting	3597	90.5
Stunting	377	9.5
Total	3974	100
Wasting (weight for height)		
Not wasting	3749	94.3
Wasting	225	5.7
Total	3974	100

Figure 4.1 Prevalence of child nutritional status by gender

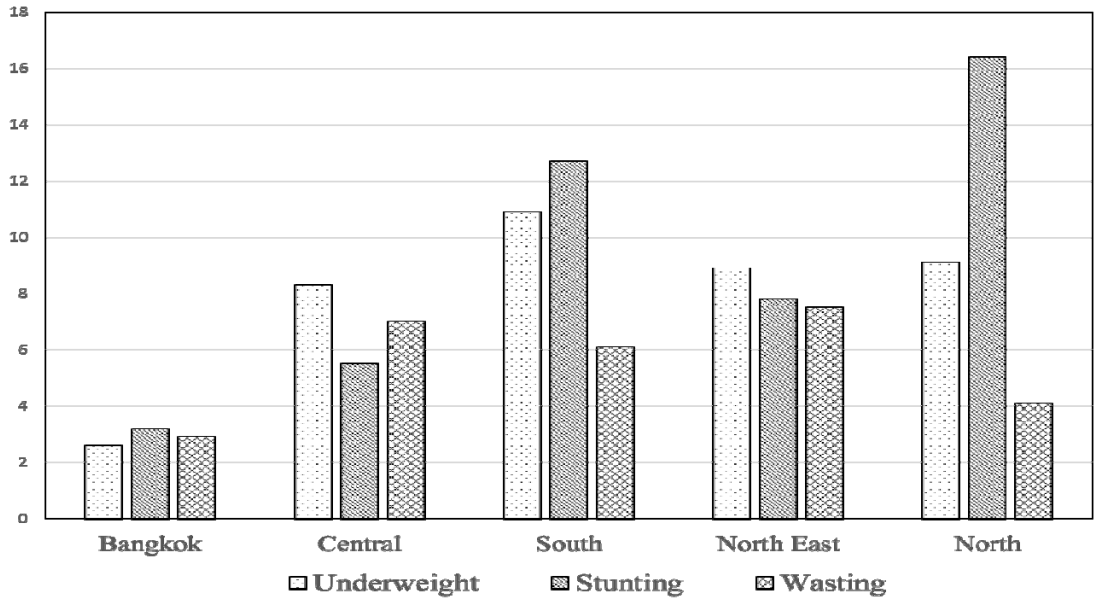


Figure 4.2 Prevalence of child nutritional status by location

4.2 Description of independent variable

4.2.1 General characteristics of children

There were 4,151 participants involved in this study. As shown in Table 4.2, about half of gender were boy and girl who were the first year of age. Only 7.8% children were low birth weight and about half (50.5%) of children were less than 50 cm of tall. In addition, only 9.7% children were reported to get illness within 12 months. Over 70 % of the relative such as grandfather, grandmother, uncle and aunt took care of the child mainly.

Table 4.2 Frequency and percentage of general characteristics of children

General characteristics of children		Frequency	Percentage
Gender			
Boy		2063	49.7
Girl		2088	50.3
Total		4151	100
Birth weight			
< 2500 g		312	7.8
≥ 2500 g		3668	92.2
Total		3980	100
Mean= 3061	Median= 3050	Min= 985	Max= 5220
Birth length			
< 50 cm		1953	50.5
≥ 50 cm		1914	49.5
Total		3867	100
Mean= 49.38	Median= 49.00	Min= 36	Max= 61
Illness within 12 months			
Yes		392	9.7
No		3641	90.3
Total		4033	100
Type of main caregiver			
Parents		1071	26.9
Relative		2916	73.1
Total		3987	100

4.2.2 Socio- demographic and family characteristics

As shown in Table 4.3, over two- third of the family (79%) were Buddhism religion. Over four- fifth of the mother (88.2%) belonged to age group over 20 years old and only 3.3% of the mother had height less than 145 cm as Thai reference tall. Over half of the mother (52.7%) reported education level less than primary school. Over 80% of mother were working and only one- sixths of the mother (17.9%) were either unemployed such as housewife and students. About half of the

family (45.8%) had more than 5 people. One- fourth of the family (25%) had low income less than 52,000 Baht for a year.

Table 4.3 Frequency and percentage of socio- demographic and family characteristics

Socio- demographic and family characteristics		**Frequency**	**Percentage**
Location			
North East		855	20.6
North		761	18.3
South		1047	25.2
Central		771	18.6
Bangkok		717	17.3
Total		4151	100
Religion			
Buddhism		3247	79.0
Not Buddhism (Islam/ Christian/Ghost / Others)		861	21.0
Total		4108	100
Mother age			
< 20 years old		487	11.8
≥ 20 years old		3629	88.2
Total		4116	100
Mean= 26.99	Median= 26.00	Min= 14	Max= 48

Table 4.3 Frequency and percentage of socio- demographic and family characteristics (cont.)

Socio- demographic and family characteristics		Frequency	Percentage
Mother height			
< 145 cm		135	3.3
≥ 145 cm		3953	96.7
Total		4088	100
Mean= 155.23	Median= 155.00	Min= 132	Max= 175
Education of mother			
≤ Primary school (Informal/ Primary)		2168	52.7
> Primary school (Secondary/ Higher)		1946	47.3
Total		4114	100
Occupation of mother			
Unemployed (House wife/ Student)		739	17.9
Employed (Famer/ Shopkeeper/ Clerk/ Professional/ Others)		3382	82.1
Total		4121	100
Number of family member			
< 5 people		2196	54.2
≥ 5 people		1855	45.8
Total		4051	100
Mean= 4.62	Median= 4.00	Min= 0	Max= 27
Family income (Baht for a year)			
< 52,000 Baht (25 percentile)		1005	25.0
≥ 52,000 Baht (25 percentile)		3021	75.0
Total		4026	100

4.2.3 Utilization of health services

As regards to frequency of antenatal care visits in Table 4.4, four-fifths of mothers (86.9%) were found to have had antenatal care visits at least four visits. Over one- third of children (34.0%) were not completed immunization OPV-DPT for 12 months.

Table4.4 Frequency and percentage of utilization of health services

Utilization of health services	Frequency	Percentage
Frequency of ANC		
< 4 times	545	13.1
≥ 4 times	3606	86.9
Total	4151	100
Immunization status: OPV- DPT		
Completed immunization for age	2656	66.0
Not completed immunization for age	1370	34.0
Total	4026	100

4.2.4 Feeding practice

According to feeding practice in Table 4.5, concerning the age at which the children were stopped from breastfeeding, nearly half of children (42.4%) were stopped breastfeed before 6 months. The result showed that about 90 % of the children were introduced rice and banana before 6 months.

Table4.5 Frequency and percentage of feeding practice

Feeding practice	Frequency	Percentage
Age at which children were stopped breastfed		
< 6 months	1243	42.4
≥ 6 months	1688	57.6
Total	2931	100
Time introduced of complementary food: rice		
< 6 months	3362	88.9
≥ 6 months	418	11.1
Total	3780	100
Time introduced of complementary food: banana		
< 6 months	3549	92.3
≥ 6 months	296	7.7
Total	3845	100

4.2.5 Child rearing characteristics

As parent's activities shown in Figure 4.2 and Figure 4.3, over 90% of mother and over 75 % of father were answered that they were playing with their children always or sometimes during the day time in a weeks except singing of parent's activities. Singing is lower in parent's activities and about half of mothers (61.7%) and father (43.2%) were reported to always or sometimes singing to their child. All parent's activities showed that mothers were higher than fathers. As child rearing pattern in Figure 4.4 showed that over half of children have got over protection parenting style in child rearing pattern: food introduction, control of sleeping time and responding to cry. Control of feeding time of child rearing pattern is over half of children (56.1%) have got rational parenting style.

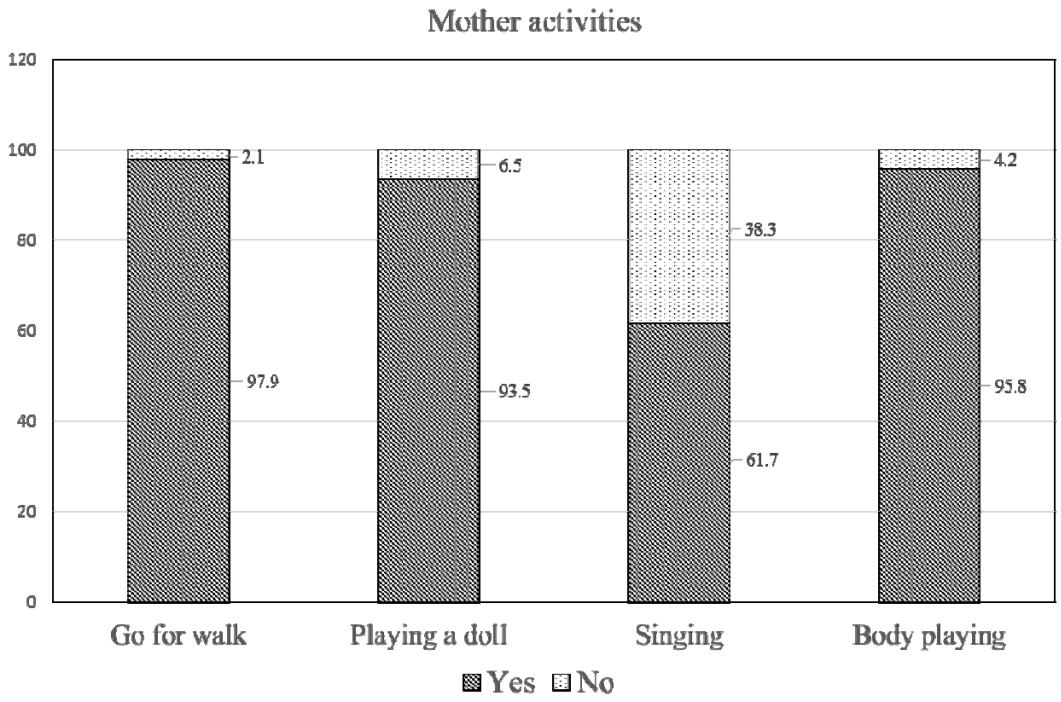


Figure 4.2 Mother activities

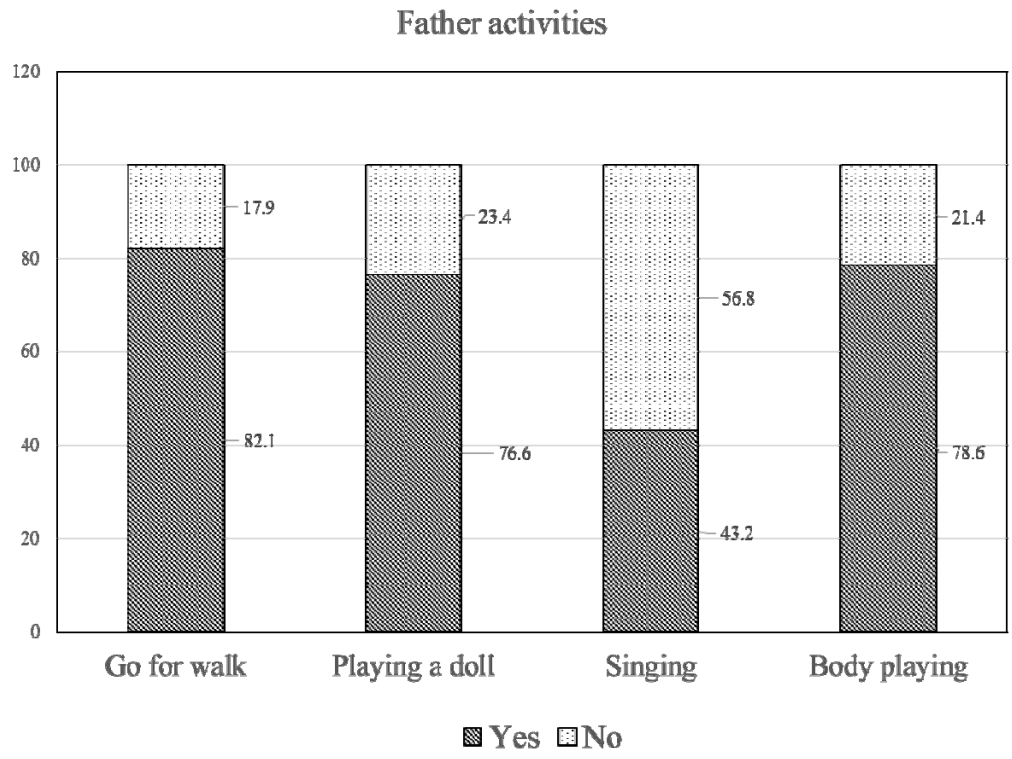


Figure 4.3 Father activities

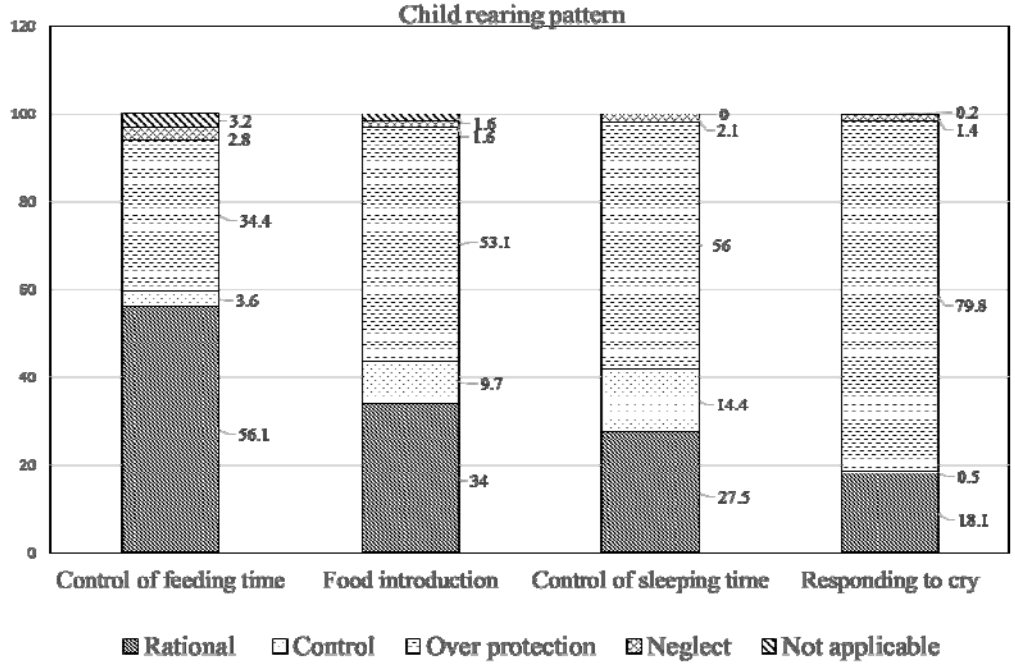


Figure 4.4 Child rearing pattern

Table 4.6 Frequency and percentage of child rearing characteristics

Child rearing characteristics	Frequency	Percentage
Mother activities: Go for a walk		
Yes (Always/ Sometimes)	3380	97.9
No (Never)	72	2.1
Total	3452	100
Mother activities: Playing a doll		
Yes (Always/ Sometimes)	3226	93.5
No (Never)	225	6.5
Total	3451	100
Mother activities: Singing		
Yes (Always/ Sometimes)	2126	61.7
No (Never)	1321	38.3
Total	3447	100
Mother activities: Body playing		
Yes (Always/ Sometimes)	3302	95.8
No (Never)	146	4.2
Total	3448	100
Father activities: Go for a walk		
Yes (Always/ Sometimes)	2821	82.1
No (Never/ Father is not here/ Don’t have father)	614	17.9
Total	3435	100
Father activities: Playing a doll		
Yes (Always/ Sometimes)	2634	76.6
No (Never/ Father is not here/ Don’t have father)	803	23.4
Total	3437	100
Father activities: Singing		
Yes (Always/ Sometimes)	1483	43.2
No (Never/ Father is not here/ Don’t have father)	1950	56.8
Total	3433	100

Table 4.6 Frequency and percentage of child rearing characteristics (cont.)

Child rearing characteristics	Frequency	Percentage
Father activities: Body playing		
Yes (Always/ Sometimes)	2697	78.6
No (Never/ Father is not here/ Don't have father)	733	21.4
Total	3430	100
Child rearing pattern: Control of feeding time		
Every 3- 4 hours and observe the child (Rational)	2249	56.1
No schedule but based on my need (Neglect)	112	2.8
Never let the child hungry, feed all the time (Over protection)	1377	34.3
Every 3- 4 hours and must be as scheduled (Control)	145	3.6
Others (No applicable)	128	3.2
Total	4011	100
Child rearing pattern: Food introduction		
Try and force till success (Control)	389	9.7
Encourage and let him/ her eat as he/ she can (Rational)	1369	34.0
Doesn't matter, not a big deal (Neglect)	65	1.6
Depend on the child (Over protection)	2138	53.1
Others (Not applicable)	65	1.6
Total	4026	100
Child rearing pattern: Control of sleeping time		
Always trying to be on time (Control)	581	14.4
Schedule but flexible (Rational)	1109	27.5
Depend on myself (Neglect)	83	2.1
Depend on the child (Over protection)	2259	56.0
Total	4032	100

Table 4.6 Frequency and percentage of child rearing (cont.)

Child rearing characteristics	Frequency	Percentage
Child rearing pattern: Responding to cry		
Left till stop (Neglect)	58	1.4
Yell or smack till stop (Control)	22	0.5
Hold up immediately, not allow crying (Over protection)	3218	79.8
Find the cause and calm down (Rational)	728	18.1
Others (Not applicable)	7	0.2
Total	4033	100

4.3 The association between independent variables and child nutritional status during the first year of life

This section presents preliminary findings according to five broad independent variables namely, general characteristics of children, socio- demographic and family characteristics, utilization of health services, feeding practice and child rearing characteristics each child nutritional status.

4.3.1 The association between independent variables and underweight

To find out the association of underweight at first year of life with independent variables, chi- square test was used.

4.3.1.1 The association between general characteristics of Children and Underweight

As shown in Table 4.7, gender, birth weight, birth length and type of main caregiver were remained independently associated with underweight at one year of age according to WHO reference.

Boy were 1.5 times ($p< 0.001$) higher risk of being underweight than girl. Low birth weight (< 2500 g) were 4.5 times ($p< 0.001$) higher risk of being underweight than standard birth weight. Children less than 50 cm in length at birth were 2.7 times ($p< 0.001$) higher risk of being underweight than children over 50 cm. Children whose main caregiver are relative had 1.8 times ($p< 0.001$) higher risk of being underweight than children whose main caregiver is parents.

In summary, four variables of general characteristics of children such as gender, birth weight, birth length and type of main caregiver were found to be associated with underweight.

Table 4.7 The association between general characteristics of children and underweight

General characteristics of children	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Gender					
Girl	1888 (93.3)	136 (6.7)	1		
Boy	1798 (90.1)	198 (9.9)	1.53	1.22-1.92	<0.001
Birth weight					
≥ 2500 g	3327 (93.0)	249 (7.0)	1		
< 2500 g	224 (74.9)	75 (25.1)	4.47	3.34-5.99	<0.001
Birth length					
≥ 50 cm	1780 (95.2)	89 (4.8)	1		
< 50 cm	1680 (88.1)	226 (11.9)	2.69	2.09-3.47	<0.001
Illness within 12 months					
No	3299 (91.7)	298 (8.3)	1		
Yes	351 (90.9)	35 (9.1)	1.10	0.77-1.60	0.598
Type of main caregiver					
Parents	967 (94.5)	56 (5.5)	1		
Relative	2612 (90.4)	276 (9.6)	1.83	1.36-2.46	<0.001

4.3.1.2 The association between socio- demographic and family characteristics and underweight

As shown in Table 4.8, location, religion, mother age, mother height, education of mother, number of family member and family income were remained independently associated with underweight at the first year of age according to WHO reference.

As location, children residing in Central area had 3.4 times ($p< 0.001$), South area had 4.7 times ($p< 0.001$), North East area had 3.7 times ($p< 0.001$) and North area had 3.8 times ($p< 0.001$) higher risk of being underweight than

children residing in capital city of Bangkok in Thailand. As religion, children have not Buddhism family were 2.5 times (p< 0.001) higher risk of being underweight than children have Buddhism family. Children who were born from mother less than 20 years old had 1.5 times (p< 0.05) higher risk of being underweight than children who were born from mother over 20 years old. Children whose mother has less than 145cm in height were 3.3 times (p< 0.001) higher risk of being underweight than children whose mother has over 145 cm in height. Children who have mother that educated lower and equal primary school were 2.2 times (p< 0.001) higher risk of being underweight than children who have mother educated over primary school. Children who have over 5 people in the number of family member were 1.6 times (p< 0.001) higher risk of being underweight than children who have less than 5 people. As family income in currency of Thailand Baht for year, children who have family income less than 52,000 Baht were 1.9 times (p< 0.001) higher risk of being underweight than children who have family income over 52,000 Baht.

In summary, seven variables of socio- demographic and family characteristics such as location, religion, mother age, mother height, education of mother, number of family member and family income were found to be associated with underweight.

Table 4.8 The association between socio- demographic and family characteristics and underweight

Socio-demographic and family characteristics	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Location					
Bangkok	643 (97.4)	17 (2.6)	1		
Central	682 (91.7)	62 (8.3)	3.44	1.99-5.94	<0.001
South	920 (89.1)	113 (10.9)	4.65	2.76-7.81	<0.001
North East	761 (91.1)	74 (8.9)	3.68	2.15-6.30	<0.001
North	680 (90.9)	68 (9.1)	3.78	2.20-6.51	<0.001

Table 4.8 The association between socio- demographic and family characteristics and underweight (cont.)

Socio-demographic and family characteristics	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Religion					
Buddhism	2931 (93.4)	207 (6.6)	1		
Not Buddhism	717 (85.0)	127 (15.0)	2.51	1.982-3.174	<0.001
Mother age					
≥ 20 years old	3239 (92.0)	281 (8.0)	1		
< 20 years old	417 (88.7)	53 (11.3)	1.47	1.074-1.999	<0.05
Mother height					
≥ 145 cm	3528 (92.2)	300 (7.8)	1		
< 145 cm	104 (78.2)	29 (21.8)	3.28	2.137-5.032	<0.001
Education of mother					
> Primary school	1779 (94.6)	101 (5.4)	1		
≤ Primary school	1875 (88.9)	233 (11.1)	2.19	1.718-2.789	<0.001
Occupation of mother					
Unemployed	649 (91.9)	57 (8.1)	1		
Employed	3012 (91.6)	277 (8.4)	1.05	0.778-1.410	0.762
Number of family member					
< 5 people	1980 (93.3)	142 (6.7)	1		
≥ 5 people	1620 (89.8)	184 (10.2)	1.58	1.260-1.990	<0.001
Family income (Baht for year)					
≥ 52,000 Baht	2720 (93.1)	201 (6.9)	1		
< 52,000 Baht	861 (87.7)	121 (12.3)	1.90	1.499-2.413	<0.001

4.3.1.3 The association between utilization of health services and underweight

As shown in Table 4.9, immunization OPV- DPT was remained independently associated with underweight at the first year of age according to WHO reference.

Children who are not completed immunization OPV- DPT at age were 0.7 times ($p< 0.05$) higher risk of being underweight than children who are completed immunization OPV- DPT at age.

In summary, one variables of utilization such as immunization OPV- DPT was found to be associated with underweight.

Table 4.9 The association between utilization of health services and underweight

Utilization of health services	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Frequency of ANC					
≥ 4 times	3213 (92.0)	280 (8.0)	1		
< 4 times	473 (89.8)	54 (10.2)	1.31	0.96-1.78	0.084
Immunization OPV-DPT					
Completed	2381 (90.7)	244 (9.3)	1		
Not completed	1247 (93.4)	88 (6.6)	0.69	0.54-0.89	<0.05

4.3.1.4 The association between feeding practice and underweight

As shown in Table 4.10, age at which children were stopped breastfed, time of introduced of complementary food: banana were remained independently associated with underweight at the first year of age according to WHO reference.

Children who were stopped breastfed after 6 months of age were 2.6 times ($p< 0.001$) higher risk of being underweight than children who were stopped breastfed less than 6 months of age. Children who were introduced banana as complementary food items after 6 months were 2.7 times ($p< 0.001$) higher risk of being underweight than children who were introduced banana as complementary food items less than 6 months.

In summary, two variables of feeding practice such as age at which children were stopped breastfed, time of introduced of complementary food: banana were found to be associated with underweight.

Table 4.10 The association between feeding practice and underweight

Feeding practice	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Age at which children were stopped breastfed					
< 6 months	1178 (96.1)	48 (3.9)	1		
≥6 months	1517 (90.6)	158 (9.4)	2.56	1.83-3.56	<0.001
Time of introduced of complementary food: rice					
< 6 months	3045 (92.0)	263 (8.0)	1		
≥6 months	372 (90.1)	41 (9.9)	1.28	0.90-1.80	0.167
Introduce of complementary food: banana					
< 6 months	3235 (92.6)	259 (7.4)	1		
≥6 months	240 (82.2)	52 (17.8)	2.71	1.96-3.75	<0.001

4.3.1.5 The association between child rearing characteristics and underweight

As shown in Table 4.11, mother activities: playing a doll, father activities: playing a doll, singing and body playing, child rearing pattern: control of sleeping time were remained independently associated with underweight at the first of age according to WHO reference.

Children who were not playing a doll with their mother during a day time in a weeks had 2 times ($p< 0.001$) higher risk of being underweight than children who were playing a doll with their mother. Children who were not playing a doll with their father during a day time in a weeks had 1.7 times ($p< 0.001$) higher risk of being underweight than children who are playing a doll with their father. Children who were not singing with their father during a day time in a weeks had 1.4 times ($p< 0.05$) higher risk of being underweight than children who were singing with their father. Children who were not body playing with their father during a day time in a weeks had 1.5 times ($p< 0.05$) higher risk of being underweight than children who

were body playing with their father. As child rearing pattern, children who have caregiver who control, neglect, over protection and others parenting style about control of sleeping time were 1.5 times ($p< 0.01$) higher risk of being underweight than children who have caregiver who rational parenting style.

In summary, five variables of child rearing characteristics such as mother activities: playing a doll, father activities: playing a doll, singing and body playing, child rearing pattern: control of sleeping time were found to be associated with underweight.

Table 4.11 The association between child rearing characteristics and underweight

Child rearing characteristics	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Mother activities:					
Go for a walk					
Yes	3040 (90.9)	303 (9.1)	1		
No	65 (92.9)	5 (7.1)	0.77	0.31-1.93	0.579
Mother activities:					
Playing a doll					
Yes	2915 (91.4)	273 (8.6)	1		
No	189 (84.4)	35 (15.6)	1.98	1.35-2.90	<0.001
Mother activities:					
Singing					
Yes	1903 (90.6)	198 (9.4)	1		
No	1197 (91.6)	110 (8.4)	0.88	0.69-1.13	0.318
Mother activities:					
Body playing					
Yes	2972 (91.1)	292 (8.9)	1		
No	129 (89.0)	16 (11.0)	1.26	0.74-2.15	0.391
Father activities:					
Go for a walk					
Yes	2553 (91.4)	240 (8.6)	1		
No	538 (89.2)	65 (10.8)	1.29	0.96-1.72	0.089

Table 4.11 The association between child rearing and underweight (cont.)

Child rearing characteristics	Not underweight children (%)	Underweight children (%)	Crude OR	95% CI	P-value
Father activities: Playing a doll					
Yes	2400 (92.1)	206 (7.9)	1		
No	693 (87.5)	99 (12.5)	1.66	1.29-2.15	<0.001
Father activities: Singing					
Yes					
No	1358 (92.6)	108 (7.4)	1		
	1731 (89.8)	197 (10.2)	1.43	1.12-1.83	<0.01
Father activities: Body playing					
Yes	2449 (91.8)	220 (8.2)	1		
No	637 (88.2)	85 (11.8)	1.49	1.14-1.94	<0.01
Child rearing pattern: Control of feeding time					
Rational parenting style	2036 (92.1)	175 (7.9)	1		
Another parenting style	1578 (91.1)	155 (8.9)	1.14	0.91-1.43	0.247
Child rearing pattern: Food introduction					
Rational parenting style	1237 (92.8)	96 (7.2)	1		
Another parenting style	2393 (91.1)	233 (8.9)	1.26	0.98-1.61	0.072
Child rearing pattern: Control of sleeping time					
Rational parenting style	1019 (93.7)	69 (6.3)	1		
Another parenting style	2614 (90.9)	263 (9.1)	1.49	1.13-1.96	<0.01
Child rearing pattern: Responding to cry					
Rational parenting style	661 (92.1)	57 (7.9)	1		
Another parenting style	2973 (91.5)	275 (8.5)	1.07	0.80-1.44	0.644

4.3.2 The association between independent variables and stunting

To find out the association of stunting at the first year of life with independent variables, chi- square test was used.

4.3.2.1 The association between general characteristics of children and stunting

As shown in Table 4.12, gender, birth weight, birth length and type of main caregiver were remained independently associated with stunting at the first year of age according to WHO reference.

Boy were 1.7 times (p< 0.001) higher risk of being stunting than girl. Low birth weight (< 2500 g) were 4 times (p< 0.001) higher risk of being stunting than standard birth weight. Children less than 50 cm in length at birth were 2.8 times (p< 0.001) higher risk of being stunting than children over 50 cm. Children whose main caregiver are relative had 1.7 times (p< 0.001) higher risk of being stunting than children whose main caregiver is parents.

In summary, four variables of general characteristics of children such as gender, birth weight, birth length and type of main caregiver were found to be associated with stunting.

Table 4.12 The association between general characteristics of children and stunting

General characteristics of children	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Gender					
Girl	1858 (92.8)	145 (7.2)	1		
Boy	1739 (88.2)	232 (11.8)	1.71	1.38-2.13	<0.001
Birth weight					
≥2500 g	3249 (91.8)	291 (8.2)	1		
< 2500 g	216 (73.7)	77 (26.3)	3.98	2.99-5.30	<0.001
Birth length					
≥50 cm	1747 (94.6)	100 (5.4)	1		
< 50 cm	1626 (86.2)	260 (13.8)	2.79	2.20-3.55	<0.001

Table 4.12 The association between general characteristics of children and stunting (cont.)

General characteristics of children	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Illness within 12 months					
No	3213 (90.3)	344 (9.7)	1		
Yes	347 (91.3)	33 (8.7)	0.89	0.61-1.29	0.534
Type of main caregiver					
Parents	946 (93.3)	68 (6.7)	1		
Relative	2545 (89.2)	309 (10.8)	1.69	1.29-2.22	<0.001

4.3.2.2 The association between socio- demographic and family characteristics and stunting

As shown in Table 4.13, location, religion, mother height, education of mother, number of family member and family income were remained independently associated with stunting at the first year of age according to WHO reference.

As location, children residing in Central area had 1.8 times ($p< 0.05$), South area had 4.4 times ($p< 0.001$), North East area had 2.5 times ($p< 0.001$) and North area had 5.8 times ($p< 0.001$) higher risk of being stunting than children residing in capital city of Bangkok in Thailand. As religion, children have not Buddhism family were 2.7 times ($p< 0.001$) higher risk of being stunting than children have Buddhism family. Children whose mother has less than 145cm in height were 5.9 times ($p< 0.001$) higher risk of being stunting than children whose mother has over 145 cm in height. . Children who have mother that educated lower and equal primary school were 2.2 times ($p< 0.001$) higher risk of being stunting than children who have mother educated over primary school. Children who have over 5 people in the number of family member were 1.3 times ($p< 0.05$) higher risk of being stunting than children who have less than 5 people. As family income in currency of Thailand Baht for year, children who have family income less than 52,000 Baht were 2.4 times ($p< 0.001$) higher risk of being stunting than children who have family income over 52,000 Baht.

In summary, six variables of socio- demographic and family characteristics such as location, religion, mother height, education of mother, number of family member and family income were found to be associated with stunting.

Table 4.13 The association between socio- demographic and family characteristics and stunting

Socio-demographic and family characteristics	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Location					
Bangkok	628 (96.8)	21 (3.2)	1		
Central	699 (94.5)	41 (5.5)	1.75	1.03-3.00	<0.05
South	893 (87.3)	130 (12.7)	4.35	2.72-6.98	<0.001
North East	758 (92.2)	64 (7.8)	2.53	1.53-4.18	<0.001
North	619 (83.6)	121 (16.4)	5.85	3.63-9.41	<0.001
Religion					
Buddhism	2873 (92.6)	228 (7.4)	1		
Not Buddhism	686 (82.2)	149 (17.8)	2.74	2.19-3.42	<0.001
Mother age					
≥ 20 years old	3156 (90.7)	325 (9.3)	1		
< 20 years old	411 (88.8)	52 (11.2)	1.23	0.90-1.68	0.193
Mother height					
≥ 145 cm	3458 (91.4)	325 (8.6)	1		
< 145 cm	85 (64.4)	47 (35.6)	5.88	4.05-8.55	<0.001
Education of mother					
> Primary school	1741 (93.9)	113 (6.1)	1		
≤ Primary school	1824 (87.4)	264 (12.6)	2.23	1.77-2.81	<0.001
Occupation of mother					
Unemployed	636 (91.0)	63 (9.0)	1		
Employed	2936 (90.3)	314 (9.7)	1.08	0.81-1.43	0.597
Number of family member					
< 5 people	1924 (91.7)	174 (8.3)	1		
≥ 5 people	1593 (89.4)	189 (10.6)	1.31	1.06-1.63	<0.05

Table 4.13 The association between socio- demographic and family characteristics and stunting

Socio-demographic and family characteristics	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Family income (Baht for year)					
≥ 52,000 Baht	2676 (92.9)	206 (7.1)	1		
< 52,000 Baht	823 (84.4)	152 (15.6)	2.40	1.92-3.00	<0.001

4.3.2.3 The association between utilization of health services and stunting

As shown in Table 4.14, frequency of ANC and immunization OPV- DPT were remained independently associated with stunting at the first year of age according to WHO reference.

Children who has mother took antenatal care less than 4 times were 1.6 times ($p< 0.01$) higher risk of being stunting than children who have mother took antenatal care over 4 times. Children who are not completed immunization OPV-DPT at age were 0.7 times ($p< 0.01$) higher risk of being stunting than children who are completed immunization OPV- DPT at age.

In summary, two variables of utilization such as frequency of ANC and Immunization OPV- DPT were found to be associated with stunting.

Table 4.14 The association between utilization of health services and stunting

Utilization of Health services	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Frequency of ANC					
≥4 times	3143 (91.1)	308 (8.9)	1		
< 4 times	454 (86.8)	69 (13.2)	1.55	1.17-2.05	<0.01
Immunization OPV-DPT					
Completed	2324 (89.4)	277 (10.6)	1		
Not completed	1218 (92.5)	99 (7.5)	0.68	0.54-0.87	<0.01

4.3.2.4 The association between feeding practice and stunting

As shown in Table 4.15, age at which children were stopped breastfed, time of introduced of complementary food: rice and banana were remained independently associated with stunting at the first year of age according to WHO reference.

Children who were stopped breastfed after 6 months of age were 1.7 times ($p< 0.001$) higher risk of being stunting than children who were stopped breastfed less than 6 months of age. Children who were introduced rice as complementary food items after 6 months were 1.5 times ($p< 0.05$) higher risk of being stunting than children who were introduced rice as complementary food items less than 6 months. Children who were introduced banana as complementary food items after 6 months were 2.6 times ($p< 0.001$) higher times risk of being stunting than children who were introduced Banana as complementary food items less than 6 months.

In summary, three variables of feeding practice such as age at which children were stopped breastfed, time of introduced of complementary food: rice and banana were found to be associated with stunting.

Table 4.15 The association between feeding practice and stunting

Feeding Practice	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P- value
Age at which children were stopped breastfed					
< 6 months	1138 (94.4)	68 (5.6)	1		
≥ 6 moths	1510 (90.6)	156 (9.4)	1.73	1.29-2.32	<0.001
Time of introduced of complementary food: rice					
< 6 months	2983 (91.2)	289 (8.8)	1		
≥ 6 months	358 (87.3)	52 (12.7)	1.50	1.09-2.05	<0.05

Table 4.15 The association between feeding practice and stunting (cont.)

Feeding Practice	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Time of introduced of complementary food: banana					
< 6 months	3171 (91.8)	285 (8.2)	1		
≥ 6 months	236 (81.4)	54 (18.6)	2.55	1.85-3.50	<0.001

4.3.2.5 The association between child rearing characteristics and stunting

As shown in Table 4.16, mother activities: playing a doll, father activities: playing a doll, child rearing pattern: control of feeding time, food introduction and control of sleeping time were remained independently associated with stunting at the first year of age according to WHO reference.

Children who were not playing a doll with their mother during a day time in a weeks had 2.5 times ($p< 0.001$) higher risk of being stunting than children who were playing a doll with their mother. Children who were not playing a doll with their father during a day time in a weeks had 1.5 times ($p< 0.01$) higher risk of being stunting than children who were playing a doll with their father. As child rearing pattern, children who have caregiver who control, neglect, over protection and others parenting style about control of feeding time were 1.3 times ($p< 0.05$) higher risk of being stunting than children who have caregiver who rational parenting style. Children who have caregiver who control, neglect, over protection and others parenting about food introduction were 1.4 times ($p< 0.05$) higher risk of being stunting than children who have caregiver who rational parenting style. Children who have caregiver who control, neglect, over protection and others parenting style about control of sleeping time were 1.6 times ($p< 0.001$) higher risk of being stunting than children who have caregiver who rational parenting style.

In summary, five variables of child rearing characteristics such as mother activities: playing a doll, father activities: playing a doll, child rearing pattern: control of feeding time, food introduction and control of sleeping time were found to be associated with stunting.

Table 4.16 The association between child rearing characteristics and stunting

Child rearing characteristics	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Mother activities:					
Go for a walk					
Yes	2973 (89.7)	343 (10.3)	1		
No	67 (95.7)	3 (4.3)	0.39	0.12-1.24	0.098
Mother activities:					
Playing a doll					
Yes	2864 (90.5)	300 (9.5)	1		
No	175 (79.2)	46 (20.8)	2.51	1.78-3.55	<0.001
Mother activities:					
Singing					
Yes	1858 (89.2)	224 (10.8)	1		
No	1177 (90.6)	122 (9.4)	0.86	0.68-1.09	0.202
Mother activities:					
Body playing					
Yes	2911 (89.9)	328 (10.1)	1		
No	125 (87.4)	18 (12.6)	1.28	0.77-2.12	0.342
Father activities:					
Go for a walk					
Yes	2484 (89.7)	284 (10.3)	1		
No	541 (90.0)	60 (10.0)	0.97	0.72-1.30	0.839
Father activities:					
Playing a doll					
Yes	2345 (90.7)	240 (9.3)	1		
No	682 (86.8)	104 (13.2)	1.49	1.17-1.90	<0.01
Father activities:					
Singing					
Yes	1311 (90.4)	140 (9.6)	1		
No	1712 (89.4)	204 (10.6)	1.12	0.89-1.40	0.343
Father activities:					
Body playing					
Yes	2384 (90.1)	263 (9.9)	1		
No	636 (88.7)	81 (11.3)	1.15	0.89-1.50	0.286

Table 4.16 The association between child rearing characteristics and stunting (cont.)

Child rearing characteristics	Not stunting children (%)	Stunting children (%)	Crude OR	95% CI	P-value
Child rearing pattern: Control of feeding time					
Rational parenting style	2007 (91.5)	187 (8.5)	1		
Another parenting style	1520 (89.0)	187 (11.0)	1.32	1.07-1.63	<0.05
Child rearing pattern: Food introduction					
Rational parenting style	1211 (92.2)	103 (7.8)	1		
Another parenting style	2331 (89.6)	271 (10.4)	1.37	1.08-1.73	<0.05
Child rearing pattern: Control of sleeping time					
Rational parenting style	998 (93.2)	73 (6.8)	1		
Another parenting style	2548 (89.4)	303 (10.6)	1.63	1.25-2.12	<0.001
Child rearing pattern: Responding to cry					
Rational parenting style	639 (89.9)	72 (10.1)	1		
Another parenting style	2908 (90.5)	304 (9.5)	0.93	0.71-1.22	0.587

4.3.3 The association between independent variables and wasting

To find out the association of wasting at the first year of life with independent variables, chi- square test was used.

4.3.3.1 The association between general characteristics of children and wasting

As shown in Table 4.17, birth weight, birth length and type of main caregiver were remained independently associated with wasting at the year of age according to WHO reference.

Low birth weight (< 2500 g) were 3 times (p< 0.001) higher risk of being wasting than standard birth weight. Children less than 50 cm in length at were 1.5 times (p< 0.01) higher risk of being wasting than children over 50 cm. Children whose main caregiver are relative had 1.8 times (p< 0.01) higher risk of being wasting than children whose main caregiver is parents.

In summary, three variables of general characteristics of children such as birth weight, birth height and type of main caregiver were found to be associated with wasting.

Table 4.17 The association between general characteristics of children and wasting

General characteristics of children	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Gender					
Girl	1901 (94.9)	102 (5.1)	1		
Boy	1848 (93.8)	123 (6.2)	1.24	0.95-1.63	0.117
Birth weight					
≥ 2500 g	3362 (95.0)	178 (5.0)	1		
< 2500 g	253 (86.3)	40 (13.7)	2.99	2.07-4.31	<0.001
Birth length					
≥ 50 cm	1763 (95.5)	84 (4.5)	1		
< 50 cm	1758 (93.2)	132 (6.8)	1.53	1.15-2.03	<0.01
Illness within 12 months					
No	3354 (94.3)	203 (5.7)	1		
Yes	358 (94.2)	22 (5.8)	1.02	0.65-1.60	0.948
Type of main caregiver					
Parents	977 (96.4)	37 (3.6)	1		
Relative	2669 (93.5)	185 (6.5)	1.83	1.28-2.63	<0.01

4.3.3.2 The association between socio- demographic and family characteristics and wasting

As shown in Table 4.18, location, religion, mother age, education of mother and number of family member were remained independently associated with wasting at the first year of age according to WHO reference.

As location, children residing in Central area had 1.5 times ($p< 0.01$), South area had 2.1 times ($p< 0.01$) and North East area had 2.7 times ($p< 0.001$) higher risk of being wasting than children residing in capital city of Bangkok in Thailand. Only North area were not significantly associated with wasting. As religion, children have not Buddhism family were 1.4 times ($p< 0.05$) higher risk of being wasting than children have Buddhism family. Children who were born from mother

less than 20 years old had 1.6 times (p< 0.05) higher risk of being wasting than children who were born from mother over 20 years old. Children who have mother that educated lower and equal primary school were 1.8 times (p< 0.001) higher risk of being wasting than children who have mother educated over primary school. Children who have over 5 people in the number of family member were 1.3 times (p< 0.05) higher risk of being wasting than children who have less than 5 people.

In summary, five variables of socio- demographic and family characteristics such as location, religion, mother age, education of mother and number of family member were found to be associated with wasting.

Table 4.18 The association between socio- demographic and family characteristics and wasting

Socio- demographic and family characteristics	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Location					
Bangkok	630 (97.1)	19 (2.9)	1		
Central	688 (93.0)	52 (7.0)	2.51	1.45-4.29	<0.01
South	961 (93.9)	62 (6.1)	2.14	1.27-3.61	<0.01
North East	760 (92.5)	62 (7.5)	2.71	1.60-4.57	<0.001
North	710 (95.9)	30 (4.1)	1.40	0.78-2.51	0.258
Religion					
Buddhism	2937 (94.7)	164 (5.3)	1		
Not Buddhism	774 (92.7)	61 (7.3)	1.41	1.04-1.91	<0.05
Mother age					
≥ 20 years old	3295 (94.7)	186 (5.3)	1		
< 20 years old	425 (91.8)	38 (8.2)	1.58	1.10-2.28	<0.05
Mother height					
≥ 145 cm	3568 (94.3)	215 (5.7)	1		
< 145 cm	125 (94.7)	7 (5.3)	0.93	0.43-2.01	0.853
Education of mother					
> Primary school	1777 (95.8)	77 (4.2)	1		
≤ Primary school	1940 (92.9)	148 (7.1)	1.76	1.33-2.34	<0.001

Table 4.18 The association between socio- demographic and family characteristics and wasting (cont.)

Socio- demographic and family characteristics	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Occupation of mother					
Unemployed	650 (93.0)	49 (7.0)	1		
Employed	3074 (94.6)	176 (5.4)	0.76	0.55-1.05	0.099
Number of family member					
< 5 people	1993 (95.0)	105 (5.0)	1		
≥5 people	1665 (93.4)	117 (6.6)	1.33	1.02-1.75	<0.05
Family income (Baht for year)					
≥ 52,000 Baht	2727 (94.6)	155 (5.4)	1		
< 52,000 Baht	910 (93.3)	65 (6.7)	1.26	0.93-1.70	0.134

4.3.3.3 The association between utilization of health services and wasting

As shown in Table 4.19, utilization of health services are not associated with wasting at the first year of age according to WHO reference.

Table 4.19 The association between utilization of health services and wasting

Utilization of health services	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Frequency of ANC					
≥ 4 times	3257 (94.4)	194 (5.6)	1		
< 4 times	492 (94.1)	31 (5.9)	1.06	0.72-1.56	0.778
Immunization OPV-DPT					
Completed	2440 (93.8)	161 (6.2)	1		
Not completed	1255 (95.3)	62 (4.7)	0.75	0.55-1.01	0.059

4.3.3.4 The association between feeding practice and wasting

As shown in Table 4.20, age at which children were stopped breastfed was remained independently associated with wasting at the first year of age according to WHO reference.

Children who were stopped breastfed after 6 months of age were 2.4 times ($p< 0.001$) higher risk of being wasting than children who were stopped breastfed less than 6 months of age.

In summary, one variables of feeding practice such as age at which children were stopped breastfed was found to be associated with wasting.

Table 4.20 The association between feeding practice and wasting

Feeding practice	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Age at which children were stopped breastfed					
< 6 months	1169 (96.9)	37 (3.1)	1		
≥ 6 moths	1548 (92.9)	118 (7.1)	2.41	1.65-3.51	<0.001
Time of introduced of complementary food: rice					
< 6 months	3087 (94.3)	185 (5.7)	1		
≥ 6 months	390 (95.1)	20 (4.9)	0.86	0.53-1.37	0.518
Time of introduced of complementary food: banana					
< 6 months	3265 (94.5)	191 (5.5)	1		
≥ 6 months	266 (91.7)	24 (8.3)	1.54	0.99-2.40	0.053

4.3.3.5 The association between child rearing characteristics and wasting

As shown in Table 4.21, father activities: go for walk, playing a doll, singing and body playing were remained independently associated with wasting at the first year of age according to WHO reference.

Children who were not going a walk with their father during a day time in a weeks had 1.6 times ($p< 0.01$) higher risk of being wasting than children who were going a walk with their father. Children who were not playing a doll with their father during a day time in a weeks had 1.6 times ($p< 0.01$) higher risk of being wasting than children who were playing a doll with their father. Children who were not singing with their father during a day time in a weeks had 1.6 times ($p< 0.01$) higher risk of being wasting than children who were singing with their father. Children who were not body playing with their father during a day time in a weeks had 1.5 times ($p< 0.05$) higher risk of being wasting than children who were body playing with their father.

In summary, four variables of child rearing characteristics such as father activities: go for walk, playing a doll, singing and body playing were found to be associated with wasting.

Table 4.21 The association between child rearing characteristics and wasting

Child rearing characteristics	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Mother activities:					
Go for a walk					
Yes	3116 (94.0)	200 (6.0)	1		
No	67 (95.7)	3 (4.3)	0.70	0.22-2.24	0.543
Mother activities:					
Playing a doll					
Yes	2972 (93.9)	192 (6.1)	1		
No	210 (95.0)	11 (5.0)	0.81	0.44-1.51	0.509

Table 4.21 The association between child rearing characteristics and wasting (cont.)

Child rearing characteristics	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Mother activities:					
Singing					
Yes	1959 (94.1)	123 (5.9)	1		
No	1219 (93.8)	80 (6.2)	1.05	0.78-1.40	0.765
Mother activities:					
Body playing					
Yes	3046 (94.0)	193 (6.0)	1		
No	133 (93.0)	10 (7.0)	1.19	0.61-2.29	0.610
Father activities:					
Go for a walk					
Yes	2616 (94.5)	157 (5.6)	1		
No	515 (91.7)	50 (8.3)	1.56	1.12-2.18	<0.01
Father activities:					
Playing a doll					
Yes	2448 (94.7)	137 (5.3)	1		
No	721 (91.7)	65 (8.3)	1.61	1.19-2.19	<0.01
Father activities: Singing					
Yes	1385 (95.5)	66 (4.5)	1		
No	1780 (92.9)	136 (7.1)	1.60	1.19-2.17	<0.01
Father activities:					
Body playing					
Yes	2501 (94.5)	146 (5.5)	1		
No	661 (92.2)	56 (7.8)	1.45	1.05-2.00	<0.05
Child rearing pattern:					
Control of feeding time					
Rational parenting style	2076 (94.6)	118 (5.4)	1		
Another parenting style	1603 (93.9)	104 (6.1)	1.14	0.87-1.50	0.339
Child rearing pattern:					
Food introduction					
Rational parenting style	1245 (94.7)	69 (5.3)	1		
Another parenting style	2449 (94.1)	153 (5.9)	1.13	0.84-1.51	0.422

Table 4.21 The association between child rearing characteristics and wasting (cont.)

Child rearing characteristics	Not wasting children (%)	Wasting children (%)	Crude OR	95% CI	P-value
Child rearing pattern:					
Control of sleeping time					
Rational parenting style	1007 (94.0)	64 (6.0)	1		
Another parenting style	2692 (94.4)	159 (5.6)	0.93	0.69-1.25	0.631
Child rearing pattern:					
Responding to cry					
Rational parenting style	667 (93.8)	44 (6.2)	1		
Another parenting style	3033 (94.4)	179 (5.6)	0.90	0.64-1.26	0.521

4. 4 The predicting factor for child nutritional status

4.4.1 The Full model of Multiple Logistic Regression

The full model of multiple logistic regression analysis of predicting factors for child nutritional status was calculated by using Backward Wald method in SPSS version 16.0. The result of full model of Multiple Logistic Regression was presented in Table 4.22.

Table 4.22 The full model of Multiple Logistic Regression

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Gender						
Girl	1		1			
Boy	2.15 (0.82-5.65)	0.121	2.31 (0.77-6.93)	0.133	N/A	
Birth weight						
≥ 2500 g	1		1		1	
< 2500 g	9.05 (2.48-33.00)	<0.01	5.21 (1.16-23.33)	<0.05	3.99 (1.24-12.85)	<0.05
Birth length						
≥ 50 cm	1		1		1	
< 50 cm	2.38 (0.80-7.15)	0.121	3.05 (0.78-11.88)	0.108	1.65 (0.60-4.56)	0.331

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

Table 4.22 The full model of Multiple Logistic Regression (cont.)

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Type of main caregiver						
Parents	1		1		1	
Relative	0.60 (0.19-1.97)	0.401	0.38 (0.10-1.40)	0.145	3.94 (1.15-13.52)	<0.05
Location						
Bangkok	1		1		1	
Central	1.28 (0.00- .)	0.999	1.88 (0.09-39.93)	0.687	1.20 (0.00- .)	0.999
South	3.36 (0.00- .)	0.999	2.45 (0.07-83.20)	0.619	2.98 (0.00- .)	0.999
North East	1.28 (0.00- .)	0.999	0.72 (0.03-15.44)	0.833	1.04 (0.00- .)	0.999
North	3.93 (0.00- .)	0.999	0.83 (0.04-16.40)	0.902	3.49 (0.00- .)	0.999
Religion						
Buddhism	1		1		1	
Not Buddhism	3.35 (0.99-72.38)	0.299	2.09 (0.89-4.95)	0.092	1.77 (0.21-14.83)	0.601
Mother age						
≥ 20 years old	1				1	
< 20 years old	0.20 (0.04-0.98)	<0.05	N/A		0.37 (0.07-1.87)	0.230
Mother height						
≥145 cm	1		1			
< 145 cm	0.00 (0.00- .)	0.999	3.98 (0.30-52.60)	0.294	N/A	
Education of mother						
> Primary school	1		1		1	
≤ Primary school	1.83 (0.61-5.47)	0.280	0.95 (0.28-3.25)	0.929	1.61 (0.58-4.50)	0.362
Number of family member						
< 5 people	1		1		1	
≥ 5 people	1.53 (0.59-3.95)	0.382	0.49 (0.16-1.51)	0.217	1.28 (0.52-3.19)	0.594
Family income						
< 52,000 Baht	1		1			
≥ 52,000 Baht	1.72 (0.57-5.23)	0.337	0.95 (0.24-3.87)	0.947	N/A	
Frequency of ANC						
≥ 4 times			1			
< 4 times	N/A		0.53 (0.09-3.13)	0.484	N/A	

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

Table 4.22 The full model of Multiple Logistic Regression (cont.)

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Immunization OPV-DPT						
Completed	1		1			
Not completed	0.37 (0.11-1.31)	0.124	0.89 (0.23-3.39)	0.859	N/A	
Age at which children were stopped breastfed						
< 6 months	1		1		1	
≥ 6 moths	1.45 (0.41-5.15)	0.567	1.52 (0.35-6.58)	0.572	1.00 (0.29-3.51)	0.997
Time of introduced of complementary food: rice						
< 6 months			1			
≥ 6 months	N/A		0.80 (0.08-7.90)	0.851	N/A	
Time of introduced of complementary food: banana						
< 6 months	1		1			
≥ 6 months	0.21 (0.02-2.90)	0.243	0.00 (0.00- .)	0.998	N/A	
Mother activities: Go for walk						
Yes	1		1		1	
No	0.00 (0.00- .)	0.998	0.00 (0.00- .)	0.998	0.00 (0.00- .)	0.998
Mother activities: Playing a doll						
Yes	1		1		1	
No	1.84 (0.38-9.00)	0.450	0.50 (0.03-7.71)	0.618	3.02 (0.79-11.50)	0.106
Mother activities: Singing						
Yes	1		1		1	
No	0.33 (0.12-0.93)	<0.05	0.43 (0.12-1.50)	0.186	0.81 (0.32-2.00)	0.643
Mother activities: Body playing						
Yes	1		1		1	
No	0.74 (0.09-6.34)	0.787	0.23 (0.10-5.62)	0.363	1.44 (0.26-7.85)	0.673

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

Table 4.22 The full model of Multiple Logistic Regression (cont.)

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Father activities: Go for a walk						
Yes	1					
No	1.70 (0.57-5.04)	0.341	N/A		N/A	
Father activities: Playing a doll						
Yes			1		1	
No	N/A		2.48 (0.66-9.44)	0.181	0.73 (0.28-1.86)	0.502
Child rearing pattern: Control of feeding time						
Rational parenting style	1		1		1	
Another parenting style	0.84 (0.30-2.30)	0.728	1.13 (0.34-3.77)	0.837	0.85 (0.33-2.18)	0.732
Child rearing pattern: Food introduction						
Rational parenting style	1		1		1	
Another parenting style	0.91 (0.31-2.65)	0.863	2.68 (0.64-11.27)	0.180	0.75 (0.30-1.89)	0.539
Child rearing pattern: Control of sleeping time						
Rational parenting style	1		1		1	
Another parenting style	4.22 (1.01-17.68)	<0.05	1.24 (0.29-5.30)	0.773	1.74 (0.55-5.53)	0.346
Child rearing pattern: Responding to cry						
Rational parenting style	1		1		1	
Another parenting style	1.78 (0.38-8.33)	0.462	1.48 (0.33-6.55)	0.606	1.10 (0.27-4.42)	0.895

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

4.4.2 The final model of Multiple Logistic Regression

As shown in Table 4.23, the most significant risk factors related to child underweight were birth weight (AOR= 10.07, 95% CI= 2.87-35.28, p< 0.001), mother activities: singing (AOR= 0.31, 95% CI= 0.11-0.87, p< 0.05) and child rearing pattern: control of sleeping time (AOR= 4.71, 95% CI= 1.16-19.10, p< 0.05). As shown in Table 4.23, the most significant risk factors related to child stunting was only birth weight (AOR= 4.49, 95% CI= 1.16-17.39, p< 0.05). As shown in Table 4.23, the most significant risk factors related to child wasting were birth weight (AOR= 3.94, 95% CI= 1.24-12.49, p< 0.05) and type of main caregiver (AOR= 4.04, 95% CI= 1.15-14.21, p< 0.05).

All three nutritional status were significantly associated with birth weight. Low birth weight (< 2500 g) were 10 times for underweight, 4.5 times for stunting and 3.9 times for wasting greater risk of being these nutritional status than standard birth weight. For, mother activities, mothers who were not singing was a protective factor for child underweight. Children who have caregiver who control, neglect, over protection and others parenting style about control of sleeping time were 4.7 times greater risk of being underweight than children who have caregiver who rational parenting style. Children whose main caregiver are relative had 4 times greater risk of being wasting than children whose main caregiver is parents. Other factors were no longer related to child underweight, stunting and wasting.

Table 4.23 The final model of Multiple Logistic Regression

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P- value	Adjusted OR (95 % CI)	P- value	Adjusted OR (95 % CI)	P- value
Gender						
Girl	1		1			
Boy	2.19 (0.86-5.61)	0.101	2.08 (0.74-5.88)	0.166	N/A	
Birth weight						
≥ 2500 g	1		1		1	
< 2500 g	10.07 (2.87-35.28)	<0.001	4.49 (1.16-17.39)	<0.05	3.94 (1.24-12.49)	<0.05

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

Hosmer and Lemeshow Test: Underweight ($\chi 2$= 9.01, Sig. = 0.342), Stunting ($\chi 2$= = 12.46, Sig. = 0.132) and Wasting ($\chi 2$=9.07, Sig. = 0.336).

Table 4.23 The final model of Multiple Logistic Regression (cont.)

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Birth length						
≥ 50 cm	1		1		1	
< 50 cm	2.23 (0.18-1.89)	0.147	2.34 (0.71-7.70)	0.160	1.64 (0.60-4.48)	0.337
Type of main caregiver						
Parents	1		1		1	
Relative	0.57 (0.18-1.89)	0.360	0.36 (0.10-1.28)	0.113	4.04 (1.15-14.21)	<0.05
Location						
Bangkok	1				1	
Central	1.45 (0.00- .)	0.999			1.29 (0.00- .)	0.999
South	3.93 (0.00- .)	0999			2.61 (0.00- .)	0.999
North East	1.31 (0.00- .)	0.999			8.35 (0.00- .)	0.999
North	4.18 (0.00- .)	0.999	N/A		3.34 (0.00- .)	0.999
Religion						
Buddhism	1		1		1	
Not Buddhism	6.96 (0.96-50.61)	0.055	1.98 (0.39-10.02)	0.411	1.80 (0.22-15.03)	0.589
Mather age						
≥ 20 years old	1				1	
< 20 years old	0.22 (0.05-1.01)	0.052	N/A		0.33 (0.07-1.58)	0.164
Mother height						
≥ 145 cm			1			
< 145 cm	N/A		2.83 (0.25-31.54)	0.398	N/A	
Education of mother						
> Primary school	1		1		1	
≤ Primary school	1.72 (0.60-4.95)	0.313	1.29 (0.44-3.77)	0.644	1.56 (0.57-4.26)	0.389
Number of family member						
< 5 people	1		1		1	
≥ 5 people	1.69 (0.67-4.25)	0.268	0.54 (0.19-1.56)	0.258	1.32 (0.55-3.19)	0.537
Family income						
< 52,000 Baht	1					
≥ 52,00 Baht	1.67 (0.57-4.93)	0.354	N/A		N/A	

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

Table 4.23 The final model of Multiple Logistic Regression (cont.)

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Frequency of ANC						
≥ 4 times			1			
< 4 times	N/A		0.59 (0.11-3.23)	0.541	N/A	
Immunization OPV-DPT						
Completed	1		1			
Not completed	0.38 (0.11-1.32)	0.127	0.73 (0.22-2.40)	0.609	N/A	
Age at which children were stopped breastfed						
< 6 months	1		1		1	
≥ 6 moths	1.56 (0.43-5.59)	0.496	1.31 (0.36-4.87)	0.683	1.31 (0.37-4.62)	0.673
Time of introduced of complementary food: rice						
< 6 months			1			
≥ 6 months	N/A		0.53 (0.06-4.77)	0.573	N/A	
Time of introduced of complementary food: banana						
< 6 months	1					
≥ 6 months	0.20 (0.02-2.51)	0.214	N/A		N/A	
Mother activities: Playing a doll						
Yes			1		1	
No	N/A		0.48 (0.04-4.83)	0.414	2.09 (0.52-8.39)	0.299
Mother activities: Singing						
Yes	1		1		1	
No	0.31 (0.11-0.87)	<0.05	0.50 (0.16-1.54)	0.229	0.72 (0.29-1.80)	0.476
Mother activities: Body playing						
Yes	1		1		1	
No	0.37 (0.05-2.77)	0.335	0.36 (0.03-4.48)	0.424	0.62 (0.11-3.52)	0.586

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

Table 4.23 The final model of Multiple Logistic Regression (cont.)

Predictors	Underweight		Stunting		Wasting	
	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value	Adjusted OR (95 % CI)	P-value
Father activities: Go for walk						
Yes	1					
No	1.98 (0.69-5.70)	0.204	N/A		N/A	
Father activities: Playing a doll						
Yes			1		1	
No	N/A		2.01 (0.59-6.88)	0.264	0.87 (0.34-2.23)	0.769
Child rearing pattern: Control of feeding time						
Rational parenting style					1	
Another parenting style	N/A		N/A		0.88 (0.35-2.23)	0.790
Child rearing pattern: Food introduction						
Rational parenting style			1		1	
Another parenting style	N/A		2.33 (0.61-8.87)	0.217	0.80 (0.32-2.00)	0.635
Child rearing pattern: Control of sleeping time						
Rational parenting style	1		1		1	
Another parenting style	4.71 (1.16-19.10)	<0.05	1.40 (0.36-5.41)	0.625	1.84 (0.59-5.78)	0.297
Child rearing pattern: Responding to cry						
Rational parenting style	1		1			
Another parenting style	1.97 (0.45-8.69)	0.373	1.57 (0.39-6.39)	0.529	N/A	

N/A: The independent variables were not related by the backward procedure of the Multiple Logistic Regression or not included since the Chi- square test found to be non- significant

CHAPTER V
DISCUSSIONS

This chapter presents discussion of the findings about the prevalence of child nutritional status at first year of age, and the association between multiple factors; general characteristics of children, socio demographic and family characteristics, utilization of health services, feeding practice and child rearing characteristics with child nutritional status (underweight, stunting and wasting) during the first year of life in Thailand. In course of discussion, findings were compared with previous studies and also in related other findings in this study.

The aim of this study was to investigate the association between child rearing and child nutritional status during the first year of life in Thailand. A total of 4,245 children born between July 2000 and June 2002 were enrolled consecutively base on the PCTC project. 60 twin infants and 35 dead and abnormal children (including one of twin) were excluded. Then, the remaining 4,151 children were conducted for data analysis.

5.1 Prevalence of child nutritional status at the first year of life

One of objectives of this study was to investigate the prevalence and incidence of child nutritional status at first year of life in Thailand. This study shows that 8.3% of the children were underweight (Weight for Age), 9.5% of the children were stunting (Height for Age) and 5.7% of children were wasting (Weight for Height) by using WHO reference 2006. This study showed that boy was higher risk being underweight, stunting and wasting than girl. Also, for prevalence of each study area, all nutritional status showed that Bangkok was the lowest prevalence. Rural area was higher prevalence than Bangkok. This suggests that proper nutrition need to enhance growth in Thai boy children in rural area.

Similar result of another study in urban and rural area in Thailand showed that prevalence of underweight were 9.3%, stunting were 11.9%, wasting were 4.1% for children under 5 years of age in 2005- 2006 (100). However, result of studies in same study area but children of particular case was differed in this study. Prevalence of malnutrition was 36.9% by weight for age, 42.5% by height for age and 17.8% by weight for height for children 1- 5 years of age in malaria endemic area of Kanchanaburi province, Thailand in 1998 (101). The result of study of the Klong Toey slam, Bangkok was that 25.4% by weight for age, 18.1% by height for age, 6.9% by weight for height for children 1- 5 years of age in 2001 (86). This study and those previous studies were revealed that prevalence of child nutritional status has large differences by region or situation of children in Thailand. This suggests that strongly recommend to support nutritional education in those populations.

5.2 General characteristics of children

Gender

The study showed that gender related significantly to all child nutritional status. Boy were 1.5 times for underweight, 1.7 times for stunting and 1.2 time for wasting higher risk of being these nutritional status than girl.

The finding similar studies showed that boy in high risk of underweight, stunting and wasting (1, 56, 57, 102-104). The existing vulnerability of boy that is seen in all cultures and also may partly have a genetic basis (103, 105). As contrast with result's reasons are some parents look after male children treasures than female children in order to male children may be important source of labor on the family farm, expected to provide economic and social security for their parents and the family name is carried on by sons (59, 60).

Birth weight

It was found that Birth weight related significantly to all child nutritional status. Low birth weight (< 2500 g) were 4.5 times for underweight, 4 times for stunting and 3 times for wasting greater risk of being underweight, stunting and

wasting than standard birth weight. After adjusting the confounding factors in the final model, birth weight was most significant factor for all three nutritional status.

The similar result of this study showed that the prevalence of underweight children and low birth weight were correlated (84). For stunting, low birth weight was a significant predictor by some studies (73, 103, 106, 107). Low birth weight was a significant predictor of stunting and underweight at 12 months (103). It is open to calculation that low birth weight results from poor maternal health and nutrition. Also, possible reasons are the inability of infants with low birth weight to counteract the environmental and socio- economic conditions, allowing persistence of infection and sub- optimal nutrition.

Therefore, the study revealed that birth weight was strongly related directly with underweight, stunting and wasting. It was recommended that education to pregnant women for preventive low birth weight and improve of quality of ANC.

Birth length

The study showed that birth length related significantly to all nutritional status. Children less than 50 cm in length at birth were 2.7 times for underweight, 2.8 times for stunting and 1.5 times for wasting higher risk of being these nutritional status than children over 50 cm.

The similar result of the study showed that children who were larger in size at birth had lower risk of malnutrition than those who were very small in size at birth (63).

Illness within 12 months

The study found that children get illness within 12 months did not relate to any nutritional status.

Differ result of study showed that higher proportion of child underweight and child stunting who had been sick one week prior to the study. The study of Vietnam found that the risk of being underweight was 2.3 times higher for children who had experienced diarrhea in the last 2 weeks than in children who had not (1). Another study showed that diarrhea was significantly associated with stunting in children under 2 years of age (108). Also, previous study found that history of fever

was associated with child stunting under 2 years of age (55). If this study conduct specific disease and period, it might be influence to child nutritional status in this study.

Type of main caregiver

The study found that type of main caregiver related significantly to all child nutritional status. children whose main caregiver are relative had 1.8 times for underweight, 1.7 times for stunting and 1.8 times for wasting higher risk of being these nutritional status. After adjusting the confounding factors in the final model, type of main caregiver was most significant factor for wasting. In Thailand, percentage of children aged 0-4 years living neither parents is about 20 % according to living arrangements in 2008 (65). However, this study showed that relative looking after the child was over 70%. Over 80% of mothers have job outside in this study. Labor participation rate were 81.3% of male, 65.1% of female in 15 years old and over in 2006 by report on Thailand Gender- Disaggregated Statistics 2008 (109). Both mother and husband work is the main current in Thailand. Thus, relative such as grandmother, grandfather, aunt, uncle and so on have to looking after the child.

The study of UK showed that Grandparents play a prominent role in providing child care and supporting maternal employment, especially for low income families. Also, levels of Grandparent involvement are highest for mothers who return to work before children are 6 months of age and in single parent. Grandparents are more likely to provide care when grandchildren are first-born, where are younger and when mothers work part-time (66). The finding of Korea found that significant economic difficulties compound other problems that are specific to older caregivers. And, poverty may be both a cause and an effect of Grandparent primary caregiving (110). These finding showed that if just left child to Grandparents or relative when parents go to work, it may not face economic problem. However, if only Grandparents looking after the child in life, it may face many problems such as economic, social, physical and emotional, and it can probably think as result that influence to child health problem and child nutritional status.

5.3 Socio- demographic and family characteristics

Location

The study showed that location related significantly to all nutritional status. Children residing in Central area was 3.4 times for underweight, 1.8 times for stunting and 2.5 times for wasting , in South area was 4.6 times for underweight, 4.4 times for stunting and 2.1 times for wasting, in North East area was 3.7 times for underweight, 2.5 times for stunting, and 2.7 times for wasting and 3.8 times for underweight and in North area was 5.8 times for stunting and 1.4 times for wasting higher risk of being these nutritional status than children residing in capital city of Bangkok in Thailand. For underweight, South area was highest prevalence. For stunting, North area was highest prevalence. For wasting, North East area was highest prevalence. Bangkok was lowest prevalence in all study area.

The previous studies of this result showed that have also described rural-urban differences in health (111-113). The study of Vietnam found that compared with children in urban areas, children in rural areas and mountain areas were 4.3 and 5.1 times more likely to be underweight, 2.2 and 1.9 times more likely to be stunting, 3.8 and 7.1 times more likely to be wasting, respectively (1). This shows people who live in rural area had live under difficult conditions than people who live in urban area. May be possible reasons that are lack of knowledge, poor educational level, not easy accessibility to go to health service, inconvenient of social network and social support system and still remain traditional feeding.

Religion

The study found that religion related significantly to all child nutritional status. Children have not Buddhism family were 2.5 times for underweight, 2.7 times for stunting and 1.4 times for wasting higher risk of being these nutritional status than children have Buddhism family. In this study showed that 79% of household was Buddhism and 21% of household was not Buddhism such as Islam or Christ or others.

The study of India showed that religion have found in child under nutrition (114). However, another study of India found that no significant association with malnutrition was noted with religion (76). Religion is a system of beliefs that is

expressed commonly through rituals and symbols and that are disturbed with the supernatural. Food is an important part of religious symbols, customs and rituals. Food is used to communicate with God, to demonstrate faith through acceptance of divine directives concerning diet, and to develop discipline through fasting. Unlike taboos for certain periods in a life cycle, religion is involved in permanent food prohibitions and prescriptions (115).

Mother age

The study showed that mother age related significantly to underweight and wasting of nutritional status. Children who were born from mother less than 20 years old had 1.5 times for underweight and 1.6 times for wasting higher risk of being these nutritional status than children who were born from mother over 20 years old.

The previous study corroborates result found that significant positive associations between maternal age and good nutritional status in pre- school children (60, 79, 80). The similar result of the study also showed that Mother under 20 years old was associated with the child nutritional status (73). The possible reasons that young mother may not have sufficient experienced and lack of knowledge.

Mother height

The study found that mother height related significantly to underweight and stunting of nutritional status. Children whose mother has less than 145cm in height were 3.3 times for underweight and 5.9 times for stunting higher risk of being these nutritional status than children whose mother has over 145 cm in height.

The similar result of the study found that Mother height is significantly associated to the height for age indicator of stunting (116-118). Also, previous studies showed that the mother with height less than 150 cm was significantly more likely to be stunting (119-122). Maternal factors might change prenatal characteristics of a child and due to the intergenerational effect. It can be affected further as a cause for stunting. Another study which is similar result showed that mothers shorter than 140 cm had substantially higher risk of being underweight and stunting in infancy, but the association between maternal height and wasting was weak (123). As possible reason,

the mother stature is an important determinant of intrauterine growth restriction and low birth weight (124).

Education of mother

The study showed that education of mother related significantly to all nutritional status. Children who have uneducated mother were 2.2 times for underweight, 2.2 times for stunting, 1.8 times for wasting higher risk of being underweight, stunting and wasting than children who have educated mother.

It is well recognized that maternal education is directory related to child health including child nutritional status (125, 126). The similar result of study of Thailand revealed that mother whose educational level was lower than primary school had 10.1 times higher risk of having malnourished children (86). The findings showed that a highly significant association with malnutrition was mother's educational status (76). Also the studies of similar result found that low educated mother have malnourished children (127-129). The study of Vietnam showed that mother's educational level was one of the most important factors of malnutrition (1). Mother educational level can be connected with knowledge of child health care and nutrition practices so that lack of maternal knowledge associated directly to child nutritional status.

Occupation of mother

The study found that occupation of mother is not related to any nutritional status.

Differ result of study of Thailand showed that the children whose mother were unemployed or housewives had 6.5 times higher risk of malnutrition than the children of employed mothers (86). On the other hands, the children of employed mothers had significantly associated with nutritional status than those of unemployed mothers because maternal income might be spent on higher quality of food (130). It thought that unemployed mother can be provided on higher quality of care of children and can be spent on long time for take care of children. However, this study is not related to nutritional status.

Number of family member

The study showed that number of family member related significantly to all nutritional status. Children who have over 5 people in the number of family member were 1.6 times for underweight, 1.3 times for stunting and 1.3 times for wasting higher risk of being these nutritional status than children who have less than 5 people.

This confirms other studies showed that large family size to be significantly negatively associated with good nutritional status (60, 131). This was attributed to the inability of mothers to provide adequate care for their young children, especially where there was more than one pre-school child in the family. Also intra-family distribution of food was poor, with older family members receiving that largest share (60). However, the other study have found that toddlers from large families had better nutritional status than those from medium sized or small families. It was hypothesized that in large families have person who available to care for young children (79).

Family income

The study found that family member related significantly to underweight and stunting of nutritional status. As family income in currency of Thailand Baht for year, children who have family income less than 52,000 Baht (25 percentile) were 1.9 times for underweight and 2.4 times for stunting higher risk of being underweight and stunting than children who have family income over 52,000 Bath (25 percentile).

Family income is clearly associated with children's health status and health behavior (132). The study of showed that family income was affecting the weight gain of infant 3- 6 months (133). As the possible reasons, high family income is perhaps involved in educational level. Therefore, high income family have more knowledge about child care and child nutrition.

5.4 Utilization of health services

Frequency of ANC

The study showed that frequency of ANC related significantly only stunting of nutritional status. Children who has mother took antenatal care less than 4 times were 1.6 times higher risk of being stunting than children who have mother took antenatal care over 4 times. About nearly 90% of mothers had 4 times or more times for ANC in this study.

The study of Demographic and Health Surveys found that in most cases, children whose mothers had one or more ANC visits were less likely to be stunting and underweight than children whose mothers had no ANC visit. Wasting rate were not as clearly associated with ANC visit (134). Utilization of ANC might be indicative of improved availability and access to health care services as well as willingness or ability to practice effective health behaviors. In this study, only child stunting is associated with utilization of ANC. However, it is important for safe delivery, increased knowledge on postnatal care and child care practices.

Immunization status: OPV-DPT

The study found that completed immunization OPV- DPT related significantly to underweight and stunting of nutritional status. Children who are not completed immunization OPV- DPT at age were 0.7 times higher risk of being these nutritional status than children who are completed immunization OPV- DPT at age. In this study, 66% of children were completed immunization OPV-DPT for age and 34 % of children were not completed Immunization OPV-DPT for age.

It is very important to completed immunization on time for increases chance of survival. Also, immunization for children is good opportunities to check child health and nutritional status by skilled health providers. The study of Istanbul showed that higher socio- economic status was related with a higher rate of full vaccination and private vaccination for children under 5 years of age (135). The similar result study of Uganda found that children who received full immunization for age significantly associated with underweight and stunting. Only wasting was not associated with Immunization status (136). Moreover, it was more high risk of sick

among children who were not received full immunization for age compared with children who were received full immunization at age (136). Also study of Thailand, there was significantly higher proportion of stunting among children who were not completed full Immunization for age compared with children who were completed full immunization at age (81). The study of Nepal found that the prevalence of underweight among completely children was significantly lesser than those who had not complete immunization DPT/ Polio (11). This reasons could be because of malnourished children have more vulnerable to infection and incidence of diseases than children of well nutritional status.

5.5 Feeding practices

Age at which children were stopped breastfed

The study showed that age at which children were stopped breastfed related significantly all nutritional status. Children who were stopped breastfed after 6 months of age were 2.6 times for underweight, 1.7 times for stunting and 2.4 times for wasting higher risk of being these nutritional status than children who were stopped breastfed less than 6 months of age.

Children who were stopped breastfed was found in contradiction to WHO recommendations, only 40% of the children were stopped breastfed. Since most of the children were found being introduced complementary foods early, this result could be due to reverse causality as some previous studies have showed (137, 138). However, other studies have found the risk of malnutrition among the children getting prolonged breastfeeding (107, 139).

As those opposed, the study of Nepal showed that the prevalence of underweight was significantly higher in children who were exclusively breast fed for greater period. The study of Indonesia showed that underweight level increase dramatically from 0- 5 months of age group to 6- 11 months of age group (140). Also, the study of Uganda showed that the children who never fed breast milk had higher incidence of underweight (141). The previous study found that children under first

year of life who was no longer exclusively breast fed were showed more malnourished (11, 140, 142). These of reasons that it can be assumed that the availability of consuming artificial milk and increasing working mothers would make the reduction of breast fed rate. Also, continuous of breast milk to be key source of rich nutrients for children. However, result of in this study was the reverse of what researcher expected. The reason that early introduction of complementary food might have led to termination of breast milk in the large group of children.

Time introduced of complementary food: rice and banana

The study found that timed introduce of complementary food related significantly nutritional status of underweight and stunting. Children who were introduced rice as complementary food items after 6 months were 1.5 times higher risk of being stunting than children who were introduced rice as complementary food items less than 6 months. Children who were introduced banana as complementary food items after 6 months were 2.7 times for underweight and 2.5 times for stunting higher risk of being these nutritional status than children who were introduced banana as complementary food items less than 6 months.

WHO recommended that complementary feeding starts from 6 months of age (43). It mean that results of the study were against WHO recommendation. The study found that the children whose mother introduced banana or rice after 6 months is risky. It may be due to banana or rice are benefit for the child physical growth in early introduction.

The other study of Thailand found that rice and banana were habitually given to infants within the first few months (143). In this study also showed that introduced rice was 89%, and introduced banana was 92 % to the children within 6 months of age already. It is difference to the timing of introduce and kinds of complementary foods by location. However, the study of USA showed that the early introduction of complementary food is commonly not recommended prior to 4 months of age, and increases the risk of infections (144). The study of Ethiopia found that starting formula before 6 months and early and late start of complementary foods causes malnutrition (145). It is important that timing of introduce and appropriate to the age and type of complementary food for first feeding children and also,

complementary food should be increased as children show more interested in suit their eating abilities. It may one of the technic of parental child rearing.

5.6 Child rearing

Parents activities: go for a walk

The study showed that parent's activities related significantly all nutritional status but those were difference result by the items of activities. As result showed that children who were not going a walk with their father during a day time in a weeks had 1.6 times higher risk of being wasting than children who were going a walk with their father.

Playing for children improve many aspects of psychological well- being and reduce stress, depression, anxiety, loneliness and sleep problem. Also, play promotes joy, which is essential for health (146).

Parents activities: playing a doll

The result of study showed that children who were not playing a doll with their mother during a day time in a weeks had 2 times for underweight and 2.5 times for stunting higher risk of being these nutritional status than children who were playing a doll with their mother. Children who were not playing a doll with their father during a day time in a weeks had 1.7 times for underweight, 1.5 times for stunting and 1.6 times for wasting higher risk of being these nutritional status than children who were playing a doll with their father.

Play has always been part of learning and growing as well as providing enjoyment. It is important that playing toys which for develop to create and imaginations. The study of Europe found that according to research conducted in homes, play material and the quality of the mother's involvement with the child were significantly related to cognitive development during infancy (146).

Parents activities: singing

Children who were not singing by their father during a day time in a weeks had 1.4 times for underweight and 1.6 times for wasting higher risk of being these nutritional status than children who were singing by their father. However, after adjusting the confounding factors in the final model, singing from mother activities, mothers who were not singing was a protective factor for child underweight. Infant need to provide stimulation and make sensory such as auditory, visual and tactile through playing. It is important that listening songs which for feel comforted and development of language. Moreover, the amount of play varies with the amount of food (146).

Parents activities: body playing

Children who were not body playing with their father during a day time in a weeks had 1.5 times higher risk of being underweight and wasting than children who were body playing with their father.

The study of USA showed that play is essential to development that is contributed to the cognitive, physical, social and emotional well-being of children (147). It may be possible reason that play is influence not only child development but child nutritional status as well. Therefore, parent's activities for child revealed to need child development, growth and health in this study.

Child rearing pattern: control of feeding time, food introduction, control of sleeping time and responding to cry

The study found that child rearing pattern except responding to cry related significantly nutritional status of underweight and stunting. Children who have caregiver who control, neglect, over protection and others parenting style about control of feeding time were 1.3 higher risk of being stunting than children who have caregiver who rational parenting style. Children who have caregiver who control, neglect, over protection and others parenting style about food introduction were 1.4 times higher risk of being stunting than children who have caregiver who rational parenting style. Children who have caregiver who control, neglect, over protection and others parenting style about control of sleeping time were 1.5 times for underweight

and 1.6 for stunting higher risk of being underweight and stunting than children who have caregiver who rational parenting style. After adjusting the confounding factors in the final model, control of sleeping time was most significant factor for underweight.

The same PCTC study of parenting style showed that pattern of parenting style among infancy are unpredictable and not stable (17). Parental responses will be related to parental attitudes, adjustment and sensitivity to child care practices (17, 148). However, this study revealed that parenting style affect child nutritional status during the first year of life. Parents need to adopt authoritative parenting style that combine high levels of acceptance and warmth with firm control (149). Authoritative parenting style such as rational parenting style is recommended as central approach but this study found that over protection parenting style was remarkable in Thailand. According to Baumarind theory, permissive parenting style such as overprotect parenting style is lacked demanding dimension (28, 52, 150). This parenting style unlike authority and control over their children. The study of Iran showed that children who have parents or caregivers who permissive parenting style become dependent and lack social responsibility and are low in cognitive development (29). Thus, child rearing and parenting has its advantages and disadvantages and is impact to child develop and health. Any children have individuality, so it is difficult to raise with uniform way. However, it is important that caregivers should learn way of thinking and knowledge about child rearing and parenting and find to way of rear suit for own children.

CHAPTER VI
CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The objective of this study was to determine the relationship between child rearing and child nutritional status during the first year of life in Thailand. In addition, general characteristics of children, socio- demographic and family characteristics, utilization of health services and feeding practices are also examined. A total of 4,245 children born between July 2000 and June 2002 were enrolled consecutively base on The Prospective Cohort of Thai Children. Sixty twin infants and thirty five dead and abnormal children (including one of twin infant) were excluded. Then, the remaining 4,151 children were conducted for data analysis.

For the purpose of determining the prevalence of child nutritional status at first years of life. This study shows that 8.3% of the children were underweight (Weight for Age), 9.5% of the children were stunting (Height for Age) and 5.7% were wasting (Weight for Height) by WHO growth reference.

Chi- square test was used to assess significant association between each independent variable and outcome variable. Crude odd ratio was used to present the strength of association with 95% confidence interval. Multiple logistic regression was used backward selection for performed to explore the relationship between each independent variable and outcome variable.

The significant association factors of underweight by Chi- square test were gender ($p< 0.001$), birth weight ($p< 0.001$), birth length ($p< 0.001$), and type of main caregiver ($p< 0.001$), from general characteristics of children, location (Central, South, North East and North were $p< 0.001$), religion ($p< 0.001$), mother age ($p< 0.05$), mother height ($p< 0.001$), education of mother ($p< 0.001$), number of family member ($p< 0.001$) and family income ($p< 0.001$) from socio- demographic characteristics and family characteristics, immunization OPV- DPT ($p< 0.01$) from utilization of health services, age at which children were stopped breastfed ($p< 0.001$),

time introduced of complementary food: banana ($p< 0.001$) from feeding practices and mother activities: playing a doll ($p< 0.001$), father activities: playing a doll ($p< 0.001$), singing ($p< 0.01$) and body playing ($p< 0.01$), child rearing pattern: control of sleeping time ($p< 0.01$) from child rearing characteristics.

The significant association factors of stunting by Chi- square test were gender ($p< 0.001$), birth weight ($p< 0.001$), birth length ($p< 0.001$) and type of main caregiver ($p< 0.001$) for general characteristics of children, location (Central $p< 0.05$, South, North East and North were $p< 0.001$), religion ($p< 0.001$), mother height ($p< 0.001$), education of mother ($p< 0.001$), number of family member ($p< 0.05$) and family income ($p< 0.001$) from socio- demographic and family characteristics, frequency of ANC ($p< 0.01$) and immunization OPV- DPT ($p< 0.01$) from utilization of health services, age at which children were stopped breastfed ($p< 0.001$), time introduced of complementary food: rice ($p< 0.05$) and banana ($p< 0.001$) from feeding practices and mother activities: playing a doll ($p< 0.01$), father activities: playing a doll ($p< 0.01$), child rearing pattern: control of feeding time ($p< 0.05$), food introduction ($p< 0.05$), and control of sleeping time ($p< 0.001$) from child rearing characteristics.

The significant association factors of wasting by Chi- square test were birth weight ($p< 0.001$), birth length ($p< 0.01$) and type of main caregiver ($p< 0.01$) from general characteristics of children, location (Central $p< 0.01$, South $p< 0.01$ ad North East $p< 0.001$), religion ($p< 0.05$), mother age ($p< 0.05$), education of mother ($p< 0.001$) and number of family member ($p< 0.05$) from socio- demographic and family characteristics, age at which children were stopped breastfed ($p< 0.001$) and father activities: go for walk ($p< 0.01$), playing a doll ($p< 0.01$), singing ($p< 0.01$) and body playing ($p< 0.05$) from child rearing characteristics.

By Multiple logistic Regression analysis using Backward selection, it found that the most significant risk factors related to child underweight were birth weight (AOR= 10.07, 95% CI= 2.87-35.28, $p< 0.001$), mother activities: singing (AOR= 0.31, 95% CI= 0.11-0.87, $p< 0.05$) and child rearing pattern: control of sleeping time (AOR= 4.71, 95% CI= 1.16-19.10, $p< 0.05$).

It found that the most significant risk factors related to child stunting was only birth weight (AOR= 4.49, 95% CI= 1.16-17.39, p< 0.05).

It found that the most significant risk factors related to child wasting were birth weight (AOR= 3.94, 95% CI= 1.24-12.49, p< 0.05) and type of main caregiver (AOR= 4.04, 95% CI= 1.15-14.21, p< 0.05).

6.2 Recommendations

The significant factors associated with all nutritional status such as underweight, stunting and wasting were only birth weight. Also, wasting was significantly associated with type of main caregiver. For child rearing, only underweight was significantly associated with mother activities: singing and child rearing pattern: control of sleeping time. The following public health activities are recommended.

6.2.1 Recommendations for child birth weight

・Need to prevent premature birth for reduction of child low birth weight to pregnant women: promote and announce to visit ANC regularly (At least 4 times), check whether or not smoking and drinking and guidance, manage nutritional status of pregnant women.

・Identify high risk groups for pregnant women. Education and guidance to the high risk group of pregnant women with direct communication (face to face): mother age (less than 18 years of age and over 35 years of age), poverty, single pregnant women, mother height (less than 145 cm), obese pregnant women, experienced abortion (over 2 times), fertility (over 5 times), smoking and drinking women, chronic disease (hypertension, heart disease, cancer and infection and others), pregnant women who have twin or triplet infant and chromosomal aberration infant.

・An appropriate nutritional education during pregnancy: control weight, food and iron supplementation. Explain how to take a balanced diet for pregnant women.

・Need to family and community encouragement and support for pregnant women: involvement maternal and child health care and education, provide proper and adequate food, promote intervention for preventive contraction and need to mental support.

・Promote to the education of nutrition especially pay attention to the boy and children who are residing in rural area.

6.2.2 Recommendations for main caregiver

・In main caregiver is relative case, health workers should provide health education, nutritional education and how to child rearing effectively to main caregiver.

・Especially in main caregiver is older person case, health workers and community need to provide intensively: provide community class such as mother's class and child rearing class, visit and education regularly by village health volunteers and announce to the effective use of social resources.

・Caregiver should monitoring to child weight and height regularly and record Maternal and Child Health Handbook correctly.

6.2.3 Recommendations for child rearing

・Explain and guidance about child rearing to the mothers and families before baby discharge from hospital and at the WCC.

・Caregiver should be encouraged to use and read MCH handbook.

・Provide to the child rearing class in the each hospital and health center: provide to the place and opportunity, reflect and reconsider parenting style oneself through talking with same mothers and caregivers, sharing parenting style among mothers and caregivers, and consultation service about child rearing in individual.

・Explain and guidance about importance of playing with child regularly for child psychological health and development. To play for children related with appetite. Encourage to combine play and communication activities with other care for the child. All families should involve for child care and play with the child.

・Need to give the child affection and love, protect from danger and pay attention.

・Introduce about how to support child rearing to the medical students at pediatrics class in School.

・Promote to environment of child rearing support with policy: Supply to Child allowance.

6.3 Recommendations for further study

・More research is needed which focuses specifically on child rearing during infancy. Not enough for information about child rearing in these period. Also, further studies need to research by cohort study from child rearing at infancy to grow up at those children aged adolescent year.

・Qualitative research should be conducted to ascertain the reasons for child rearing patterns. Child rearing pattern will be change according to many situations. Also, caregiver have way peculiar to child rearing.

・Further studies need to research focusing on only mothers as children’s caregiver. The study showed result that relative was about 70% of children’s main caregiver. Therefore, only mothers should be explored as limitation of the study.

・Research on type of complementary foods, amount of complementary foods and frequency of complementary foods.

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APPENDICES

APPENDIX A

Main outcome

Item	Form Number	Age	Variables Retrieved
1	D11	1 years old	Physical Examination For Child at age of 1 year ± 1 week: Child age, weight, length

Determinant assessments

Item	Form Number	Age	Variables Retrieved
1	B05	At Birth	Pregnancy Outcome Record Form (upon delivery): gender, birth weight, birth length
2	K02	At Birth	Demographic characteristics of the family (socioeconomics of the family): location, religion, mother age, education of mother and occupation of mother, family income and number of family member
3	B02a	During pregnancy	General Physical Examination of Pregnant Woman: mother height
4	D03	0- 1 years old	Child's Hospitalization, Sickness age at 0- 1 years Questionnaire: illness at 12 months
5	D02	1 years old	Child rearing at Aged 1 Years ± 1weeks Questionnaire: type of main caregiver
6	D05	1 years old	Child feeding, Child Development and Vaccination at Age of 1 year ± 1 week Questionnaire:immunization of OPV-DPT
7	K06	During pregnancy	Practice during Pregnancy Questionnaire:Frequency of ANC
8	C08	6 months	Feeding Pattern at Age of 6 Months ± 1 week: Feeding, Development, Sleeping, excretion, and Health Care Questionnaire: age at which children stopped breastfed, time of introduced food: rice and banana and child rearing characteristics

	Feeding pattern at age of 6 months : Feeding, Development, Sleeping, excretion, and Health Care	C08

Mother's name Child's name

Address IDCHD

Interviewer's name..... C8NAME (Text)

Child relation ☐1. Mother ☐2. Father ☐3. Others ..... C8STAT (1-3) C8STATX(Text),C8STATXG (Code)

Infant feeding

1. Milk feeding (Copy from food and development diary)

1.1 Breast milk C81A1 (1,2)
- ☐1. Breast milk
- ☐2. Stop breast milk age..... month C81A2

1.2 Formula milk C81B1 (1,2)
- ☐1. Never --------→ Skip to No.3
- ☐2. Start mixture milk age ..... month C81B2

21. In the last 3 months, has your child ever been admitted to the hospital?

☐0 No ☐ 1. Yes, specify the following items C821A (0,1)

C821B1 (วัน/เดือน,98/98) C821B2 (วัน/เดือน,98/98) C821B3 (Text)

1st Admitted between ..... to ..... at hospital ..... C821B3G (Code)

C821C1 (วัน/เดือน,98/98) C821C2 (วัน/เดือน,98/98) C821C3 (Text)

2nd Admitted between ..... to ..... at hospital .....

3rd Admitted between ..... to ..... at hospital ..... C821D3G (Code)

22. What did you do when your child had a mild illness such as a cold or fever

- ☐**0. Never had any illness**
- ☐**1. Self care and bring to the doctor if not getting better** C822 (0-5)
- ☐**2. Self medication**
- ☐**3. Seek traditional healing methods**
- ☐**4. Do nothing**

C822X (Text),C822XG(Code)

Child rearing

☐ 5. Other specify.....

23. Parent activities during the day time this week

Behavior	Mother			Father		
	never (0)	sometime (1)	always (2)	never (0)	sometime (1)	always (2)
23.1 Go for a walk	C823A1 (0-2)			C823A2 (0-2,3,4)		
23.2 Playing doll	C823B1 (0-2)			C823B2 (0-2,3,4)		
23.3 Singing	C823C1 (0-2)			C823C2 (0-2,3,4)		
23.4 Banter	C823D1 (0-2)			C823D2 (0-2,3,4)		
23.5 Reading specify..... C823E (Text) C823EG (Code)	C823E1 (0-2)			C823E2 (0-2,3,4)		

Note : C823A2 – C823E2 add Code 3 = สามีไม่อยู่, 4 = ไม่มีสามี

Feeding pattern (Ask and observe)

24. Let child live alone C824A (0,1)

☐ 0 Never → skip to item 25 ☐ 1. Yes go to 24.1,24.2

24.1 How often

☐ During.....C824B1.....minute / time

☐ Time.....C824B2.....time/day

24.2 How did you do when you have to leave your child

24.2.1 Just left there	☐1.Yes	☐2. No	C824C1 (1,2)
24.2.2 Left with other person	☐1.Yes	☐2. No	C824C2 (1,2)

C824C3 (1,2)

C824C4 (1,2)

24.2.3 Put the child in a cage ☐1.Yes ☐2. No

24.2.4 Tide up his/her leg with a pole ☐1.Yes ☐2. No

24.2.5 Other specify…C824C (Text.) C824CG (Code)….☐1.Yes ☐2. No C824C5 (1,2)

25. Did you schedule time for feeding and how?

☐1. Every 3-4 hours and observe the child

☐2. No schedule but based on my need C825 (1-5)

☐3. Never let the child hungry, feed all the time

☐4. Every 3-4 hours and must be as scheduled ☐ 5. Other

26. What did you do when your child refuse to new food C826 (1-5)

☐1. Try and force till success ☐ 2. Encourage and let him/her eat as he/she can

☐ 3. Doesn't matter, not a big deal ☐ 4. Depend on the child ☐ 5. Other

27. During child turn over C827 (1-5)

☐1. Always support

☐2. Little support

☐3. Never support

☐4. Lake a look but not support ☐ 5. Other

28. When did you bring your child to bed? C828 (1-5)

☐ 1. Always trying to be on time ☐2. Schedule but flexible

☐3. Depend on myself ☐4. Depend on the child ☐ 5. Other

29. What did you do when your child cry or in bad temper?

☐1. Left till stop ☐2. Yell or smack till stop C829 (1-5)

☐3. Hold up immediately, not allow crying ☐ 4. Find the cause and calm down ☐ 5. Other

Other observe during interview

……MEMO……

Recorder ……NAME…… Date ……/……DATE……

Editor…… Date……/……/……

APPENDIX B

ที่ สช 0321/ 2094

กระทรวงสาธารณสุข
ถนนติวานนท์ จังหวัดนนทบุรี 11000

๒๖ พฤษภาคม 2547

เรื่อง อนุมัติให้ดำเนินการวิจัยได้
เรียน ผู้อำนวยการสถาบันวิจัยระยะยาวในเด็กไทย
สิ่งที่ส่งมาด้วย 1. หนังสืออนุมัติ ฉบับภาษาไทย จำนวน 1 แผ่น
2. หนังสืออนุมัติ ฉบับภาษาอังกฤษ จำนวน 1 แผ่น
3. รายชื่อคณะกรรมการพิจารณาศึกษาวิจัยในคน กระทรวงสาธารณสุข จำนวน 1 ชุด

ตามที่ สถาบันวิจัยระยะยาวในเด็กไทย โดย นางสาวจันทร์เพ็ญ ศุประภาวรรณ ซึ่งเป็นหัวหน้าโครงการวิจัย "การวิจัยระยะยาวในเด็กไทยโครงร่างวิจัยระยะที่ 2 กรกฎาคม 2546 ถึง มิถุนายน 2553 (Ref. No. 40/2546) ได้เสนอโครงการดังกล่าวให้คณะกรรมการพิจารณาการศึกษาวิจัยในคน กระทรวงสาธารณสุข พิจารณาอนุมัตินั้น

ในการนี้ กระทรวงสาธารณสุข โดยคณะกรรมการพิจารณาการศึกษาวิจัยในคน กระทรวงสาธารณสุข อนุมัติให้ดำเนินการตามโครงการดังกล่าวได้ อนึ่งคณะกรรมการ ฯ ขอแจ้งเกี่ยวกับหน้าที่และความรับผิดชอบของผู้วิจัยภายหลังได้รับการอนุมัติ คือ จะต้องแจ้งหรือรายงานสถานะ (status) ให้คณะกรรมการฯ ทราบทุกปี และเมื่อเกิดเหตุการณ์ต่อไปนี้ทุกครั้ง ได้แก่

1. เมื่อโครงการวิจัยยุติลง ซึ่งอาจจะเป็นการดำเนินการวิจัยเสร็จสิ้นสมบูรณ์ หรืออาจจะไม่สามารถดำเนินการวิจัยต่อไปได้ พร้อมทั้งแจ้งสาเหตุของการยุติโครงการวิจัยให้ทราบด้วย
2. เมื่อมีการเปลี่ยนแปลงในโครงการวิจัยต้องระบุให้ชัดเจนว่า มีการเปลี่ยนแปลงอะไร อย่างไร พร้อมเหตุผลที่ต้องเปลี่ยนแปลง
3. เมื่อมีการเปลี่ยนแปลงหัวหน้าโครงการวิจัย หรือเพิ่มเติมคณะผู้วิจัย ต้องส่งประวัติของคนที่เปลี่ยนแปลงพร้อมเหตุผลให้คณะกรรมการ ฯ ทราบด้วย
4. เมื่อมีอาการไม่พึงประสงค์เกิดขึ้นในโครงการวิจัย ขอให้ผู้วิจัยวิเคราะห์สถานการณ์การเกิดอาการไม่พึงประสงค์ที่ relate, possible/likely, probably related, fatal กับโครงการวิจัยที่ท่านรับผิดชอบอย่างไร รวมทั้งรอทราบมาตรการในการดูแลป้องกันอาสาสมัครในประเทศไทยด้วย

จึงเรียนมาเพื่อทราบ

ขอแสดงความนับถือ

กรมการแพทย์
สำนักพัฒนาวิชาการแพทย์
โทรศัพท์/โทรสาร 591-8251

เอกสารเลขที่ 34 /2547

คณะกรรมการพิจารณาการศึกษาวิจัยในคน
กระทรวงสาธารณสุข

โครงการวิจัย: การวิจัยระยะยาวในเด็กไทยโครงร่างวิจัยระยะที่ 2 กรกฎาคม 2546 ถึง มิถุนายน 2553 (Ref. No. 40/2546)

ผู้ดำเนินการวิจัยหลัก: นางสาวจันทร์เพ็ญ ชูประภาวรรณ และคณะ

หน่วยงานรับผิดชอบ : สถาบันวิจัยระยะยาวในเด็กไทย

คณะกรรมการพิจารณาการศึกษาวิจัยในคน กระทรวงสาธารณสุข อนุมัติในแง่จริยธรรมให้ดำเนินการศึกษาวิจัยเรื่องข้างต้นได้

.....
(นายเสรี ตู้จินดา) ประธานคณะกรรมการ

.....
(นายปกรณ์ ศิริยง) กรรมการและเลขานุการ

รับรองวันที่ 26 พฤษภาคม 2547 ถึงวันที่ 30 มิถุนายน 2553

Document No. 34 /2004

The Ethical Review Committee for Research in Human Subjects
Ministry of Public Health, Thailand

Title of Project : The Prospective Cohort Study of Thai Children (PCTC) Protocol for Phase II July 2003 to June 2010 (Ref.No.40/2546)

Principle Investigator : Ms Chanpen Choprapawan and staff

Place of Proposed Study : The Prospective Cohort Study of Thai Children.

We also confirm that we are an ethics committee constituted in agreement and in accordance with the ICH-GCP.

Approved by The Ethical Review Committee for Research in Human Subjects Ministry of Public Health, Thailand.

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Chairman
(Mr. Seree Tuchinda)

.....
Secretary
(Mr. Pakorn Sisiyong)

Date of Approval 24 May 2004 Date of expire 30 June 2009

Document No. 34 /2547

The Ethical Review Committee for Research in Human Subjects
Ministry of Public Health, Thailand
29 August 2001 - Present

Member Title and Name	Occupation (Position)	Qualification (If applicable)	Male/Female (M/F)	Tick
Chairman Mr. Seree Tuchinda	Director-General, Department of Medical Services	M.D.	M	-
Vice Chairman Mr. Vichai Chokevivat	Director-General, Department of development of Thai traditional and alternative medicine	M.D., M.P.H.	M	-
Member Mr. Luecha Wanaratana	Senior Public Health officer (Nutrition), Office of the Permanent Secretary	M.D.	M	-
Mr. Tanongsan Sutatam	Deputy director general, Department of Medical Services	M.D.	M	-
Mrs. Nanta Auamkul	Senior Medical Officer, Department of Health	M.D. M.Sc., MCH	F	✓
Mr. Supachai Rerkhngarm	Senior Expert in Preventive Medicine, Department of Communication Disease Control	M.D.	M	✓
Mr. Kasem Tantiphlachiva	Senior Psychiatrist Somdet Chaopraya Hospital, Department of Mental Health	M.D., B.Sc., FRCP sychT.	M	✓
Mrs. Mayura Kusump	Senior Principal Medical Scientist, Department of Medical Sciences	M.D.	F	✓
Ms. Yuppadee Javroongrit	Senior Pharmacist, The Food and Drug Administration	B.Sc.in.Pharm. M.S., Ph.D.	F	✓
Mr. Pinit Kunlavanit	Secretary General, The Thai Medical Council	M.D., M.Sc.	M	✓
Director of Legal Affairs Division	Director of Legal Affairs Division, Office of the Permanent Secretary	Bachelor LL.b	F	✓

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Member Title and Name	Occupation (Position)	Qualification (If applicable)	Male/Female (M/F)	Tick
Director of Medical Registration Division	Director of Medical Registration Division, Office of the Permanent Secretary	M.D.	M	-
Mr. Wiwat Rojanapithayakorn	Senior Advisor, International Health Policy Program ,Bangkok	B.Sc., M.D., M.P.H.	M	-
Mrs. Oratai Rauyajin	Associate Professor, Faculty of Social Science and Humanities, Mahidol University	MA., M.P.H., Dr.PH	F	-
Secretary Mr. Pakorn Siriyong	Senior Medical Doctor Department of Medical Services	M.D., M.P.H.	M	✓
Assistant Secretary Mr.Korakot Chutasmit	Physician , Department of Medical Services	M.D.	M	✓
Mr. Suchart Chongprasert	Senior Pharmacist, The Food and Drug Administration	B.Sc in Pharm. Ph.D.	M	✓
Mrs. Rachneebool Udomchairat	Senior Health Technical Officer, Department of Medical Services	B.Sc. in Public Health nursing., M.A.	F	✓
Mrs. Porntiva Chaloemvipaht	Senior Health Technical Officer, Department of Medical Services	B.Sc. in Nurse & Midwife., M.P.H.	F	✓
Ms. Narukorn Thamkasem	Health Technical Officer, Department of Medical Services	B.Sc. in Nurse & Midwife.,M.A.	F	✓

Date of Meeting : 23 April, 2003

Date of Approval : 26 May ....,2004

For Protocol : The Prospective Cohort Study of Thai Children (PCTC) Protocol for Phase II July 2003 to June 2010 (Ref.No.40/2546)

Signed : Pakorn Siriyong .....(Secretary of Ethics Committee)

สำหรับพื้นที่อำเภอ.....

ใบยินยอมเข้าร่วมโครงการด้วยความสมัครใจ

การวิจัยเรื่อง **การศึกษาติดตามเด็กไทยตั้งแต่ก่อนคลอดไปในระยะยาว กับ ปัจจัยที่มีอิทธิพลทั้งด้านครอบครัว ชุมชน และสิ่งแวดล้อม**

วันให้คำยินยอม วันที่ .....เดือน.....พ.ศ. 254.....

ก่อนที่จะลงนามในใบยินยอมเข้าร่วมโครงการวิจัยนี้ ข้าพเจ้าได้รับคำอธิบายจากผู้วิจัยถึงวัตถุประสงค์ของการวิจัย วิธีการวิจัย อันตรายที่อาจเกิดขึ้นจากการวิจัย รวมทั้งประโยชน์ที่จะเกิดขึ้นจากการวิจัยอย่างละเอียด และมีความเข้าใจดีแล้ว ผู้วิจัยรับรองว่าจะตอบคำถามต่างๆ ที่ข้าพเจ้าสงสัยด้วยความเต็มใจ ไม่ปิดบัง ซ่อนเร้นจนข้าพเจ้าพอใจ

ข้าพเจ้ามีสิทธิที่จะบอกเลิกการเข้าร่วมโครงการนี้เมื่อใดก็ได้ และเข้าร่วมโครงการนี้โดยสมัครใจและการบอกเลิกการเข้าร่วมการวิจัยนี้ จะไม่มีผลต่อบริการต่างๆ ที่ข้าพเจ้าจะได้รับต่อไป

ผู้วิจัยรับรองว่าจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าและครอบครัวไว้เป็นความลับและจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย หรือการเปิดเผยข้อมูลต่อผู้มีหน้าที่เกี่ยวข้องกับการสนับสนุนและกำกับดูแลการวิจัยเท่านั้น

ผู้วิจัยรับรองว่าหากเกิดอันตรายใดๆ จากการวิจัยดังกล่าว ข้าพเจ้าจะได้รับการรักษาพยาบาลโดยไม่คิดมูลค่า และจะได้รับการชดเชยรายได้ที่สูญเสียไประหว่างการรักษาพยาบาลดังกล่าว ตลอดจนเงินทดแทนความพิการที่อาจเกิดขึ้น และรายละเอียดที่เกี่ยวกับการรักษาพยาบาลหรือเงินชดเชยดังกล่าว ข้าพเจ้าสามารถติดต่อได้ที่ผู้อำนวยการโรงพยาบาลอำเภอ.....จังหวัด.....

หรือ ผู้อำนวยการโครงการฯ พ.ญ. จันทร์เพ็ญ ชูประภาวรรณ สถาบันวิจัยระบบสาธารณสุข ที่อยู่ สถาบันวิจัยระบบสาธารณสุข กระทรวงสาธารณสุข อาคารกรมสุขภาพจิตชั้น 5 ถนนติวานนท์ อำเภอเมือง จังหวัดนนทบุรี หมายเลขโทรศัพท์ (02) 951-1284-95 ต่อ 145 และ 148 หรือหมายเลขโทรศัพท์เคลื่อนที่ (01) 868-3634 หรือ วิทยุติดตามตัว (1188) 7114420

ข้าพเจ้าได้อ่านข้อความข้างต้นแล้ว มีความเข้าใจดีทุกประการ จึงลงนามในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม.....ผู้ยินยอม

ลงนาม.....พยาน

ลงนาม.....พยาน

ข้าพเจ้าไม่สามารถอ่านหนังสือได้ แต่ผู้วิจัยได้อ่านข้อความในใบยินยอมนี้ให้ข้าพเจ้าฟังจนเข้าใจดีแล้ว ข้าพเจ้าจึงลงนามในใบยินยอมนี้ด้วยความเต็มใจ

ลงนาม.....ผู้ยินยอม

ลงนาม.....พยาน

ลงนาม.....พยาน

ในกรณีของบุตร/หลานข้าพเจ้า ซึ่งยังไม่บรรลุนิติภาวะ ผู้ปกครองหรือผู้อุปการะที่ชอบด้วยกฎหมาย จึงลงนามยินยอมด้วยความเต็มใจ

ลงนาม.....ผู้ปกครองที่ชอบด้วยกฎหมาย

ลงนาม.....พยาน

ลงนาม.....พยาน

ผู้อำนวยการโครงการวิจัยฯ ในฐานะผู้รับผิดชอบโครงการ ได้ทำความเข้าใจกับผู้ยินยอมแล้ว ผู้ยินยอมเข้าใจดีทุกประการ จึงลงนามในฐานะคู่สัญญา

ลงนาม.....ผู้อำนวยการ

ลงนาม.....พยาน

ลงนาม.....พยาน

BIOGRAPHY

NAME	Mai Beniko
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INSTITUTION ATTENDED	School of Nursing ATSUGI, Japan, 2002-2005 Technical Associate of Nurse MUSASHINI UNIVERSITY, Correspondence Division, Japan, 2012-2013 Bachelor of Nurse Mahidol University, ASEAN Institute for Health Development, Thailand, 2013-2014(registered 2014-2015) Master of Primary Health Care Management
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