FACTORS OF MOTHERS' HEALTH BEHAVIOR RELATED TO SEVERITY OF ACUTE RESPIRATORY INFECTION IN CHILDREN UNDER 5 YEARS

BOONLERT BUTCHAN

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B. Butchan
.....
Mr. Boonlert Butchan
Candidate

A. Podhipak
.....
Assoc. Prof. Amornrath Podhipak, Ph.D.
Major-Advisor

Roongrote Poomriew
.....
Assoc. Prof. Roongrote Poomriew, Ph.D.
Co-Advisor

.....
Mrs. Pensri Kramomthong, M.D.
Co-Advisor

.....
Prof. Liangchai Limlomwongse, Ph.D.
Dean
Faculty of Graduate Studies

A. Podhipak
.....
Assoc. Prof. Amornrath Podhipak, Ph.D.
Chairman
Master of Science (Public Health)
Major in Infectious Disease
Faculty of Public Health

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on

May 8, 2000

B. Butchan
.....
Mr. Boonlert Butchan
Candidate

A. Podhipak
.....
Assoc. Prof. Amornrath Podhipak, Ph.D.
Chairman

Roongrote Poomriew
.....
Assoc. Prof. Roongrote Poomriew, Ph.D.
Member

.....
Mr. Wipat Udomponglukana, M.D.,Cert. on Thai Board of Pediatric
Member

.....
Mrs. Pensri Kramomthong, M.D.
Member

.....
Prof. Liangchai Limlomwongse, Ph.D.
Dean
Faculty of Graduate Studies
Mahidol University

Kanda Vathanophas
.....
Assoc. Prof. Kanda Vathanophas, M.D., M.Sc. in Hygiene. (P.H. Microbiology)
Dean
Faculty of Public Health
Mahidol University

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Boonlert Butchan

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Acute respiratory infections are the most common illnesses in childhood, comprising approximately 50% of all illnesses in children under 5 years and 30% in children of 5-12 years. This study design was conceptualized as a case-control study. The purpose of this study was to determine the maternal behavior regarding severe ARI in children aged under five years. The target population was mothers who brought a child aged under five years with ARI to outpatient and inpatient departments of Sawanpracharuk Hospital, Maternal and Child Hospital and Maewong District Hospital, Nakhornsawan province, during the period of June to August 1999. Data were collected using questionnaires to interview 240 mothers, who were divided into two groups: the case group (severe ARI) of 120 cases, and the control group (non-severe ARI) of 120 cases.

The multivariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years was performed. Mothers' behavior related to severe ARI were: administration of throat swab (OR = 6.58, 95% CI = 2.02-21.43), giving no breast-feeding or with breast-feeding for less than four months (OR = 6.36, 95% CI = 2.26-17.92), refraining from some essential foods (OR = 3.77, 95% CI = 1.35 –10.54), having left over drugs of previous use (OR = 3.65, 95% CI = 1.44 – 9.26), and not giving warm water while the children were ill (OR = 3.22, 95% CI = 1.10 – 9.43). The study showed that children who received high humidity from long time sponge bath had a less risk of severe ARI than children who received high humidity from short time sponge bath. The policy related recommendation from this study is that, the Government Pharmaceutical Organization (GPO) should terminate the production of throat swab medication.

4136342 PHPH/M: สาขาวิชาเอก: โรคติดเชื้อ , วท.ม. (สาธารณสุขศาสตร์)

บุญเลิศ บุตรจันทร์: การศึกษาพฤติกรรมของมารดาที่มีความสัมพันธ์กับความรุนแรงของโรคติดเชื้อเฉียบพลันระบบหายใจในเด็กอายุต่ำกว่า 5 ปี (FACTORS OF MOTHERS' HEALTH BEHAVIOR RELATED TO SEVERITY OF ACUTE RESPIRATORY INFECTION IN CHILDREN UNDER 5 YEARS). คณะกรรมการควบคุมวิทยานิพนธ์: อมรรัตน์ โพธิพรรค, Ph.D., รุ่งโรจน์ พุ่มริ้ว, Ph.D., เพ็ญศรี กระหม่อมทอง, พ.บ. 87 หน้า. ISBN 974-664-035-6

โรคติดเชื้อเฉียบพลันระบบหายใจในเด็ก เป็นโรคที่เป็นปัญหาทางด้านสาธารณสุขของประเทศต่างๆทั่วโลก การศึกษาครั้งนี้เป็นการศึกษาแบบย้อนหลัง (case-control study) เพื่อศึกษาถึงพฤติกรรมของมารดาที่มีความสัมพันธ์กับความรุนแรงของโรคติดเชื้อเฉียบพลันระบบหายใจในเด็กอายุต่ำกว่า 5 ปี ประชากรที่ใช้ในการวิจัย คือ มารดาที่นำเด็กอายุต่ำกว่า 5 ปี มารับการรักษาด้วยโรคติดเชื้อเฉียบพลันระบบหายใจ ที่แผนกผู้ป่วยนอก และแผนกผู้ป่วยใน ของโรงพยาบาลสวรรค์ประชารักษ์ โรงพยาบาลแม่และเด็ก และโรงพยาบาลแม่วงก์ จังหวัดนครสวรรค์ในระหว่างเดือน มิถุนายน – ตุลาคม 2542 เก็บรวบรวมข้อมูลโดยใช้แบบสัมภาษณ์สอบถามพฤติกรรมของมารดาก่อนบุตรป่วย ขณะบุตรป่วย และหลังบุตรป่วยจำนวน 240 ราย แบ่งเป็นกลุ่มมารดาของเด็กที่มีอาการรุนแรง 120 ราย และมารดาเด็กที่มีอาการไม่รุนแรง 120 ราย

ผลการวิเคราะห์เชิงซ้อนเพื่อหาความสัมพันธ์และความหนักแน่นของความสัมพันธ์ พบว่าปัจจัยที่มีความสัมพันธ์กับความรุนแรงของโรคติดเชื้อเฉียบพลันระบบหายใจ เรียงลำดับความสำคัญดังนี้คือ การกวาดคอเด็ก (OR = 6.58, 95% CI = 2.02 – 21.43) การไม่ได้รับนมมารดาหรือได้รับน้อยกว่า 4 เดือน (OR = 6.36, 95% CI = 2.26 – 17.92) การงดของแสลง (OR = 3.77, 95% CI = 1.35 – 10.54) การรับประทานยาที่เหลือจากการป่วยครั้งก่อน (OR =3.65, 95% CI = 1.44 – 9.26) การไม่ดื่มน้ำอุ่น (OR = 3.22, 95% CI = 1.10 – 9.43) จากการศึกษายังพบว่าการเช็ดตัวลดไข้ที่ใช้เวลาในการเช็ดตัวตั้งแต่ 30 นาทีขึ้นไป ช่วยลดความรุนแรงของโรคติดเชื้อเฉียบพลันระบบหายใจในเด็กด้วย ข้อเสนอแนะเชิงนโยบายจากผลการศึกษาครั้งนี้ สืบเนื่องมาจากที่พบว่า การกวาดคอเด็กมีความสัมพันธ์อย่างสูงกับความรุนแรงของโรคดังนั้น องค์การเภสัชกรรมควรระงับการผลิตยากวาดคอสำหรับ โดยเฉพาะในเด็กต่ำกว่า 5 ปี เพราะอาจเป็นอันตรายต่อเด็กในแง่ของการทำให้การติดเชื้อรุนแรงขึ้น

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CHAPTER I

INTRODUCTION

Acute respiratory infections are the most common illnesses in childhood, comprising approximately 50% of all illness in children under 5 years and 30% in children of 5-12 years (1). Pneumonia is the most important cause of morbidity and mortality in children aged under 5 years worldwide especially in developing countries, totaling more than four million child deaths each year (2).

Morbidity and mortality of pneumonia in Thailand were reported by Office of the Permanent Secretary for Public Health, Ministry of Public Health, in 1996; morbidity was 238.58 per hundred thousand population and mortality was 1.80 per hundred thousand population. It was the first cause of death in children aged under 5 years (3).

Table 1 Morbidity and mortality per 100,000 population of pneumonia from the year 1994 to 1996 (3).

	1994	1995	1996
Morbidity	228.26	251.41	238.58
Mortality	2.29	1.98	1.80

From Table 1 a morbidity was not stable each year because there was no suitable program for preventing disease, while mortality seemed to decrease each year, showing that there was a better standard treatment.

Acute respiratory infections are common causes of illness and death. Complications of disease such as otitis media, sinusitis, bronchitis, pneumonia, or pneumothorax. Although some patients survive, there are some disorders of the respiratory tract such as, asthma, chronic bronchitis, emphysema, or

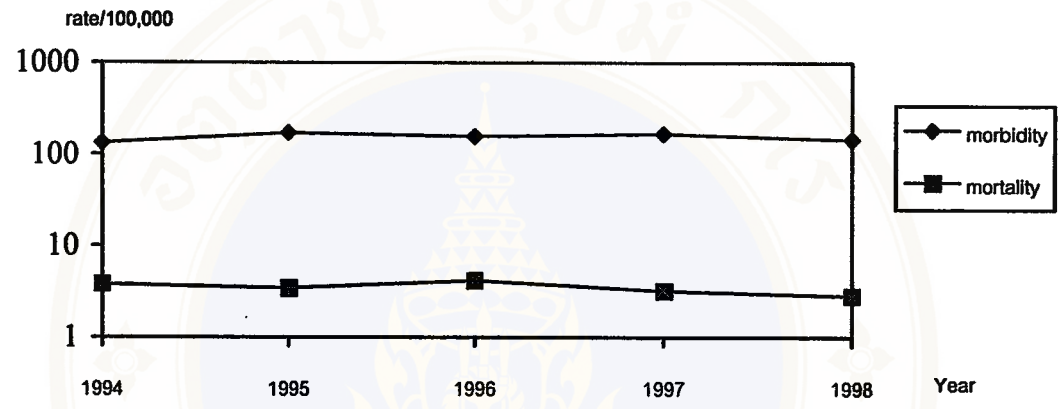
malnutrition. These complications have stopped the growth and destroyed the quality of life of children and has caused a loss to the economy of the nation (4).

The incidence and clinical patterns of illness are now well known. The majority of the respiratory viruses and their subtypes have been isolated and their relation to clinical illness established. Infection of the respiratory tract is the commonest illness of infants and children. A child has about seven to nine infections per year an average; most of them are mild, limited to the upper respiratory tract and do not require medical attention (5). The incidence in the first year of life depends on the number and age of older siblings and whether the child is cared for completely at home or in a day-care centre. For infants cared for at home, the rate is about five to six attacks per year. Children between 1 and 6 years of age contract the disease between seven and nine respiratory infections per year (6), many of which are minor in nature, being limited to mild colds or sore throats. Approximately three per year are associated with constitutional disturbance. The peak incidence is between 2 and 4 years and the number does not fall to the average adult pattern of four to six per year until 8-10 years (7). The changes with age are probably due to the development of partial immunity.

The programme for prevention and control of Acute Respiratory Infection In Children which started in 1987 under the umbrella of the Tuberculosis Division, Department of Communicable Disease Control, Ministry of Public Health. It considers that the basic approach to the prevention and control of Acute Respiratory Infection consists of two main elements: first; immunization against measles, pertussis and diphtheria in order to prevent the severe pneumonia associated with these conditions and, second; improved case management. Improving the management of cases of acute respiratory infection implies recognition of pneumonia, treatment with the appropriate antibiotic, and the use of appropriate supportive measures (8,9).

In Nakhonsawan province, pneumonia was a major cause of morbidity and mortality.

Figure 1 Morbidity and mortality per 100,000 population in children aged under five years in Nakhornsawan province (10).

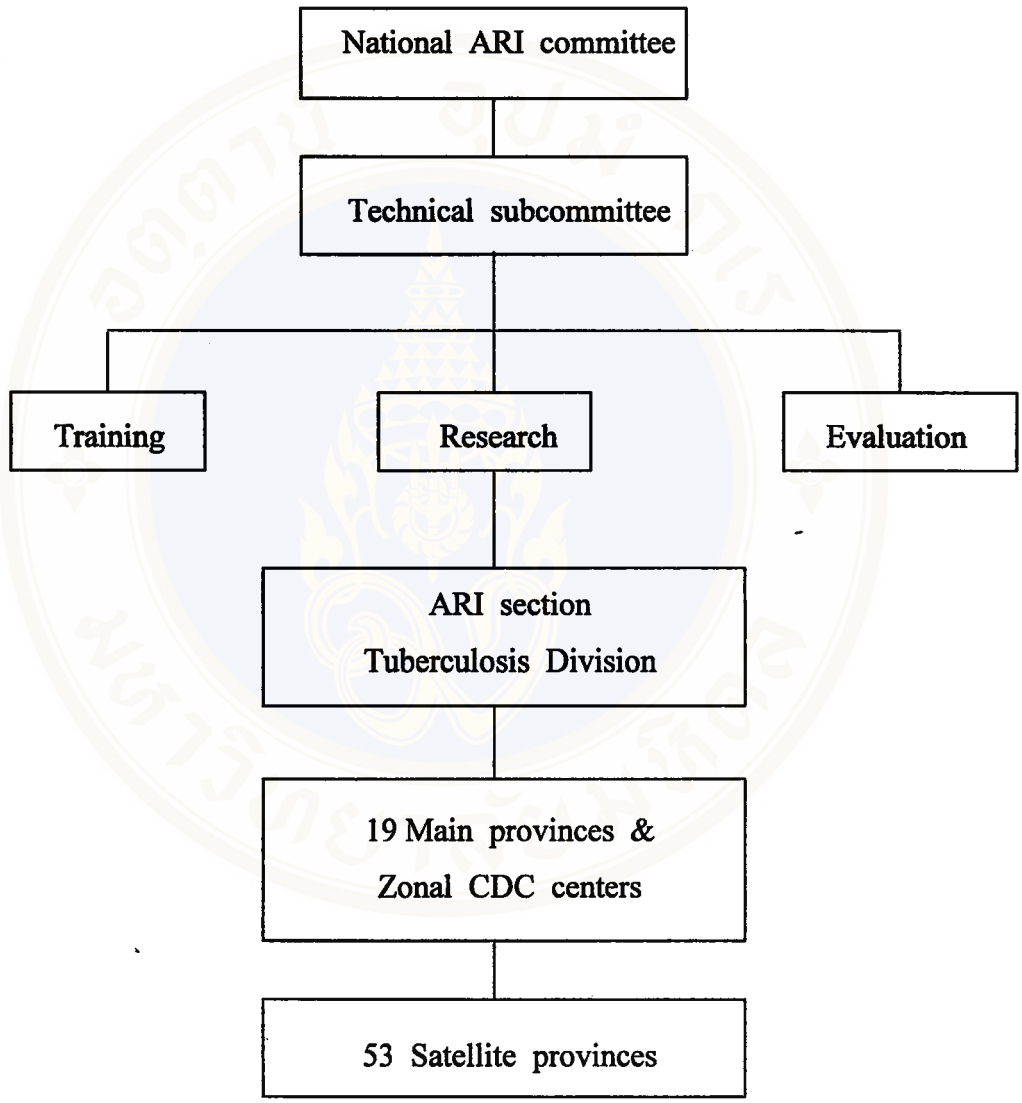


The data show that morbidity between 1994 to 1998 was almost stable and mortality was a little decreased. However, there are numerous risk factors that are associated with severe ARI such as overcrowding, use of insect-repellent smoke, incomplete immunization and poor sanitation. A study from Children's Hospital, showed that congenital heart disease and malnutrition were two independent host factors relating to high risk of deaths from pneumonia (11).

The most important activity for the implementation of acute respiratory infection case management is to enable health staff at the peripheral health centers to recognize and manage non-severe pneumonia. These cases, with or without complications such as streptococcal sore throat and otitis media, can be adequately treated with antibiotics at home. However, severe cases need to be recognized and referred to the hospital in good time.

A 2-days training course, using modified training material provided by WHO, was developed in 1989, and the acute respiratory infections prevention

and control programme was launched with a detailed national plan in 1990. Specialists in respiratory disease in children from all medical institutions and hospitals participated in this programme as committee members. The structure of the National ARI Committee (1990-1991) was as follows:



Implementation of ARI standard case management was initiated in 19 districts of some provinces (1 district/province) in 1990. In the following year, expansion of the programme was performed in order to cover the whole area of 19 provinces. During 1992-1993 the programme had been comprehensively expanded until it covered the remaining 53 provinces. Training was done at all levels of the provincial sectors. Pediatricians, district doctors and nurses who

had been trained in the trainer's courses became facilitators for training of personnel in the lower levels. Approximately 16,000 paramedical health personnel (two from each health centre), along with approximately 30,000 health volunteers, were trained with the 2-day and 1-day training courses respectively at the end of 1993 (12). As the programmes were being carried out, it was felt there was a need for mothers of sick children to be oriented with knowledge and favorable attitudes regarding ARI management, to accelerate the effectiveness of the programme.

The purpose of this study is to determine the maternal behaviors regarding ARI in children aged under five years. The results of this study should help the provincial programme managers to plan for suitable and effective health education programmes in different areas.

OBJECTIVE:

To study factors of mothers' behavior related to severity of acute respiratory infection in children aged under five years, these factors are:

1. Behavior of mothers before their child became ill, such as
   - child's breast-feeding
   - child's immunization
   - child's nutrition
   - maternal occupation
   - maternal antenatal care

2. behavior of mothers while their child was ill with ARI, such as
   - humidity from long time sponge bath
   - exposed to blowing wind
   - take pill orally before sponge bath
   - use moist cloth for sponge bath
   - use times for sponge bath
   - exposed to blowing wind

- drinking warm water
- swabbing the throat
- using warm cloths while sleeping
- having some left over drugs
- treatment seeking behavior
- refraining from some essential food
- sleeping in a crowded bed

HYPOTHESIS:

1. Children with no breast feeding or with breast feeding for less than four months after birth have a higher risk of severe ARI than children with breast feeding for at least four months, or more.

2. Children without immunization or with incomplete immunization have a higher risk of severe ARI than children with complete immunization.

3. Children who had malnutrition have a higher risk of severe ARI than children who had not.

4. Children whose mothers work outside home have a higher risk of severe ARI than children whose mothers do not.

5. Children whose mothers without antenatal care or with incomplete antenatal care have a higher risk of severe ARI than children whose mothers with complete antenatal care.

6. Children who received high humidity from long time sponge bath have a higher risk of severe ARI than children who did not.

7. Children who exposed to blowing wind while doing sponge bath have a higher risk of severe ARI than children who did not.

8. Children who do not drink warm water while they are ill have a higher risk of severe ARI than children who drink warm water while they are ill.

9. Children who had swabbed the throats have a higher risk of severe ARI than children who did not.

10. Children who are not covered with warm cloths while sleeping have a higher risk of severe ARI than children who are kept warm while sleeping.

11. Children taking some left over drugs have a higher risk of severe ARI than children who did not.

12. Mothers who do not seek care from public health workers have children with a higher risk of severe ARI than mothers who do.

13. Children who refrained from some essential food have a higher risk of severe ARI than children who have not.

14. Children who sleep with other up to 3 persons have a higher risk of severe ARI than children who do not.

OPERATIONAL DEFINITIONS:

Acute Respiratory Infection (ARI), an acute infection of the ear, nose, throat, larynx, trachea, bronchi, bronchioles or lung with signs and symptoms such as fever, cough or difficult breathing for the duration of less than 14 days.

Case: a severe ARI in children aged under five years who attended the inpatient department of a hospital and were diagnosed by a physician, as having very severe pneumonia, severe pneumonia, pneumonia or with only sign

or only symptom as follow; fast breathing (60 times per minute or more if the child aged less than 2 months), fast breathing (50 times per minute or more if the child aged 2 months up to 1 year), fast breathing (40 times per minute or more if the child aged 1 year up to 5 years), chest indrawing, abnormally sleepy or difficult to wake, wheezing, convulsions, stridor in calm child or not able to drink if the child aged 2 months up to 5 years, fever or low body temperature, stopped feeding well if the child aged less than 2 months.

Control: non severe ARI in children aged under five years attending the outpatient department of a hospital. Controls were matched for age of cases(0-2 months, 3-12 months, 13-24 months, 25-36 months, 37-48 months, and 49-60 months) and time before coming to hospital (within 3 days and more than 3 days) and diagnosed by physician such as cold, URI or signs and symptoms i.e. low fever, running nose, no chest indrawing, no fast breathing and no history of pneumonia.

Breast feeding: breast feeding in children 4 months of age or more.

Complete immunization mean the child who had received BCG, OPV, DTP, Measles, Hepatitis B, and JE vaccines completed by age and programme of vaccination, as follows (13);

Age	Vaccine
Under 7 days	BCG + HB1
2-3 months	DTP1 + OPV1 + HB2
4-5 months	DTP2 + OPV2
6-7 months	DTP3 + OPV3 + HB3
9-12 months	Measles
12-18 months	DTP4 + OPV4 + JE1 + JE2
24-30 months	JE3
4-6 years	DTP5 + OPV

Nutritional status means nutritional status at least 1 month before illness measured by age compared with weight and compared with the standard weight of Thai children aged under five years. The weight at percentime 50 is regarded to 100 percent, there are;

90-100 percent = normal
75-89 percent = malnutrition degree 1
60-74 percent = malnutrition degree 2
lower than 60 percent = malnutrition degree 3(14).

Maternal occupation means the job of the mother which is divided into two groups, one is the mother who works outside home, and the other is a housewife or mother who works in the home.

Antenatal care (ANC) means the receiving of ANC by the mother during pregnancy divided into two groups: complete ANC and incomplete ANC. The number of pregnant women who completed the required standard antenatal care. These are: gestational of less than 6 months should receive ANC at least once, between 6-7 months should receive ANC at least once, between 7-8 months should receive ANC at least once, and over 9 months should receive ANC at least once(15).

Sponge bath, means reducing fever by moist cloth while the child is ill

Method of correct sponge bath (16):

1. Take pills orally such as paracetamol for relieving fever if temperature is 38.5° C or more.
2. Remove clothing and cover the body with new clothing.
3. Use two moist cloths to scrub face, neck, chest, and back.
4. Use at least 30 minutes for this activity.
5. No exposed to blowing wind while doing sponge bath.

Humidity from long time sponge bath means sponge bath for at least 30 minutes, or more.

Exposed to blowing wind means exposed to blowing wind while doing sponge bath.

Warm water means water which does not include ice nor water in a refrigerator.

Swabbing the throat means introduction of medicine into the child's throat with a finger, or other material e.g. cotton bud, cotton ball, etc.

No warm clothing while sleeping means not covering the child's body with suitable cloth while sleeping at night.

Using some left over drugs means using some left over drugs or using expired drugs. These drugs were meant to use for treatment of previous illness and was kept at home for further use.

Treatment seeking behavior means treatment seeking behavior of mothers who have brought their child aged under five years to a health service when their child was ill with ARI.

Refraining from some foods means stop eating some essential foods while the child is ill with ARI, such as pork, egg, chicken, fruits, etc.

Sleeping in a crowded bed means sleeping of the child who is ill with ARI with three other persons or more in one bed.

VARIABLES:

1. **Independent variables:**
   - child's breast-feeding
   - child's immunization
   - child's nutrition
   - maternal occupation
   - maternal antenatal care
   - humidity from long time sponge bath
   - exposed to blowing wind
   - drinking warm water
   - swabbing the throat
   - using warm cloths while sleeping
   - using some left over drugs
   - seeking treatment
   - refraining from some essential foods
   - sleeping in a crowded bed

2. **Dependent variable:**

   Severity of acute respiratory infection in children.

CHAPTER II

LITERATURE REVIEWS

The literature reviews involve the following:

Part I Information about Acute Respiratory Infection in Children under 5 years of age.

Part II The prevention and control of Acute Respiratory infections..

Part III Review of relevant studies.

Part I Information about Acute Respiratory Infection in Children under 5 years of age.

DEFINITION:

Acute respiratory infection in children is an episode of acute symptoms and signs resulting from infection of any part of the respiratory tract or related structures (including paranasal sinus, middle ear and pleural cavity). The etiology can be infection from viruses, bacteria, fungi and some types of protozoa (4,17).

ETIOLOGY:

In developing countries, studies indicate that most cases of severe pneumonia in children are caused by bacteria, usually *Streptococcus pneumoniae* or *Haemophilus influenzae.* This contrasts with the situation in developed countries, where the great majority is due to viruses(18).

CLASSIFICATION:

Illness are described and classified primarily on an anatomical basis as following (19, 20).

1. Respiratory tract infection

1.1 Upper respiratory tract infection

- cold, rhinitis, coryza, influenza
- pharyngitis
- tonsillitis
- adenoid hypertrophy and adenoiditis
- otitis media
- sinusitis
- acute epiglottitis

1.2 A condition resulting from narrowing of the larynx, trachea or epiglottis, which interferes with air entering the lungs.

- croup

1.3 Lower respiratory tract infection

- acute bronchitis
- acute bronchiolitis

1.4 An acute infection of the lungs

- pneumonia

According to World Health Organization classification of Acute Respiratory Infection as following (21):

A: Management of the child with cough or difficult breathing

I. Classify the Illness of the Child Aged Two Months up to Five Years

"Classify the illness" means making decisions about the type and severity of diseases. This is done by answering questions about the signs that

were seen during the assessment. Then put each child into one of four classifications:

1. Very severe disease
2. Severe pneumonia
3. Pneumonia (not severe)
4. No pneumonia: Cough or Cold

Each disease classification has a corresponding treatment plan which should be followed after the child's illness has been classified. There are three general treatment plans (although there will be minor variations based on a child's age, whether he has fever or is wheezing, and whether referral is feasible).

1. Decide if the child has very severe disease

There are four classifications of disease for a child aged 2 months up to 5 years: very severe disease, severe pneumonia, pneumonia (not severe) and no pneumonia (cough or cold). The first step is to decide if the child should be classified as having Very Severe Disease.

It can be determined if a child has very severe disease by using the information from the assessment to decide if the child has a "danger sign" that was seen with a cough or difficult breathing:

Danger signs for the child age 2 months up to 5 years of age are inability to drink, convulsions, abnormally sleepy or difficult to wake, stridor when calm, or severe malnutrition. The possible causes of these signs are many. However, the health worker is not required to diagnose their specific cause. He must only recognize the danger signs and know that the child may be at high risk of dying.

2. Decide if the child has pneumonia

If a danger sign of the child was identified in the preceding step, the health workers need to refer the child urgently. Do not try to also determine if the child has pneumonia because each child should be put in a single classification. However, if health workers could not identify a danger sign, the next step is to use the clinical information from the assessment for further classification. The child without danger signs is classified as having either:

severe pneumonia
pneumonia (not severe) or
no pneumonia: cough or cold.

2.1 Severe pneumonia

A child with chest indrawing is classified as having severe pneumonia. Chest indrawing occurs when the lung become stiff and the effort required to breathe in is much greater than normal.

A child with chest indrawing may not have fast breathing. If the child becomes tired, and if the effort needed to expand the stiff lungs is too great, then the child's breathing slows down. Therefore, chest indrawing may be the only sign that the child has severe pneumonia. A child with chest indrawing is at higher risk of death from pneumonia than a child with fast breathing without chest indrawing.

A child classified as having severe pneumonia might also have other signs:

- Nasal flaring, when the nose widens as the child breathes in.
- Grunting, the short sounds made with the voice when the child has difficulty breathing.

- Cyanosis, a dark bluish or purplish coloration of the skin, caused by hypoxia. If the tongue is cyanosed, the child should be given oxygen.

2.2 Pneumonia (not severe)

A child who does not has chest indrawing and fast breathing (50 per minute or more if 2 months up to 12 months, 40 per minute or more if 12 months up to 5 years) is classified as having pneumonia (not severe).

A child with fast breathing and no chest indrawing is classified as having pneumonia (not severe). Most children with pneumonia are not classified as severe pneumonia, especially if they are brought early for treatment.

The mother should be given instructions on home care, including when to return if the child is getting worse and how to give the antibiotic. She should also be advised to return with the child in 2 days (48 hours) for reassessment, or earlier if the child's breathing becomes more difficult or faster, or is not able to drink, or becomes sicker.

2.3 No pneumonia: cough or cold

A child who does not has chest indrawing and has not fast breathing (less than 50 per minute if 2 months up to 12 months, less than 40 per minute if 12 months up to 5 years) is classified as having no pneumonia: cough or cold.

Most children with a cough or difficult breathing do not have any danger signs of pneumonia (chest indrawing or fast breathing). These children have a simple cough or cold. They are classified as having no pneumonia: cough or cold.

Although the child with a cough or cold does not need an antibiotic, the mother has brought the child to the clinic because of an illness that concerns her. These concerns need to be addressed and advice given on good home care. In particular, she must know to watch for signs of pneumonia and to return if these signs develop. Advising the mother on good home care for the child with a simple cough or cold will help ensure that she will bring the child back to the clinic for further treatment if the child does develop pneumonia.

II: Classify the Illness of the Young Infant Aged less than Two Months

Young infants with some specific characteristics must be carefully taken care of during sickness is classified. They could become very sickly and die very soon after serious bacterial infections, moreover, they are much less likely to cough with pneumonia, and frequently have only non-specific signs such as poor feeding, fever or low body temperature. Further, mild chest indrawing is normal in young infants because their chest wall bones are soft.

1. Deciding if a young infant has very severe disease

As stated earlier, there are three classifications of illness for a young infant with a cough or difficult breathing: very severe disease, severe pneumonia, and no pneumonia: cough or cold.

A young infant with any danger sign is classified as having very severe disease.

Some of the danger signs in children aged 2 months up to 5 years are also danger signs in young infants:

- Convulsions, abnormally sleepy or difficult to wake: A young infant with these signs may have hypoxia, sepsis or meningitis. (malaria

infection is unusual in children of this age, so antimalarial treatment for possible cerebral malaria is not advised.)

- Stridor when calm: Infections causing stridor (e.g. diptheria, bacterial tracheitis, measles or epiglottitis) are rare in young infants. A young infant who has stridor when calm should be classified as having very severe disease.

2. Decide if the young infant has pneumonia

Severe pneumonia or no pneumonia: cough or cold.

The classification of pneumonia (not severe) is not included as it was for older children. Young infants can become sick and die very quickly from serious bacterial infections such as pneumonia, sepsis and meningitis. Therefore, any young infant who has a sign of pneumonia is classified as having severe pneumonia.

The most important signs to consider when deciding if the young infant has pneumonia are the breathing rate and whether or not there is severe chest indrawing.

2.1 Severe pneumonia

A young infant who has fast breathing (60 times per minute or more), or severe chest indrawing is classified as having severe pneumonia.

Mild chest indrawing is normal in young infants because their chest wall bones are soft. However, severe chest indrawing (very deep and easy to see) is a sign of pneumonia. Since pneumonia in a young infant can progress very rapidly to death, all pneumonia is considered severe in this age group.

No pneumonia: cough or cold

A young infant who does not have fast breathing (less than 60 times per minute), and no severe chest indrawing or danger signs is classified as having no pneumonia: cough or cold.

Young infants who have neither fast breathing nor severe chest indrawing, and have no other signs of very severe disease, do not have pneumonia. They have a simple cough or cold.

B. Management of the child with an ear problem or sore throat

1. The child with an ear problem is classified as having either:
   - mastoiditis
   - acute ear infection
   - chronic ear infection.

2. The child with a sore throat is classified as having either:

   - throat abscess
   - diphtheria
   - streptococcal sore throat
   - viral sore throat.

Advise the mother to give home care

Home care is very important for a child with an acute respiratory infection, and most children you manage will be treated with it. Good home care means that the mother will:

- Feed the child to prevent weight loss. Weight loss can contribute to malnutrition.

- Increase the amount of fluids in the child's diet to prevent dehydration. Dehydration can weaken the child and make the child even more sick.

- Soothe the child's sore throat and relieve the cough with a safe remedy.

- The most important is to watch for signs that the child is getting worse and return quickly to the health center if they occur.

Part II The prevention and control of acute respiratory infections (10)

According to Acute Respiratory Infections prevention and control programme, Communicable Disease Control Department, Ministry of Public Health, the mother should have knowledge about acute respiratory infections and the management to decrease morbidity and mortality rates of acute respiratory infections in children.

1. Preventive measures for Acute Respiratory Infections

Health education should be given to general people in the community and encouragement in the following aspects;

1.1 The personal health and hygiene should be promoted by

- Avoid crowded areas.
- Take good quality and balanced diet.
- Breast-feed children and keep them in good nutrition.
- Improve housing condition by avoiding gas or charcoal smoke exposure in the house.

- Keep body warm by wearing suitable clothes, especially during cold season.
- Complete immunizations in children.
- Pregnant women should receive care from health workers or physician (22).

1.2 Knowledge of the transmission of acute respiratory infections should be given, i.e. that acute respiratory infections can be transmitted by droplet infection such as nasal discharge and saliva. Thus people should avoid contamination from coughing, sneezing and also avoid sharing the same spoons or same glasses with acute respiratory infection patients.

1.3. An update on the situation and knowledge of acute respiratory infection prevention should be passed through the mass media, and public communication, especially at the time of epidermic.

2. Control measures

In order to control mild cases that do not progress to be serious ones, these recommendations are strictly followed;

2.1. The proper treatment for early signs and symptoms are tepid sponge for high fever or give antipyretic preparations and encourage oral fluid intake.

2.2. Living in well ventilated area.

2.3. If necessary, the child should not be allowed to go to school until the condition was improved.

2.4 If the disease seems to be more serious, a mother should consult a physician.

2.5. Staying in crowded areas, such as department stores, movie theaters, etc. should be avoided.

2.6. People should be aware of transmission by sputum of nasal discharge.

Part III Review of relevant studies

The review of relevant studies is compounded by factors of mothers health behavior related to the severity of acute respiratory infection in children. These factors are:

1. Behavior of mothers before their child is ill.

1.1. Breast feeding. The child who has received breast feeding are infected with an acute respiratory infection to a lesser degree than the child who has not received it (23,24). The factor associated with a higher incidence of acute lower respiratory tract infections such as pneumonia, bronchitis or bronchiolitis were no breast feeding or breast feeding less than four months (25,26,27). Nafstad *et al* (28) found that during the first year of life, the risk of lower respiratory tract infections was increased when the duration of breast-feeding was less than six months. In Azizi's *et al* (29) study, the effect of breast feeding for at least one month was confirmed as an independent protective factor. Midtrapanon's study (30) about factors related to severity of acute respiratory infection in children under five years found that feeding the child with sweetened condensed milk or powdered milk instead of breast feeding was related to the severity of acute respiratory infection.

1.2. Immunizations. Incomplete immunization is a major risk factor for acute respiratory infection in children. Therefore, immunization against diphtheria, pertussis, measles and childhood tuberculosis must be strengthened

and should have a very high priority for any country addressing the acute respiratory infection problem, since these conditions contribute heavily to childhood morbidity and mortality, Completed immunization can protect from complications of disease such as measles and pertussis about 15-25 percent (31). Deb's study (32) found that measles and diphtheria, pertussis and tetanus (DTP) immunization had a protective role in pneumonia. Kaowanggoon and Anuntasereevitaya (33) found that, among the factors related to the death of children under one year of age that have pneumonia, one of them was incomplete immunization. Sirinopmanee's study (34) about factors affecting mothers' health behavior related to severity of acute respiratory infection in children under 2 years found that incomplete immunization was one of the factors which related to the severity of acute respiratory infection.

1.3. Malnutrition. Malnutrition is one reinforcing factor that could be related to severity of acute respiratory infection in children. Inadequate nutrition, such as dificiency protein, carbohydrate or vitamins decreased the defense mechanisms of the body by causing the followings:

- missing function of cilia in the respiratory tract
- decrease of secretory Ig A
- withered tonsil gland; especially in severe malnutrition it can be withered to 36 percent (35,36).

Infections and diseases impair the nutritional process when food is scarce, malnutrition is aggravated and under nourished children are more susceptible to infection. Kaowanggoon and Anuntasereevitaya (33) said that one risk factor associated with the mortality of pneumonia, particularly deaths under one year of age, was malnutrition. Malnutrition in children under five years of age gave a higher risk in acute respiratory infection (32,37). Man's *et al* (38) found that the factor associated with pneumonia was nutritional status of children, particularly when the weight for age z-score was -1.725. Malnutrition was the most important risk factor for childhood pneumonia in children under two years of age, with weight for age, height for age, and weight for height also being important risk factors (27). O'Dempsey *et al* (39) found that an increased

risk of pneumococcal disease was associated with poor weight gain and suggested that the incidence of pneumococcal disease could be reduced by improving nutrition and taking steps to identify and rehabilitate those children whose weight is faltering or falling.

1.4. Maternal occupation. The mortality from acute respiratory infection in developing countries was higher than in developed countries. From the record it was shown that, mortality from pneumonia in the Phillippines was 15.6/1,000 population but in the Australia there was 0.6/1,000 population (40). Occupation related with health status of each person and the family. Midtrapanon's study (30) about factors related to severity of acute respiratory infection in children aged under five years, found that the mother who works outside home was more prone to have a child with severe acute respiratory infection. Punnatrakul (41) found that a difference of maternal occupation made a difference in home care for acute respiratory infection in children under one year. However Ratchawat's study (42) found that the mother who was unemployed and worked outside home did not make different in maternal home care for acute respiratory infection in children.

1.5 Maternal antenatal care. The mother who is pregnant should be advised and get antenatal care from the health worker or physician for the good health of her child (22). The number of pregnant women who completed the required standard antenatal care (these are: gestational of less than 6 months should receive ANC at least once, between 6-7 months should receive ANC at least once, between 7-8 months should receive ANC at least once, and over 9 months should receive ANC at least once (15). Thaisriwong *et al* (43) found that the coverage of ANC in mothers who have children with ARI was 86.18 per cent.

2. Behavior of mothers while their child is ill

2.1 Sponge bath. Sponge bath or tepid sponge bath (16) is used to reduce high fever in the child aged 6 months to 6 years. Whenever the child in this age group has high fever it may have complications such as vomiting, convulsions, etc., and these causes made them severe.

Method of correct sponge bath

1. Take pills orally such as paracetamol for relieving fever if temperature is 38.5° C or more.
2. Remove clothing and cover the body with new clothing.
3. Use two moist cloths to scrub face, neck, chest, and back.
4. Use at least 30 minutes for this activity.
5. No exposure to blowing wind while doing sponge bath.

In the study about sponge bath in the child who has fever in Bangkok, Lampang, KhonKaen, Yala, and Nakhonprathom, this practice was found in 57.7, 58.1, 57.3, 31.9, and 60.0 per cent of cases respectively (44). Thaisriwong *et al* (43) found that sponge bath by mothers for the child who has high fever was 82.4 per cent. Sponge bath for at least 30 minutes, or more or exposed to blowing wind could make respiratory symptoms severe because of dampness of these activities. Yang *et al* (45) found that dampness in the home was the risk factor for respiratory symptoms (such as cough, wheezing, pneumonia, bronchitis, and asthma).

2.2. Drinking warm water. When the child is ill, it has lost a lot of fluid, which makes the child exhausted, so it should drink water frequently, especially warm water because it can make mucus in the respiratory tract soft and can be removed easily (46). Thaisriwong *et al* (43) found that 90.24 per cent of mothers, when their child was ill with cough, would make their child drink warm water. The Tuberculosis Division's study (44) found 0.5 per cent in Bangkok, 0.8 per cent in Nakhonprathom, 0.7 per cent in KhonKaen, and

0.4 per cent in Yala that mother would administer warm water when her child was ill.

2.3 Swabbing the throat. Swabbing the throat with medicine is used for treatment of the child who is ill with ARI. The mother believe that this action could help her child get relief from illness, but indeed, it could make the child worse because introduction of medicine into the throat with a finger may make the throat traumatized and easily infected. Thaisriwong study (43) found that mother's swabbing the throat when her child has ARI was 9.76 per cent. It was 6.6 per cent in Bangkok, 7.0 per cent in Nakhonprathom, and 2.7 per cent in Yala for mother's swabbing the throat when their child had cough (44).

2.4 Receiving warmth while sleeping. One reinforcing factor could relate to severe ARI in children is not receiving enough warmth while sleeping because at night the weather is cold. If the child who has an illness does not have enough warmth, he or she could have severe ARI. (22)

2.5 Having some left over drugs or having expired drugs might be toxic because these drugs might deteriorate so the efficiency of the drugs may be reduced and may not kill germs. The study about the practice of mothers for prevention and control of ARI in children (44) found that when the child is ill with ARI, 7.6% of mothers in Bangkok, 23.0% of mothers in Nakhonprathom and 7.2% of mothers in KhonKaen took some drugs left for their child, but they did not find mothers in Yala and Lampang took some still drugs left for their child when they were ill.

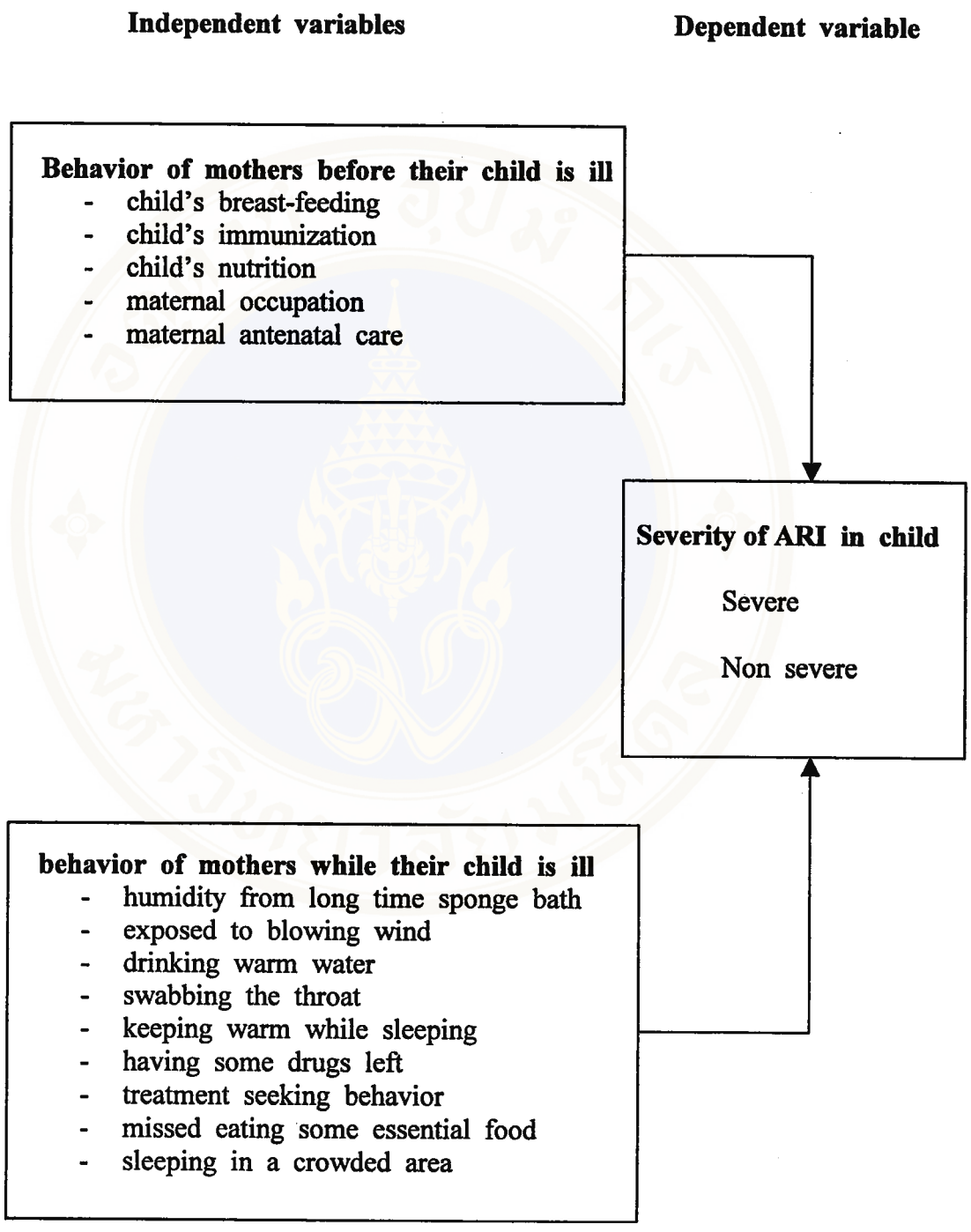
2.6 Treatment seeking behavior. Therapy for ARI can be divided into supportive and specific treatment. The appropriate treatment plan depends on the degree of illness, complications if any, and knowledge of the infectious agent or of the agent that is likely to cause the ARI. Having an incomplete course of drugs, or having drugs nonspecific to the causes of illness, or being unadvised by a physician or health worker, these are the causes of drug

resistance. Study of having incomplete courses of drugs or having drugs nonspecific to the cause of illness made organisms (such as *S. pneumoniae* and *H. influenzae*) highly resistant to the drugs (such as penicillin, chloramphenicol, cotrimoxazole) (9,47).

2.7. Refraining from some foods (such as pork, fruits, fish, etc.). While the child is ill, he or she needs more foods for enhancing his or her health. Not having some essential foods makes the child malnourished and worse health. When the child who is ill with ARI missed eating some foods, ARI could be more severe because the body defense is diminished.

2.8. Sleeping in a crowded bed. Polluted air is the cause of irritation of the respiratory tract and makes the mucous glands misfunction (46). Obstruction in the respiratory tract occurs from this cause. Dharmage *et al* (26) studied the risk factors of acute lower respiratory tract infection in children under five years of age and found that the sharing of sleeping space (average person per room > 2) was associated with severe ARI. Midtrapanon's study (30) on the factors associated with severe ARI in children under 5 years in Roi-Et Hospital, found that sleeping with three or more other persons in one bed was one of factors associated with severe ARI in children. Muhe *et al* (48) studied the role of nutritional rickets in the risk of developing pneumonia in Ethiopian children and found that the difference of between cases (childhood pneumonia) and controls (no pneumonia) was living in crowded area. Pereira *et al* (49) found one of factors for pneumonia in children in South Paulo, Brazil, was a bedroom crowding.

CONCEPTUAL FRAMEWORK



CHAPTER III

RESEARCH METHODOLOGY

STUDY DESIGN:

The study was conceptualized as a case-control study.

STUDY POPULATION AND STUDY AREA:

The target population for this study was mothers who brought an ARI child aged under five years to the outpatient and inpatient departments of Sawanpracharuk Hospital, Maternal and Child Hospital and Maewong District Hospital, Nakhornsawan Province, during the period June 1999 to August 1999.

Study population is divided into 2 groups

Case group: mother of severe ARI children aged under five years who attended the inpatient department of a hospital and were diagnosed by a physician, as having very severe pneumonia, severe pneumonia, pneumonia or with signs or symptoms as follow; fast breathing (60 times per minute or more if the child aged less than 2 months), fast breathing (50 times per minute or more if the child aged 2 months up to 1 year), fast breathing (40 times per minute or more if the child aged 1 year up to 5 years), chest indrawing, not able to drink, abnormally sleepy or difficult to wake, wheezing, convulsions, stridor in calm child or not able to drink if the child aged 2 months up to 5 years, fever or low body temperature, stopped feeding well if the child aged less than 2 months.

Control group: mother of non severe ARI children aged under five years attending the outpatient department of a hospital. Controls were matched

for age of the child (0-2 months, 3-12 months, 13-24 months, 25-36 months, 37-48 months, and 49-60 months) and time before coming to hospital (within 3 days and more than 3 days). The children were diagnosed by physician such as cold, URI or signs and symptoms i.e. low fever, running nose, no chest indrawing, no fast breathing and no history of pneumonia.

SAMPLE SIZE:

The calculation of sample size was based on the following formula (50).

$$n = \frac{\left[Z_{\alpha/2}\sqrt{2P_2(1-P_2)} + Z_{\beta}\sqrt{P_1(1-P_1)+P_2(1-P_2)}\right]^2}{\left[P_1 - P_2\right]^2}$$

Where:

- n = the number of mothers who brought ARI child aged under five years to Sawanpracharuk Hospital, Maternal and Child Hospital or Maewong District Hospital.
- $Z\alpha$ = Z Value from table of standard normal deviate at the specified
- level of α.
- $Z\beta$ = Z Value from table of standard normal deviate at the specified
- level of β.
- P_1 = Anticipated probability of exposure for people with the disease.
- P_2 = Anticipated probability of exposure for people without the disease.

$$P_1 = \frac{(OR)P_2}{(OR)P_2 + (1-P_2)}$$

When:

- OR = Anticipated odds ratio
- α = 0.05
- β = 0.20

For sample size calculation, data from relevant studies, the variables for calculation are;

The variable for calculation	P_2	OR	n
Non breast-feeding (30)	0.27	2.21	107
Sleeping in crowded area (30)	0.22	2.29	95
Incomplete immunization (34)	0.03	4.11	98

The highest sample size was 107. The total sample size in this study used 120 cases and 120 controls from Sawanpracharuk Hospital, Maternal and Child Hospital and Maewong District Hospital.

STUDY INSTRUMENT:

The data collection instrument was a constructed question comprising of 4 parts, as follows;

Part I Maternal demographic characteristics.

Maternal demographic characteristics were age, educational level, marital status, family income, occupation, number in the family members, number of children aged under 5 years, maternal smoking and number in the family smoking.

Part II The child's characteristics and mothers' behavior before their child became ill.

The variables were age, gender, birth weight, breast-feeding, immunization nutritional status, and maternal antenatal care.

Part III Mothers' behavior while their child was ill.

The variables were sponge bath, using drugs to the child before going to hospital, treatment seeking behavior, using left over drugs, drinking warm water, swabbing the throat, using warm cloths while sleeping, refraining from some essential foods, and sleeping in a bed.

Part IV Mothers' behavior after discharge from hospital.

The variables were course of drugs, appointed for follow-up by physician attending the follow-up and health status of children.

DATA COLLECTION:

Data were collected using questionnaires to interview mothers who have brought the child aged under 5 years to the outpatient department and inpatient department of Sawanpracharuk Hospital, Maternal and Child Hospital and Maewong District Hospital. Nurses in Maewong District Hospital. Two Interviewers were trained for data collection. Follow-up data were collected with the help of public health workers in 7 districts (Latyoa, Bunprotpisai, Krokpra, Maung, Tatako, Maewong and Prisaree) and by telephone, within 5 weeks after discharge from hospitals.

DATA ANALYSIS:

1. Descriptive statistics such as frequency, percent, mean and standard deviation etc.

2. Influential statistics were used to study the data associated with severe ARI in children

2.1. Univariate analysis
- chi square test
- OR and 95% confidence interval for OR

2.2. Multivariate analysis
- adjusted. OR from multiple logistic regression

VARIABLES INCLUDED IN THE STUDY:

1. **Independent variables:**

- child's breast-feeding
- child's immunization
- child's nutrition
- maternal occupation
- maternal antenatal care
- humidity from long time sponge bath
- exposed to blowing wind
- drinking warm water
- swabbing the throat
- using warm cloths while sleeping
- having some left over drugs
- treatment seeking behavior

- refraining from some essential food
- sleeping in a crowded bed

2. Dependent variable:

Severity of acute respiratory infection in children.

CHAPTER IV

RESULTS

The purpose of this study is to determine the relationship between mothers' behavior and severity of acute respiratory infection in children aged under five years. The studied results were divided into three parts,

1. General information
   1.1 maternal demographic characteristics.
   1.2 the child's characteristics and mothers' behavior before their child became ill.
   1.3 mothers' behavior while their child was ill with ARI.
   1.4 mothers' behavior after the child was discharged from hospital.

2. The univariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years.
   2.1 maternal demographic characteristics.
   2.2 the child's characteristics and mothers' behavior before their child became ill.
   2.3 mothers' behavior while their child was ill with ARI.

3. The multivariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years.

1. General information

1.1 Maternal demographic characteristics.

Age

The majority of mothers in the case and control groups were in the age group 20-29 years (49.2% and 46.7%, respectively). The second largest group were in the age group 30-39 years (37.5% and 41.75, respectively). The mean

age of mothers was 28.75 years (SD = 6.94 years). The maximum age was 63 years and the minimum was 15 years.

Educational level

The majority of mothers in the case and control groups had primary educational level (47.5% and 58.3%, respectively). The second largest group had secondary educational attainment (25.8% and 23.3, respectively).

Marital status

The majority of mothers in the case and control groups were married (86.7% and 89.2%, respectively).

Family income

The majority of mothers in the case and control groups had family income between 2,001-5,000 baht/month (29.2% and 41.7%, respectively). The second largest group had family income between 5,001-10,000 baht/month (26.7% and 30.0%, respectively). The maximum was 53,000 baht/month and the minimum was 200 baht/month. The mean family income was 8,390.58 baht/month (SD = 8,642.4 baht/month).

Maternal occupation

The majority of maternal occupation in the case group was laborer (39.2%), and the next were agriculture (26.7%). The most of maternal occupation in control group were housewife (50.0%), and the second largest group were labour (23.3%).

Numbers in the family members

The majority of cases and controls had family members between 4-6 persons (65.0% and 58.3%, respectively). The mean size of family was 5.43 persons (SD = 2.24 persons). The maximum was 16 persons, and the minimum was 2 persons.

Numbers of children aged under five years in the family

The majority of family had 1 child under five years of age (67.5% in case and 66.7% in control group, respectively). The second largest was family with 2 children under five years of age (23.3% and 26.7%, respectively).

Maternal smoking

The majority of mothers in the case and control groups were non smokers (95.0% and 96.7%, respectively).

Family smoking history and numbers in the family members who smoked

The majority of family in the case and control groups had at least one smoker (65.8% and 54.2%, respectively). The majority had one smoker in the family (71.5% and 67.7%, respectively).

Table 2 Maternal demographic characteristics in case and control groups. (Case = 120, Control = 120)

	Case group		Control group	
Demographic characteristics	Number	Percent	Number	Percent
Age (years)				
< 20	10	8.3	7	5.8
20-29	59	49.2	56	46.7
30-39	45	37.5	50	41.7
≥ 40	6	5.0	7	5.8
Educational level				
No formal education	9	7.5	5	4.2
Primary	57	47.5	70	58.3
Secondary	31	25.8	28	23.3
Higher than secondary	23	19.2	17	14.2

Table 2 (continued)

Demographic characteristics	Case group Number	Percent	Control group Number	Percent
Marital status				
Married	104	86.7	107	89.2
Separated	11	9.2	10	8.3
Widowed	5	4.2	3	2.5
Family income (baht/month)				
≤ 2,000	24	20.0	11	9.2
2,001-5,000	35	29.2	50	41.7
5,001-10,000	32	26.7	36	30.0
> 10,000	29	24.2	23	19.2
Maternal occupation				
Housewife	25	20.8	60	50.0
Agriculture	32	26.7	9	7.5
Labor	47	39.2	28	23.3
Trade	6	5.0	10	8.3
Government services	9	7.5	13	10.8
Others	1	0.8	0	0
Numbers in the family members				
1-3	19	15.8	19	15.8
4-6	78	65.0	70	58.3
≥ 7	23	19.2	31	25.8
Numbers of children aged under five years in the family				
1	81	67.5	80	66.7
2	28	23.3	32	26.7
3	8	6.7	6	5.0
4	4	1.7	2	1.7
5	1	0.8	0	0

Table 2 (continued)

Demographic characteristics	Case group Number	Case group Percent	Control group Number	Control group Percent
Maternal smoking				
Yes	6	5.0	4	3.3
No	114	95.0	116	96.7
Smoking in the family				
No smoker	41	34.2	55	45.8
With smoker	79	65.8	65	54.2
- 1 person	59	49.2	44	36.7
- ≥ 2 persons	20	16.7	21	17.5

1.2 The child's characteristics and mothers' behavior before their child became ill.

Age of the child

In case and control groups, the numbers of children in each age groups are similar The majority of children in case and control groups were in age groups 3-12 months (29.2%). The mean age was 20.83 months (SD = 14.59 months).

Sex of the child

The majority of children in the case and control groups were male (52.5% and 54.2%, respectively).

Birth weight of the child

The majority of children in the case and control groups had birth weight of ≥ 3,000 grams (50.8% and 50.0%, respectively). The second largest group were 2,500-2,999 grams (35.0% and 40.0%, respectively). The smallest group birth weight were in < 2,000 grams category (5.8% and 3.3%, respectively).

Breast-feeding

The majority of children in the case and control groups had received breast-feeding (52.5% and 89.2%, respectively). The majority of children who had received breast-feeding received it up to 4 months after birth (30.0% and 56.7%, respectively)

Immunization

The majority of children in the case group had completed immunization (80.0%). Compared to 97.5% in control group were completed immunization. The complete immunization at proper age in case and control groups were 78.1% and 95.7%, respectively.

Nutritional status

The majority of children in the case and control groups had normal nutritional status before this episode (69.2% and 81.7%, respectively). Malnutrition the first degree malnourished children in case and control groups were 16.7% and 15.0%, respectively.

Maternal antenatal care

The majority of mothers in the case and control groups had same antenatal care (94.2% and 98.3%, respectively), and most of antenatal care were completed antenatal care (67.3% and 87.1%, respectively).

Table 3 Numbers and percentage of children in case and control groups.

Factors	Case group		Control group	
	Number	Percent	Number	Percent
Age (months)				
0-2	8	6.7	8	6.7
3-12	35	29.2	35	29.2
13-24	34	28.3	34	28.3
25-36	24	20.0	24	20.0
37-48	12	10.0	12	10.0
49-60	7	5.8	7	5.8
Sex				
Male	63	52.5	65	54.2
Female	57	47.5	55	45.8
Birth weight (grams)				
< 2,000	7	5.8	4	3.3
2,000-2,499	10	8.3	8	6.7
2,500-2,999	42	35.0	48	40.0
≥ 3,000	61	50.8	60	50.0
Breast-feeding and numbers of month breast-feeding				
No	57	47.5	13	10.8
Yes	63	52.5	107	89.2
- < 4 months	27	22.5	39	32.5
- ≥ 4 months	36	30.0	68	56.7
Immunization and complete of immunization at proper age				
Incomplete	24	20.0	3	2.5
Complete	96	80.0	117	97.5
- at proper age	75	62.5	112	93.3
- not at proper age	21	17.5	5	4.2

Table 3 (continued)

Factors	Case group Number	Case group Percent	Control group Number	Control group Percent
Nutritional status before illness				
Normal	83	69.2	98	81.7
1° Degree	20	16.7	18	15.0
2° Degree	15	12.5	4	3.3
3° Degree	2	1.7	0	0
Maternal antenatal care				
No	7	5.8	2	1.7
Yes	113	94.2	118	98.3
- complete	76	63.3	102	85.0
- incomplete	37	30.8	16	13.3

1.3 Mothers' behavior while their child was ill with ARI.

Sponge bath

The majority of mothers in the case and control groups gave sponge bath to the child when their child was ill (80.0% and 94.2%, respectively), take pill orally before sponge bath (78.1% and 93.8%, respectively), and no exposed to blowing wind while doing this activity (69.8%, and 90.3%, respectively). The majority of mothers in the case group used one moist cloth (70.8%), and used for less than 30 minutes for this activity (71.1%). The majority of mothers in the control group used two moist cloths (77.0%), and used at least 30 minutes or more for this activity (81.4%).

Using drugs for the child before go to a hospital

The majority of mothers in the case and control groups used drugs for illness before going to a hospital (93.3% and 90.8%, respectively), and the majority of mothers in both groups knew the types of drug they used (92.5% and 90.0%, respectively).

Treatment seeking behavior

The majority of mothers in the case and control groups gave some kinds of treatment to their child at home when the child was ill with ARI (30.8% and 35.8%, respectively). Places where mothers in the case group sought for care were clinic (27.5%), hospital (17.5%) and health center (15.8%), respectively. On the other hand, places where mothers in the control group sought for care were health center (25.8%), clinic (15.0%) and hospital (11.7%), respectively.

Using left over drugs

The majority of children in the case group were given left over drugs (60.8%), whereas in the control group, the majority of children were not given (65.8%).

Drinking warm water

The majority of mothers in the case and control groups gave some warm water to their child while the child were ill with ARI (57.5% and 86.7%, respectively). The main reason for giving warm water in the case and control groups were the belief that warm water was clean (53.6% and 50.0%, respectively).

Swabbing the throat

The majority of mothers in the case and control groups did not swab the child's throat when the child was ill with ARI (56.7% and 90.0%, respectively). The main reason for those who swabbed the child's throat in case and control groups was to relieve sore throat (48.1% and 50.0%, respectively).

Using warm cloths while sleeping

The majority of children in the case group was not covered with warm cloths while sleeping (64.2%). In the control group, the majority of children were covered with warm cloths while sleeping (76.7%). The main reason for using warm cloths while sleeping in the case and control groups was to decrease severity (86.0% and 95.7%, respectively).

Refraining from some essential foods

The majority of children in the case and control groups had not refrained from some essential foods (64.2 and 82.5%, respectively). The main reason for refraining from some essential foods in the case group was that it may increase severity (30.2%). On the other hand, the main reason for refraining from some essential foods in the control group was that it may endanger the child (38.1%).

Sleeping in crowded room

The majority of children in the case and control groups slept in the same bed with other persons (98.3% and 100%, respectively). Sleeping with < 2 persons in case and control groups were 71.7% and 79.2%, respectively.

Table 4 Numbers and percentage in case and control groups. Information about mothers' behavior while their child was ill.

Factors	Case group		Control group	
	Number	Percent	Number	Percent
Sponge bath				
No	24	20.0	7	5.8
Yes	96	80.0	113	94.2
-take pill orally before sponge bath	n = 96		n = 113	
Yes	75	78.1	106	93.8
No	21	21.9	7	6.2

Table 4 (continued)

Factors	Case group		Control group	
	Number	Percent	Number	Percent
-use one moist cloth				
Yes	68	70.8	26	23.0
No	28	29.2	87	77.0
-use 30 minutes or up				
Yes	22	22.9	92	81.4
No	74	71.1	21	18.6
-exposed to blowing wind				
Yes	29	30.2	11	9.7
No	67	69.8	102	90.3
Using drugs for children before go to a hospital				
No	8	6.7	11	9.2
Yes	112	93.3	109	90.8
- know the types of drugs	111	92.5	108	90.0
- not know	1	0.8	1	0.8
Treatment seeking behavior				
At home	37	30.8	43	35.8
Clinic	33	27.5	18	15.0
Health center	19	15.8	31	25.8
Hospital	21	17.5	14	11.7
Drug store	10	8.3	14	11.7
Having some left over drugs				
Yes	73	60.8	41	34.2
No	47	39.2	79	65.8

Table 4 (continued)

Factors	Case group Number	Case group Percent	Control group Number	Control group Percent
Drinking warm water				
Yes	69	57.5	104	86.7
No	51	42.5	16	13.3
Reasons of drinking warm water	**n = 69**		**n = 104**	
Reduce severity	7	10.1	17	16.3
Relief cough	12	17.4	29	27.9
Relief sore throat	0	0	3	2.9
Clean water	37	53.6	52	50.0
Advised by adult	13	18.8	3	2.9
Swabbing the throat				
Yes	52	43.3	12	10.0
No	68	56.7	108	90.0
Reasons of swabbing child's throat	**n = 52**		**n = 12**	
Decrease severity	2	3.8	1	8.3
Relief sore throat	25	48.1	6	50.0
Kill germs	1	1.9	1	8.3
Relief cough	18	34.6	4	33.3
Advised by adult	6	11.5	0	0
Using warm cloths while sleeping				
Yes	43	35.8	92	76.7
No	77	64.2	28	23.3

Table 4 (continued)

Factors	Case group Number	Case group Percent	Control group Number	Control group Percent
Reasons of using warm cloths while sleeping	**n = 43**		**n = 92**	
Decrease severity	37	86.0	88	95.7
No reason	6	14.0	4	4.3
Refraining from some essential foods				
Yes	43	35.8	21	17.5
No	77	64.2	99	82.5
Reasons of refraining from some essential foods	**n = 43**		**n = 21**	
Increase severity	13	30.2	3	14.3
Endanger the child	12	27.9	8	38.1
Advised by other adult	6	14.0	4	19.0
Increase cough	12	27.9	6	28.6
Sleeping with other persons				
No	2	1.7	0	0
Yes	118	98.3	120	100.0
- ≤ 2 persons	86	71.7	95	79.2
- > 2 persons	32	26.7	25	20.8

1.4 Mothers' behavior after discharge from hospital

There was 115 (95.8%) of mothers in case and control were interviewed for the follow-up data. Only 5 (4.2%) of mothers in case and control were lost because of these mothers did not stay at the same address that they gave for

interviewer before discharge from hospital. Their neighbours did not know where did the new place of these mothers lived.

Course of drugs

The majority of children in case and control groups completed their course of drugs (74.8% and 73.0%, respectively).

Follow-up by physician

The majority of children in the case and control groups did not received appointment for the follow-up by a physician (56.5% and 83.5%, respectively). The majority of mothers in the control group brought their child for follow-up (89.5%), but the majority of mothers in the case group did not bring their child for the follow-up (54.0%).

Health status of the child

The majority of children in the case and control groups were healthy after discharge from hospital (60.9% and 89.5%, respectively).

Table 5 Numbers and percentage in case and control groups. Information about mothers' behavior after discharge from hospital.

Factors	Case group		Control group	
	Number	Percent	Number	Percent
Course of drugs				
Complete	86	74.8	84	73.0
Incomplete	29	25.2	31	27.0
Appointed for follow-up by physician				
Yes	50	43.5	19	16.5
No	65	56.5	96	83.5

Table 5 (continued)

Factors	Case group Number	Case group Percent	Control group Number	Control group Percent
Attending the follow-up	**n = 50**		**n = 19**	
Yes	23	46.0	17	89.5
No	27	54.0	2	10.5
Health status of children				
Healthy	70	60.9	101	87.8
Recover illness but remain weak	10	8.7	6	5.2
continued illness	35	30.4	8	7.0

2. The univariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years.

2.1 Maternal demographic characteristics.

The studied factors were age, education, marital status, family income, maternal occupation, numbers of family members, maternal smoking and numbers in the family members who smoke. The analysis showed that there were no statistically significant association between severe ARI and age, education, marital status, family income, numbers of family members, maternal smoking or numbers in the family members who smoke.

There was a statistically significant association between maternal occupation and severe ARI. Children whose mothers work outside home had a higher risk of severe ARI than children whose mothers do not (OR = 3.80, 95% CI = 2.15-6.70).

Table 6 The univariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years. Factors from maternal demographic characteristics.

Factors	OR	95% CI OR	p-value
Age (years)			
< 20	1.60	0.57-4.50	0.377
20-29	1.18	0.70-1.99	0.542
≥ 30	1.00		
Educational level			
No formal education	1.33	0.38-4.69	0.657
Primary	0.60	0.29-1.23	0.166
Secondary	0.82	0.36-1.84	0.627
Higher than secondary	1.00		
Marital status			
Married	1.00		
Not married	1.27	0.58-2.76	0.553
Family income (baht/month)			
≤ 5,000	1.00		
> 5,000	1.07	0.64-1.78	0.796
Maternal occupation			
Housewife	1.00		
Others	3.80	2.15-6.70	< 0.001*
Numbers in the family members			
≤ 3	1.00		
> 3	1.00	0.50-2.00	1.000
Maternal smoking			
Yes	1.53	0.42-5.55	0.521
No	1.00		

Table 6 (continued)

Factors	OR	95% CI OR	p-value
Family smoking			
Yes	1.63	0.97-2.74	0.066
No	1.00		

* A statistical significantly at $\alpha = 0.05$.

2.2 The child's characteristics and mothers' behavior before their child became ill.

The studied factors were birth weight, breast-feeding, immunization, the child's nutritional status, maternal antenatal care. It was found that there were no statistical significant association between severe ARI and birth weight.

There were statistically significant ($p < 0.05$) association between some factors and severe ARI. These factors were;

Breast-feeding

Children with no breast-feeding or with breast-feeding for less than four months have a higher risk of severe ARI than children with breast-feeding for at least four months, or more (OR = 7.45, 95% CI = 3.78-14.67).

Immunization

Children without or with incomplete immunization have a higher risk of severe ARI than children with complete immunization (OR = 9.72, 95% CI = 2.85-33.23).

Nutritional status

Children who had second or third degree malnutrition for at least one month before illness have a higher risk of severe ARI than children who had not (OR = 5.02, 95% CI = 1.62-15.50).

Maternal antenatal care

Children whose mothers had incomplete antenatal care have a higher risk of severe ARI than children whose mothers had complete antenatal care (OR = 3.10, 95% CI = 1.61-5.99).

Table 7 The univariate analysis of mothers' behavior before their child became ill related to severity of acute respiratory infection in children aged under five years.

Factors	OR	95% CI OR	p-value
Birth weight (grams)			
< 2,500	1.49	0.68-3.26	0.324
≥ 2,500	1.00		
Breast-feeding			
Yes	1.00		
No	7.45	3.78-14.67	< 0.001*
Immunization			
Complete	1.00		
Incomplete	9.72	2.85-33.23	< 0.001*
Nutritional status			
Normal	**1.00**		
Degree 1	1.31	0.65-2.64	0.448
Degree 2,3	5.02	1.62-15.50	0.005*
Maternal antenatal care			
Yes	1.00		
No	3.64	0.74-17.84	0.112

Table 7 (continue)

Factors	OR	95% CI OR	p-value
Complete of maternal antenatal care			
Yes	1.00		
No	3.10	1.61-5.99	< 0.001*

2.3 Mothers' behavior while their child was ill with ARI.

The studied factors were sponge bath, correct sponge bath, giving some drugs to the child before going to hospital, treatment seeking behavior, using some left over drugs from the last episode of illness, drinking warm water, swabbing the throat, using warm cloths while sleeping, refraining from some essential foods and sleeping in crowded room.

It was found that there were no statistically significant association between giving some drugs before going to hospital, treatment seeking behavior or sleeping in crowded bed and severe ARI.

The increased risk of severe ARI were found to be associated with:

Humidity from long time sponge bath

Children who received high humidity from long time sponge bath have a less risk of severe ARI than children who received high humidity from short time sponge bath (OR 0.68, 95% CI = 0.03-0.13)

Exposed to blowing wind while doing sponge bath

Children who exposed to blowing wind while doing sponge bath had a higher risk of severe ARI than children who did not (OR = 4.01, 95% CI = 1.88-8.58).

Using some left over drugs

Children having some left over drugs from the last episode of illness had a higher risk of severe ARI than children who did not (OR = 2.99, 95% CI = 1.77-5.06).

Drinking warm water

Children who did not always drink warm water while they were ill had a higher risk of severe ARI than children who always drink warm water while they were ill (OR = 4.80, 95% CI = 2.54-9.10).

Swabbing the throat

Children whose throats were swabbed had a higher risk of severe ARI than children whose throats were not swabbed (OR = 6.88, 95% CI = 3.43-13.82).

Using warm cloths while sleeping

Children who were not covered with warm cloths while sleeping had a higher risk of severe ARI than children who were covered with warm cloths while sleeping (OR = 5.88, 95% CI = 3.35-10.34).

Refraining from some essential foods

Children who refrained from some essential foods had a higher risk of severe ARI than children did not (OR = 2.63, 95% = CI = 1.44-4.80).

Table 8 The univariate analysis of mothers' behavior while their child was ill related to severity of acute respiratory infection in children aged under five years.

Factors	OR	95% CI OR	p-value
Humidity from long time sponge bath			
Yes	0.68	0.03-0.13	< 0.001*
No	1.00		
Exposed to blowing wind			
Yes	4.03	1.88-8.58	< 0.001*
No	1.00		
Giving drugs to the child before going to hospital			
Yes	1.00		
No	0.71	0.27-1.83	0.475
Treatment seeking behavior			
Health officer	1.00		
Others	0.71	0.43-1.19	0.193
Using some left over drugs			
Yes	2.99	1.77-5.06	< 0.001*
No	1.00		
Drinking warm water			
Yes	1.00		
No	4.80	2.54-9.10	< 0.001*
Swabbing the child's throat			
Yes	6.88	3.43-13.82	< 0.001*
No	1.00		
Using warm cloths while sleeping			
Yes	1.00		
No	5.88	3.35-10.34	< 0.001*

Table 8 (continued)

Factors	OR	95% CI OR	p-value
Refraining from some essential foods			
Yes	2.63	1.44-4.80	0.002*
No	1.00		
Sleeping with other persons in the same bed			
≤ 2 persons	1.00		
> 2 persons	1.41	0.78-2.57	0.257

3. The multivariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years.

From the univariate analysis, the increased risk of severe ARI were found to be associated with maternal occupation, breast-feeding, immunization, the child's nutritional status before illness, complete of maternal antenatal care, correct sponge bath, using some left over drugs from the last episode of illness, drinking warm water, swabbing the child's throat, using warm cloths while sleeping and refraining from some essential foods.

Due to the confounding nature of the variables studied, multivariate logistic regression analysis was performed by including all the potential risk factors into the regression model without applying any stepwise procedure. These are potential risk factors;

- maternal occupation
- breast-feeding
- immunization
- the child's nutritional status before illness
- complete of maternal antenatal care

- humidity from long time sponge bath
- exposed to blowing wind while doing sponge bath
- using some left over drugs from the last episode of illness
- drinking warm water
- swabbing the throat
- using warm cloths while sleeping
- refraining from some essential foods.

The risk factors which remained significant in multivariate analysis were;

Breast-feeding

Children with no breast-feeding or with breast-feeding for less than four months had a higher risk of severe ARI than children with breast-feeding for at least four months, or more (OR = 6.36, 95% CI = 2.26-17.92).

Humidity from long time sponge bath

Children who received high humidity from long time sponge bath had a less risk of severe ARI than children who received high humidity from short time sponge bath (OR = 0.13, 95% CI = 0.05-0.34).

Using some left over drugs

Children having some left over drugs from the last episode of illness had a higher risk of severe ARI than children who did not (OR = 3.65, 95% CI = 1.44-9.26).

Drinking warm water

Children who did not drink warm water while they are ill have a higher risk of severe ARI than children who drank warm water while they are ill (OR = 3.22, 95% CI = 1.10-9.43).

Swabbing the child's throat

Children whose throats were swabbed had a higher risk of severe ARI than children whose throats were not swabbed (OR = 6.58, 95% CI = 2.02-21.43).

Refraining from some essential foods

Children who refrained from some essential foods had a higher risk of severe ARI than children did not (OR = 3.77, 95% = CI = 1.35-10.54).

Table 9 The multivariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years.

Factors	Crude OR	Adjusted OR	95% CI for Adjusted OR	p-value
Breast-feeding				
Yes	1.00	1.00		
No	7.45	6.35	2.26-17.92	< 0.001
Use 30 minutes or more for sponge bath				
Yes	0.68	0.13	0.05-0.34	< 0.001
No	1.00	1.00		
Using some left over drugs				
No	1.00	1.00		
Yes	2.99	3.65	1.44-9.26	0.006
Drinking warm water				
Yes	1.00	1.00		
No	4.80	3.22	1.10-9.43	0.033
Swabbing the throat				
No	1.00	1.00		
Yes	6.88	6.58	2.02-21.43	0.002

Table 9 (continue)

Factors	Crude OR	Adjusted OR	95% CI for Adjusted OR	p-value
Refraining from some essential foods				
No	1.00	1.00		
Yes	2.63	3.77	1.35-10.54	0.012

Adjusted OR is the OR from the multivariate analysis

Crude OR is the OR from the Univariate analysis

CHAPTER V

DISCUSSION

The factors which increased the risk of severe ARI by multivariate logistic regression analysis, were:

Breast-feeding

Children with no breast-feeding or with breast-feeding for less than four months had an increased risk of severe ARI, 5.04 times that of children with breast-feeding for at least four months, or more. This result corresponded with other studies: Lopez *et al* (25) found that during the first year of life, breast-feeding for less than four months was associated with a higher incidence of pneumonia. Dharmage *et al* (26) found that the risk factors of acute lower respiratory tract infections in children under five years of age included not being exclusively breast fed up to the completion of four months. Muhe *et al* (48) found that there was a significant difference between the child aged under five years who had nutritional rickets and pneumonia, and the child who had no evidence of pneumonia, in Ethiopia for the months of exclusive breast-feeding ($p < 0.05$). Azizi *et al* (29) found that breast-feeding for at least one month was confirmed as an independent protective factor for acute respiratory infections in children between the ages of one month and five years. Midtrapanon (30) found that in the first year of life non-exclusive breast-feeding had a 2.9-fold higher risk of severe ARI than children with exclusive breast-feeding. Fonseca *et al* (27) found that non-breast-feeding in children aged under two years was significantly associated with an increased risk of pneumonia with an estimated odds ratio = 1.69 (p =0.01). Victora *et al* (51) found that non-breast-feeding in children aged under two years in a Brazilian metropolitan area had a higher risk factor for pneumonia (OR = 2.61, 95% CI = 1.54 – 4.44). Nafstad *et al* (28) found that during the first year of life,

children breast-fed for less than 6 months and maternal smoking increased the risk of lower respiratory tract infection. Pisacane *et al* (52) found that the child in Southern Italy with acute lower respiratory infections was less likely to have been breast-fed than the child with no acute lower respiratory infections. It is certain that breast-feeding gives both good nutrition and immunity for protection from severe ARI.

Humidity from long time sponge bath

Children whose mothers used for at least 30 minutes, or more for sponge bath had a less risk of severe ARI than children whose mothers used for less than 30 minutes for this activity. This study found that the majority of mothers in the case group used for less than 30 minutes (77.1%) for sponge bath. In contrast, mothers in the control group who used for less than 30 minutes were 18.6%. this result did not corresponded to the study of Yung *et al* (45) found that damp housing conditions increased risk of ARI. Although sponge bath was made the child dampened but it was temporary and could not make the child severe. Indeed, mother who had a long time sponge bath she would take good care to her child better than mother who had a short time sponges bath and this cause may affect the severity of ARI.

Having some left over drugs

Children who had some left over drugs from the last episode of illness have a higher risk of severe ARI than children who did not (OR = 3.13, 95% CI = 1.28 – 7.68). Using some left over drugs from the last episode of illness might be toxic because these drugs might deteriorate, so the efficiency may be reduced. In addition, incorrect of doses of drugs and the unnecessary use of antibiotics has contributed to rapid increases in resistance which has already made some bacteria resistant to all antibiotics (47). This study found that 51% of mothers in the case group used antibiotics for their child, unnecessary use of improper antibiotics developed some bacteria resistance and including delayed

treatment effects the severity of ARI. Nadtakun *et al* (53) found that using antibiotics such as amoxycillin and cotrimoxazole were good for a treatment of pneumonia if they were taken as advised by a physician. Using left over drugs from the last episode of illness might not be advised by physician; this made the mothers give incorrect doses of drugs or use antibiotics unnecessarily and made their child have severe ARI eventually.

Drinking warm water

Children who did not drink warm water while they were ill have a higher risk of severe ARI than children who drank warm water while they were ill (OR = 3.88, 95% CI = 1.38 – 10.93). This result corresponded to other studies: Thaisriwong *et al* (43) found that 90.24% of mothers gave warm water for their child while their child was ill with ARI in order to relieve cough. Charearnrob and Posri (54) found that 83.3% of caregivers of children aged under five years in Roi-et Province gave warm water to their child when they were ill with ARI in order to relieve cough. Drinking water made mucus in the respiratory tract soft and so that it can be removed easily, but drinking cold water in the child aged under five years who was ill with a cold made the cold more severe and made the child breathe with difficulty. If difficult breathing was not remedied, the child would have a severe consequence of ARI.

Swabbing the throat

Children whose throats were swabbed have a higher risk of severe ARI than children whose throats were not swabbed (OR = 6.86, 95% CI = 2.15 – 21.87). Mothers in rural areas usually swab the child's throat when the child was ill with ARI. They believe that swabbing the child's throat could relieve sore throat or could relieve cough or could relieve the illness. Thaisriwong *et al* (43) found that while the child was ill with ARI, the mother (9.76%) would swab the child's throat because they believe that it could relieve the illness.

The Tuberculosis Division (44) found that mothers in Bangkok (6.6%), Nakhornprathom (7.0%) and Yala (2.70%) Province would swab the child's throat while the child was ill with ARI; the reason for swabbing the child's throat was the belief that it could relieve illness. This study found that the main reason for swabbing the child's throat in the case group was the belief that it could relieve sore throat (48.1%) and as being advised by other adult (11.5%). The trade name of the medicine most used for swabbing the child's throat was "Bipo" (26.9% in case and 58.3% in control) that was made from medicinal herbs. Using medicinal herbs once or twice was not adequate treatment for ARI. Indeed, it may make the child's ARI condition become worse because introduction of medicine into the throats with a finger might make the child's throat traumatized and easily infected.

Refraining from some essential foods

Children who refrained from some essential foods had a higher risk of severe ARI than children who did not (OR = 4.00, 95% CI = 1.46 – 10.92). While children are ill, they need more essential foods for enhancing their health. Some essential foods, such as protein or lipid, strengthen the body, repair the worn-out cells and give high energy, respectively. Refraining from these foods could make ARI become more severe. This study found that majority of foods refrained from were the protein group (60.9%), lipid (37.5%) and fruit or vegetables (32.8%). The main reason for refraining from these foods was the belief that it may endanger the child (31.3%) and the belief that it may increase the child's cough (28.1%). This is a mistaken belief of mothers who care for the child when the child is ill. Archananupap *et al* (55) advised that a sick child needs more food for energy, so mothers should continue to feed the child if he or she is able to eat or drink.

The factors which did not increase the risk of severe ARI by multivariate logistic regression analysis, were:

Maternal occupation

The result of this study found that the child whose mother work outside home did not increased risk of severe ARI. This result did not corresponded to other studies: Midtrapanon (30) found that the child whose mother works outside home had a higher risk of severe ARI than the child whose mother does not (OR = 2.08, 95% CI = 1.76 – 3.56). Vathanophas *et al* (56) found that a significantly increased risk of severe ARI was associated with the child whose mother works outside home. Cerqueiro *et al* (57) found that the child whose mother works outside home had an increased risk of acute lower respiratory tract infections, 2.08 times that of the child whose mother does not. Fonseca *et al* (27) found that the child whose mother works outside home had a higher risk of severe ARI than the child whose mother does not (OR = 1.58, 95% CI = 1.21 – 2.07). One study that correspond to this study was the Sirinopmanee study (34); she found that mothers' working outside home was not significantly associated with severe ARI in children.

Immunization

Children with incomplete immunization did not increased the risk of severe ARI. This result did not correspond to other studies: Sri-a-run (58) found that incomplete immunization in children aged under five years increased the risk of pneumonia. Deb (32) found that most of the children (59%) had been immunized with measles and diphtheria, pertussis and tetanus (DTP) vaccine earlier. The immunization had a protective role in pneumonia. The relative risk was 2.7 in the non-immunized group. Shah *et al* (59) found that full or partial immunization in children aged under five years had a protective role in severe pneumonia and non-immunization increased the risk of severe pneumonia 3.03 (95% CI = 1.86 – 4.95) times that of children who had

completed immunization. Fonseca *et al* (27) found that the increased risk of pneumonia in children aged under five years in the urban poor in Fortaleza, Brazil was due to incomplete vaccination. This result corresponded to other studies: Midtrapanon study (30), Wongwanit study (60) and Jirapongsa study (61) found that incomplete immunization in children under five years of age did not associated with severe ARI. This study found that the majority of incomplete immunization in the case group was found in children under one year of age, but in the other age groups, immunization of the child were adjoining so incomplete immunization did not associated with severe ARI.

Antenatal care

Children whose mothers had incomplete antenatal care did not increased the risk of severe ARI. Receiving adequate antenatal care, these mothers were given care on nutrition, immunization and the safety of their infants while pregnant, but this does not mean that these children whose mothers had complete antenatal care would have a better protection severe ARI than children whose mothers had incomplete antenatal care. The result found that it was not no statistically significant difference between case and control groups about maternal antenatal care. Complete antenatal care was found 63.3% in case and 85.0% in control group.

Exposed to blowing wind while doing sponge bath

Children who exposed to blowing wind while doing sponge bath did not associated with severe ARI. Exposed to blowing wind while doing sponge bath of the child in case and control were found 30.2%, and 9.7% respectively.

Using warm cloths while sleeping

Children without warm cloths while sleeping did not increased the risk of severe ARI. Archananupap *et al* (55) and Spoke (62) advised for a child

who was ill and had a high fever, the mother or caregiver should undress the child and cover it with only a sheet or light blanket. The result found that the practice of covering the child with warm cloths while sleeping in the case group was 35.8%, and 76.7% in the control group.

Nutritional status

Nutritional status of the child before illness did not have a statistically significant association with severe ARI. This result did not correspond to other studies: Sri-a-run (58) found that malnutrition in children aged under five years associated with the occurrence of pneumonia. O'Dempsey *et al* (39) found that an increased risk of pneumococcal disease was associated with poor weight gain. Deb (32) found that the relative risk of developing pneumonia in children aged under five years was 2.3 in malnourished children. This result corresponded to the study of Midtraponon's (30); she found that malnutrition in the child aged under five years did not have a statistically significant association with severe ARI. This study used the weight for age to measure the nutritional status of the child between 1-3 months before illness. This measurement is sensitive for a change of nutritional status but does not identify chronic malnutrition.

Treatment seeking behavior

Places where mothers sought for care for their child did not have a statistically significant association with severe of ARI in children. This study found that the place where public health workers were on duty was the major place where mothers sought care for their child (56.7%). This is the correct place for treatment for the child who is ill with ARI. 33.3% of mothers gave treatment to their child at home. Although these children did not get care from health workers but their mothers in this study were able to give appopriate care for their child when their child was ill with ARI. Only 10% of mothers

gave treatment to their child at the drug store near their home. These mothers believed that this is the place where treatment for a minor illness, and if the illness of their child did not improve, they would bring the child to a public health center.

Sleeping with other persons

The study found that sleeping in the same bed with more than two persons did not have statistically significant association with severity of ARI. This result did not correspond to the other studies: Midtrapanon (30) found that the child who was ill with ARI and slept in the same room with more than three persons had a higher risk of severe ARI than the child who did not (OR = 2.2). Muhe *et al* (48) found that sleeping in a crowded area had a significant association with pneumonia ($p < 0.05$). Dharmage *et al* (26) found that the child aged under five years who shared sleeping space had an increased risk of acute lower respiratory tract infections. However, the interview did not inquire about the size of the room, closing of windows while sleeping, and the circulation of air in the room.

CHAPTER VI

CONCLUSION

This study design was conceptualized as a case-control study. The purpose was to determine the maternal behaviors regarding ARI in children aged under five years. The target population was mothers who brought an ARI child aged under five years to the outpatient and inpatient departments of Sawanpracharuk Hospital, Maternal and Child Hospital and Maewong District Hospital, Nakhornsawan Province, during the period June 1999 to August 1999. Data were collected by using questionnaires to interview 240 mothers, these mothers were divided into two groups, one was the case group (severe ARI) 120 cases, the another was the control group (non-severe ARI) 120 cases.

The result of this study

1. Maternal demographic characteristics. The majority of mothers in the case and control groups were in the age group 20-29 years (49.2% and 46.7%, respectively), had primary educational level (47.5% and 58.3%, respectively), were married (86.7% and 89.2%, respectively). had a family income between 2,001-5,000 baht/month (29.2% and 41.7%, respectively). Maternal occupation in the case group was laborer (39.2%), in the control group was housewife (50.0%), the majority of cases and controls had a family of between 4-6 persons (65.0% and 58.3%, respectively), had 1 child under five years of age (67.5% in the case and 66.7% in the control group, respectively). The majority of mothers in the case and control groups were non-smokers (95.0% and 96.7%, respectively), and the majority of families in the case and control groups had at least one smoker (71.5% and 67.7%, respectively).

2. The child's characteristics and mothers' behavior before their child became ill. In case and control groups, the numbers of children in each age

group were similar. The majority of children in the case and control groups were in the age groups 3-12 months (29.2%), were male (52.5% and 54.2%, respectively), had a birth weight of ≥ 3,000 grams (50.8% and 50.0%, respectively), had received breast-feeding (52.5% and 89.2%, respectively). The majority of children who had received breast-feeding received it up to 4 months after birth (30.0% and 56.7%, respectively). The majority of children in the case group had completed immunization (80.0%), compared with 97.5% in the control group. Complete immunization at the proper age in the case and control groups was 78.1% and 95.7%, respectively. The majority of children in the case and control groups had normal nutritional status before this episode. The majority of mothers in the case and control groups had the same antenatal care (94.2% and 98.3%, respectively), and the antenatal care received was completed antenatal care (67.3% and 87.1%, respectively).

3. Mothers' behavior while their child was ill with ARI. The majority of mothers in the case and control groups gave sponge bath to the child when it was ill (80.0% and 94.2%, respectively), take pill orally before sponge bath (78.1% and 93.8%, respectively), and no exposed to blowing wind while doing this activity (69.8%, and 90.3%, respectively). The majority of mothers in the case group used one moist cloth (70.8%), and used for less than 30 minutes for this activity (71.1%). The majority of mothers in the control group used two moist cloths (77.0%), and used at least 30 minutes or more for this activity (81.4%). The majority of mothers in the case and control groups used drugs for illness before going to a hospital (93.3% and 90.8%, respectively), and in both groups knew the types of drug they used (92.5% and 90.0%, respectively), gave some kinds of treatment to their child at home when the child was ill with ARI (30.8% and 35.8%, respectively). The majority of children in the case group had used left over drugs (60.8%), whereas in the control group, the majority of children had not used them (65.8%). The majority of mothers in the case and control groups gave warm water to their child while the child was ill with ARI (57.5% and 86.7%, respectively). The main reason for giving warm water in the case and control groups were the

belief that warm water is clean (53.6% and 50.0%, respectively). The majority of mothers in the case and control groups did not swab the child's throat when the child was ill with ARI (56.7% and 90.0%, respectively). The main reason for those who swabbed the child's throat in case and control groups was to relieve sore throat (48.1% and 50.0%, respectively). The majority of children in the case group was not covered with warm cloths while sleeping (64.2%). In the control group, the majority of children were covered with warm cloths while sleeping (76.7%). The main reason for using warm cloths while sleeping in the case and control groups was to decrease severity (86.0% and 95.7%, respectively). The majority of children in case and control groups had not refrained from some essential foods (64.2 and 82.5%, respectively). The main reason for refraining from some essential foods in the case group was that it may increase severity (30.2%). On the other hand, the main reason for refraining from some essential foods in the control group was that it may endanger the child (38.1%). The majority of children in the case and control groups slept in the same bed with other persons (98.3% and 100%, respectively) and sleeping with < 2 persons in case and control groups were 71.7% and 79.2%, respectively.

4. Mothers' behavior after discharge from hospital. The majority of children in case and control groups completed their course of drugs (74.8% and 73.0%, respectively), did not receive follow-up by a physician (56.5% and 83.5%, respectively). The majority of mothers in the control group brought their child for follow-up (89.5%), but in the case group did not bring their child for the follow-up (54.0%). The majority of children in the case and control groups were healthy after discharge from hospital (60.9% and 89.5%, respectively).

5. The multivariate analysis of mothers' behavior related to severity of acute respiratory infection in children aged under five years was performed. The factors related to severe ARI are children whose throats were swabbed (OR = 6.58, 95% CI = 2.02-21.43), children with no breast-feeding or with

breast-feeding for less than four months (OR = 6.36, 95% CI = 2.26-17.92), children who refrained from some essential foods (OR = 3.77, 95% CI = 1.35 –10.54), children having some left over drugs (OR = 3.65, 95% CI = 1.44 – 9.26), and children who did not always drink warm water while they were ill (OR = 3.22, 95% CI = 1.10 – 9.43). The study found that children who received high humidity from long time sponge bath have a less risk of severe ARI than children who received high humidity from short time sponge bath.

RECOMMENDATIONS

The study found that some behaviors of mothers increased the risk of severe ARI. The recommendations for the mothers' behavior to protect their child against severe disease, there are:

1. Promotion of exclusive breast-feeding up to four months in children aged under five years.

2. Strengthening health education for mothers or caregivers with a child aged under five years about duration for sponge bath, refraining from swabbing the child's throat, continue feeding as usual if the child is able to eat or drink, refraining from using left over drugs especially antibiotic drug if necessary it should be taken as advised by physician and giving warm or clear water to the child who is ill with ARI.

RECOMMENDATION TO THE GOVERNMENT POLICY ON PHARMACEUTICAL PRODUCTS

In general practice, it is often found that the child's caretaker do swab the child's throat when the child had ARI. The mother (or caretaker) almost

always show the swab medication to her doctor and states that it is the production of Government Pharmaceutical Organization (GPO). The result of this study suggested that swabbing the throat independently increase the risk of severe ARI. Moreover, swabbing the throat, when not properly done could introduce some irritation, trauma and/ or germs, into the child's throat. The author thus would like to recommend that the GPO should terminate the production of throat swab medication and should make a recommendation to the mothers that they should not perform the throat swab in any case.

RECOMMENDATIONS FOR FURTHER STUDY

1. Community-based study for observation of the mothers' behavior increased the risk of severe ARI.
2. Comparison study on breast-feeding and severity of ARI in children aged under one year.
3. The above to be focused on the same community

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APPENDIX

QUESTIONNAIRE

Identification number.....

Place [ ] Sawanpracharuk Hospital

[ ] Maternal and Child Hospital

[ ] Maewong District Hospital

Department

[ ] outpatient [ ] inpatient

MATERNAL DEMOGRAPHIC CHARACTERISTICS.

1. Name.....
2. Address.....
3. Age.....years Religion.....
4. Educational level

   [ ] No formal education [ ] Primary

   [ ] Secondary [ ] Higher than secondary
5. Marital status

   [ ] Married [ ] Separated [ ] Widowed
6. Family income.....(baht/month)
7. Maternal occupation

   [ ] Housewife [ ] Agriculture

   [ ] Labour [ ] Trade

   [ ] Government services [ ] Other.....
8. Numbers in the family members.....
9. Numbers of children aged under five years in the family.....
10. Maternal smoking

    [ ] Yes [ ] No

11. Smoking in the family

[ ] Yes [ ] No

12. Numbers of smoker in the family.....

THE CHILD'S CHARACTERISTICS AND MOTHERS' BEHAVIOR BEFORE THEIR BECAME ILL.

13. The child's name.....

14. The first day of illness.....

15. The first day that was treated in this hospital.....

16. Sex

[ ] Male [ ] Female

17. Age years months days

18. Birth weight

[ ] Less than 2,000 grams [ ] 2,000-2,4999 grams

[ ] 2,500-2999 grams [ ] 3,000 grams or up

19. Breast feeding

[ ] Yes.....months [ ] No

20. Immunization

BCG (newborn)

[ ] Yes (age.....months) [ ] No

1st DTP

[ ] Yes (age.....months) [ ] No

2nd DTP

[ ] Yes (age.....months) [ ] No

3rd DTP

[ ] Yes (age.....months) [ ] No

4th DTP

[ ] Yes (age.....months) [ ] No

5th DTP

[ ] Yes (age.....years) [ ] No

1st OPV

[ ] Yes (age.....months) [ ] No

2nd OPV

[ ] Yes (age.....months) [ ] No

3rd OPV

[ ] Yes (age.....months) [ ] No

4th OPV

[ ] Yes (age.....months) [ ] No

5th OPV

[ ] Yes (age.....years) [ ] No

Measles

[ ] Yes (age.....months) [ ] No

1st Hepatitis B vaccine

[ ] Yes (age.....months) [ ] No

2nd Hepatitis B vaccine

[ ] Yes (age.....months) [ ] No

3rd Hepatitis B vaccine

[ ] Yes (age.....months) [ ] No

1st JE vaccine

[ ] Yes (age.....months) [ ] No

2nd JE vaccine

[ ] Yes (age.....months) [ ] No

the summary of immunization

[ ] Incomplete [ ] Complete

[ ] at proper age

[ ] not at proper age

21. The child's body weight before this illness.....kilograms (date...../...../.....)

For a researcher			
[ ] Normal	[ ] 1°	[ ] 2°	[ ] 3°

22. Maternal antenatal care

[ ] Yes [ ] No

From No. 22 if 'yes' the **receiving** of antenatal care was:

Gestational of less than 6 months

[ ] Yes [ ] No

Gestational between 6-7 months

[ ] Yes [ ] No

Gestational between 7-8 months

[ ] Yes [ ] No

Gestational over 9 months

[ ] Yes [ ] No

For a researcher

[ ] Complete ANC [ ] Incomplete ANC

MOTHERS' BEHAVIOR WHILE THEIR CHILD WERE ILL WITH ARI.

23. Do you sponge bath your child when they had high fever ?

[ ] Yes [ ] No

If 'yes' answer the question below (24-27).

24. Do you take pills orally such as paracetamol for relieving fever before sponge bath ?

[ ] Yes [ ] No

25. Do you use only one moist cloths for sponge bath ?

[ ] Yes [ ] No

26. Do you use at least 30 minutes for this activity ?

[ ] Yes [ ] No

27. Do you expose to blowing wind while doing this activity ?

[ ] Yes [ ] No

For a researcher

[ ] correct [ ] incorrect

28. Do you use drugs for illness before going to this hospital ?

[ ] Yes [ ] No

29. Do you know the types of drug you used ?

[ ] Yes [ ] No

If 'yes' what's type of drug ?

.....

.....

30. Place where seek for care the child.

[ ] Home [ ] Clinic

[ ] Health centre [ ] Hospital

[ ] Others.....

31. Do you use left over drugs ?

[ ] Yes [ ] No

If 'yes' what's type of drug ?

.....

.....

32. Do you give your child drank warm water when they were ill ?

[ ] Yes [ ] No

33. The reason of drinking warm water.

[ ] Relief illness [ ] Relief cough

[ ] Relief sore throat [ ] Others.....

34. Do you swab the child's throat ?

[ ] Yes [ ] No

If 'yes' what's type of drug ?

.....

.....

.....

.....

35. The reason of swabbing the child's throat.

[ ] Decrease severity [ ] Relief sore throat

[ ] Advised by adult [ ] Kill germs

[ ] Others.....

36. Do you cover the child with warm cloths while sleeping ?

[ ] Yes [ ] No

37. The reason of covering the child with warm cloths while sleeping.

[ ] Decrease severity [ ] Others.....

38. Do you give your child refrained from some foods ?

[ ] Yes [ ] No

If 'yes' what's type of food ?

.....

.....

39. The reason of refraining from some foods.

[ ] Increase severity [ ] Endanger the child

[ ] Advised by adult [ ] others.....

40. Do you keep your child sleeping with other persons in the same bed ?

[ ] Yes [ ] No

If 'yes' how many ?

[ ] 1 [ ] 2 [ ] 3, or up

MOTHERS' BEHAVIOR AFTER DISCHARGE FROM HOSPITAL.

Date...../...../.....

41. Do you give your child to complete course of drugs ?

[ ] Yes [ ] No

42. Do the child be appointed for follow-up by physician ?

[ ] Yes [ ] No

43. Do you take your child attending the follow-up ?

[ ] Yes [ ] No

44. Health status of the child.

[ ] Healthy

[ ] Recover illness but weakly

[ ] Continue illness

BIOGRAPHY

NAME	Mr. Boonlert Butchan
DATE OF BIRTH	16 April 1968
PLACE OF BIRTH	Kamphaengphet, Thailand
INSTITUTIONS ATTENDED	Sukhothai Thammathirat University, 1989-1992: Bachelor of Public Health (Public Health) Mahidol University, 1998-2000: Master of Science (Public Health), Major in Infectious Disease
POSITION & OFFICE	1991-Present, Yangsoong Public Health Centre, Khanuworaluksaburi District, Kamphaengphet Province, Thailand. Position: 1991-1997, Junior Public Health Worker 1997-Present, Health Technical Officer