FACTORS ASSOCIATED WITH THE OCCURRENCE OF ACUTE RESPIRATORY INFECTIONS IN CHILDREN FROM SIX MONTHS TO FIVE YEARS OF AGE IN TAPRAYA HOSPITAL, TAPRAYA DISTRICT (SAKAEO PROVINCE)

SVAY SOMANA

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ABSTRACT

Many children of less than five years of age die from acute respiratory infection, To develop preventive measures we need know the possible causes and factors related to the infections.

So in January and February of 2004 I undertook at communing hospital-based survey at Tapraya hospital, Tapraya district, Sakaeo province in order to identify those risk factors associated with acute respiratory infections among children of six months to five years of age, mothers of 251 children filled on my questionnaire, the prevalence of acute respiratory infection was 45%.

I found that younger children, those with history of wheezing, those whose family members had history of chronic respiratory infection and those whose mothers had less education or were less informed about acute respiratory infections had a higher risk of infection.

So intervention program should be developed and applied that are directed to improving the knowledge of mothers about acute respiratory infection, providing close care to children with wheezing history and younger age of children.

KEY WORDS : CHILDREN/A.R.I.

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LIST OF ABBREVIATIONS

ARI	:	Acute Respiratory Infections
ARIC	:	Acute Respiratory Infections Center
BCG	:	Baille Calmette Guerin Vaccine
CRD	:	Chronic Respiratory Diseases
DHF	:	Dengue Hemorrhagic Fever
DPT	:	Diphteria, Pertussis and Tetanus Vaccine
EPI	:	Expanded Program of Immunization
IMR	:	Infants Mortality Rate
IPD	:	In-patient Department
LBW	:	Low Birth Weight
MoH	:	Ministry of Health
MoPH	:	Ministry of Public Health
OPD	:	Out-patient Department
OPV	:	Oral Polio Vaccine
UNICEF	:	United Nation Children's Fun
WHO	:	World Health Organization

CHAPTER I
INTRODUCTION

1.1 Rationale and justification

1.1.1 Problem statement

Acute Respiratory Infections (A.R.I) is one of the leading causes of the morbidity and the mortality among the children in many developing countries. According to the estimates of the United Nation/WHO, 12.9 millions of children under five years died worldwide in 1990 and one third of these deaths (4.3 millions) were attributed to the A.R.I. (1).

The main causes of illness and death of children in developing countries are A.R.I, diarrheal diseases and malnutrition A.R.I. is still the leading causes of death in young children under five years (2).and among the various diseases, child is prone to, A.R.I. and diarrhea, rank first (3) WHO estimated that A.R.I. are responsible for 4 out of 15 millions, death that occurred, each year among children under five years (4). In 1994 reported that A.R.I, which caused about 3.4 million deaths annually in children under 5 years old, is currently the leading cause of childhood deaths and a frequent cause of morbidity. Its top positive is partly a reflection of the decrease in mortality from diarrhea and vaccine preventable disease in the last decade. Pneumonia is the principle cause of deaths from A.R.I. Risk factors for pneumonia are malnutrition, L.B.W, indoor air pollution and expose to cold (5).in 1995, A.R.I is still the first main cause of death among the children less than 5 years. In 1997, there were 10 million deaths under 5 years, 97% in developing countries and most of them due to infectious diseases such as pneumonia and diarrhea, combined with malnutrition.

From the Regional Health Forum also found that A.R.I and diarrhea diseases are among the top three killers of children in the world today especially in developing countries. About 10 million children died before they reach their fifth birthday; A.R.I (2.2 million) and diarrhea (1.48 million) together account for nearly half of these deaths (6).from the prospective community also indicated that the annual incidence of pneumonia in children under 5 years to be 2-4 % in developed countries and 10-20 % in developing countries. However, incidence exceeding 50% have been reached in settings with high prevalence of malnutrition. The most serious problem was that of high A.R.I mortality in young children in developing countries, mostly attributable to bacterial pneumonia. (7).A.R.I accounts for 30% all pediatric out patient attendance and 10-30% of all child admission to hospital in developing countries (8).

And four respiratory diseases are included in the E.P.I (measles, pertussis, and diphtheria and child-hood tuberculosis).These diseases are of universal importance in developing countries without immunization, virtually every child in developing countries suffered measles between age of 6 months and 3 years, which can lead to complications such as pneumonia. It was estimated that 15% of children in developing countries, acquired pertussis would die from its complications (E.P.I coverage survey in Thailand in 1990).

In Thailand the under 5-mortality rate due to pneumonia is the leading cause of death of all deaths in Siriraj hospital in 1995 and about 14% die in that (Siriraj hospital, annual Statistic report, 1995)

The government of Thailand with support of UNICEF and WHO set a target of 80% children to receive all E.P.I antigen of the first year of age and each year A.R.I contributed 25% of infant death show the leading causes of disease mortality rate under surveillance, Thailand, 1991. In some provinces of Thailand: Yasothorn province showed that the Pneumonia is the fourth leading cause of mortality in 1998(9) and Srakaeo province also found that the leading cause of morbidity for

outpatient in 2002 is the respiratory infections (source: Sakaeo Provincial Profile in 2002).

1.1.2 Risk factors of A.R.I.

According to the previous studies, the factors that increase the risk of A.R.I in developing countries: failure to breastfeed was accounted for 2.50 fold higher risk of death attributable to A.R.I than the children who have exclusive breastfed(10).although there is considerable evidence of an increased risk of respiratory infections associated with not breastfeeding from both developed and developing countries(11-13) there have been few reports of an increased risk of A.R.I deaths among non breastfed infants(14), malnutrition accounted for 6 million (15) has been associated with high A.R.I morbidity (16), indoor air pollution and socio-demographic factors such as large family size, low income, low level of education, poor housing and incomplete immunization. (17-18).

The child mortality is the world largest public health problem due to respiratory infections so it must be a priority goal of the health services in developing countries... If the child mortality cannot be reduced, then people would not accept the family planning to control growth rate, which is one of the constraints for developing countries. The importance factors for reducing the mortality from those diseases because of many episodes of A.R.I. can lead to death within 3-5 days so the easy and quick access to antibiotic therapy is useful. A.R.I. control program required that the caretakers should know when to seek care outside the home many deaths from A.R.I. occurred because they are brought to health care too late. For an effective case management program, the parents should know what the signs and symptoms of mild A.R.I. And care at home and must return to health services if the child does not get better. (9).

1.2 Research Questions:

What factors that associated with the occurrence of Acute Respiratory Infections in children from six months to five years?

1.3 Research Objective

1.3.1 General Objective

To identify the factors associated with the occurrence of A.R.I in children from six months to five years in Tapraya hospital (Sakaeo province).

1.3.2 Specific Objectives

1 To identify the occurrence of Acute Respiratory Infections in children from six months to five years.

2 To identify the hosts factors such as age, sex, immunization, nutrition, breastfeeding, birth weight and wheezing history of child and the occurrence of A.R.I

3 To identify the mothers factors: age, education, occupation, income and knowledge and the occurrence of A.R.I.

4 To identify the environmental factors: exposure to passive smoking, family size, number of children and chronic respiratory infections among family.

5 To examine the association between host factors, maternal factors and environmental factors and the occurrence of A.R.I.

1.4 Research Hypothesis

A: There is an association between host factors (age, nutrition sex, immunization, breastfeeding, birth weight) and the occurrence of A.R.I.

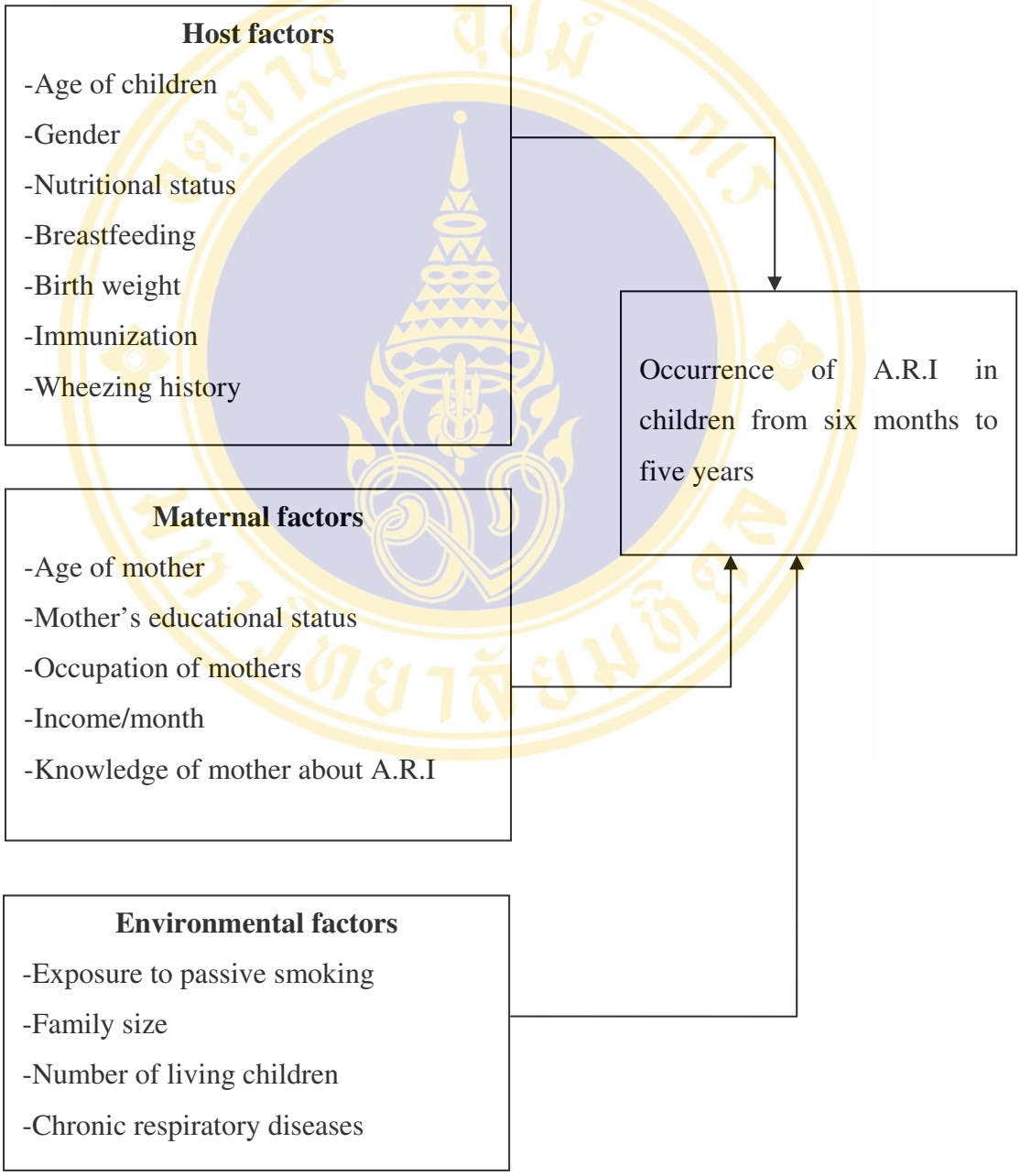
B: There is an association between environment factors (passive smoke, family size, number of children and chronic respiratory diseases) and the occurrence of A.R.I.

C: There is an association between maternal factors (mother's age, education, occupation and income and knowledge) and the occurrence of A.R.I.

1.5 Conceptual framework

The factors associated with the occurrence of A.R.I in children from six months to five years.

Independent variables **dependent variable**



1.6 Variable Operational Definitions

1.6.1 A.R.I

Episodes of acute symptoms and signs resulting from infections of any parts of the respiratory tract.

Classifications of A.R.I

Source WHO meeting of principal investigator of A.R.I studies in the Western pacific region.

-Mild A.R.I:

2 or more of the following symptoms must be present

-Clear discharge from nose

-Fever less than 3 days

-Cough without sputum

-Nasal congestion

-Moderate A.R.I

At least 1 of the following sign and symptom plus and 1 sign and symptom of mild case.

-Greenish nasal discharge from the nose

-Severe cough with vomiting

-Continuous cough

-Cough with sputum

-Earache and discharge

-Severe A.R.I

At least one of the following sign and symptom plus one sign and symptom of moderate A.R.I

-Mouth breathing

-Chest in drawing

-No A.R.I

The children, who don't have any episodes of signs and symptoms resulting from infections of any parts of the respiratory tract, were considered as no A.R.I.

1.6.2 Host factors:

Ages: it was classified as 6-24 months and 25-60 months.

Genders: referred to the male and female.

Nutritional statuses:

It was calculated by age with the proportion of weight and height according to the National Growth Standard of Thailand as normal or not normal by weight for age, height for age and weight for height (Division of Nutrition, MoPH, 1999).

Breastfeeding:

Referred to as which kind of milk the child has consumed within 6 months. It was classified as the following:

-Breastfeeding only

-Mixed feeding (breastfeeding and bottle feeding) and others food.

-Bottle feeding.

Birth weight of child

The weight of child when he/she was born. It will be classified as the following:

-Under 2500g. (Low birth weight)

-Equal or more than 2500g.

Immunization status:

Complete immunization:

When the children received all dose of immunization according to the following schedule and to the age of children were called the complete immunization:

-6-9 months received at least BCG, 2 doses of DPT and OPV.

-9-12 months received at least BCG, 3doses of DPT and OPV

-12-24 months received at least BCG, measles, 3 doses of DPT and OPV

-More than 24 months received at least BCG, measles and 4 doses of DPT and OPV.

Incomplete immunization: that means if the child misses any one of the above vaccination regarding their age.

Without immunization: if the child does not receive any immunization.

Wheezing history.

Referred to the child has a respiratory disease such as common cold or bronchitis or asthma and classify as Yes and No.

1.6.2 Maternal factors.

Ages of mothers

Referred to the age of the mother younger or older that has experienced to feed child. In this study it was classified as less than 25 years old and equal or more than 25 tears old according to the previous study in Bangkok(9).

Occupations of mothers

Divided into 2 groups: house wife and wife working outside such as government officer, trader, worker in private sector; and farmer.

Mother's education

According to the education system in Thailand: primary level includes 6 schooling years, secondary level includes other 6 years and university level includes at least 4 years for bachelor degree. In this study it was classified by educational years as the following: no school, primary school and secondary school and above.

Income/month

Referred to the total family income that they can earn per month and it is divided into 2 groups as less than 5000 Baht and more than 5000 Baht and at the same time, the sufficient of income will be asked as not enough and enough (can save and can't save).

Knowledge of mothers about A.R.I.

Referred to the awareness of understanding of correct information regarding the acute respiratory infections. (Signs and symptoms, transmission, risk factors and prevention). The knowledge will be divided into 2 groups as good and poor knowledge according to the score of knowledge. There are 13 questions, the correct answer is given 1 score and incorrect answer is given 0 score, the total score varied from 0 to 13. Good knowledge means the score 10 to 13 points and poor knowledge means the score less than 10.

1.6.3 Environmental factors:

Smoking:

Any member in the household who are currently smoking.

Family sizes

The number of people who were living in the same household. It was classified as follow:

-Less than 5 and equal or more than 5 family members. (9).

Numbers of children:

How many children that they have. In this study we grouped into 1-2 children and more than 2 children.

Chronic respiratory diseases of the family members (CRD).

Any members in the household have respiratory infections such as: asthma, allergic rhinitis (repeated cold) chronic bronchitis or tuberculosis.

1.7 Limitation of the Study

The study population refers only to the mothers who have children from 6 months to 5 years and come to well baby clinic, outpatient and inpatient in Tapraya hospital. The only constructed questionnaire will be interviewed of the mothers, who have the children from 6 months to 5 years, come to the hospital with/without A.R.I at OPD, IPD and well baby clinic through the trained nurses at that hospital.

CHAPTER II
LITERATURE REVIEW

2.1 Acute Respiratory Infections Problem.

Respiratory diseases as children mortality from the vaccine preventable diseases fall, the proportion of total deaths caused by A.R.I, including pneumonia, have been increasing (19). To reduce children morbidity and mortality in developing world WHO has developed a diagnostic and treatment algorithm that target the principal causes of deaths in children, which include A.R.I, malaria, measles, diarrhea and malnutrition (20).(Table 1).

Table 1 The mortality rate for children under five years in 1990.

Rank	Causes	Deaths
1	A.R.I/Pneumonia	25%
2	Diarrhea	23%
3	A.R.I/measles	5%
4	Malaria	5%
5	A.R.I/malaria	2%
6	Diarrhea/measles	2%
7	A.R.I/pertussis	2%
8	Measles	2%
9	Others	34%

Source WHO sixth Program Report in 1993.

According to WHO report on A.R.I in 1991: A.R.I, diarrhea and malnutrition are the leading causes of illness and death of children less than 5 years and approximately, 4.5 millions Deaths every year due to A.R.I. The majority is in developing countries. Pneumonia is the most serious infection of A.R.I; it is accounted for 80% of death in children under 5 years and also a leading cause for health service utilization in both developing and developed countries. They account for 20%-40% of child attending out patient clinic and 12%-35% of admission (WHO 1991).

The UN population division published a report on A.R.I indicated that 12.9 millions children under five years died in developing countries in 1990.33% of these deaths were due to A.R.I the other serious problem of A.R.I is widespread and unnecessary use of antibiotic in uncomplicated respiratory infections (A.R.I in South East Asia, WHO 1992).

Table 2 Main causes of deaths among children under five years in developing countries in 1995.

Ranks	**Diseases**	**Number of deaths (millions)**
1	A.R.I	2.1
2	Diarrhea	2.0
3	Measles	1.1
4	Malaria	0.7
5	Neonatal/prenatal	0.7
6	Malnutrition	0.3
7	Others	3.6

Source the World Health Report in 1998.

The world submit held in 1990, has to reduce the A.R.I mortality by one third by the year 2000. The WHO already has initiated A.R.I control program globally. The main objectives of that program:

To reduce the severity and mortality from pneumonia.

To reduce inappropriate use of antibiotics.

To reduce the severity of complications from upper respiratory infections.

(WHO SEA 1992).

And more than 12 millions of children under five years died each year in developing countries, in that amount they showed that one third of deaths or more than 10,000 deaths a day were the A.R.I and mostly due to pneumonia (16-21-22). The annual incidence of A.R.I is much higher in developing countries (Table3) and the mortality from pneumonia for children in developing countries are 30-70 times higher than in developed countries.

Table 3 Annual incidence of Pneumonia in the World.

No	Countries	Age in years	Annual incidence of pneumonia (‰)
1	Chapel Hill, USA	<5	3.6
2	Seattle, USA	<5	3.0
3	Bangkok, Thailand	<5	7.0
4	Gadchiorlis, India	<5	13.0
5	Haryana, India	<1(LBW)	40.0
6	Maragna, Kenya	<5	18.0
7	Papua New Guinea	<1	25.0
8	Gilgit, Pakistan	<5	30.0

Source WHO in 1996, A.R.I for Medical Students.

In 1995, WHO reported that A.R.I was still the first main cause of death in children under five years. There were 10 millions deaths among children under five years, 97% of them was in developing countries and mostly due to infectious diseases such as pneumonia and diarrhea, combined with malnutrition in 1997.

Each year, more than 11 million children die from effects of diseases and inadequate nutrition. In some countries, more than one in five children die before they reach their fifth birthday, and many of those who do survive are unable to grow and develop to their full potential. Seven out of ten of childhood deaths in developing countries can be attributed to just five main causes, or often to a combination of them: pneumonia, diarrhea, measles, malaria and malnutrition. A.R.I, mostly in the form of pneumonia, is the leading cause of death in children under five years, killing over 2 million children annually and up to 40% of children seen in health clinics are suffering from A.R.I and many deaths attributed to the others causes are, in fact, hidden A.R.I deaths.(23).

2.2 A.R.I. In South East Asia

A.R.I are responsible for one quarter to one third of deaths (WHO, Nov 1991) the higher incidence of pneumonia is attributed to higher prevalence of risk factors such as malnutrition, parental smoking, indoor air pollution and crowded environment. Besides the high mortality, A.R.I constitutes a major burden on the limited health resources accounting for up to 60% of all out patients' visits and 15%-30% of hospital admissions.

According to the CDHS in 2000 survey found that the infants' mortality rate is still so high between Cambodia and Laos out of the 7 countries that why they can not reach their fifth birthday.(24)(Table 4).

2.2.1 A.R.I in Cambodia:

kingdom of Cambodia occupies 181035 sq km.it is located in the southwest of Indochina, bordered by Thailand to the west, by the Laos PDR to the north, by Socialist Republic of Viet Nam to the south and by the Gulf of Thailand to the south. Cambodia is still so high for infants mortality rate (76 per 1000 live birth) and under 5 mortality rate (99.6 per 1000 live birth) in 2000. (Source: Bucen-IDB, 2002).

According to the ministry of health in 1996 indicated that under five mortality rate of 181/1000 live birth. The leading causes of deaths for children less than five years are: A.R.I, diarrhea, malaria, measles and DHS.A.R.I and diarrhea accounted for 63% of total outpatient consultations and infant's deaths is estimated at between 90-115/1000 live birth compared with the regional average of 42/1000 live births. Hospital data showed that the leading causes of mortality in 1996 to have been malaria 20%, A.R.I 14.6%, TB 6% and others. For the outpatient consultations at hospital, A.R.I 23.80%, diarrhea 9.80%, malaria 6.5 %(source: Country Health Information Profile, country Situation and Trends, 2003). In flood 2000, the A.R.I was the first rank of morbidity (32%) in Cambodia (Table 5).

Table 4 Infant's mortality rate in the South East Asia countries.

Rank	Countries	Deaths per 1000 live birth
1	Laos	104
2	Cambodia	95
3	Indonesia	46
4	Viet nam	30
5	Philippine	26
6	Thailand	20
7	Malaysia	8

Source PRB 2002 World Population Database

Table 5 The five leading causes of morbidity during flood disaster in Cambodia, 2000

Rank	Diseases	% of morbidity
1	A.R.I	32
2	Diarrhea	22
3	Skin infections	14.50
4	Eye infections	4.30
5	Malaria	0.50
6	Others	26.70

Source Report of the Workshop on Curriculum Planning for Health and Disaster Preparedness, Jan-Feb/2001.

2.2.2 A.R.I. In Thailand

Data from the national health statistics shows that the A.R.I accounted for about 25% of all death in children less than 5 years in 1990. Although most of the A.R.I is not reportable morbidity, the problem has become evident that 30%-50% of children visiting general hospital are affected with A.R.I and about 10% of them are hospitals admission. From the report of Grand P.J found that A.R.I. was responsible for 30%-40% of outpatient department consultations, A.R.I contributed about 5% of infant deaths and ranked the first cause of deaths in children under five years (25). On the other hand A.R.I is the primary cause of hospitalization for A.R.I before bronchitis and laryngitis (26) and until 1994 the A.R.I deaths was still the first rank (Table 6-7).

Infant mortality rate (IMR) in Thailand is 26/1000, although it's about 40/1000 in some areas of the country. The case fatality rate varies between 5 and 10% for A.R.I (6). From the survey of A.R.I.C project in Thailand in 1990 from the 16 rural districts revealed that the morbidity rate of pneumonia was 4.7% per year, which is between the morbidity rate in developing countries 7-18% and developed countries 3-4%. The case fatality rate of pneumonia was 1.4%. In 1997, A.R.I still ranks the 3rd leading cause of morbidity rate but there are some differences in the provinces in Thailand. (Table 8-10).

Table 6 The leading causes of mortality of under five children under surveillance in 1991, Thailand.

Ranks	Diseases	Cases	Mortality
1	Pneumonia	98338	1090
2	Diarrhea	792513	473
3	Malaria	88267	325
4	Tuberculosis	21107	262
5	Suicide by liquid substance	2946	170
6	Rabies	171	171
7	DHS	43511	137
8	Encephalitis	959	108
9	Tetanus	706	90

Source Annual Epidemiological surveillance in 1991(Thailand).

Table 7 No of cases and death of under five children due to under surveillance diseases

Diseases/year	1992		1993		1994	
	Cases	Death	Cases	Death	Cases	Death
A.R.I	92689	963	131460	1176	48353	436
Acute diarrhea	834953	388	868338	411	460361	220
Tuberculosis	21531	234	21085	272	6834	60
Malaria	79443	276	70128	252	23151	68
DHF	42809	138	67017	222		

Source Ministry of Public Health, Thailand, 1994

Table 8 Ten leading causes of morbidity of under five children under surveillance in 1997

Diseases	Rate /100000 population
Acute diarrhea	177.48
Pyrexia of unknown origin	402.90
A.R.I	250.48
H conjunctivitis	191.29
Food poisoning	170.73
DHF	166.99
Malaria	97.50
Dysentery	84.74
Influenza	82.78
Chickenpox	81.33

Source Health Information Division, MOPH, 1997.

Table 9 Ten leading causes of mortality of all age group in Yasothorn Province in 1998.

Ranks	Diseases	Rate/100,000 population
1	Cancer	76.27
2	Heart diseases	69.86
3	Transport accidents	15.03
4	Pneumonia	14.30
5	HIV/AIDS	13.38
6	Liver and Pancreas diseases	11.73
7	Diabetes mellitus	11.73
8	Diseases of kidney	8.06
9	Tuberculosis	5.31
10	Septicemia	4.76

Source Yasothorn Provincial Health Data Profile in 1998.

2.2.3 A.R.I control program in Thailand

The A.R.I control program was initiated in Thailand from 1987 following the WHO guidelines (MOPH, 1990). The objectives of the program:

-To reduce the mortality and morbidity from A.R.I in under 5 years children.

-To reduce the severity of morbidity from A.R.I.

-To reduce sequel of A.R.I.

-To train people how to use drugs.

-To train people on self care and develop skills in order to prevent common cold progressing to pneumonia (MOPH, Thailand, 1992)

The program is a national policy and health workers at levels are being trained in case management of A.R.I. Large-scale training has been undertaken with its completion in 57 provinces during 1990: 19 program managers, 76 facilitators, 465 health workers and 17500 volunteers were trained.

In 1991, program managers from 53 provinces, 774 facilitators, 3576 health workers and 18279 volunteers were trained. In addition an orientation on standard care management was given to 2200 people.

In 1992, it is completed the training of 1060 districts levels facilitators, 53 consultants, 5472 health workers and 7800 volunteers.

Table 10 The leading causes of morbidity for outpatient in 2002.

Diseases	**Number**	**Rate/100,000 pop.**
1 Diseases of respiratory system	283,470	52,581
2 Diseases of digestive system	143,473	26,613
3 Diseases of musculosketal and connective tissue.	94,149	17,464
4 Diseases of the circulatory system	67,045	12,436
5 Infectious and parasitic diseases	63,736	11,823

Source Sakaeo Provincial Health Data Profile in 2002

A national A.R.I seminar is organized every two years to orient the pediatricians. Mothers are also being taught how to differentiate between common cold and pneumonia, recognizing the warning signs of pneumonia and follow up step and be taken at home to prevent mild illness turning serious (WHO, SEA, 1993).

2.3 Epidemiological Aspects of A.R.I:

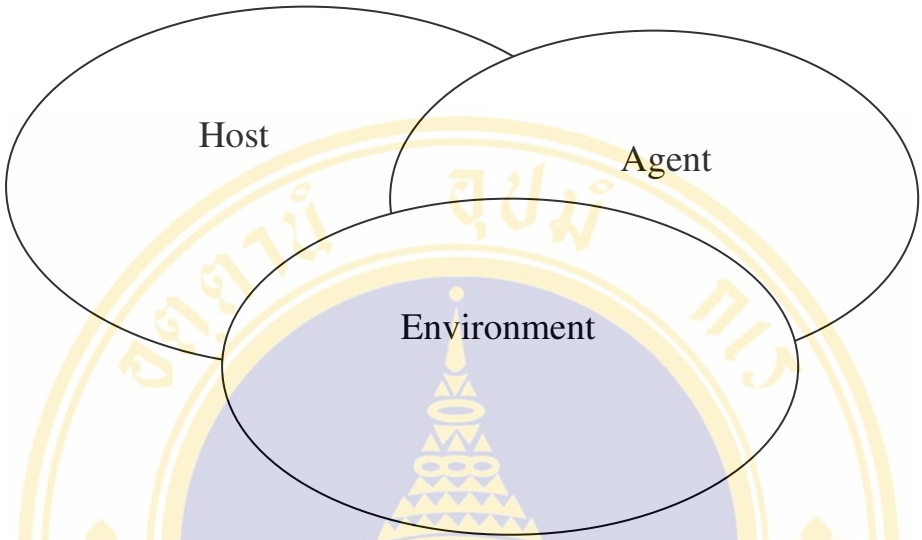


Figure 1 : A.R.I is the result of interaction between 3 factors:

Etiologic agent of A.R.I

Accurate data regarding bacterial and viral etiologies for A.R.I in infants and childhood are lacking because of the difficulty in making microbial diagnosis.

In developed countries, viruses are the predominant etiological agent of A.R.I; the majority of these diseases are benign and self limiting. The most frequent viral infections of lower respiratory infections are (27-29)

-Respiratory syncytial virus (RSV)

-Adenovirus

-Para influenza

-Influenza A and B

-Cytomegalovirus

In developing countries: the bacteria as primary or secondary invaders of the respiratory tract seen to be very prevalent. Many studies indicated that bacterial pneumonia is one of the most common causes of deaths from A.R.I, hemophilus influenza, streptococcus pneumonia and staphylococcus aureus are among the frequent etiologic agent of bacterial A.R.I. The others possible important causes are: Chlamydia trachomatis, mycoplasma pneumonia, mycobacterium tuberculosis, urea plasma urealyticum and pneumocystis carinii seen in children with immunodeficiency

Common causes of pneumonia: for infants:

+Viruses: Para influenza, influenza, adenovirus, RSV, cytomegalovirus.

+Bacteria: streptococcus pneumonia, hemophilus influenza.

+Atypical organisms: Chlamydia trachomatis and urea plasma urealyticum. For young children:

+Viruses: Para influenza, influenza, adenovirus and RSV.

+Bacterial: pneumococcus and mycobacterium tuberculosis.

+Atypical organisms: mycoplasma pneumonia.

2.4 Risk factors of A.R.I:

Socio-demographic, environmental and host variable may associate with the occurrence of A.R.I. Many studies indicated that the main factors associated with the A.R.I morbidity and mortality including age, gender, incomplete immunization, malnutrition, lack of breastfeeding, low birth weight, antecedent of respiratory diseases, low socio-economic status, passive smoking, family size, family's history of respiratory infections and the knowledge of mother(19).

Age of child:

A.R.I incidence is greatest among infants under 1 year and decreases steadily with age during childhood. The fatality rate due to A.R.I is higher in infants-the younger the child, the higher the risk (30).according to HE HUI in 2000 found that the risk of pneumonia among younger age group was 8.31 times(95%CI: 2.83-24.41) higher than the older age group, the result was highly significant(p-<0.001).(8).

Gender:

There is slight difference between boys and girls in association with A.R.I and it is more common that the symptoms are more severe in boys. (30).

Immunization:

Incomplete immunization is the major risk factors for producing A.R.I in children. Therefore immunization against diphtheria, pertussis, measles and child-hood tuberculosis must be strengthening and should have very high priority for any country which addressing the A.R.I problem since these conditions contribute heavily to child-hood morbidity and mortality (31). (Joint report on control of A.R.I in children UNICEF/WHO 1985).

Measles, pertussis, BCG vaccines and diphtheria toxoid are the effective preventive measures of A.R.I in children under five years. Therefore immunization against those four vaccines must be strengthening and should have very high priority for any countries which addressing the A.R.I problem since theses conditions contribute heavily to childhood morbidity and mortality, incomplete immunization is the major risk factors for producing A.R.I. (Joint report on control of A.R.I in children UNICEF/WHO 1985).

There is an increase risk in area where coverage with diphtheria, pertussis and tetanus (DPT) and measles vaccines are low; the frequency of pneumonia in children could be reduced by 10-20% through immunization (32).HE HUI found that in 2000 children who do not complete their vaccination schedule for their age were 11.29 times (95% CI: 2.44-52.38) more likely to get pneumonia than those who have completed immunization with highly significant (P-0.001) (8).

Malnutrition:

Although malnutrition is rarely listed as the direct cause, it contributes to about half of all deaths of children so lack of access to food is not the only cause of malnutrition, poor feeding practices and infections, or a combination of the two, are both major factors. (33). Malnutrition may increase the risk of pneumonia 3-17 times (95% CI 1.35-7.44) more likely to become ill than normal nutritional children. (9). And from the previous study found that malnutrition in children under five years were associated with A.R.I, even after adjusting for potential confounders(odds ratio:2.03; confidence interval: 1.20-2.43)(34).

Breastfeeding:

Breastfeeding is an important source of passive immunity that protects infants from respiratory infections. It is between 6 months and 24 months, the transition between exclusive breastfeeding and sharing fully in the family diet, that children are most at risk of getting ill. The special important of breastfeeding: a modest increase in breastfeeding rate could prevent up to 10% of all deaths of children under 5 years when the mothers breastfeed exclusively during at least 4 months and if possible, 6 months of life, there is a dramatic decrease in episodes of respiratory infections or diarrhea(33).

Low birth weight:

L.B.W was approximately 50% greater risk of pneumonia compared with the normal and may contribute to pneumonia through the decrease immune response of L.B.W infants (35) and through impaired lung function due to reduction of diameters of major airways or an obstruction of peripheral airways (36). One study found that L.B.W had 6.77 times (95% CI 1.42-32.37) of getting pneumonia compared to the normal with significant (P-0.005). (9).

Wheezing history:

There was an increases risk of pneumonia among children who had previously suffered from episodes of wheezing and indicated that there was 3.26 times (95%CI: 1.21-8.80) more likely to get pneumonia than those who had never get wheezing with significant (P-0.02). (9).

Active smoking and crowding:

The association between housing and disease are often overlooked. The people living in overcrowded have high risk of many diseases, including respiratory infections. (9).according to WHO, indoor air pollution was the fourth among the risk to human health in developing countries and ranks higher still in India (3 rd ranks), just below malnutrition. Studies yield an estimated that range of 400,000-2 million premature deaths annually attributive to indoor air pollution in India with the majority of deaths occurring in children under five years due to A.R.I(pneumonia)(37). HE HUI found that children who had smoking parent were 4.29 times (95% CI: 1.21-15.13) at risk of pneumonia with those who did not have smoking parent with statistical significant (P-0.023). (9).

Chronic respiratory diseases of family:

The presence of chronic respiratory tract infections was found for twice more than group who don't have. These results were expected from the mechanisms of pathogen transmission (38).

Age of mother:

Age of mother is important related to the occurrence of A.R.I. The risk of pneumonia among the younger mother (18-24 Y) increased to 4.48 times (95%CI: 1.68-11.81) compared with the older mothers (>24 years). (9).

Knowledge of mother about A.R.I:

According to the prevention and control program (WHO/UNICEF Joint statement, 1985), mother should have knowledge about A.R.I and its management to decrease the morbidity and mortality of A.R.I for the children. The mothers with knowledge and right action about A.R.I are very important to reduce the occurrence of A.R.I because mothers are the one, who have close contact and look after their children when they get sick. And about 43% mothers had good knowledge on A.R.I, 43.3% of them had fair knowledge and 16.8% mothers showed poor knowledge. The knowledge of mothers had a statistically significant association with the occurrence of A.R.I (18).

Factors related to deaths of children from A.R.I.

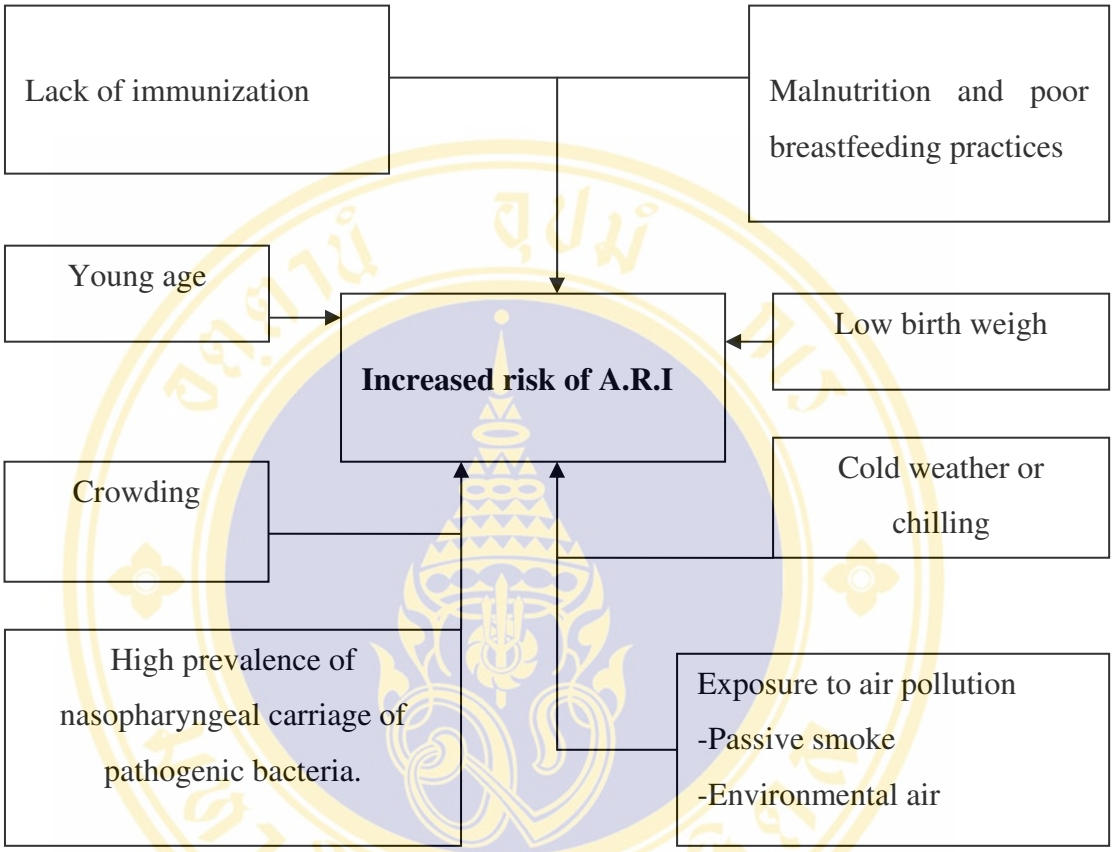


Figure 2: Risk factors for deaths from A.R.I

Source Report of the workshop on curriculum planning for health and disaster preparedness prepared by national institute of public health (January-February/2001, Cambodia)

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research design

The research design in this topic was cross-sectional survey on the factors associated with the occurrence of ARI in children from 6 months to 5 years who attend Tapraya hospital with or without ARI at well baby clinic, OPD and IPD and the data was collected by interviewing the mothers by constructed questionnaire through the trained nurses.

3.2 Study population

The target population of this study was children aged from 6 months to 5 years attending the hospital with or without ARI. The children with respirator's history of diseases within one month will be excluded.

3.3 Sample size and Sampling frame

The sample size was selected for the mothers who have the children from 6 months to 5 years attending the hospital with or without ARI. By the following formula:

$$n = \frac{Z^2{}_{\alpha/2} P(1-P)}{d^2}$$

With n: sample size required

Z: reliability coefficient base on the level of confidence here 0.05 and $Z^2{}_{\alpha/2} = (1.96)^2$

P: prevalence of ARI in 2003 got from the director of Tapraya hospital (0.19).

d: specific difference between our prevalence and the true value, here we assign as 0.05.

$$n = \frac{(1.96)^2 \times 0.19 \times 0.81}{(0.05)^2}$$

$$=236 +10\%$$

Thus total sample sizes required are 250

3.4 Research Instruments

The instruments used for data collection was a structured questionnaire which covered potential risk factors for individual interviewed by trained nurses from that hospital. The questionnaire were prepared and translated into Thai language

Before data collection, pre-testing was carried out at the same hospital to confirm the reliability and validity of questionnaire. The reliability of knowledge part equal to 0.61.

The questionnaires consist of five parts:

Part I: information of host factors (8 questions): age of child, gender, episodes of A.R.I, vaccination, nutritional status, breastfeeding, birth weight and wheezing history,

Part II: The occurrence of A.R.I of children within one month (4 questions).

Part III: Maternal factors such as age of mothers, mother's educational status, occupation of mothers and monthly family income and sufficient (5 questions).

Part IV: Environmental factors as exposure to passive smoking (smoking persons, number of smokers and smoking place) family size, chronic respiratory diseases among the family group and number of living children (6 questions).

Part V: The knowledge of A.R.I of the mothers includes transmission and evolution, signs and symptoms, risk factors of ARI and preventions of A.R.I (13 questions).

3.5 Data collection

Three trained interviewers carried out the data collection. In the form of hospital visit interview. They were given one day training in order to understand technique of interviewing and the meaning of questions.

3.6 Data analysis and Statistical analysis

After the completion of data collection, editing and coding was done. Then the collected data was verified and analyzed by the computer divided into two parts as descriptive analysis; frequency and percentage (mean median, standard deviation, minimum and maximum) and chi-square test and P-value to identify the association between independent variable and occurrence of A.R.I.

The scoring of knowledge was given as <1> for correct answer and <0> for false or do not know. The total scores from the correct answers were divided into two parts as good and poor knowledge.

-Good knowledge: equal or more than 80% of total scores on knowledge questions (knowledge scores≥10).

-Poor knowledge less than 80% of total scores on knowledge questions (knowledge scores < 10).

CHAPTER IV
RESULTS

The study was conducted between January 12 through February 12, 2004 at the Tapraya hospital (Tapraya district), Sakaeo province. The sample of the study were interviewed 250 mothers who have children from six months to five years olds, come to the hospital at the outpatient, inpatient and well baby clinic department. The mothers were interviewed by using structured questionnaire and by the trained nurses for this interview. The purpose of the study is to identify the factors associated with the occurrence of A.R.I. such as host factors, maternal factors and environmental factors.

In order to analyze various characteristics of the study, descriptive statistics and chi-square were applied. The results were presented in two parts:

Part one: Descriptive information of the study such as:

1. The occurrence of A.R.I
2. Host factors.
3. Maternal factors
4. Environmental factors

Part two: Analytic information of the study presented as following:

1-The association between host factors and occurrence of A.R.I by chi-square and P-value analysis.

2-The association between maternal factors and occurrence of A.R.I by Chi-square and P-value analysis.

3-The association between environmental factors and occurrence of A.R.I with corresponding chi-square and P-value.

Part one Descriptive analysis.

4.1 Number and percentage of occurrence of A.R.I

4.1.1 Episode of A.R.I. within one month

Table 11 showed that 55.38% had no episode of A.R.I., 26.90% had one episode of A.R.I., 9.96% had 2 episodes of A.R.I. and 3 episodes of A.R.I. was 6.37% while 1.99% was 4 episodes of A.R.I.

4.1.2 Occurrence of A.R.I.

The occurrence of A.R.I., in Table 11 showed that 55.38% had no A.R.I, 19.52% had moderate A.R.I, and 16.33% was mild while 8.76% had severe A.R.I.

Table 11 Number and percentage of the occurrence of A.R.I and episode of A.R.I

Variables	Frequency, n=251	Percentage, %
Occurrence of A.R.I.		
Episodes within 1 months		
No	139	55.38
Yes	112	44.62
1 Time	66	26.29
2 Times	25	9.96
3 Times	16	6.37
4 Times	5	1.99
A.R.I.		
No A.R.I	139	55.38
Mild A.R.I	41	16.33
Moderate A.R.I	49	19.52
Severe A.R.I	22	8.76

4.2 Number and percentage of host factors.

The child's characteristics in this study were the age of child, gender, nutritional status, breastfeeding within six months and at present, birth weight and immunization as shown in the following Table.

4.2.1 Age of children:

Regarding age of children Table 12 showed that young children aged from 6 months to 24 months were 50.60% while 49.40% of children were more than 25 months ranging from 25-59 months. Mean age of children was 27.70, minimum age was 6 months, and standard deviation was 15.00, while maximum age was 59 months.

4.2.2 Gender

Table 12 indicated also the gender was similar, 51.39% were female while 48.61% were male.

Table 12 Number and percentage of age and gender of child.

Variables (Host factors)	**Frequency n=251**	**Percentage %**
Age of child		
6-24 months	127	50.60
25-59 months	124	49.40
Mean=27.70 SD=15.00 Min=6 Max=59		
Gender		
Male	122	48.61
Female	129	51.39

4.2.3 Nutritional status

Weight for age: Table 13 showed that 78.49% of children were normal weight, 11.95 % were overweight and 9.56% were under weight.

Height for age: Table 13 showed that 66.93% of children were normal, 24.30% were tall while 8.76% were short.

Weight for height: Table 13 below indicated that 65.34% of children were normal, 27.49% were thin while 7.17% were obese.

Table 13 Number and percentage of nutritional status of child by weight for age height for age and weight for height.

Variables	Frequency n=251	Percentage %
Nutritional status		
Weight for age		
Under weight	24	9.56
Normal weight	197	78.49
Over weight	30	11.95
Height for age		
Short	22	8.76
Normal	168	66.93
Tall	61	24.30
Weight for Height		
Thin	69	27.49
Normal	164	65.34
Obese	18	7.17

4.2.4 Breastfeeding within 6 months

Table 14 showed that 33.86% of children were bottle-feeding only, 21.91% were breast feeding and 18.33% were mixed feeding, while 25.90% were others milk intake (UHT).

4.2.5 Breastfeeding at present

About breastfeeding at present Table 14 revealed that 38.65% of children were bottle-feeding only, 9.56% were breastfeeding only 4.38% were mixed while 47.41% were others intake (U.H.T. milk). In Table 1 (in appendix) showed that children aged from 6 months to 12 months (50.00%), from 13 months to 24 months (45.83%), while the age from 25 months to 36 months (4.17%), still receive the breastfeeding. So breastfeeding is still very important for young children.

Table 14 Number and percentage of breastfeeding within 6 months and at present.

Variables	**Frequency n=251**	**Percentage %**
Milk intake		
Within 6 months		
Breastfeeding only	55	21.91
Bottle feeding only	85	33.86
Mixed feeding	46	18.33
Others	65	25.90
At present		
Breastfeeding only	24	9.56
Bottle feeding only	97	38.65
Mixed feeding	11	4.38
Others	119	47.41

4.2.6 Birth weight

In Table 15 showed that the majority of children, 94.82% were normal weight and 5.18% were low birth weight(less than 2500g). The mean of birth weight was 3068; while minimum was 1900, maximum was 5000g, it was only 1 case, who had 5000g of birth weight, confirmed by nurse who interviewed.

4.2.7 Immunization

Regarding immunization of children, Table 15 showed that the majority of children got completely immunization 95.62% while 4.38% were incomplete immunization.

4.2.8 Wheezing history

In Table 15 showed the majority of children did not have wheezing history (85.26%) while 14.74% had wheezing history.

Table 15 Number and percentage of birth weight, immunization and wheezing history.

Variables	Frequency, n=251		Percentage
Birth weight			
1900-2499	13		5.18
2500-5000	238		94.82
Mean=3068	SD=420.30	Min=1900	Max=5000
Immunization			
Incomplete by age	11		4.38
Complete by age	240		95.62
Wheezing history			
No	214		85.26
Yes	37		14.74

4.3 Number and percentage of maternal factors.

The maternal information that included in this study was the age of mother, occupation, education, family income and knowledge of mother as shown in the following Table.

4.3.1 Age of mothers

Regarding age of mother Table 16 showed that the majority of mothers were old mothers aged more than 25 years (82.07%) while 17.93% were young mother ranging from 18-24 years. Median age of mothers 30, minimum age was 18 and maximum age was 58 years.

4.3.2 Occupation of mother

In Table 16 showed that 30.28% were farmers, 27.09% were workers, 21.91% were housewife while government officer and traders were 10.76% and 9.96% respectively.

4.3.3 Education level of mothers

Table 16 showed the education of mothers 47.01% was attended primary school, 21.91% was secondary school while 16.33%, 9.16% and 5.58% were high school, university and no schooling respectively.

4.3.4 Monthly family income

Regarding the family income Table 16 showed that the majority of incomes were 54.98% more than 5000 Baht while 45.02% were less than 5000 Baht. The mean of income was 6600, minimum income was 1000 and maximum income was 30000 Baht.

And most of them 42.63% did not have enough income, while 36.65% and 20.72% had enough income with no saving or with saving respectively.

Table 16 Number and percentage of age of mothers, occupation, education and family income.

Variables	Frequency n=251	Percentage %
Age of mothers		
Less than 25	45	17.93
Equal/more than 25	206	82.07
Mean=30.40 SD=6.25	Min=18	Max=58
Occupation		
House wife	55	21.91
Farmer	76	30.28
Worker	68	27.09
Trader	25	9.96
Government officer	27	10.76
Education level of mothers		
No schooling	14	5.58
Primary school	118	47.01
Secondary school	55	21.91
High school	41	16.33
University	23	9.16
Income per month		
Less than 5000	113	45.02
Equal/more than 5000	138	54.98
Mean=6600 SD=5100	Min=1000	Max=30000
Sufficient of income		
Enough (can save)	52	20.72
Enough(can't save)	92	36.65
Not enough	107	42.63

4.3.5 Knowledge on A.R.I

In Table 17 revealed that 58.17 % of mothers had poor knowledge, while 41.83% had good knowledge about A.R.I. the total score was 13, maximum score was 13 while minimum score was 0 and the mean score was 8.64.

Regarding the knowledge of mother about transmission of A.R.I., the majority of them 88.45% gave correct answer (in Table 3 in appendix)

The results showed also that most of them 66.14% understand the signs and symptoms of A.R.I. meant correct answer (see in Table 3 in appendix).

Risk factors on the child living in overcrowding house has less chance of getting A.R.I, 39.89% gave correct answer while on measles is a normal event for every child and need not to be counted as an illness, 38.65% gave correct answer as shown in Table 3 in appendix meant that they still misunderstood.

The question on separate child from common cold's patient can prevent him/her from A.R.I, 76.89% gave correct answer, complete vaccination can prevent him/her from A.R.I, 76.89% gave correct answer while breastfeeding at least 6 months can prevent him/her from A.R.I gave 71.71% correct answer.

Table 17 The level of knowledge of mothers about A.R.I.

Knowledge level	**Frequency n=251**	**Percentage %**
Good knowledge (10-13)	105	41.83
Poor knowledge (0-9)	146	58.17
Mean=8.64 SD=2.48	Min=0	Max=13

4.4 Number and percentage of environmental factors.

4.4.1 Number of smokers

Table 18 indicated the half of smokers 52.19% was 1 persons, non smokers was 40.24%, and 7.17%, 0.40% was 2 and 3 people respectively. The mean numbers of smokers was 0.67 and minimum was 00 while maximum was 3.

And the majority of smokers 42.6288% was fathers, 17.1312% was the others such as grand father and uncle. Most of them smoked both in and outside the house was 43.82%, 14.74% was outside the house and 1.20% was inside the house.

Table 18 Number and percentage of smokers.

Variables	Frequency, n=251	Percentage, %
Numbers of smokers		
No	101	40.24
Yes	150	59.76
1	131	52.19
2	18	7.17
3	1	0.40
Mean=0.67 SD=0.62	Min=00	Max=3
Smoking person		
No	101	40.24
Yes	150	59.76
Fathers	107	42.62
Others	43	17.13

Table 18 (cont)

Variables	Frequency n=251	Percentage %
Where they smoke		
No	101	40.24
Yes	150	59.76
In the house	3	1.20
Outside the house	37	14.74
Both in and out of the house	110	43.82

4.4.2 Number of family members

Table 19 showed most of them had family member ranging from 2-4 persons was 57.37% and more than 5 members was 42.63%. The mean of numbers was 4.52 and minimum was 2 while maximum was 13.

4.4.3 Number of living children

Table 19 showed that 41.83% of mothers have 2 children, while those who have 1, 3, 4, 5 children were 36.25%, 14.74%, 6.77% and 0.40% respectively. Mean living child was 1.93 and minimum was 1 while maximum was 5.

4.4.4 Chronic respiratory diseases

Table 19 showed that the majority of them (93.23%) had no diseases, only 5.18% had asthma and 0.80%, 0.80% had bronchitis and tuberculosis respectively.

Table 19 Number and percentage of family size, number of living children and chronic respiratory diseases.

Variables	Frequency n=251	Percentage %
Numbers of family members		
2-4	144	57.37
5 and more	107	42.63
Mean=4.52 SD=1.40 Min=2 Max=13		
Number of living children		
1	91	36.25
2	105	41.83
3	37	14.74
4	17	6.77
5	1	0.40
Mean=1.93 SD=0.90 Min=1 Max=5		
Chronic respiratory diseases		
No	234	93.23
Yes	17	6.77
Asthma	13	5.18
Bronchitis	2	0.80
TB	2	0.80

Part two Analytic result of the study

4.5 Analysis on the association between host factors and occurrence of A.R.I with corresponding chi-square.

4.5.1 Age of child and occurrence of A.R.I

For the statistical analysis, age of child was divided into two groups as 6 to 24 months and 25 to 60 months. The results showed that there is statistical association between the age of children and occurrence of A.R.I (P-value=0.004) (Table 20).

4.5.2 Gender and occurrence of A.R.I

The gender in this study was divided into male and female for statistical analysis. The results showed that there is no statistical association between gender and occurrence of A.R.I (P-value=0.36) (Table 20).

4.5.3 Breastfeeding within 6 months and occurrence of A.R.I

For the statistical analysis, the breastfeeding within 6 months was divided into 4 groups as breastfeeding only, bottle feeding, mixed feeding and others. The results showed that there is no statistical association between the breastfeeding within 6 months and the occurrence of A.R.I (P-value=0.62) (Table 20).

4.5.4 Wheezing history and occurrence of A.R.I

For the statistical analysis, the wheezing history was classified into 2 groups as with wheezing history and no wheezing history. The chi-square test was carried out to see the association between wheezing history and occurrence of A.R.I. The result showed that there is statistical association between wheezing history and occurrence of A.R.I (P-value< 0.001) (Table 20).

Table 20 The association between the host factors (age, gender, breastfeeding and wheezing history) and the occurrence of A.R.I with corresponding chi-square.

Variables	**Occurrence of A.R.I**			**No A.R.I**
	Mild	**Moderate**	**Severe**	**n (%)**
	n (%)	**n (%)**	**n (%)**	
Age of child, n=251				
6-24 months	27(21.26%)	31(24.41%)	13(10.24%)	56(44.09%)
25-60 months	14(11.29%)	18(14.52%)	9(7.26%)	83(66.94%)
X^2=13.50	d.f=3		**P-value=0.004**	
Gender, n=251				
Male	25(20.49%)	23(18.85%)	11(9.02%)	63(51.64%)
Female	16(12.40%)	26(20.16%)	11(8.53%)	76(58.91%)
X^2=3.18	d.f=3		P-value=0.36	
The milk intake within six months				
Breastfeeding only	9(16.36)	9(16.36)	5(9.09)	32(58.18)
Bottle feeding	14(16.47)	17(20.00)	12(14.12)	42(49.41)
Mixed feeding	18(16.22)	23(20.72)	5(4.50)	65(58.56)
X^2=6.28	d.f=6		P-value=0.39	
Wheezing history				
No	36(16.82)	43(20.09)	12(5.61)	123(57.48)
Yes	5(13.51)	6(16.22)	10(27.03)	16(43.24)
X^2=18.12	d.f=3		**P-value<0.001**	

4.5.5 Nutritional status (weight for age) and occurrence of A.R.I

With weight for age, the statistical analysis was divided into two groups as normal and not normal (under weight and over weight). The results revealed that there is no statistical association between weight for age and occurrence of A.R.I (P-value=0.68) (Table 21).

4.4.6 Nutritional status (height for age) and occurrence of A.R.I

With height for age was divided into 3 groups as short, normal and tall. For the statistical analysis, we have to regroup the occurrence of A.R.I again because of small number that we can not make cross tab, the result showed that there is no statistical association between height for age and occurrence of A.R.I (P-value=0.11) (Table 22).

4.4.7 Nutritional status (weight for height) and occurrence of A.R.I

With weight for height, it was classified into 2 groups as normal and not normal (thin and obese). For the statistical analysis, the results indicated that there is no statistical association between weight for height and occurrence of A.R.I (P-value=0.97) (Table 21).

The 2 independent variables such as immunization status and birth weight that we did not test the association because only 4.38% were incomplete while 95.62% were complete immunization by age. Regarding birth weight, we also only 5.18% of children were L.B.W while 94.82% were normal weight. Therefore, it is quite homogenous in these two variables.

Table 21 The association between the nutritional status (weight for age, weight for height and height for age) and the occurrence of A.R.I with corresponding chi-square.

Variables	Occurrence of A.R.I			No A.R.I
	Mild	Moderate	Severe	n (%)
	n (%)	n (%)	n (%)	
Nutritional status				
Weight for age				
Normal	32(16.24)	40(20.30)	19(9.64)	106(53.81)
Not normal	9(16.67)	9(16.67)	3(5.56)	33(61.11)
X^2=1.50	d.f=3		P-value=0.68	
Weight for Height				
Normal	28(17.07)	32(19.51)	14(8.54)	90(54.88)
Not normal	13(14.95)	17(19.54)	8(9.20)	49(56.32)
X^2=0.20	d.f=3		P-value=0.97	

Table 22 Association between height for age and occurrence of A.R.I.

Variables	With A.R.I	No A.R.I
	n (%)	n (%)
Height for age		
Short	8(36.36)	14(63.64)
Normal	70(41.67)	98(58.33)
Tall	34(55.74)	27(44.26)
X^2=4.25	d.f=2	P-value=0.11

4.5 Analysis on the association between maternal factors and the occurrence of A.R.I with corresponding chi-square.

4.5.1 Age of mother and occurrence of A.R.I

For the statistical analysis, the age of mother was classified into 2 groups as less than 25 years and more than 25 years. The chi-square test showed that the value of p 0.98, it revealed that there is no association between the age of mother and occurrence of A.R.I (Table 23).

4.5.2 Occupation of mother and occurrence of A.R.I

According to the occupation, the mothers were classified into 2 groups as house wife and mother working outside. The chi-square test revealed that there is no association between the occupation of mother and the occurrence of A.R.I (P-value=0.91) (Table 23).

Table 23 The association between age of mothers and occupation and the occurrence of A.R.I with corresponding chi-square.

Variables	Occurrence of A.R.I			No A.R.I
	Mild	Moderate	Severe	n (%)
	n (%)	n (%)	n (%)	
Age of mother				
Less than 25	8(17.78)	8(17.78)	4(8.98)	25(55.56)
More than 25	33(16.02)	41(19.90)	18(8.74)	114(55.34)
X^2=0.15	d.f=3		P-value=0.98	
Occupation				
House wife	8(14.55)	12(21.82)	4(7.24)	31(56.36)
Working outside	33(16.84)	37(18.88)	18(9.18)	108(55.10)
X^2=0.52	d.f=3		P-value=0.91	

4.5.3 Educational level and occurrence of A.R.I

For the educational level, it was regrouped no schooling case with primary level as a few cases and secondary school and above. For the statistical analysis, the results showed that there is statistical association between the education of mothers and the occurrence of A.R.I with P-value=0.010 (Table 24).

4.5.4 Monthly family income and occurrence of A.R.I

It was divided into 2 groups as enough and not enough. The chi-square test showed the value of p 0.093. And monthly income was classified into 2 groups as less than 5000 Baht and more than 5000 Baht. The P-value was 0.53. So the family income was not statistical association between the family income and occurrence of A.R.I (Table 24).

Table 24 The association between level of education of mothers and family income and occurrence of A.R.I with corresponding chi-square.

Variable	**Occurrence of A.R.I**			**No A.R.I**
	Mild	**Moderate**	**Severe**	**n (%)**
	n (%)	**n (%)**	**n (%)**	
Educational level				
No schooling & Primary school	14(10.61)	26(19.70)	8(6.06)	84(63.64)
Secondary school & above	27(22.69)	23(19.33)	14(11.76)	55(46.22)
X^2=11.34	d.f=3		**P-value=0.010**	
Family income				
Not enough	13(12.15)	17(15.89)	8(7.48)	69(64.49)
Enough	28(19.44)	32(22.22)	14(9.72)	70(48.61)
X^2=6.40	d.f=3		P-value=0.093	

Table 24 (Cont)

Variables	Occurrence of A.R.I			No A.R.I
	Mild n (%)	Moderate n (%)	Severe n (%)	n (%)
Income per month				
Less than 5000	17(15.04)	23(20.35)	7(6.19)	66(58.41)
More than 5000	24(17.39)	26(18.84)	15(10.87)	73(52.90)
X^2=2.17	d.f=3		P-value=0.53	

4.5.5 Knowledge of mothers and occurrence of A.R.I

Knowledge of mothers about A.R.I was classified into 2 groups for statistical analysis as good and poor knowledge. The chi-square test was applied to see that the relationship between the knowledge of mothers and occurrence of A.R.I. the result showed that the P-value=0.025, it meant there is statistical association between knowledge of mothers and occurrence of A.R.I (Table 25).

Table 25 The association between the knowledge of mother about A.R.I and the occurrence of A.R.I with corresponding chi-square.

Knowledge of mothers about A.R.I	Occurrence of A.R.I			No A.R.I
	Mild n (%)	Moderate n (%)	Severe n (%)	n (%)
Good knowledge	12(11.43)	28(26.67)	6(5.71)	59(56.19)
Poor knowledge	29(19.81)	21(14.38)	16(10.96)	80(54.79)
X^2=9.31	d.f=3		**P-value=0.025**	

4.6 Analysis on the association between the Environmental factors and the occurrence of A.R.I with corresponding chi-square and P-value.

4.6.1 Number of smoker and occurrence of A.R.I

For statistical analysis, number of smoker was divided into 2 groups as no smoking and smoking. The results revealed that there is no statistical association between the smokers and the occurrence of A.R.I with P-value=0.45 (Table 26).

4.6.2 Number of family member and occurrence of A.R.I

The number of family member was divided into 2 groups as less than 5 and equal/ more than 5 members. For the statistical analysis, the results showed that there is no association between the family member and the occurrence of A.R.I with P-value=0.34 (Table 26).

4.6.3 Number of living children and occurrence of A.R.I

For the statistical analysis, number of children was divided into 2 groups as less than 3 and equal or more than 3 children. The chi-square test showed that there is no association between number of children and occurrence of A.R.I (P-value=0.32) (Table 26).

Table 26 The association between smoking, family size and number of living children and the occurrence of A.R.I with corresponding chi-square.

Variables	Occurrence of A.R.I			
	Mild	**Moderate**	**Severe**	**No A.R.I**
	n (%)	**n (%)**	**n (%)**	**n (%)**
Number of smokers				
No	13(12.87)	22(21.78)	7(6.93)	59(58.42)
Yes	28(18.67)	27(18.00)	15(10.00)	80(53.33)
X^2=2.61	d.f=3		P-value=0.45	
Number of family members				
Less than 5 members	23(15.97)	33(22.92)	14(9.72)	74(51.39)
Equal/more than 5	18(16.82)	16(14.95)	8(7.48)	65(60.75)
X^2=3.34	d.f=3		P-value=0.34	
Number of children				
Less than 3	35(17.86)	39(19.90)	19(9.69)	103(52.55)
Equal/more than 3	6(10.91)	10(18.18)	3(5.45)	36(65.45)
X^2=3.50	d.f=3		P-value=0.32	

4.6.4 Chronic respiratory diseases and occurrence of A.R.I

Chronic respiratory disease history of family members was divided into 2 groups as Yes and No. For the statistical analysis, we divided the dependent variable as 2 groups: with A.R.I and No A.R.I because of small numbers of cases, the results indicated that there is statistical association between the chronic respiratory disease and occurrence of A.R.I (P-value=0.006) (Table 27).

Table 27 The association between chronic respiratory diseases and occurrence of A.R.I.

Variable	**Occurrence of A.R.I n (%)**	**No A.R.I n (%)**
Respiratory history diseases.(C.R.D.)		
No	99(42.31)	135(57.69)
Yes	13(76.47)	4(23.53)
X^2=7.48 d.f=1	**P-value=0.006**	

Conclusion

The factors associated with the occurrence of A.R.I in young children are

1 Age of children with P-value=0.004

2 Wheezing history with P-value<0.001

3 Educational level of mothers with P-value=0.010

4 Knowledge of mothers about A.R.I with P-value=0.025

5 Chronic respiratory diseases of family members with P-value=0.006

CHAPTER V
DISCUSSION

Two hundred and fifty and one mothers, who have children from six months to five years of age, were interviewed by the constructed questionnaire from the trained nurses, who were given one day training about questionnaire and the procedures of data collection, in this study. The cross sectional survey was carried out at the Tapraya hospital (Tapraya district) Sakaeo province. The data collection was spent for one month (from 12/01/2004 to 12/02/2004) and the collected data were entered and analyzed by Minitab program. The results were divided into two parts as descriptive information and inferential analysis to see the association between independent variables (host factors, maternal and environmental factors and knowledge of mothers) and dependent variable (occurrence of A.R.I).

5.1 Occurrence of A.R.I

This cross sectional study conducted in Tapraya hospital (Tapraya district), the prevalence of A.R.I was 44.62%. This included 19.52% was moderate and 16.33% while 8.76% were mild and severe A.R.I respectively. So the cases of moderate and severe of A.R.I is 28.28% (19.52+8.76) If we do not survive, otherwise it will affect the child morbidity or mortality even the growth and development, compare with the previous study conducted in congested areas in Bangkok in 1989, the prevalence was 47% so it meant that the present study is nearly the same as the previous study (39).

In 1995, WHO reported that A.R.I was still the first main cause of death in children less than five years. there were ten millions deaths among children under five years, 97% of them was in developing countries and mostly due to infectious diseases such as pneumonia and diarrhea, combined with malnutrition in 1997.

Each year, more than 11 millions children died from effects of diseases and inadequate nutrition. In developing countries, more than one in five children died before they reached their fifth birth day, and many of those who do survive are unable to grow and develop to their potential. Seven of ten of childhood deaths in developing countries can be attributed to just five main causes, or often to a combination of them as pneumonia, diarrhea, measles, malaria and malnutrition. A.R.I, mostly in form of pneumonia, is the leading cause of death in children under five years, killing over 2 millions children annually and up to 40% of them seen in health clinics are suffering from A.R.I (23). From the previous study, OHNMA conducted cross sectional survey in 2 congested areas in Bangkok, he found that the prevalence of A.R.I was 47 %(39).

5.2 Association between host factors and occurrence of A.R.I

5.2.1 Age of children

Regarding the data of children's age, the result showed that the younger children less than 2 years were more susceptible with A.R.I than the older, the result was significant (P-value=0.004) if we compare the younger groups with older groups the results as 10.24% of younger had severe A.R.I, while 7.26% of older and 24.41% of younger had moderate, while 14.52% of older. This may be related to the knowledge of mothers to take care of their children. The same as HE HUI study (9) found that the risk of pneumonia among younger age group was higher than the older groups.

5.2.2 Gender

In this study, it is nearly the same between boy and girl. Boy, 20.49% was mild, 18.85% was moderate, 9.02% was severe and 51.64% was no A.R.I. girl, 20.16% was moderate, 12.40% was mild, 8.53% was severe and 59.91% was no A.R.I. There was no significant in this study. The reason may be in Thailand, the mothers take care of their children equally different from Cambodia, and most of mothers prefer to look after the girl more than boy.

So if compared with the previous studied, there was slight difference between boy and girl in association with A.R.I and it is more common that symptoms are more severe in boy (30).

5.2.3 Immunization

Immunization is very important to protect against preventable diseases such as diphtheria, pertussis, measles and childhood tuberculosis. So vaccinations are very effective preventable measures of A.R.I in children under five years. Therefore incomplete immunization is the major risk factors for producing A.R.I in children since these conditions contributed heavily to childhood morbidity and mortality (31). In this study, almost all children received complete immunization, the analysis of association between immunization status and occurrence of A.R.I is not possible.

5.2.4 Breastfeeding

Breastfeeding rate could prevent up to 10% of all deaths of children under five years when mothers breastfed exclusively during at least 4 months and possible 6 months because it is important source of passive immunity that can protects them from respiratory infections or diarrhea (33). In this study, the breastfeeding and occurrence of A.R.I, 33.86% was bottle feeding, 21.91% was breastfeeding only, 18.33% was mixed feeding while 25.90% was others (U.H.T). The result, however, in this study failed to demonstrate a significant association between breastfeeding and occurrence of A.R.I (p-value=0.62). The policy of breastfeeding in Thailand has extended every year, most of mothers gave breast milk or even mixed feeding, and they can prevent from A.R.I (9).

5.2.5 Birth weight

L.B.W was approximately 50% greater risk of A.R.I compared with the normal birth weight and may contribute to A.R.I through the decrease immune response of L.B.W infants (35). HE HUI conducted in 2000 at Queen Sirikit National Institute of Child Hospital in Bangkok found that 22% of L.B.W was significant association with A.R.I (9). In this study only 5.38% was L.B.W while nearly 95% was normal birth weight. Thus the analysis of association between birth weight and occurrence of A.R.I is not possible.

5.2.6 Wheezing history

In this study, the children who have wheezing history only 43.24% was not A.R.I while nearly 57% with A.R.I. the result indicated that there was significant association between wheezing history and occurrence of A.R.I (P-value<0.001) as the same as HE HUI study (9) conducted in Bangkok in 2000 found that there was an increases risk of A.R.I among children who had previously suffered from episodes of wheezing.

5.2.7 Nutritional status

Nutritional status is an important factor influencing the occurrence of A.R.I. normally weight for age is influenced by acute disease while height for age is indicated by chronic diseases (9). Although malnutrition is rarely listed as the direct cause, it contributes to about half of all deaths of children so lack of access to food is not the only cause of malnutrition, poor feeding practice and infections, or a combination of the two, are both major factors(33). In this study, the result showed that there was no association between nutritional status and occurrence of A.R.I, because the nutritional status in Thailand is better and better if we compare the study of HE HUI in 2000 (9) found that the nutritional status of children, the normal weight was only 50.00%, while in this study, the normal weight is 78.49%. There was association between weight for age and occurrence of A.R.I (0.012) but in this study the nutritional status was failed to see the association with the occurrence of A.R.I.

5.3 Association between maternal factors and occurrence of A.R.I

5.3.1 Age of mothers

Statistically the association between age group of mothers and occurrence of A.R.I was shown that there was no association between age group and occurrence of A.R.I (P-value 0.98). This may be from many things as the experience of older mothers (82.07%) but related to the knowledge, 62.22% of the younger mothers had poor knowledge, while 57.28% of older (Table 4 in appendix). It is different from the previous study, HE HUI found that age of mothers is important related to occurrence of A.R.I, the risk of A.R.I among the younger mothers is higher than the older mothers (9)

5.3.2 Education level of mothers

The level of education of mothers and occurrence of A.R.I in this study revealed that there was an association between educational level and occurrence of A.R.I with P-value 0.046. It found that 20% of no schooling and primary school mothers got moderate A.R.I, while 23% of secondary school and above got mild A.R.I. So from this point showed that the mothers who have high education they got only mild A.R.I and on the others hand if we compare the number of mother who don't have A.R.I was 46.22% of secondary school and above mothers, while 63.64% of low education. This meant that may be the mothers who had high education; they concern more about their children's health than the low education mothers. The same as HE HUI found that the mothers who had primary education were much more at risk than mother had higher education (9).

5.3.3 Occupation of mothers

In this study the result showed that 21.82% of children whose mothers were housewives had moderate A.R.I, 14.55% and 7.24% were mild and severe A.R.I and 18.88% of children with mothers working outside were moderate A.R.I, 16.84% and 9.18% were mild and severe A.R.I, it found that there was no association between the occupation of mothers and occurrence of A.R.I (P-value 0.91) the same as the result of HE HUI revealed that there was no association between mothers working outside and occurrence of A.R.I (9). The reason may be related to the educational level of mothers if they have good knowledge, they can take care of their children very well.

5.3.4 Monthly family income

45.02% of mothers who had income less than 5000 Baht while 54.98% more than 5000 Baht. in this study, the result found that 20.35% of mother with income less than 5000 Baht were moderate A.R.I, 15.04% and 6.19% were mild and severe A.R.I and 18.84% of children with mother income more than 5000 Baht was moderate A.R.I, 17.39% while 10.87% were mild and severe A.R.I, it is shown that there was no association between monthly family income and occurrence of A.R.I.

Also, 15.89% in moderate A.R.I was not enough money, 12.15%, 7.48% in mild and severe A.R.I were not enough for daily expenses. The result was not associated with A.R.I. the result of HE HUI found that there was higher risk of children in low family income than high income family with statistical association between low income family and occurrence of A.R.I. In this study, the reason why there was no association because the income of Thai people, so far, get better and better from 71.50% of low income of OHNMA study to 33% of this survey (see Table 5 in appendix).

5.3.5 Knowledge of mothers about A.R.I

The children with mothers of score knowledge more than 10 as good knowledge while of score less than 10 as poor knowledge. In this study 41.83% of mothers were good while 58.17% was poor knowledge. According to the prevention and control of A.R.I program (WHO/UNICEF Joint statement in 1985), the mothers should have knowledge about A.R.I and its management to decrease the morbidity and mortality of A.R.I for the children because the mothers with knowledge and right action about A.R.I are very important to reduce the occurrence of A.R.I (18).

From this study, the result shown that 28.67% of mothers who had good knowledge got moderate A.R.I while 11.43%, 5.71% got mild and severe A.R.I and 19.81% of children from mothers who had poor knowledge got mild A.R.I, 14.38%, 10.96% was moderate and severe A.R.I and the outcome was significant association between knowledge of mothers and occurrence of A.R.I (p-value 0.025). The poor knowledge mothers had higher proportion of children with severe A.R.I than the good knowledge groups. Lack of knowledge about risk factors of A.R.I (signs and symptoms of A.R.I, transmission of A.R.I and prevention of A.R.I) concerning the age of child, wheezing history, chronic respiratory diseases and education leading to the association with occurrence of A.R.I.

5.4 Association between environmental factors and occurrence of A.R.I

5.4.1 Number of smokers

In this study, 18.67% of smokers got mild A.R.I, 18.00%, 10.00% was moderate and severe while 21.78% of non smokers got moderate A.R.I, 12.87%, 6.93% was mild and severe. The result shown that there was no statistically significant relationship between smoking and occurrence of A.R.I with p-value=0.45. From the previous study, OHNMA (39) found that 76.00% of smokers and more than half of them smoked inside the house with significant association of P-value 0.029. However, in this study about 59% of smokers, they rarely smoked inside the house (Table 5 in appendix). If compared with previous study the number of smokers decreased from year to year (from 76% to 59%). On the other hand, this reduction of smokers is from the health education of Thai government policy (Ministry of Public Health).

5.4.2 Number of family members and numbers of children.

The association between housing and disease are overlooked. The children living in overcrowding have high risk of many diseases, including respiratory infections (9). In this study, 22.92% of family less than 5 was moderate A.R.I while 16.82% of family more than 5 members was mild A.R.I. The result of this study failed to demonstrate the significant association and even the number of living children because in Thailand, nearly 50% of people have only two children (mean of living children 1.93). On the other hand, the area of this study was in rural (Tapraya district) different from Bangkok, there are many people and cars (environmental issues).

5.4.3 Chronic respiratory diseases (C.R.D)

Regarding the chronic respiratory diseases in this study, the result showed that 29.41% of family who had C.R.D got severe A.R.I while 23.53% were mild, moderate and no A.R.I and 19.23% of family who had never got C.R.D was contacted moderate A.R.I while 15.81%, 7.26% and 57.69% were mild, severe and no A.R.I respectively. This found that there was statistically significant association between C.R.D and occurrence of A.R.I (P-value=0.005) if compared with the previous study, they found that 68.30% of children with family history of C.R.D developed A.R.I and 41.50% of children from family without C.R.D developed A.R.I, the result was association with A.R.I of P-value 0.002(39). And the presence of chronic respiratory tract infection was also found that there was twice more than group who don't have. From these results were expected from the mechanisms of pathogen transmission (38).

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

A community hospital based cross sectional survey was conducted at Tapraya hospital, Tapraya district (Sakaeo province) from 12 January to 12 February 2004. The main objective of this survey was to identify the factors associated with the occurrence of A.R.I in children from six months to five years of age. All information was collected by interviewing 251 mothers, who have children from six months to five years, come to hospital with/without A.R.I at O.P.D, I.P.D and well-baby clinic by constructed questionnaire through the trained nurses.

The independent variables included in this study were host factors, maternal factors and environmental factors.

The dependent variable was the occurrence of A.R.I in children from six months to five years of age.

The occurrence of A.R.I

In this survey, the prevalence of A.R.I is still so high (44.62%) included 19.52% of children got moderate A.R.I, 16.33% and 8.76% of children got mild and severe A.R.I. It is nearly similar as the previous study (47.00%) (39).

Association between host factors and occurrence of A.R.I

Among host factors, 2 factors associated with the occurrence of A.R.I as the following:

-Age of child was almost the same as 50.60% of children from 6-24 months, while 49.40% of 25-59 months. And still significant association with the occurrence of A.R.I that meant the younger the child, the higher the risk (P-value=0.004).

-Wheezing history, the child with wheezing history was 14.74%, while 85.26% was no wheezing history. The result shown there was association with A.R.I with P-value <0.001.

The others variables were no association with occurrence of A.R.I such as

-Gender was similar the same as 48.61% of male and 51.39% of female.

-Nutritional status was 78.49% of normal weight.

-Breastfeeding within six months: 21.91% of breastfeeding only, 33.86% of bottle feeding only and 18.33% of children with mixed feeding.

-Birth weight and immunization were nearly 100% of normal birth weight and complete immunization by age.

Association between maternal factors and occurrence of A.R.I

Among maternal factors, 2 factors related to the occurrence of A.R.I as:

-Educational level of mothers, the result was significant association with A.R.I that meant 47.01% of them were primary school, 21.91%, 16.33%, 9.16% were secondary school, high school and university because this study conducted in rural area.

-Knowledge of mothers: 58.17% of mothers had poor knowledge, while 41.83% had good knowledge. So knowledge of mothers about A.R.I is very important and it was significant associated with occurrence of A.R.I with P-value 0.025.

The others factors were failed to be statistically associated such as

-Age of mothers: 82.07% were older mothers (25 and more), while 17.93% were younger (less than 25 years old).

-Occupation of mothers was about 80.00% working outside, while 20.00% were house wife.

-Monthly family income of Thai people get better, 54.98% of them had income more than 5000 Baht/month and more than half were enough money (in rural area, Tapraya district, Srakaeo province).

Association between environmental factors and occurrence of A.R.I

Environmental factors, one factor was associated with the occurrence of A.R.I:

-The chronic respiratory disease because among the children whose family with C.R.D, they got severe A.R.I (29.41%), 23.53% were mild and moderate A.R.I.

So even the ministry of public health tried to train so far, the health workers and volunteers since 1987 but the prevalence is still so high in some part like Tapraya district (44.62%). The others factors should be significant such as smokers, family size and number of children but failed to be associated with occurrence of A.R.I.

6.2 Recommendations

6.2.1 Recommendations for program implementation

A Age of children is one risk factor so preventive measures should be enhanced through the health education of mothers who have children less than two years of age and should alert for the wheezing history. The activity can be conducted continuously at the well baby clinic.

B Wheezing history is a risk factor in this study, so the parents should know the repetition of these diseases and dangerous for their children to contact A.R.I. on the other hand the health personnel should focus on this point and explain to

the mothers, who come to well baby clinic, how to prevent from the severity of theses diseases and come to hospital in order to cure that diseases.

C Education of mothers is important. The government should increase education level from primary school to secondary or over as much as possible.

D Knowledge of mothers in this study is associated with the occurrence of A.R.I. So improvement of knowledge of mothers about risk factors of ARI through health volunteers and health workers should be considered particular in mothers with low education level.

E Chronic respiratory diseases is very important risk factor because if one family has C.R.D that can transmit to the other, especially the children so the C.R.D people have to see the doctor to cure and to make them understand the transmission of this diseases to children and to keep the children away from the sick people.

6.2.2 Recommendations for further study

1 This cross sectional survey could be conducted nation wide to get more meaningful results and to formulate the government health policy.

2 Conduct an experimental study to improve child care giver's knowledge on A.R.I.

3 Conduct a longitudinal study to follow up the growth and development of children with frequent A.R.I at pre-school year.

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APPENDIX

APPENDIX A

QUESTIONNAIRES

Interview questionnaires for mothers who have children from 6 months to 5 years. The answer of this health survey will be analyzed in group and used to improve health program, individual information will be help confidentially.

Part one Child's characteristic

Code N^0:…….....

1. Date of interview:……..

2. Child's birthday: ……/……/…….(DD/MM/YY)

Age of the child on the day of interview(for researcher only) …….years……months……..days.

3. Sex of child: (1) Male (2) Female

4. Weight of the child on the day of interview…….kilograms.

5. Height of the child on the day of interview……..cm

Nutritional status of child(for researcher only)		
Weight for age: (1) Under weight (2) Normal weight for age. (3) Over weight.	Height for age: (1) Short (2) Quite short (3) Normal (4) Quite tall (5) Tall	Weight for Height (1) Thin (2) Quite thin (3) Normal (4) Quite fat (5) Fat

6. History of breastfeeding within 6 months?

(1) Breastfeeding only

(2) Bottle feeding only

(3) Mixed feeding.

7. The breastfeeding in present

(1) Breastfeeding only

(2) Bottle feeding only

(3) Mixed feeding

(4) Other (specify)…….

8. What is births weight of this child?.....grams.

9. History of Immunization:

BCG	DPT/OPV (1)	DPT/OPV (2)	DPT/OPV (3)	Measles	Not any

Immunization status of the child (for researcher only)

(1) Not any

(2) Incomplete by age

(3) Complete by age

Part II The occurrence of A.R.I.

10. As this child got any respiratory disease within one month?

(1) If yes, how many times,……..(Times)

(2) No (step to 13).

11. What kind of disease of those episodes (diagnosed by doctors)?

N_o	**Diseases**	**Yes**	**No**	**Don't know**	**Conclusion**
1	Common cold (1)				For researcher only 1 2 3
2	Tonsillitis (1)				
3	Otitis media (1)				
4	Bronchitis (2)				
5	Bronchiolitis (3)				
6	Pneumonia (3)				

12. If do not know, has the child got any of the following signs and symptoms?

N_0	Signs/symptoms	Yes	N0	Conclusion
1	Clear discharge from nose(1)			For researcher only 1 2 3
2	Fever less than 3 days(1)			
3	Nasal congestion(1)			
4	Greenish nasal discharge from nose(2)			
5	Cough without sputum(1)			
6	Cough with sputum(2)			
7	Severe cough with vomiting(2)			
8	Continuous cough(2)			
9	Earache and discharge(2)			
10	Mouth breathing(3)			
11	Chest in drawing(3)			

The occurrence of A.R.I of this child(for researcher) (1) No A.R.I. (2) Mild A.R.I. (3) Moderate A.R.I. (4) Severe A.R.I.

13. Has this child ever had wheezing history?

(1) No.

(2) Yes

(3) Do not know.

Part three Maternal and environmental information of mothers.

14. What is your age?.....years.

15. How many living children do you have?.....

16. What is your occupation?

(1): House wife.

(2): Farmer

(3): Worker

(4): Trader.

(5): Government officer.

(6) Others……

17. What is your education level?

(1): No schooling

(2): Primary school

(3): Secondary school

(4): High school

(5): University

18. What is your total family income per month?.....Baht.

19. Sufficient of income.

(1): Enough can saving

(2): Enough but not saving

(3) Not enough.

20. How many family members are there in the household?.....

21. How many family members smoke?

(1):……..

(2): No (if no pass to 23)

22. Who smokes?

(1): Father. Yes No

(2): Mother. Yes No

(3): Others (specify)……..

23. Where do the family members usually smoke?

(1): In the house.

(2): Outside the house.

(3) Both in and out of the house.

24. Have anybody of the family got chronic respiratory diseases?

(1) Asthma. Yes No

(2) Chronic bronchitis. Yes No

(3) Tuberculosis. Yes No

Part four Knowledge of mothers about A.R.I

Items	Yes	No	Don't know
25. Common cold can develop pneumonia			
26. Running nose, cough, fever and fast breathing are the signs and symptoms of A.R.I.			
27. Mouth breathing, chest in drawing or can't drink or take breastfeeding are the signs/symptoms of severe A.R.I.			
28. Malnourished child have more chance of getting pneumonia.			
29. The low birth weight has more chance of getting A.R.I than normal birth weight.			
30. Closely contacts with smoke can easily getting A.R.I.			
31. The child who lives in overcrowding house has less chance of getting A.R.I.			
32. The child who has wheeze can easily get pneumonia.			
33. Measles is a normal event for every child and need not to be counted as an illness.			
34. Separate child from common cold's patient can prevent him/her from getting A.R.I.			
35. Complete vaccinations can prevent child from A.R.I.			
36. Breastfeeding at least six months can prevent child from A.R.I.			
37. Pneumonia can lead to death of child.			

APPENDIX B

Table 1 Feeding at present and age of children.

Feeding at present	Age of children (months)			
	6-12	13-24	25-36	37-59
	n (%)	n (%)	n (%)	n (%)
Breastfeeding only	12(30.00)	11(12.64)	1(1.92)	0.00
Bottle feeding only	21(52.50)	46(52.87)	21(40.38)	9(12.50)
Mixed feeding	2(5.00)	9(10.34)	0.00	0.00
Others (UHT)	5(12.50)	21(24.14)	30(57.69)	63(87.50)

Table 2 Association between height for age and occurrence of A.R.I

Variables	Occurrence of A.R.I			No A.R.I
	Mild	Moderate	Severe	
Short	2(9.09)	6(27.27)	0.00	14(63.64)
Normal	26(15.48)	32(19.05)	12(7.14)	98(58.33)
Tall	13(21.31)	11(18.03)	10(16.39)	27(44.26)
Educational level				
No schooling	1(7.14)	3(21.43)	2(14.29)	8(57.14)
Primary school	13(11.02)	23(19.49)	6(5.08)	76(64.41)
> Secondary school	27(22.69)	23(19.33)	14(11.76)	55(46.22)
Respiratory history diseases.(C.R.D.)				
No	37(15.81)	45(19.23)	17(7.26)	135(57.69)
Yes	4(23.53)	4(23.53)	5(29.41)	4(23.53)

Table 3 The knowledge of mothers about A.R.I. were included the signs and symptoms of A.R.I., transmission and evolution, risk factors and the prevention of A.R.I.

Knowledge items	Correct answer	
	n	%
1. Common cold can develop pneumonia	170	67.73
2. Pneumonia can lead to death	222	88.45
3. Running nose…are signs and symptoms of A.R.I.	165	65.74
4. Mouth breathing…is severe A.R.I.	166	66.14
5. Malnourished child have more chance	155	61.75
6. L.B.W. has more chance of getting A.R.I. than normal Weight.	156	62.15
7. Close contact with smoke can easily get A.R.I	185	73.71
8. Child living in over crowding can easily get A.R.I	99	39.44
9. Child has wheezing can easily get A.R.I	190	75.70
10. Measles is a normal event for every child and need not to be counted as an illness.	97	38.65
11. Separate child from common cold	193	76.89
12. Complete vaccination can prevent him/her from A.R.I	193	76.89
13. Breastfeeding at least six months can prevent him/her from A.R.I	180	71.71

Table 4 Comparison of age of mother, occupation and monthly income with knowledge of mother

Variables	**Good knowledge n (%)**	**Poor knowledge n (%)**
Age of mothers		
Less than 25	17(37.78)	28(62.22)
25 and more	88(42.72)	118(57.28)
X^2=0.37	d.f=1	P-value=0.54
Occupation of mothers		
House wife	28(50.91)	27(49.09)
Working outside	77(39.29)	119(60.71)
X^2=2.38	d.f=1	P-value=0.12
Monthly income		
Less than 5000 Baht	40(35.40)	73(64.60)
5000 and more	65(47.10)	73(52.90)
X^2=3.49	d.f=1	P-value=0.061

Table 5 Number and percentage of smokers.

Variables	Frequency, n=251	Percentage, %
Numbers of smokers		
No	101	40.24
Yes	150	59.76
1	131	52.19
2	18	7.17
3	1	0.40
Mean=0.67 SD=0.62	Min=00	Max=3
Smoking person		
No	101	40.24
Yes	150	59.76
Fathers	107	42.6288
Others	43	17.1312
Where they smoke		
No	101	40.24
Yes	150	59.76
In the house	3	1.20
Outside the house	37	14.74
Both in and out of the house	110	43.82
Monthly family income		
< 4000 Baht	83	33
>=4000 Baht	168	67
Mean=6600 SD=5100	Min=1000	Max=30000

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