DIARRHEA PREVENTIVE BEHAVIOR OF MOTHERS WITH CHILDREN AT AGE BETWEEN TWO AND FIVE YEARS OLD AT SAO MAI SCHOOL, CAU GIAY DISTRICT, HANOI CITY, VIETNAM

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PRIMARY HEALTH CARE MANAGEMENT FACULTY OF GRADUATE STUDIES MAHIDOL UNIVERSITY 2009

Thesis
entitled

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for the degree of Master of Primary Health Care Management
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ACKNOWLEDGEMENTS

First and foremost, I wish to express my sincere and heartfelt thank to all people for their help to achievement of this thesis.

I would like to express my special thank to Ph.D Nate Hongkrailert, my major-advisor, for his encouraging guidance and valuable suggestion to complete this thesis. His effort, assistance an commitment made the entire research paper process an enjoyable time that I will always live to remember.

I also would like to express my sincere gratitude to my co-advisor: Assoc. Prof. Sirikul Isaranurung, Assoc. Prof. Jirapon Chompikul, for their helpful suggestion, encouragements, and guidance of during the research paper process. More specifically, I appreciate her support and guidance with regard to research paper analysis and general review of my research paper that led to its successful completion.

I am thankful to all the professors and staff at MHPM office for cordial help during my study period. I also thank the ASEAN house staff for their facilities during my stay in ASEAN house.

Grateful thank also given to the Head of Cau Giay Health Center, the Head of Sao Mai school Cau Giay District, all the health personnel and respondents for their cooperation and assistance during data collection. Their support and enthusiasm made the entire data collection process a memorable experience for me. I express sincere thanks to the Vietnamese Hanoi Department of Health, and Hanoi General Traditional Hospital for selecting me to participate in the Master of Primary Health Care management course at ASEAN Institute for Health Development.

Last but not least, I express my gratitude to my family members, relative and friends for according me the moral support and motivation throughout my study at the ASEAN Institute for Health Development, Thailand

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ABSTRACT

This cross-sectional study was performed to explore the diarrhea preventive behavior of mothers with children age 2-5 years old at Sao Mai school Cau Giay district in Hanoi city, Vietnam.

Two hundred and sixty mothers were interviewed face- to- face during January, 2009. The interview included information about socio-demographic factors, perception related to diarrhea, cues to action on diarrhea preventive behavior and diarrhea preventive behavior.

The analysis indicated that the majority of mothers were 30-39 years old (59.2%), and had graduated with bachelor's degree (55%). Also 46.1% of them had a family income between $300 and $499 per month. Most of them were company employees (65.3%) with a small family size (4 people or less) (85%) and 68% of mothers had only one child age between 2-5 years old in the family. Most of mothers had positive perception concerning the prevention of diarrhea. Also, they had a good understanding on the susceptibility of diarrhea diseases, and they understood the severity of diarrhea, but most of the mothers had a poor understanding about barriers preventive diarrhea, 63.4% of the mothers had a high level of understanding concerning cues to action related to diarrhea preventive behavior. The results showed that there was an association between the mother's diarrhea preventive behavior and mothers' understanding about benefits of preventive behavior (p-value=0.01), and source of information about preventive diarrhea, both health education program (p-value=0.013) and health personnel (p-value=0.033). It is suggested that childhood diarrhea preventive behavior at Sao Mai school should be promoted and the negative perception concerning barriers toward preventive behavior should be changed through various mean that are effective among this group.

KEY WORD(S) : DIARRHEA/ MOTHERS/ PREVENTIVE BEHAVIOR/ CHILDREN AT AGE BETWEEN TWO AND FIVE YEARS OLD.

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LIST OF ABBREVIATIONS

WHO : World Health Organization.
HBM : Health Belief Model
IMCI : The Integrated Management of Childhood Illness
ORS : Oral Dehydration Salt
AIHD : ASEAN Institute for Health Development
ORT : Oral Rehydration Therapy
MOH : Ministry of Health.

CHAPTER I
INTRODUCTION

1.1 Rationale and justification of the study

1.1.1 Magnitude of diarrhea among children worldwide and in Vietnam.

Diarrhea disease is one of a major cause of morbidity and mortality among children under five years old. Each year, globally more than eleven million children die from the effects of many diseases and inadequate nutrition. In some countries, more than one in five children die before they reach their birthday, and many of those who do survive are unable to grow and develop to their full potential. It is widespread all over the world, not only threatens human health, but also greatly affects society and economy. The damage is especially high in developing countries and low-income countries. (1,2,3)

Diarrhea disease is a leading cause of childhood mortality in developing countries and an important cause of malnutrition. On average, children below 3 years of age in developing countries experience three episodes of diarrhea each year. About 4 billion episodes of diarrhea per year cause 1.5 million deaths mostly in children less than five years old , 50% of deaths from diarrhea are due acute watery stool, 35% to persistent diarrhea and 15% to dysentery. Seven out of ten childhood deaths in countries can be attributed to just one main cause, or often to a combination of diseases such as pneumonia, diarrhea, measles, malaria and malnutrition. (1,3,4)

Current estimates of the global burden of disease for diarrhoea are reported and compared with previous estimates made using data collected in 1954-79 and 1980-89. For children under five years old in developing areas and countries, there was a

median of 3.2 episodes of diarrhoea per child-year. This indicated little change from previously described incidences. Estimates of mortality revealed that 4.9 children per 1000 per year in these areas and countries died as a result of diarrhoeal illness in the first five years of life, a decline from the previous estimates of 13.6 and 5.6 per 1000 per year. The decrease was most pronounced in children aged under one year. Despite improving trends in mortality rates, diarrhoea accounted for a median of 21% of all deaths of children under five years old in these areas and countries, being responsible for 2.5 million deaths per year. As population growth is focused in the poorest areas, the total morbidity component of the disease burden is greater than previously. (5)

Dehydration caused by diarrhea is a major cause of death among children in Vietnam. In 1998, as recorded in hospitals among the children, diarrhea in second disease in ten leading causes of morbidity and it is the ninth in ten leading causes of death. (6) Especially, in the Mekong delta diarrhea diseases are prevalent, and the mortality rates are the highest compared to other areas in Vietnam. Gastrointestinal diseases (including diarrhea diseases) represent 60% among the total number of cases for 24 communicable diseases reported to the Ministry of Health (MOH). Among gastroenteritis, diarrhea contributes approximately 90% of cases. In 2006 there were 1,093 diarrhea cases per 100,000 and children, which was rather high. (7)

1.1.2 Preventive measure and case management of acute diarrhea

Diarrhea is the second among the most common causes of death in children. Death is usually due to loss of fluid and electrolytes. It is an important factor in development of malnutrition. It is one of the principal causes of morbidity and mortality among children in the developing world. In Vietnam, diarrhea is lead cause of morbidity, with nearly one million hospitalized cases per year and many others going without treatment, self-medicating, or receiving treatment at private facilities. Cholera, and dysentery still exist in some areas where safe water supply and sanitary facilities remain inadequate. The Control of Diarrhea Disease Program has succeeded in reducing mortality from diarrhea. (8)

World Health Organization treats the control of diarrhea disease as global strategy. WHO activities have included development of case management guidelines for use in health facilities, training packages for all levels of health workers including licensed drug seller, research to develop improved dehydration fluids, and promotion of access to oral dehydration solutions. Diarrhea cause rapid depletion of water and sodium-both of which are necessary for life. Children are more likely than adult to die because their parents do not recognize danger signs indicating that they might be suffering, from diarrhea conditions or any other illness. Acute diarrhea disease among children under five years old is usually the responsibility of mothers, as home care provides toward management of acute diarrhea in children. (1)

Most interventions for diarrhea disease, e.g. increased breastfeeding, better weaning practices, clean water, improved sanitation and higher rates of measles immunization, would be expected to affect mortality as well as morbidity simultaneously. Nutritional status is another factor that may help to explain the de-linking of diarrhea mortality and morbidity rates. The use of oral dehydration therapy is an exception, its increased use over the past two decades probably having been responsible for some of the decrease in case-fatality rates, especially from acute dehydrating diarrhea. (9)

Since 1988, within the framework of the National programme for the fight against diarrhoeal diseases in children in Vietnam, the paedriatric hospital number one of Ho Chi Minh City has developed a unit for treatment of diarrhoea which has become a reference centre for the south of Vietnam. The unit for treatment has developed an integrated approach for caring for dirrhoea in newborns, insisting on oral rehydration, non-prescription antibiotics, improving nutritional status, and education of parents which not only aims to allow for a more effective treatment of sick children, but also to increase the principles of prevention and care in the community. The results of this programme are spectacular in terms of reduction of its lethalness and the decrease in hospitalizations toward out-patient care. The unit for treatment of diarrhoea, which has become a collaborating centre of WHO, is also a tool for training

health personnel in the south of Vietnam and a centre for clinical, epidemiological, economic and evaluative research of diarrhoea in children. (10)

1.1.3 Mothers' management of acute diarrhea in children at home

Practice of mothers on management of acute diarrhea in children at home or home care for acute diarrhea in children under five years old was defined as : Give extra fluids intake, continuing food, recognize danger signs and bring the child to the health worker for check up. Six danger signs of acute diarrhea in children five years old are: fever, repeated vomiting, bloody stool, not able to drink or breast- feed adequately, and does not get better. (11)

In the study mothers' belief and practices regarding prevention and management of diarrhea diseases in India, 48 mothers with at least one child aged less than 5 years living in two villages of Raipur Rani block in Haryana were interviewed to determine whether their beliefs and practices had changed after the diarrheal disease control program was implemented. Twenty three percent believed that eating uncovered food, eating dirty or stale food, eating mud, and dirty feeding bottles were causes of diarrhea. Only 10.4% knew specific ways to prevent diarrhea. Majority 85.5%, approved of continuing breast feeding during diarrhea, while, before the program, most mothers withheld breast milk. Previously, 98.1% would restrict foods during diarrhea, now only 35% would do so. Fifty percent believed less fluids than the normal amount should be given during diarrhea, 65% thought that the usual amount of food should be given, 68.8% would administer home remedies to treat diarrhea, 18.8% would begin oral rehydration therapy at home, and 54% had used oral rehydration solution in the past. The findings emphasize the need to focus on preventive measures by educating the public about causes and methods of diarrhea prevention while considering the existing culture. (12)

1.1.4 Problem statement

Many children die because their parents do not recognize warning signs that indicate their children might be suffering from illness. Changing family habits and the kinds of food offered to children is an important element of Integrated

Management of Childhood Illness (IMCI) approach. Correct management of diarrhea could save the lives of to 90% of children who currently die from the effects of the disease. Acute watery diarrhea is the most common form and the most easily treated. It may cause dehydration, which can usually be avoided by giving extra fluids and food with a little extra salt. (3)

The World Health Organization has reported: “In the Western Pacific region, including Vietnam, from 2001-2005, more than 5 million people were infected and 90 people died from the infectious diseases related to sanitary condition, mainly diarrhea, caused by lack of clean water and poor sanitation”. According to the Vietnam Administration of Preventive Medicine, Ministry of Health, these factors also cause 50% of the communicable diseases in Vietnam with the highest mortality rates such as diarrhea, cholera, bacillary dysentery, and typhoid fever. (8)

The situation of diarrhea in Vietnam with a population of over 84 million, diarrhea in children is a major public health problem. Although mortality rates attributable to diarrhea disease have been progressively decreasing in recent years, morbidity rates have been one of the most important health problems. Mortality rate of children under five years old is 40 per 1,000 live births. (13) Only 18% of rural households have access to proper sanitation facilities. Poor environmental sanitation, lack of knowledge and failure to put knowledge into practice contribute significantly to this problem. (14)

A case-control study was conducted to identify the aetiology of diarrhoeal diseases in pre-school children in a suburban area of Hanoi in Vietnam where the use of untreated wastewater in agriculture and aquaculture is a common practice. Stool specimens and clinical information were collected from 111 pairs of children with diarrhoea and healthy controls. A total of 73 cases (66%) and 41 controls (36%) had an enteric pathogen. The pathogens most often associated with diarrhoea were rotavirus (17% of cases) and Entamoeba histolytica (15%), followed by Shigella (5%). Diarrhoeagenic Escherichia coli (DEC) was found in 23% of both patients and controls. (15)

For many decades, Vietnam had a well-structured public health service with extensive population coverage, with free care at government health facilities until 1989. Since then the country has been going through economic transition, including major changes to the health system. These include the reduction of financial support to public facilities and the introduction of user charges. Concern has been growing about the effect of these changes on access and affordability of health care, particularly for poor families. Using data from the Vietnam National Health Survey conducted in 2001-2002, the authors conducted a tracer study of people with diarrheal illness to examine equity in access to and use of health care and the financial burdens placed on patients in seeking care. The study found that children, the elderly, and the poorly educated were more likely to suffer from diarrhea; poor people often did not seek any care regardless of severity of illness, largely because they could not afford it. The opportunity cost due to lost income was also much greater for poor families. Several new policies have been developed in Vietnam to improve access to basic health care for the poor. However, the effects of such policies require close monitoring and remain to be evaluated. (16)

According to Cau Giay district profile 2007, there is very high morbidity rate of diarrhea in Cau Giay district compared with other diseases (Table 1).

Table 1 Top three morbidity number and rate of disease among children at between two and five years old.

Rank	Diseases	Morbidity number	Morbidity rate/1,000 Children
1	Diarrhea	2,291	166.58
2	Pneumonia	1,020	74.17
3	Chicken-pox	89	6.47

Source: Cau Giay district profile 2007

In Vietnam, mothers are mainly responsible in taking care of children during the childhood and hence they are the ones who mostly influence the health of their children. The Health Beliefs of mothers toward diarrhea disease in children play a crucial role in their practice of child feeding, drinking, personal hygiene, sanitation and care of their children when have acute diarrhea disease at home. Therefore, concern in the above situation led to this research being conduced. The aim of this research is to describe the present status of diarrhea preventive behavior and related factors among mothers with children at age between two and five years old, and to give some information on ways to cope with this problem. The study will improve understanding of mother's preventive behavior of childhood diarrhea and the factors that influence mothers to reduce unnecessary morbidity and mortality from diarrhea diseases.

1.2 Research question

1. What is the current situation of diarrhea preventive behavior among mothers with children at age between two and five years old?

2. What are factors associated with preventive behavior for diarrhea disease?

1.3 Research objective

1.3.1 General objective

To study the factors related to preventive behavior of diarrhea disease among mothers with children at age between two and five years old at Sao Mai school, Cau Giay district, Hanoi city, Vietnam

1.3.2 Specific objectives

1. To describe the diarrhea preventive behavior of mothers with children at age between two and five years old.

2. To describe the socio-demographic factors, mother's perception related to diarrhea and the cues to action on mothers' diarrhea preventive behavior.

3. To assess the relationship between mother's diarrhea preventive behavior and socio-demographic factors, mother's perception related to diarrhea, and the cues to action.

1.4 Conceptual framework

The conceptual framework of this study links socio-demographic factors, mother's perception related to diarrhea, cues to action and diarrhea preventive behavior of mothers with children at age between two and five years old. The modified Health Belief Model is applied here (Figure 1).

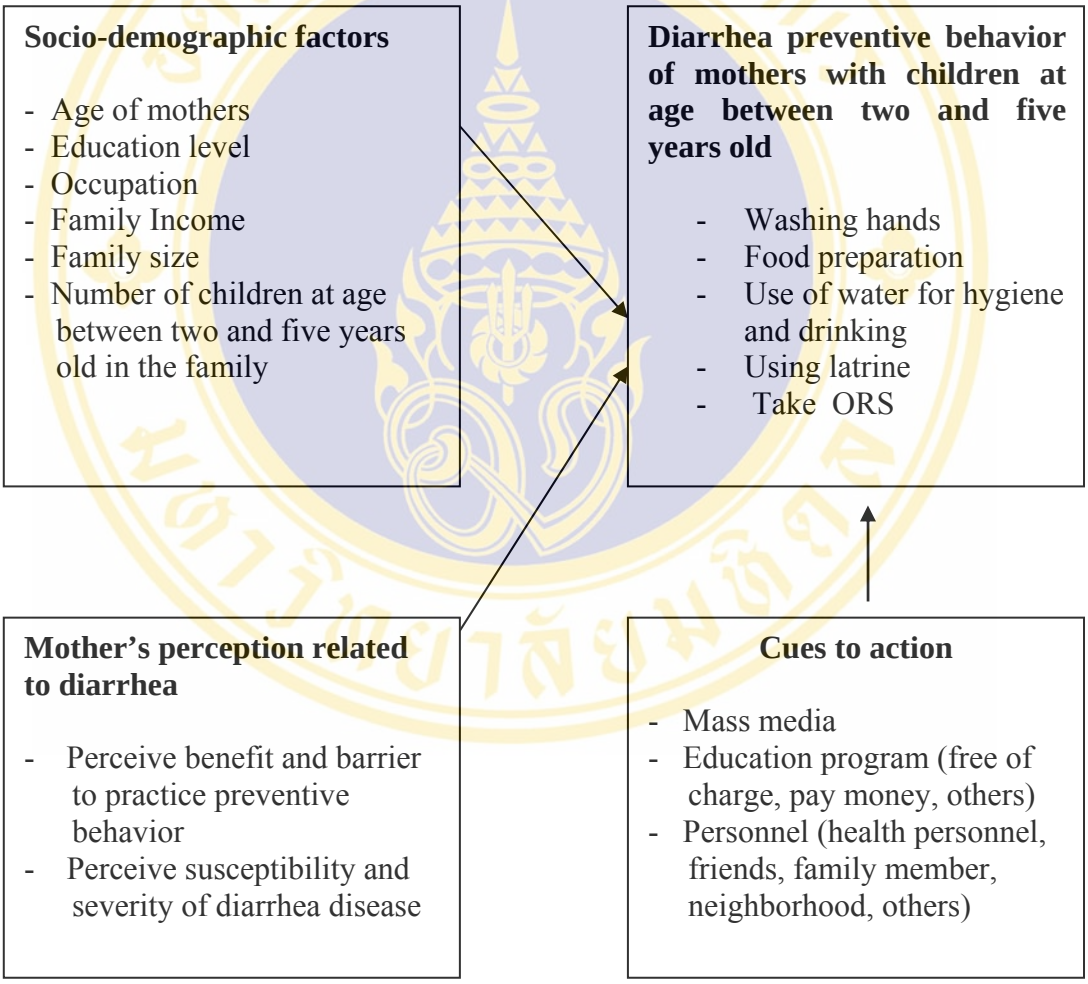


Figure 1 Conceptual framework

1.5 Operational definition

1.5.1 Socio- demographic factors

Socio-demographic factors refer to mother's age, educational level, family income, occupation of mother, family size, and number of children at age between two and five years old in the family

Age of mother

Age is a complete age of mother on the interview day and will be categorized into four groups: less than 20, 20-29, 30-39, and ≥ 40 years old.

Educational levels of mothers

Educational level is the highest education that mothers obtained and will be categorized into six levels: no school, primary school (grade 1-6), secondary school (grade 7-9), high school (grade 10-12), bachelor degree, and other.

Occupation of mothers

Occupation is the task of mothers that earn income and will be categorized into five groups: self-employed, housewife or un-employee, farmer or agriculture, labor, and others.

Family income

This refers to the average income per month of every member in family. Monthly family income is categorized into four levels: "<5,000,000 VND"(<$300), "5,000,000-9,999,999. VND"(=$300-$499), "10,000,000 -14,999,999 VND"($500-$699), and "≥ 15,000,000 VND"(≥ $700).

Family size

Family size is the total member in the family. It is categorized into two groups: ≤4 person, and > 4 person.

Number of children at age between two and five years old in the family

Number of children is the total children at age between two and five years old in the family. It is categorized into two groups: 1 child, and ≥ 2 children.

1.5.2 Mother's perception related to diarrhea

Refers to the perception of mothers such as threat (susceptibility and severity) of diarrhea, the perception of benefit and barrier to taking preventive behavior for diarrhea.

Perception: Stated as an evaluative statement or judgment of mothers concerning the hazards of diarrheal disease occurrence, the degree of compliance towards diarrhea preventive. Perception in this study will be classified into two groups:

Group 1: Positive perception
Group 2: Negative perception

Each question has three answers: agree, not sure, disagree. For positive statements, the answer agree is given 3 score, not sure is given 2 score, and disagree is give 1 score. The score is vice versa for negative statements.

Perceived benefit

It is a mother's belief or opinion in the efficacy of the advised action to reduce risk or seriousness of diarrhea. Refers to the mother's perception about benefit of washing hands, food preparation, use of water for hygiene and drinking, using latrines, take ORS.

Perceived barrier

Mother's beliefs or opinions about their limitations or obstacles for performing preventive behavior of diarrheal disease. It also includes the perception of

mother on barriers of ORS, mother assessment about any difficulties to get when they want to use ORS.

Perceived susceptibility

Mother's beliefs or opinions about the level of chance, high or low, of the child getting diarrhea and its complicated symptoms.

Perceived severity

Mother's beliefs or opinions regarding the seriousness of diarrhea in their child such as death due to dehydration, or diarrhea as the cause of malnutrition.

1.5.3 Mother's cues to action on diarrhea preventive behavior

Determines where mothers get information about diarrhea preventive behavior and actions on diarrhea in children at age between two and five years old. It includes the following sources: Mass media (radio, television, newspaper, magazine, internet, poster, others), education program from health center or hospital (free of charge, pay money, others), personnel such as health personnel (doctor, nurse, midwife, health workers, health volunteer, others), friends, neighborhood, family members (husband, parents, and relatives), and others.

1.5.4 Diarrhea preventive behavior

Diarrhea preventive behavior refers to five components as below. A proper practice is given one score, improper practice is given 0 score

Washing hands

Hands should be washed carefully after defecation and diapering, before handling food, and before feeding.

Food preparation: It includes

Washing hands before preparing food and before feeding the baby

Preparing the food in a clean place

Cooking or boiling the food well when preparing it.

If possible, preparing the food immediately before it is eaten

Keeping food in a cool place; refrigerating it if possible. Covering food that is being kept.

Protect food from insects and animals as they carry pathogenic organisms and are potential sources of contamination of food

Feeding the baby with a clean spoon, from a cup, or with a special feeding spoon (17).

Use of water for hygiene and drinking

It refers to use boiling or equivalent water for the child, clean utensils with clean water, clean feeding or eating area

Use of latrines

It refers to use well- maintained latrine, usually clean the toilet (keep the toilet clean).

Take ORS

When children get diarrhea, ORS can be treated dehydration, reduce serious diarrhea and to prevention death from diarrhea.

1.6 Limitation of the study

The study was carried out at one school in Cau Giay district, Hanoi city, Vietnam. Therefore, it may not generalized for the whole Cau Giay district. The information about diarrhea preventive behavior of mothers based on set of questions rather than actual observation.

CHAPTER II
LITERATURE REVIEW

2.1 Diarrhea disease

2.1.1 Definition

Diarrhea is characterized by three or more watery or loose stools within a 24 hour period (WHO 1998). (18)

Acute diarrhea is something nearly everyone has experienced at one time or another. The loose, watery stools and abdominal cramps that characterize diarrhea usually last a couple of days. Diarrhea often means more-frequent trips to the toilet and a greater volume of stool.

By definition, chronic diarrhea lasts much longer than does acute diarrhea, generally longer than 14 days. It can be a sign of a serious disorder, such as inflammatory bowel disease, or a less serious condition, such as irritable bowel syndrome.

There are three different types of diarrhea: acute water diarrhea, dysentery diarrhea, and persistent diarrhea. Dysentery diarrhea causes bacterial damage to the intestinal mucosa. In the gut, pathogenic toxins are released causing cell and tissue death. (19) Tissue layers deteriorate and blood is present in the feces. Symptoms include rapid weight loss and anorexia and this diarrhea can be fatal. An example of dysentery is Shigellae. (20)

Acute watery diarrhea has an acute beginning. Although it usually last less than seven days, it can often last up to 14 days. (19) Acute watery diarrhea involves

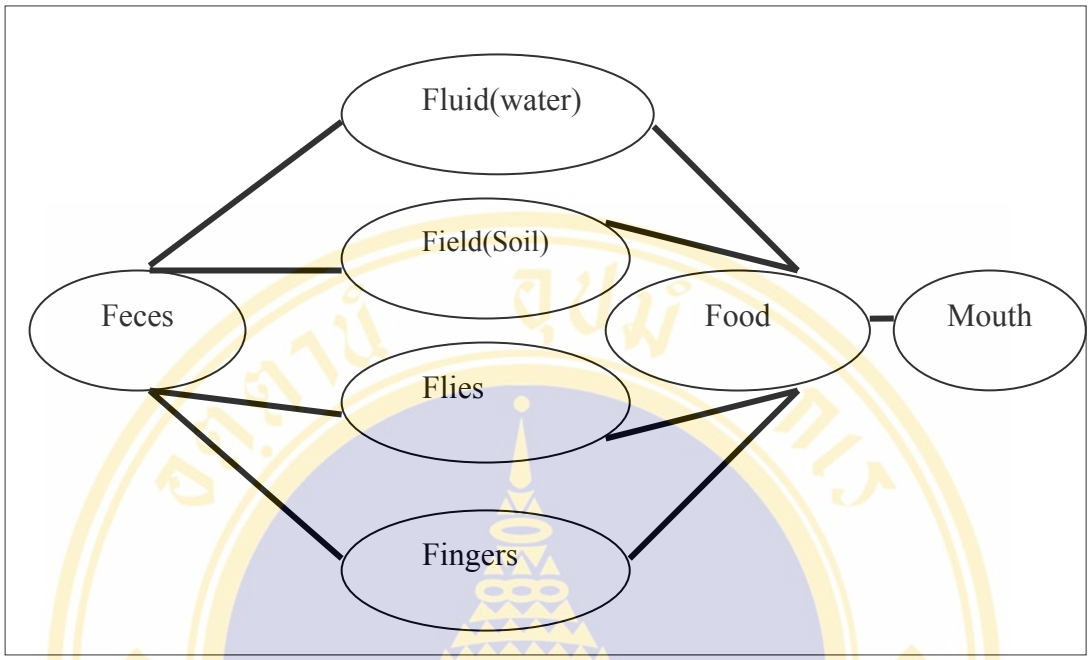
the passing of frequently occurring watery stools without any visible signs of blood. The stool is clear and termed “rice water stool” because it looks like rice water. (20) Of the three types, acute watery is the most common killer; however, one hundred percent of these death are preventable by standard case management. An example of acute watery diarrhea is Cholera. (19)

2.1.2 Clinical symptoms of diarrhea

As dehydration increases, signs and symptoms develop. These include thirst, restless or irritable behaviors, dry mucous membranes, decreased skin turgor, sunken eyes, sunken fontanelle (in infants), absence of tears when crying vigorously, moist and pale hands and feet, no urine flow for several hours, and drinks poorly. (3)

2.1.3 Factor increasing the risk of diarrhea diseases

The epidemiological pathway of diarrhea diseases could be transmitted person-to-person (direct transmission) by means of direct contact or a disease can be transmitted indirectly through a contaminated water supply. These are complex and often inter- related; whereby the improvements in water supply, excreta disposal or hygiene behaviors had resulted in the percentage reduction of diarrhea incidence among children (Figure 2). (21)



Source: Wagner and Lanois, 1958

Figure 2 Transmission pathways of fecal-oral rout diseases (6 F-Diagram)

People in developing countries suffer most from infectious forms of diarrhea. Most infections pass through a fecal-oral route. These are conditions that arise most frequently in the developing world, though they affect both rural and urban populations. (22)

The use of water in hygiene is an important preventive measure but contaminated water is also an important cause of diarrhea. Diarrhea is more common when there is a shortage of clean water for drinking, cooking and cleaning and basic hygiene is important in prevention. Water contaminated with human feces for example from municipal sewage, septic tanks and latrines is of special concern. Animal feces also contain microorganisms that can cause diarrhea. Diarrhea can also spread from person to person, aggravated by poor personal hygiene. Food is another major cause of diarrhea when it is prepared or stored in unhygienic conditions. Water can contaminate food during irrigation, and fish and seafood from polluted water may also contribute to the disease. (23)

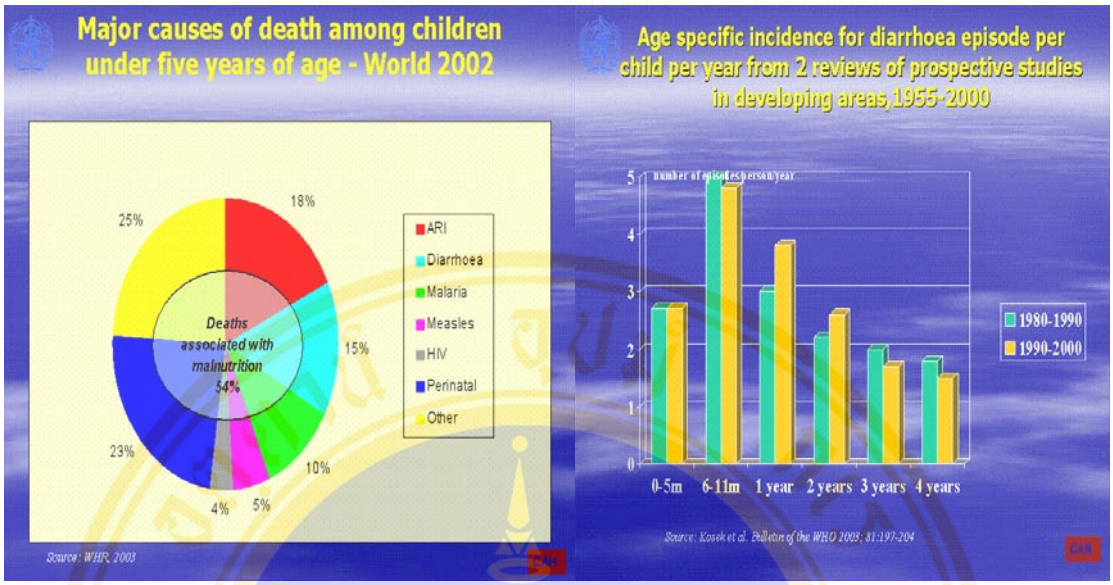
In Vietnam during the 2001-2005 period, many documents, directives and programs on food safety were approved and promulgated. Vietnam has no national strategy or policy for managing the quality of food hygiene and safety. The prevalence of food poisoning is high in Vietnam. According to the WHO, the number of poison victims is estimated at 8 million per year, about 10% the total population(compares with 0.125% per year in Canada or 0.3% per year in Japan). On average, 81% of the population use a clean water source, but the percentage is lower in the Northwest, Mekong Delta, and Central Highlands Solid waste. (8)

2.1.4 Situation of diarrhea among children under 5 years old

Present global situation of diarrhea diseases

Diarrhea occurs world-wide and causes 4% of all deaths and 5% of health loss to disability. It is most commonly caused by gastrointestinal infections which kill around 2.2 million people globally each year, mostly children in developing countries. (23) It is the second among the most common causes of death in children. Death is usually due to loss of fluid and electrolytes. It is an important factor in development of malnutrition. It is one of the principal causes of morbidity and mortality among children in the developing world. (3)

For children under 5 years of age in developing areas and countries, there is a median of 3.2 episodes of diarrhea/child/year. This mortality study revealed that 4.9 children per 1000 per year in these areas and countries died as a result of diarrhea illness in the first 5 years of life, a decline from the previous estimates of 13.6 and 5.6 per 1000 per year. The decrease was most pronounced in children aged less than 1 year. Despite improving trends in mortality rates, diarrhea continues to account for countries, being responsible for 1.5 million deaths per year. (Figure 3)



Source: WHO 2003 (24, 25)

Figure 3 Major cause of death among children under five years of age- World 2002 and age specific incidence for diarrhea episode per child per year, 1955-2000.

Infectious diseases and especially diarrheal diseases have been noted to have an adverse effect on the growth of underprivileged children in developing countries. Diarrheal diseases have been estimated to account for 10-80% of growth retardation in the first few years of life, with the magnitude of effect possibly modified by other factors, such as the adequacy and source of dietary intake, treatment and feeding practices during and following illness and the opportunity for catch-up growth after illness. (26)

Diarrhoea is an important cause of death and illness among children in developing countries. However, it remains controversial as to whether diarrhoea leads to stunting. The prevalence of stunting at age 24 months varied by study (range 21 - 90%), as did the longitudinal history of diarrhoea prior to 24 months (incidence range 3.6 - 13.4 episodes per child-year, prevalence range 2.4 - 16.3%). In this assembled sample of 24-month-old children, the proportion of stunting attributed to ≥5 diarrhoeal episodes before 24 months was 25% (95% CI 8 - 38%) and that attributed to being ill with diarrhoea for ≥2% of the time before 24 months was 18% (95% CI 1 - 31%).

These observations are consistent with the hypothesis that a higher cumulative burden of diarrhoea increases the risk of stunting. (27)

Present situation of diarrhea diseases in Vietnam

In Vietnam, the disease has been tackled since 1960, with the development of drinking water and latrine program, up to present diarrhea disease represent the basic causes of morbidity and mortality, specially among infants and child under five years old (Table 2).

According to the annual report of the Ministry of Health- Vietnam, in 2006 diarrhea disease was placed second in the top-ten leading causes of morbidity among children in almost all provincial and district hospitals. The number of episodes of diarrhea per child per year is 1.4 and the rate of children under five years of age died of diarrhea was 19.11 percent. (28)

Table 2 Three main diseases of death among children under five years old in Vietnam

Diseases	Mortality rate per 100,000 children			
	2006	2005	2004	2003
Pneumonia	0.88	1.21	1.52	1.09
Poisoning	0.12	0.18	0.20	0.34
Diarrhea	0.02	0.02	0.02	0.01

Source: Health Statistic Yearbook 2006; 154 (28)

Pathogen prevalence and antimicrobial susceptibilities are essential for the rational development of preventive strategies for diarrheal diseases, but little recent information from Vietnam is available. We prospectively studied the prevalence of enteric pathogens in children less than 5 years of age with acute diarrhea and in non diarrhea controls in a city hospital in Hanoi, Vietnam for 1 year. Result showed that

detection rates of viral pathogens among cases and controls were 31% and 3% for rotavirus, 12% and 1% for astrovirus and 4% and 1% for adenovirus. For bacterial pathogens, Aeromonas, Shigella, Salmonella, Campylobacter and enterotoxigenic E. coli were isolated from cases and controls in 15% and 8%, 9% and 1%, 7% and 1%, 4% and 0%, and 3% and 0%, respectively. The Viral etiologic agents especially rotavirus were the most important cause of acute diarrhea in children less than 5 years of age in Hanoi. The burden of rotavirus in young children in Hanoi warrants consideration of using the recently released rotavirus vaccine. (29)

According to report 2007 five leading causes of morbidity in Cau Giay district are shown in Table 3.

Table 3 Five leading causes of illness among children at age between two and five years old, Cau Giay district 2007

Diseases	Morbidity	Morbidity rate/1,000 children
Acute Diarrhea	2,291	166.58
Pneumonia	1,020	74.17
Chicken-pox	89	6.47
Dysentery	60	4.36
Influenza	20	1.45

Source: Report 2007, Cau Giay district (30)

2.2 Theoretical model

The Health Belief Model (HBM)

This study applies the HBM to construct a conceptual model because the HBM focuses on preventive behavior in health.

The health belief model was initially developed in the 1950s by group of social psychologist at the U.S. Public Health Service in an effort to explain the

widespread failure of people to participate in programs to prevent or to detect disease. Later, the model was extended to apply to people's responses to symptom (31) and to their behavior in response to diagnosed illness, particularly compliance with medical regimen. (32) For more than four decades, this model has been one of the most influential and widely used psychological approaches to explain health related behavior. The health belief model is one of the most widely use public health theoretical frameworks. It can explain health behavior modifications and can function as the foundation for the health education intervention. (31)

During the early 1950s, academic social psychology was engaged in developing an approach to understanding behavior that grew out of a confluence of learning theories derived from two major sources: Stimulus Response Theory and Cognitive Theory. Stimulus Response theorists believe that learning results from events which reduce physiological drives that activate behavior. Cognitive theorists, on the other hand, emphasize the role of subjective hypotheses and expectations held by subject. In this perspective, behavior is a function of the subjective value of an outcome and of the subjective probability, or expectation, that a particular action will achieve that outcome. Cognitive theorists, along with behaviorists, believe that reinforcements, or consequences of behavior, are important. The expectancy was further delineated in terms of the individual's estimate of personal susceptibility to and severity of an illness, and of the likelihood of being able to reduce that threat through personal action. (32, 33)

In general, it is now believed that people will take action to prevent, to screen for, or to control ill-health condition, if they believe it would have potentially serious consequences, if they believe that a course of action available to them would be beneficial in reducing either susceptibility to or the severity of the condition, and if they believe that the anticipated barriers to taking the action are outweighed by its benefits. (Table 4)

Table 4 Key concepts and definitions of health belief model

Concept	Definition	Application
Perceived susceptibility	One's belief regarding the chance of getting a condition	Define population at, risk level Personalize risk based on a Person's characteristics or behaviour Make perceived susceptibility more consistent with an individual's actual risk
Perceived severity	One's belief of how	Specify consequences of the risk and the conditions
Perceived benefits	One's belief in the efficacy of the advised action to reduce risk or seriousness of impact	Define action to take: how where, when, clarify the positive effects to be expected
Perceived barriers	One's belief about the tangible and psychological cost of the advised action	Identify and reduce perceived barriers through reassurance, correction of misinformation, incentives, assistance
Cues to action	Strategies to action One's" readiness"	Provide how-to information, promote awareness, employ reminder systems

The consideration of three aspects of the HBM is most needed: components of the HBM, the relationship between HBM components, and how to use the HBM to understand and change behaviors with public health significance.

Components of the HBM

Perceived susceptibility

Individuals were believed to vary widely in their acceptance of personal susceptibility to condition. At one extreme might be the individual who denies any

possibility of his contracting a given condition. In a more moderate position, it is the person who may admit to the "statistical" possibility of a disease occurrence, but a possibility that is not likely to happen. Finally, a person may express a feeling that he is in real danger of contracting the condition. In short, as it has been measured, susceptibility refers to the subjective risks of the contracting a condition.

Perceived severity

The seriousness of a given health problem may also vary from person-to-person. The degree of seriousness may be judged both by the degree of emotional and arousal created by the thought of a disease as well as by the kinds of difficulties the individual believes a given health condition will create for him.

A person may see a health problem in term of its medical or clinical consequence. He would thus be concerned with such question as whether a disease could lead to his death, or reduce his physical or mental functioning for long periods of time, or disable him permanently. However, the perceived seriousness of a condition may, for given individual, include such broader and more complex implications as the effects of the disease on his job, on his family life, and on his social relations. Thus, a person may not believe that tuberculosis is medically serious, but may nevertheless believe that its occurrence would be serious if it created important psychological and economic tensions with his family.

Perceived susceptibility and severity having a strong cognitive component are at least partly dependent on knowledge.

Perceived benefits of taking action and barriers to taking action

The acceptance of one's susceptibility to s disease that in also believed to be serious was thought to provide a force leading to action, but not defining the particular course of action that was likely to be taken. The direction that the action takes place was thought to be influenced by beliefs regarding the relative effectiveness of known available alternatives in reducing the disease threat to which the individual feels subjected. His behavior was thus thought to depend on how beneficial he

believed the various alternatives would be in his case. Of course, there must be available to him at least one action that is subjectively to possible. An alternative is likely to be seen as beneficial if it relates subjectively to reduction of one's susceptibility or to seriousness of an illness. Again, the person's beliefs about the availability and effectiveness of various course of action, and not the objective facts about the effectiveness of action, determine what course he will take in return, his beliefs in this area are undoubtedly influenced by the norms and pressures o his social groups.

An individual may believe that a given action itself as being inconvenient, expensive, unpleasant, painful or upsetting. These negative aspects of health action serve as barriers to action and arouse conflicting motive of avoidance. Several resolution of the conflict was thought to be possible, if the readiness to act was likely to be taken. If, on the other hand, the readiness to act was low while the potential negative aspects were seen as strong, the negative aspects functioned as barriers to prevent action.

Where the readiness to act was great and the barriers to action were also great, the conflict was thought to be more difficult to resolve. The individual was highly oriented toward acting to reduce the likelihood or impact of the perceived health danger. He was equally highly motivated to avoid action since he saw it as highly unpleasant or even painful.

Socio- demographic

Diverse demographic, socio-psychological, and structural variables may affect the individual's perceptions and thus indirectly influence health-related behavior. Specifically, socio-demographic factors, particularly educational attainment, are believed to have an indirect effect on behavior by influencing the perception of susceptibility, severity, benefits, and barriers.

Using the HBM to address public health concerns

The HBM has been used extensively to determine relationships between constructs and behaviors of public concern as to inform interventions. A

comprehensive review of all work using the HBM to address health behaviors in beyond the scope of this study. In this section, we discussed about present situation on diarrhea children at age between two and five years old among related mothers' diarrhea preventive behaviors, and showed how key HBM components are associated with these behaviors. (32)

The Health Belief Model involves four constructs representing the perceived threat and net benefits: perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. These concepts were proposed as accounting for people's readiness to act. An added concept, cues to action, would activate that readiness and stimulate overt behavior. A recent addition to HBM is the concept of self- efficacy, or one's confidence in the ability to successfully perform an action. (31) (Figure 4)

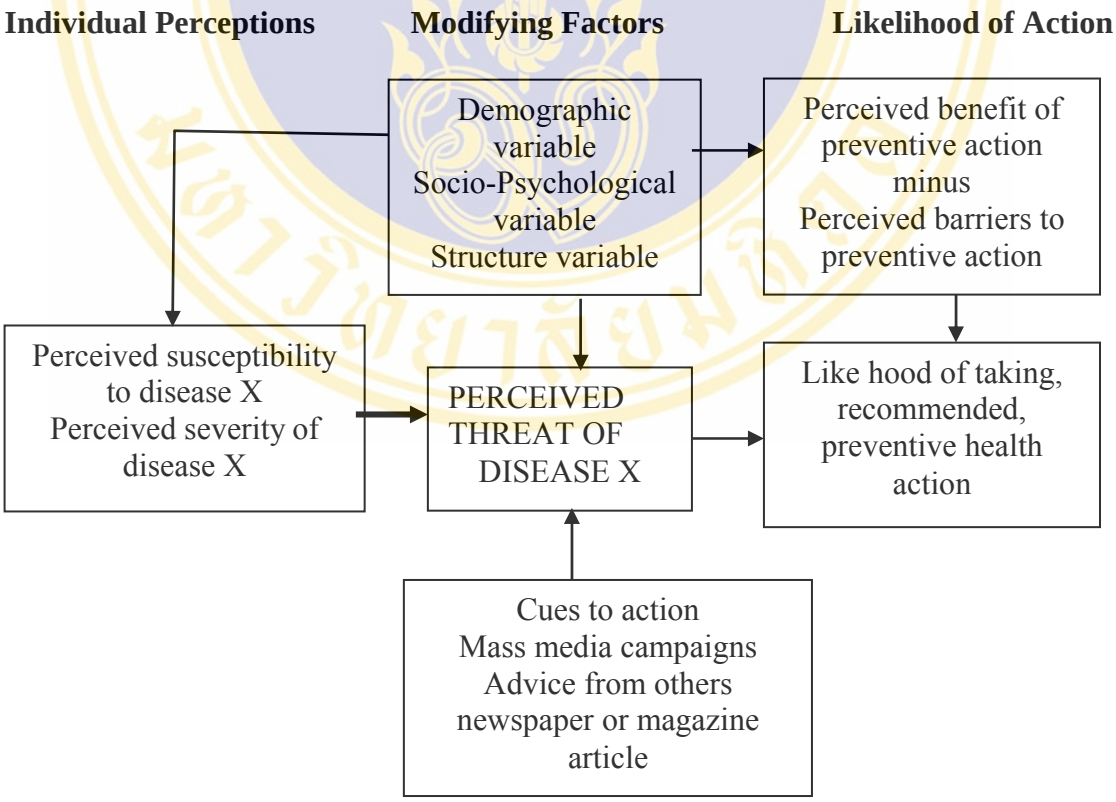


Figure 4 The Health Belief Model (HBM)

2.3 Studies regarding the dependent variable

According to the World Health Organization, over 2 million children die each year in developing countries from diarrhea diseases. The illness can be caused by a wide variety of infections, in particular due to the consumption of contaminated food and water. Diarrhea quickly spreads and infects populations around the world. It not only threatens the health of people, but also brings great loss to society and the economy. It is listed as one of the most important global sanitation problems. The damage is especially high in development counties. Diarrhea is second cause of disease of children all over the world. (23)

WHO also mentioned that diarrhea can be prevented by pursuing multicultural efforts by improving access to clean water and clean sanitation, promoting hygiene education, exclusive breast-feeding, improved weaning practices, immunizing all children, especially against measles, using latrines, keeping food and clean water, washing hands with soap (the baby's as well) before touching food, and by sanitary disposal of stools. The above is most important message that can help parents, governments and communities to prevent almost all of these deaths and most of the malnutrition caused by diarrhea. The key factors are unclean water, dirty hands at mealtime and spoilt food. (1)

Hands washing

Parents can help to protect young children against diarrhea by adopting certain hygiene practices. One very important practice is hand-washing. Hands should be washed carefully after defecation, before handling food and before feeding, and after throwing away children's feces. Good hand washing requires the use of soap (or a local substitute), and plenty of water.

Luby SP et al undertook a randomized controlled trial to assess the effect of hand washing promotion with soap on the incidence of acute respiratory infection, impetigo, and diarrhea. Hand washing with soap prevents the two clinical syndromes that cause the largest number of childhood death global-namely, diarrhea and acute

lower respiratory infections. Hand washing with daily bathing also prevents impetigo. (34) On current evidence, washing hands with soap can reduce the risk of diarrheal diseases by 42-47% and interventions to promote hand washing might save a million lives. (35)

Use of water for hygiene and drinking

The provision of safe drinking water supply to all the communities at the national level in all the developing countries, where diarrhea continues to be major cause if morbidity and a leading cause of death is important. This needs the commitment of policy and decision makers and politicians of poor countries to allocate adequate resources for basic needs of life, like water and sanitation. It is only then that sizable reduction in diarrhea morbidity will be achieved.

Most infectious agents that cause diarrhea are transmitted by the fecal-oral route. This includes transmission by contaminated drinking water or contaminated food, and person-to-person spread. A plentiful supply of clean water helps to encourage hygienic practices, such as hand washing, cleaning of eating utensils. Theses practices can interrupt the spread of infectious agents that cause diarrhea. Clean water is essential, however, for drinking and for preparing food. (18)

In one study about diarrhea prevention in Kenyan school, United Stated, they implemented a pilot project in a school in May 2003. Teachers taught students about safe water and hygiene. Safe water storage vessels were placed between classrooms. Two large water tanks for hands washing were positioned by the kitchen and latrines. The vessels were filled daily with water, which was treated with bleach and monitored for free chlorine residuals. Daily student care logs at the local clinic were reviewed. Clinic visits for diarrhea peaked during the January through March period in 2002 at 130 and in 2003 at 71, but in 2004, after project implementation, only 13 diarrhea episodes were recorded. The project saved the school about $5.49 per student per year. The project has been expanded to 70 schools, and an evaluation is planned. (36)

Use of latrines

Human feces should be disposed of in a way that prevents them from coming into contact with hands or contaminating a water source. This is best a achieved through regular use of a well-maintained latrine. The proper use of latrines can reduce the risk of diarrhea to almost the same extent as improved water supplies, but the greatest benefit occurs when improvement in sanitation and water supply are combined and education is given on hygienic practices. (37)

In Vietnam by the national program on clean water and environmental sanitation(1999-2005) indicated that there were about more than 6 million households with hygienic toilets, and 70% of rural households had hygienic toilets and practiced good personal hygiene. The survey found that the proportion of schools having public hygienic toilets is low, 42% of all schools nationwide, lower than the coverage of households (50%). Many waterborne diseases related to sanitation conditions, mainly diarrhea. (8)

Take ORS

Approximately two-thirds of diarrheal deaths are attributable to dehydration and, therefore preventable by adequate fluid therapy. Thus the recognition and treatment of dehydration are at the heart of case management of diarrheal diseases. The focus in training health workers and parents is on the recognition of clinical sign and symptoms of dehydration (sunken eyes, thirst and dry mouth, sunken fontanelle in infants, reduced skin turgor, low urinary output, apathy and lethargy), assessment of severity of dehydration, and appropriate treatment.

In many counties, diarrheal diseases remain a major cause of infant and child mortality. In appropriate treatment of diarrhea in this age group is a widespread problem in both the public and private sectors. A survey on health centers in South East Asia countries found that in some locations, less than half of children were diagnosed with simple watery stool diarrhea, received Oral Rehydration Therapy (ORT), while over 80% received hydroxyquinolone, a so-called anti diarrheal drug known to have dangerous side effects. (38)

In order to prevent dehydration children with diarrhea should be given fluids containing salts, such as ORS solution, salted drink (salted rice water or a salted yoghurt drink), vegetable or chicken soup with salt, a home made solution contain salt and common sugar (SSS).

In a study about awareness of diarrheal disease control in rural and urban areas of Bihar India showed that all aspects were poorly known to the rural community, particularly the illiterates and a large segment of literate of Bihta block. Rural people were significantly less aware than their urban counterparts regarding value of prolonged breast feeding, spoon feeding rather than bottle feeding, using hand pump and tap water, etc. Generally, parents thought anti-diarrheal drug was a must for treatment. Knowledge regarding ORS and its use in diarrhea and vomiting was very poor and significant difference ($p<0.001$) in awareness was observed between educated and illiterates. Majority parents did not know the correct method of preparation and uses of ORS. (39)

Food preparation

One study about diarrhea prevention through food safety education in India was indicated 52% reduction in the incidence of diarrhea. The environmental sanitation and personal hygiene score of most of the households and mothers improved. (40)

The study of Tomoko Hiruta in rural Ratchaburi Province, Thailand showed, nearly 100% of the caregivers answered that they always washed cups, dishes for children at each meal and wash nursing bottle with boiled water before preparing milk. The storage of pathogen- containing cooked foods may deposit pathogens on kitchen surfaces, which can then contaminate other foods and utensils. Cooking food rapidly in large quantities may involve unhygienic practices and appropriate use of ingredients or utensils, resulting in food contamination with pathogens .The result from this study showed that caregivers have high concern on washing utensils especially nursing bottle as an important diarrhea preventive behavior for infant. (41)

2.4 Studies regarding the independent variables

2.4.1 Socio-demographic factors

The Socio-demographic factors of mothers have been found to have a great influence on occurrence of diarrhea disease in children and their practices on management of acute diarrhea at home, in several studies. These factors include ages, occupation, and education of mothers, monthly income, family size, and number of children under six years old.

Five hundred mothers, who brought their children to children' hospital in Bangkok- Thailand, were interviewed for their demographic characteristics, family sanitary facility, knowledge, attitudes and practices on diarrhea. It was found that mothers who were either illiterate or who were less educated had a higher incidence of diarrhea episodes among their children (p=0.0001). Families had an income of more than 4,000 Baht per month showed a reduction in the number of episodes of diarrhea. (42) Another study on the factors associated with incidence of acute diarrheal disease in children under five years of age in Khon Kaen Province, Thailand showed association between household income and incidence of diarrhea in children under five, but there was no significant association and between education and occupation, and incidence of diarrhea in under 5 children. (43) One study demonstrated an association among household income, occupation and diarrheal diseases occurrence among children under 5, but no association between education of caregivers and diarrhea. (44)

Another study also showed that poverty, low parental schooling, poor sanitation, lack of water supply, crowding, early childbirth, short birth intervals, lack of breast feeding, and malnutrition were factors associated with diarrhea. The ultimate control and prevention of diarrhea disease lies in an overall improvement in personal hygiene, water supply, food hygiene, waste disposal, and related factors. Such change demands a holistic approach focusing on improving education, income, environmental sanitation, childcare practice, and health services. (45)

According to study of Dung M about factor related to mother' home practices on management of acute diarrhea in children under five years old, in Nam Dinh city, Vietnam showed that the distribution of family size and number of children under five years old were significantly associated with mothers practice score, where r_s for total number of family member was equal to 0.305 (p-value< 0.001) and r_s for total number of children was equal to 0.44 (p-value < 0.001), respectively. (46)

2.4.2 Mother's perception related to diarrhea

A study conducted by Suknirin C. (1991) on the factors affecting diarrheal preventive and self care behavior of the people in Yasothon province, had demonstrated that factors including knowledge, perception of the dangers and preventive practices, availability of resources, having time to practice and mount of household income had a positive relationship that was statistically significant to preventive practices. (47)

The study of parents' perception of children' risk for water borne illness in USA, in 2002. It showed that people' risk perceptions and motivations to adopt preventive behavior is important in preventing the spread of recreational water borne illnesses and other emerging infectious disease. The higher perception of diarrhea in children increased the home practice score on childhood diarrhea and there was positive statistically significant correlation between mothers' perception of diarrhea in children and their home practice on management of acute diarrhea in children. (48)

2.4.3 Cues to action

Previous study on factors related to mothers' home practices on management of acute diarrhea in children by Nguyen Manh Dung, Vietnam showed that mothers who received information about how to recognize dangerous signs, avoiding antibiotic and anti diarrhea drugs, was at low level as expected. Health personnel were the people who usually give healthy information to mothers' information about diarrhea in children. Cues to action support the mothers for home practice were also significantly correlated with their home practice on management of

acute diarrhea in children. Mothers who received more information about management of acute diarrhea in children had higher level of practice. (46)

According to the study of Tomoko Hiruta in rural Ratchaburi Province in Thailand, almost mothers got information about diarrhea preventive behavior from the mass media (93.50%) and health personnel (91.34%). However, in this study, the highest good preventive behavior group got information from their friends (67.06%), and the next group was from family members (63.64%). Both groups had high proportion of good preventive behavior. (41)

CHAPTER III
RESEARCH METHODOLOGY

3.1 Study design

This study is a cross- sectional descriptive study to identify the diarrhea preventive behavior of mothers with children at age between two and five years old at Sao Mai school, Cau Giay district, Hanoi City, Vietnam.

3.2 Study area

Cau Giay is an urban district of Hanoi, the capital city of Vietnam. It is located 10 kilometers west of Hanoi, and occupies an area of 12.04 square kilometers. Cau Giay district is divided into 8 sub-districts (Nghia Do, Quan Hoa, Dich Vong, Trung Hoa, Nghia Tan, Mai Dich, Yen Hoa, Dich Vong Hau).The total population is 147,000, and 18,000 households. The number of Sub-district health centers is 8 and each covers about 27,000 people. There are 6 kindergarten schools in this district. Most of them are private school with 30 to 100 children, only Sao Mai school is a public school with total children is 504 children at age between two and five years old. It is divided into 10 classrooms, and there are no children under 2 years old. Therefore, the study will be carried out in Sao Mai school, Cau Giay districts because it is a public school, and is in Cau Giay districts with high diarrheal disease occurrences among under five years old (Source: Head of people's committee Cau Giay district and report Cau Giay district, 2007). (30)

3.3 Study population

The study population were mothers with children from 2 to 5 years old at Sao Mai school, Cau Giay district, Hanoi city in Vietnam.

Inclusion criteria

. Mother age is ≥ 18 yeas old

. Mothers have children at age between two and five years old.

. Mothers who are willing to participate in this study

3.4 Sample size

The sample size were calculated by using the following statistical formular

$$n = \frac{Z^2NP(1-P)}{Z^2P(1-P)+ (N-1)E^2}$$

Where N= 504

n = number of sample size

Z = Standard normal deviation set at 1. 96 corresponding 95% confidence interval (α equal to 0.05)

P = 0.6 which was the estimation of mothers' good behavior for diarrhea preventive behavior in this study population from the pre-test data

1- P = 1- 0.6=0.4

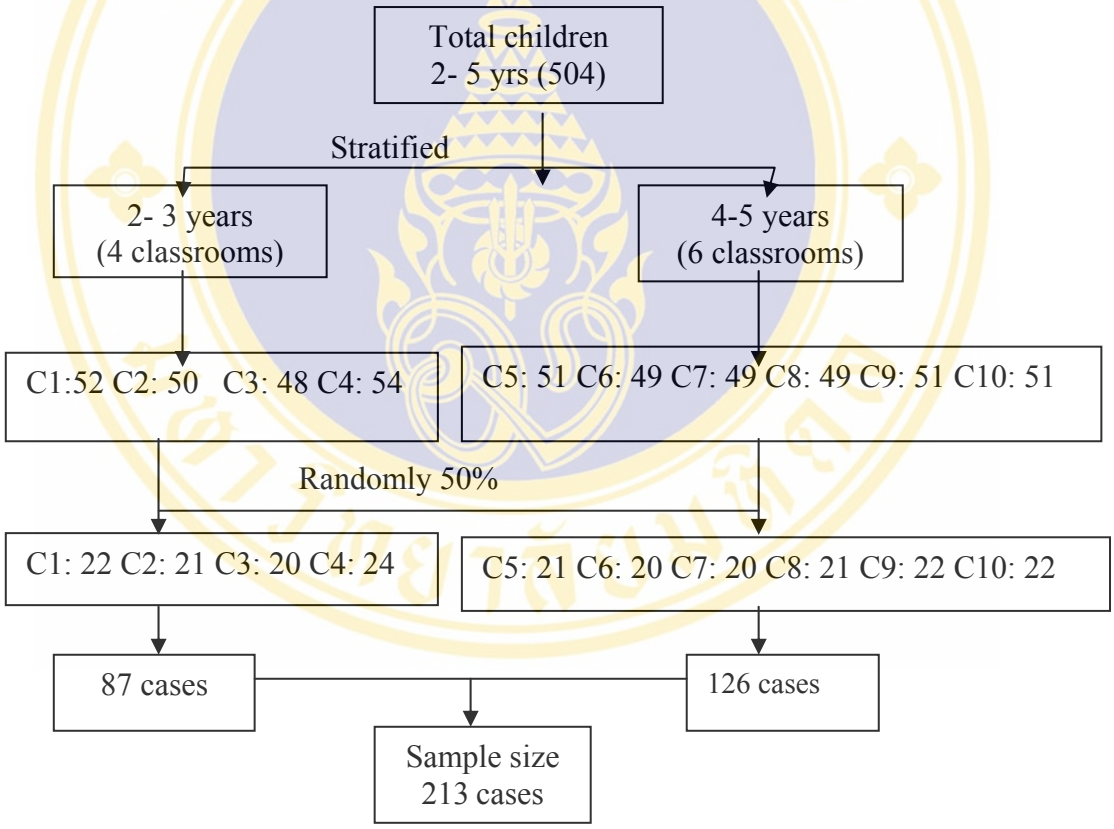
E=0.05 (allowable error)

$$n= \frac{(1.96)^2.504.(0.6).(0.4)}{(1.96)^2.(0.6).(0.4)+ (504-1).(0.05)^2} = 213$$

The required sample in this study was at least 213 mothers with children at age between two and five years old.

3.5 Sampling techniques

There were 10 classrooms in Sao Mai school with total of 504 children at age between two and five years old. First, this population was stratified into two groups: mothers of 2-3 years old and mothers of 4-5 years old. There were 4 classrooms of children 2-3 years old, and 6 classrooms of children 4-5 years old. Second, they were randomly selected by simple random sampling in each classroom of at least 50% to be the target sample of at least 213 children.



3.6 Research instrument

The research instrument is a structured questionnaire. It consists of four parts as follows:

Part 1: Socio-demographic characteristics: Socio- demographic factors of mothers are age, education levels, occupation, family income per month, family size, and number of children at age between two and five years old in the family.(Contains 6 items: Q1-Q6)

Part 2: Mother's perception related to diarrhea: They are perception of benefit and barrier to perform diarrhea preventive behavior and perception of susceptibility and severity of diarrheal disease.(Contain 26 items: Q7-Q32). The perception part contained 7 questions for perceived benefit, 7 questions for perceived barrier, 6 questions for perceived susceptibility and 6 questions for perceived severity.

Part 3: Mother's cues to action on diarrhea preventive behavior: sources of diarrhea preventive information that mother perceived television, radio, newspaper, magazine, internet, health education program from health center or hospital (free of charge, pay money, others), personnel such as health personnel (doctor, nurse, midwife, health workers, health volunteer, others), friends, neighborhood, family members (husband, parents, and relatives), and others. (Contain 1 item: Q33)

Part 4: Mother's diarrhea preventive behavior: It consists of hand washing, food preparation, use water for hygiene and drinking, using latrine, and using ORS. (Contain 19 items: Q34- Q52). Each question had 3 options: Always, sometimes and never.

Scoring system

Perception: They are three answers for each question, with the given score 3 means "agree", 2 means "not sure", and 1 means "disagree" for positive

statements and vice versa for negative statements. Perception was divided into two groups by median

Cues to action: One score is given to each source of information. The cues to action will be divided into two groups by median

Preventive behavior: One score is given to proper behavior and 0 score for improper behavior. The preventive behavior is divided into two groups by median

Validity and reliability test

Questionnaire were constructed and revised based on some reference books and recommendation from thesis advisors. Before actual data collection, the questionnaires were pre-tested for reliability by selecting 30 mothers of children at age between two and five years at Son Ca school, Cau giay district, Hanoi city, Vietnam. Cronbach's Alpha was used to determine the reliability of perception. Then the questionnaire was revised for final data collection. Reliability of mother's perception part related on diarrhea was 0.72.

3.7 Data collection

A courtesy call with officer-in charge of Sao Mai school, Cau giay district, Hanoi city, Vietnam was initially done prior to the conduct of actual study

Researcher made an appointment to interview the participants after class (4 p.m) via the teacher of the classroom. After getting the approval from the participants through signing participant's information sheet and consent form, data was collected by trained interviewer face-to-face interview using a structured questionnaire. The following steps were carried out prior to conduct of data collection:

Three staffs were recruited to become interviewers of this study. They were trained for one days on the proper way of collecting the data, such as explaining the purpose of data collection and explaining each item without including bias to the

respondents, how to check the data for its completeness, and taught them on how to handle difficulties felt by the participant during interview process. After completing the training course, the staff interviewed mothers at Sao Mai school.

Data collection was conducted from January 2 to 30, 2009.

3.8 Data processing and analysis

The data were analyzed by using Minitab software program. There were two main parts in data analysis:

Part 1: To describe the frequency and percentage distribution, median, mean and standard deviation, maximum and minimum values of each independent and dependent variables.

Part 2: To assess association between mothers' diarrhea preventive behavior and socio- demographic, mother's perception related to diarrhea, and the cues to action by using Pearson chi-square test. The significance level for this study was set at 5%. Spearman Correlation was also used to determine an association between socio-demographic factors, perception score, cues to action score and diarrhea preventive behavior score

CHAPTER IV
RESULTS

This cross sectional study was conducted to describe the diarrhea preventive behavior of mother with children aged between two and five years old at Sao Mai school, Cau Giay district, Hanoi city in Vietnam. Two hundred and sixty mothers with children aged between two and five years old were interviewed face to face at Sao Mai school during January 2009.

This chapter presents the results of the study in the following section

Part 1: Describes the frequency and percentage distribution, mean and standard deviation, maximum and minimum values of independent and dependent variables

Part 2: Assesses the association between mother's diarrhea preventive behavior and socio- demographic, psychosocial factors, and the cues to action by using Pearson Chi-square test. The confidence level for this study was set at 95% (p-value< 0.05).

Part I: Description of independent and dependent variables

4.1 Mother's socio-demographic factors

Age of mothers

Table 5 shows that the majority of mothers (59.23 %) were 30-39 years old (59.23 %). The ranges of mothers' age were from 22 to 48 years with a mean of 31.3 years. No mothers were aged less than 20 years.

Educational levels of mothers

Almost 55% of mothers had a bachelor is degree. Only a few (3.85 %) had primary school education, 3.46 % of mothers had no schooling; and 15% of mothers were at above degree.

Mother's occupation

When the occupation of the mothers was studied, it was found that many mothers (65.38%) were company employees. The housewife and self- employed group comprised 25%.

Mother's family income

For the economic status, 26.92% of the families earned less than $300 per month. This is most (46.15%) of them earned 300$ to 499$; 13.85% earned 500$ to 699$, and 13.08% of the families were in the high- income group which earned more than 700$ per month. The mean income was $ 403.7 per month.

Family size

The distribution of family size was divided into two groups as less than or equal to 4 persons or fewer (85%) and more than 4 persons (15%).

Number of children at age between two and five years old in the family

Table 5 shows that 68.08% mothers had 1 child and 31.92% mothers had 2 children.

Table 5 Number and percentage of respondents classified by socio-demographic factors

Socio-demographic factors	Number (N=260)	Percentage (%)
Age of mothers (years)		
<20	0	0.00
20-29	90	34.62
30-39	154	59.23
≥40	16	6.15
Mean=31.35 SD= 4.35 Min= 22 Max= 48		
Educational levels of mothers		
No school	9	3.46
Primary school	10	3.85
Secondary school	15	5.77
High school	44	16.92
Bachelor degree	143	55.00
Other (Above degree)	39	15.00
Occupation		
Self- employed	65	25.00
Housewife/Unemployed	21	8.08
Farmer or Agricultures	4	1.54
Company employee (Labor, others)	170	65.38
Family Income		
<300$	70	26.92
300-499$	120	46.15
500-699$	36	13.85
≥700$	34	13.08
Mean=403.7 SD=210.6 Min=100 Max=1000		
Family size		
≤4 persons	221	85.00
>4 persons	39	15.00
Mean= 3.82 SD=0.788 Min= 3 Max=7		
Number of children at age between two and five years old in the family		
1	177	68.08
2	83	31.92
Mean=1.31 SD= 0.46 Min=1 Max=2		

4.2 Mothers perceptions relating on diarrhea

Mother's perceived benefit

Regarding mothers' perceived benefit, all of the mothers had positive perception to each item. About 90% of mothers agreed with the statements of perceived benefit particularly the easiness of preparing boiling water to children. The details are shown in Table 6.

Mother's perceived barrier

With regard to perceived barrier, all items were negative statement. Thus the disagree answer showed the mothers perceived less barrier to perform preventive behavior for diarrhea. About 70% of mothers were less difficultly to prepare hygienic food, buy fresh food to cook, and boil water for their children. Less than 50% of mothers perceived fewer barriers of giving ORS and acquiring knowledge to give good care for children.

Mother's perceived susceptibility

Most mothers positively perceived susceptibility for diarrhea of young children. About 80% of mothers perceived that children aged 2 to 5 years old were prone to get diarrhea if they ate unclear food and drank unclean water. The children with diarrhea were more sicker than adults. Nearly half of the mothers (44%) agreed or doubted about the effectiveness of washing before feeding in prevention of diarrhea.

Mother's perceived severity

Most mothers positively perceived the severity of diarrheal disease among children aged 2 to 5 years old. However, some 23.46% of them agreed that diarrhea did not affect a child's nutritional status or cause any problems, and 18.08% respectively

Table 6 Percentage of respondents classified by mothers' perceptions about diarrhea by items (N=260)

Statements/ Items	Agree n (%)	Not sure n (%)	Disagree n (%)
Perceived benefit			
- Prevention on diarrhea could reduce death and malnutrition among children at age between two and five years old	250 (96.15)	8 (3.08)	2 (0.77)
- Washing hands before cooking for children at age between two and five old can prevent children from diarrhea.	247 (95.00)	12 (4.62)	1 (0.38)
- Prevention of diarrhea for children at age between two and five years old, the children will have normal growth.	250 (96.15)	10 (3.85)	0 (0.00)
- Prevention of diarrhea for children at age between two and five years old could reduce the expenses from treatment	244 (93.85)	10 (3.85)	6 (2.31)
- When the children have diarrhea, ORS can treat dehydration.	249 (95.77)	10 (3.85)	1 (0.38)
- Using latrine is necessary to prevent diarrhea	231 (88.85)	21 (8.08)	8 (3.08)
- It is easy to prepare boiling water to children.	258 (99.23)	2 (0.77)	0 (0.00)

Table 6 (Cont.) Percentage of respondents classified by mothers' perceptions about diarrheaby items (N=260)

Statements/ Items	Agree n (%)	Not sure n (%)	Disagree n (%)
Perceived barrier			
- It is difficult to prepare hygiene food for children	25 (9.62)	34 (13.08)	201 (77.30)
- Diarrhea among children at age between two and five years old can can not be prevented because mothers have no money to buy fresh food to cook for children.	33 (12.69)	28 (10.77)	199 (76.54)
- Diarrhea among children at age between two and five years old can not be prevented because both mothers and children in poor sanitation areas.	96 (36.92)	34 (13.08)	130 (50.00)
- Diarrhea disease among children at age between two and five years cannot be prevented because mothers have no time to boil water for children.	61 (23.46)	8 (3.08)	191 (73.46)
- Diarrhea among children at age between two and five years old cannot be prevented because mothers don't have enough knowledge to take good care of the children.	109 (41.92)	33 (12.69)	118 (45.39)
- Diarrhea among children at age between two and five years old cannot be prevented because the disease will occur by the season.	33 (12.69)	70 (26.92)	157 (60.39)
- It is difficult to give ORS when your children has diarrhea	47 (18.08)	102 (39.23)	111 (42.69)

Table 6 (Cont.) Percentage of respondents classified by mothers' perceptions about diarrhea by items (N=260)

Statements/ Items	Agree n (%)	Not sure n (%)	Disagree n (%)
Perceived susceptibility			
- Washing hands before feeding cannot protect children from diarrhea.	69 (26.54)	46 (17.69)	145 (55.77)
- It is easy to get diarrhea when children at age between two and five years old don't eat clean food.	226 (86.92)	15 (5.77)	19 (7.31)
- It is easy to get diarrhea when children at age between two and five years old drink dirty water.	239 (91.92)	6 (2.31)	15 (5.77)
- Diarrhea leads to death of children at age between two and five years old.	152 (58.46)	93 (35.77)	15 (5.77)
- Children at age between two and five years old are easier to get serious diarrhea than adults.	210 (80.77)	40 (15.38)	10 (3.85)
- When children have diarrhea it may cause symptoms such as thirsty, dry mouth, sunken eyes, less urination	224 (86.15)	30 (11.54)	6 (2.31)

Table 6 (Cont.) Percentage of respondents classified by mothers' perceptions about diarrhea by items (N=260)

Statements/ Items	Agree n (%)	Not sure n (%)	Disagree n (%)
Perceived severity			
- Diarrhea can cause children at age between two and five years old to have malnutrition.	218 (83.85)	35 (13.46)	7 (2.69)
- Children at age between two and five years old who get diarrhea will susceptible to other diseases.	219 (84.23)	35 (13.46)	6 (2.31)
- It is easy children at age between two and five years old to die from diarrhea	196 (75.38)	54 (20.77)	10 (3.85)
- Children at age between two and five years old who get diarrhea is a normal development	61 (23.46)	61 (23.46)	138 (53.08)
- Children at age between two and five years old who always get diarrhea will grow up slow.	201 (77.31)	44 (16.92)	15 (5.77)
- Being diarrhea for a couple weeks won't cause the child any problems.	47 (18.08)	39 (15.00)	174 (66.92)

In Table 7, the perception scores of mothers towards diarrhea in children were divided into 4 groups: benefit, barrier, susceptibility and severity.

Mother's perceived benefit

The frequency and percentage distribution of perception among mothers by categorized scores are shown in Table 7. The highest score was 21, and lowest score was 16. The median of the total score obtained was 21. It was found that 75.3%

(N=196) of the mothers had high perceived benefit on diarrhea diseases and 24.6% (N=64) of the mothers had low perceived benefit on diarrhea diseases.

Mothers' perceived barrier

The frequency and percentage distribution of perception among mothers by categorized scores are shown in Table 7. The median of the total score was 17. The highest score was 21, and the lowest score was 7. It was showed that 58.85% of them had high levels of perception on barrier of diarrhea diseases and 41.15% had low level of perception on barrier of diarrhea diseases.

Mothers' perceived susceptibility

The frequency and percentage distribution of perception among mothers by categorized scores are shown in Table 7. The median of the total score was 16. The highest score was 18, and the lowest score was 8. It was showed that 25.7%of mothers had low level of perception on susceptibility of diarrhea diseases and 74.2% of them had high level of perception on susceptibility of diarrhea diseases.

Mother's perceived severity

Table 7 shows that mothers' perceptions were classified by score in 2 groups, high and low level of perceptions. The highest score was 18, and the lowest score was 10. The median of the total score obtained was 16. It shows that 42.3% of mothers had low levels of perception on severity of diarrhea diseases and 57.6% of them had high levels of perception on severity of diarrhea diseases.

Total score

As shown in Table 7, the median of the total score was 70. The highest score was 78 and the lowest score was 54. The data shows that 51.9% of mothers had high levels of perception on diarrhea diseases, and 48.08% of them had low levels of perception.

Table 7 Number and percentage of respondents' by level of perception

Mothers' perception score	Number	Percentage
Perceived benefit		
Negative (<21)	64	24.62
Positive (≥21)	196	75.38
Median= 21 Max = 21 Min= 16		
Perceived barrier		
Negative (<17)	107	41.15
Positive (17-21)	153	58.85
Median= 17 Max= 21 Min= 7		
Perceived susceptibility		
Negative (<16)	67	25.77
Positive (16-18)	193	74.23
Median= 16 Max= 18 Min= 8		
Perceived severity		
Negative (<16)	110	42.31
Positive (16-18)	150	57.69
Median= 16 Max= 18 Min= 10		
Total perception score		
Negative (<70)	125	48.08
Positive (70-78)	135	51.92
Median= 70 Max= 78 Min= 54		

4.3 Mother's cues to action on diarrhea preventive behavior

Table 8 showed that 94.6% of mothers received information about diarrhea preventive from television, 65.3% of them received from free of charge of health education, and 89.6% of them received from health personnel. The details are shown in Table 8.

Table 8 Number and percentage of mothers by source of information received on diarrhea preventive behavior

Sources information	Yes		No	
	Number	Percentage	Number	Percentage
1. Mass media				
Television	246	94.62	14	5.38
Radio	222	85.38	38	14.62
Magazine	230	88.46	30	11.54
Internet	198	76.15	62	23.85
Newspaper	212	81.54	48	18.46
Poster	190	3.08	70	26.92
Others (Books)	158	60.77	102	39.23
2. Health education program				
Free of charge	170	65.38	90	34.62
Pay money	61	23.46	199	76.54
Others (Information from school)	111	42.69	149	57.31
3. From personnel				
Health personnel	233	89.62	27	10.38
Friends	228	87.69	32	12.31
Family member	228	87.69	32	12.31
Neighborhood	186	71.54	74	28.46
Others (Relatives of family member, teachers)	168	64.62	92	35.38

The cues to action support mothers on diarrhea preventive behavior were divided into 2 levels, high and low level, according to the median. The Table 9 shows that 36.5% of the mothers had low level and the rest had a high level

Table 9 Number and percentage of respondents by level of cues to action

Source information	Number (N=260)	Percentage (%)
Low level (<11)	95	36.54
High level (11-15)	165	63.46
Median=11	**Min=1**	**Max=15**

4.4 Mothers' diarrhea preventive behavior

About 90% of mothers always behaved properly to prevent diarrhea disease in their children. Only one item that 88.8% of mothers behaved was using toilet for children. Each item of mothers' diarrhea preventive behavior is shown in the Table 10.

In the Table 11, mothers' diarrhea preventive behavior was divided into two groups, poor and good by median score. Results showed that 61.9% of them had good behavior and 38%of mothers had poor behavior.

Table 10 Number and percentage of respondents by items of diarrhea preventive behaviour. (N=260)

Statements/Items	Always n (%)	Sometime n (%)	Never n (%)
Washing hands			
- Do you wash your hands after Cleaning children's bottom?	254 (97.69)	4 (1.54)	2 (0.77)
- Do you wash your hands before preparing food for children?	240 (92.31)	20 (7.69)	0 (0.00)
- Do you wash your hands before feeding your children?	243 (93.46)	17 (6.54)	0 (0.00)
- Do you use soap when wash your hands?	248 (95.38)	12 (4.62)	0 (0.00)
Food preparation			
- Do you use lid, cupboard, or cover to protect food from flies?	252 (96.92)	6 (2.31)	2 (0.77)
- Do you use washed cups and dishes for children at each meal?	259 (99.62)	1 (0.38)	0 (0.00)
- Do you feed your child with newly cooked food in each meal?	248 (95.38)	12 (4.62)	0 (0.00)
- Do you prepare powdered milk mix with boiled water?	260 (100.00)	0 (0.00)	0 (0.00)
- Do you feed your child with reheated food in each meal?	245 (94.23)	15 (5.77)	0 (0.00)
- Do you wash nursing bottles with boiled waterbefore preparing	254 (97.69)	6 (2.31)	0 (0.00)

Table 10 Number and percentage of respondents by items of diarrhea preventive behaviour (Cont.) (N=260)

Statements/Items	Always n (%)	Sometime n (%)	Never n (%)
Use of water for hygiene and Drinking			
- Do you give your child boiled water for drinking?	238 (91.54)	20 (7.69)	2 (0.77)
- Do you use clean water cooking food for children?	254 (97.69)	6 (2.31)	0 (0.00)
- Do you use clean water washing utensils for children?	255 (98.08)	5 (1.92)	0 (0.00)
- Do you use clean water for washing latrine?	255 (98.08)	5 (1.92)	0 (0.00)
Use latrine			
- Do you use the toilet when children go to stool?	231 (88.85)	26 (10.00)	3 (1.15)
- Do you keep the toilet clean?	257 (98.85)	3 (1.15)	0 (0.00)
Take ORS			
- Do you feed children with the mixture of ORS by using a clean spoon?	253 (97.31)	5 (1.92)	2 (0.77)
- Do you use ORS soon for your child when he/she has diarrhea?	245 (94.23)	12 (4.62)	3 (1.15)
- Do you feed children with the mixture of ORS until diarrhea stops?	240 (92.31)	16 (6.15)	4 (1.54)

Table 11 Frequency and percentage of mothers classified by mothers' diarrhea preventive behavior level

Diarrhea preventive behavior	Number (N=260)	Percentage (%)
Good (19)	161	61.92
Poor (<19)	99	38.08
Median=19 Min=9 Max=19		

Part II: Association between mother's diarrhea preventive behavior and study factors.

4.5 The relationship between socio-demographic factors and mother's diarrhea preventive behavior.

Table 12 shows the association between socio-demographic factors and mothers' diarrhea preventive behavior. By using Chi-square test was found that there was no significant association between socio-demographic factors (age, education, occupation, family income, family size, number of children) aged between two and five years old in the family) with mothers' diarrhea preventive behavior.

This table also shows that most of mothers (75%) than 40 years old had good diarrhea preventive behavior. Mothers with bachelor degrees had good preventive behavior (63.6%), mother's occupation at labor had good preventive behavior (65.6%). Mothers had family income range $300 to $ 499 had good preventive behavior (62.5%), and family size more 4 people had good preventive behavior (64.2%). Mothers with one child children aged between two and five years old in the family had good preventive behavior (62.7%)

Table 12 Association between socio-demographic factors and mothers' diarrhea preventive behaviour

Socio-demographic factors	Preventive behaviour (N=260)		p-value
	Good/n(%)	Poor/n(%)	
Age of mothers (years)			
20-29	50 (55.56)	40 (44.44)	
30-39	99 (64.29)	55 (35.71)	0.215
≥40	12 (75.00)	4 (25.00)	
Educational levels of mothers			
No school	7 (77.78)	2 (22.22)	
Primary school	5 (50.00)	5 (50.00)	
Secondary school	6 (40.00)	9 (60.00)	0.378
High school	26 (59.09)	18 (40.91)	
Bachelor degree	91 (63.64)	52 (36.36)	
Other (Above degree)	26 (66.67)	13 (33.33)	
Occupation			
Self- employed	37 (56.92)	28 (43.08)	
Housewife/Un employee	11 (52.38)	10 (47.62)	
Farmer or Agricultures	2 (50.50)	2 (50.00)	0.464
Company employee (Other, labor)	111 (65.30)	59 (34.70)	
Family Income			
<300$	36 (51.43)	34 (48.57)	
300-499$	75 (62.50)	45 (37.50)	0.112
500-699$	26 (72.22)	10 (27.78)	
≥700$	24 (70.59)	10 (29.41)	
Family size			
≤4 person	55 (57.89)	40 (42.11)	0.310
>4 person	106 (64.24)	59 (35.76)	
Number of children at age between two and five years old in the family			
1	111 (62.71)	66 (37.29)	0.702
2	50 (60.24)	33 (39.76)	

4.6 Association between psychosocial factors and mothers' diarrhea preventive

Table 13 shows the association between psychosocial factors (perceived benefit, perceived barrier, perceived susceptibility, perceived severity) by using chi-square test. A significant association was between perceived benefit and mothers' diarrhea preventive behavior with p-value= 0.01. There was no significant association between diarrhea preventive behavior and mothers' perceived barrier (p-value=0.145), mothers' perceived susceptibility (p-value=0.659), mothers' perceived severity (p-value= 0.325), or any psychosocial factors (p-value=0.558).

This table also shows that mothers who at high level of perceived benefit (33.6%) had poor diarrhea preventive behavior less than mothers who had negative of perceived benefit (51.5%) had poor diarrhea preventive behavior. About mother's perceived barrier who at positive of perceived barrier (37.9%) had poor preventive behavior more or less the same as who at negative of perceived barrier (38.3%) had poor preventive behavior. Mother's perceived susceptibility that at positive (38.8%) had poor preventive behavior more than who at negative (35.8%) had poor preventive behavior. Mother's perceived severity that at positive (39.3%) had poor preventive behavior slightly higher than who at negative (36.3%) had poor preventive behavior. Among total perception score of mothers who at positive (37.7%) had poor preventive behavior more or less the same as who at negative (38.40%) had poor preventive behavior.

Table 13 Association between psychosocial factors and mothers' diarrhea preventive behavior

Perception	Preventive behavior (N=260)		p- value
	Good n (%)	Poor n (%)	
Perceived benefit			
Negative	31 (48.44)	33 (51.56)	0.010*
Positive	130 (66.33)	66 (33.67)	
Perceived barrier			
Negative	66 (61.68)	41 (38.32)	0.947
Positive	95 (62.09)	58 (37.91)	
Perceived susceptibility			
Negative	43 (64.18)	24 (35.82)	0.659
Positive	118 (61.14)	75 (38.86)	
Perceived severity			
Negative	70 (63.64)	40 (36.36)	0.626
Positive	91 (60.67)	59 (39.33)	
Total perception score			
Negative	77 (61.60)	48 (38.40)	0.918
Positive	84 (62.22)	51 (37.78)	

* Significant at p-value < 0.05

4.7 Association between cues and mothers' diarrhea preventive behavior

The Table 14 showed association between cues to action and mother's diarrhea preventive behavior by using chi-square test. The results showed that most sources of information were not significanting associated with preventive behavior, except sources of information from health education programs (pay money programs) (p-value=0.013), and source information from personnel (relatives member, teachers) (p-value=0.033).

This Table also shows that the mothers who received information about preventive behavior from television had good preventive behavior (62.6%), from free of charge health education program had good preventive behavior (65.2%), and from health personnel had good preventive behavior (63%).

Table 15 indicates that 67.7% of mothers who had high level of source information had good preventive behavior, and 56.6% of mothers who had low levels of source information, had good preventive behavior

Table 14 Association between cues to action and mothers' diarrhea preventive behavior

Source of information	Preventive behavior (N=260)		p- value
	Good n (%)	Poor n (%)	
1. Mass media			
Television			
Yes	154 (62.60)	92 (37.40)	0.345
No	7 (50.00)	7 (50.00)	
Radio			
Yes	140 (63.06)	82 (36.94)	0.360
No	21 (55.26)	17 (44.74)	
Magazine			
Yes	146 (63.48)	84 (36.52)	0.153
No	15 (50.00)	15 (50.00)	
Internet			
Yes	125 (63.13)	73 (36.87)	0.473
No	36 (58.06)	26 (41.94)	
Newspaper			
Yes	133 (62.74)	79 (37.26)	0.571
No	28 (58.33)	20 (41.67)	
Poster			
Yes	120 (63.16)	70 (36.84)	0.499
No	4 (58.57)	29 (41.43)	
Others (Books)			
Yes	98 (62.03)	60 (37.97)	0.966
No	63 (61.76)	39 (38.24)	

Table 14 Association between cues to action and mothers' diarrhea preventive behaviour (Cont.)

Source of information	Preventive behavior (N=260)		p- value
	Good n (%)	Poor n (%)	
2. Health education program			
Free of charge program			
Yes	111 (65.29)	59 (34.71)	0.124
No	50 (55.56)	40 (44.44)	
Pay money program			
Yes	46 (75.41)	15 (24.59)	0.013*
No	115 (57.79)	84 (42.21)	
Others (Information from school)			
Yes	65 (58.56)	46 (41.44)	0.335
No	96 (64.43)	53 (35.57)	
3. From personnel			
Health personnel			
Yes	147 (63.09)	86 (36.91)	0.255
No	14 (51.85)	13 (48.15)	
Friends			
Yes	143 (62.72)	85 (37.28)	0.480
No	18 (56.25)	14 (43.75)	
Family member			
Yes	143 (62.72)	85 (37.28)	0.480
No	18 (56.25)	14 (43.75)	
Neighborhood			
Yes	119 (63.98)	67 (36.02)	0.279
No	42 (56.76)	32 (43.24)	
Others (Relatives of family member, teachers)			
Yes	112 (66.67)	56 (33.33)	0.033*
No	49 (53.26)	43 (46.74)	

* Significant at p-value < 0.05

Table 15 Association between by level of cues to action and mothers' diarrhea preventive behavior

Source of information	Preventive behavior (N=260)		p- value
	Good n (%)	Poor n (%)	
Low level (<11)	52 (54.74)	43 (45.26)	0.070
High level (11-15)	109 (66.06)	56 (33.94)	
	Median=11	**Min=1**	**Max=15**

In conclusion, the factors that related to diarrhea preventive behaviour among children aged 2 to 5 years old were perceived benefit of diarrhea preventive behavior, information from health education program with pay money, and sources of information from (relatives member and teachers)

CHAPTER V
DISCUSSION

The purpose of this study was to identify the diarrhea preventive behavior of mothers with children at age between two and five years old in Sao Mai Cau Giay district Hanoi city, Vietnam. Discussion on these results was done regarding conceptual framework.

Intensive training provided to interviewers to make them understand the definition and detail of all variable such as the definition of labourers.

Most of participants in this study well diarrhea preventive behavior. The researcher used median as cut- off point. Therefore, the cut- off point for preventive behavior of this study was quite low. The score at P_{75} should be more appropriate to use as a cut- off point of this study.

5.1 Mothers' diarrhea preventive behaviour

Mother's diarrhea preventive behavior with children at age between two and five years old in this study included washing hands, food preparation, use of water for hygiene and drinking, using latrine, take ORS. The results of the study indicated that 61.92 % of mothers had good preventive. Most of mother's good diarrhea preventive behavior. This study used median as cut- off point. Therefore, contrast with the study in rural Ratchaburi province, Thailand (2007) by Tomoko Hiruta, (41) only 37.91% of caregivers had good preventive behavior, and 62.09% of caregivers had poor preventive behavior.

Washing hands

To limit a spread of diarrhea in children, mothers' hygienic behavior in taking care of their child is the most important factors. In this study, almost all mothers had good preventive behavior about washing hand in all items. These results were found to be higher than the previous by Tomoko Hiruta that about 70% mothers were always washing hands when preparing food. (41) The previous study in Vietnam by Dung M on factors related to mothers' home practices on management of acute diarrhea in children under five years old in 2002, only 73.7% of mothers washed hands with soap, while 57% washed hands before food preparation, 55.6% washed hands before feeding children.(46). However, 26.54% of mothers in this study perceived that washing hands before feeding cannot protect children from diarrhea.

Food preparation

Regarding food preparation, there were 96.92% of mothers always using lid, cupboard or cover to protect food from flies, and 94.23% of mothers reheated food in each meal. Compared with the previous study by Tomoko Hiruta about diarrhea preventive behaviors of caregivers with children under 5 years in rural Ratchaburi province in Thailand in 2007, (41) only 70% of caregivers always feed their child with reheated food. It showed that mother's food preparation practice in this study was better. It can be explained that mothers, who live in the urban areas may have a higher concern of clean food than those in the rural areas. The study by Sheth M, Obrah M about diarrhea prevention through food safety education in India in 2004 indicated that the environmental sanitation and personal hygiene were main contribution to the reduction of the incidence of diarrhea. (40)

Use of water for hygiene and drinking

Most infectious agents that cause diarrhea are transmitted by the fecal-oral route. This includes transmission by contaminated drinking water or contaminated food, and person-to-person spread.(18)

For use of water for hygiene and drinking, 91.54% of mothers used boiled water for drinking, 97.69% of mothers used clean water for cooking food, 98.08% of them used clean water washing utensils and washing latrine. It showed that mothers had high concern on using clean water for hygiene and drinking as the important cause of diarrhea that they are dirty water, pathogens and unsanitary. Compared with the previous by Labay EM about risk factors relating to the diarrheal disease occurrence among under five years old at Samut Sakhon province, Thailand in 2007,(50) 89.9% of caregivers always cleaning the eating utensils for children, and 74.7% of caregivers washed eating utensils for children by soap and clean water. It showed that mother's food preparation practice in this study was slightly better than the previous study.

Use latrine

In Vietnam by the national program on clean water and environmental sanitation (1999-2005) indicated there were about more than 6 million households with hygienic toilets, and 70% of rural households to have hygienic toilets and practice good personal hygiene. The survey found that the proportion of schools having public hygienic toilets is low, 42% of all schools nationwide, lower than the coverage of total households (50%). (8)

The results of this study indicated that 88.85% of mothers used the toilet when children go to stool, and 98.85% of them keep the toilet clean. It may cause by the effect of the national program on clean water and environmental sanitation in the country. The result was similar with the study by Labay EM 98.1% of caregivers use the latrine in the house and latrine available. (50)

Take ORS

While taking care of children who had acute diarrhea, mothers should be able to give ORS immediately to a child to reduce serious dehydration. This study revealed that 94.23% of mothers used ORS immediately when their children had diarrhea, 92.31% of mothers used ORS until diarrhea stops, and 97.31% of them used

ORS by a clean spoon. The mothers may get information about management of acute diarrhea from health personnel since 89.62% of mothers addressed health personnel as a source of information. It was similar with the previous study by Seno A that 94.6% of mothers correctly fed their children with ORS. (51)

5.2 Association between socio-demographic factors and mothers' diarrhea preventive behaviour

The Table 12 showed that no statistically significant association between socio-demographic factors of mothers (as age, education, occupation, family income, family size, number of children at age between two and five years old).

Age of mothers

Table 5 and Table 12 showed that among 260 mothers, their age ranged from 22 to 48 years. The older mothers fended to have good preventive behavior (mothers of more than 30 years old). Contrast with the previous study in Indonesia by Seno A showed that, 96.3% of mothers less than 30 years old had good behavior in giving ORS. (51) It can be explained that mothers of any age, who live in the urban areas may easily access to the health information.

Educational levels of mothers

In this study, there was no association between mothers' education levels and prevention behavior. However, in general the mothers who had high education were more libely to have good preventive behavior except the no schooling group which had small easy. It can be explained that mothers of high education levels were more conscious, and might get more information about diarrhea preventive behavior. The study of Phouvong V in Khon Kaen Province, Thailand in 1995, revealed also no significant association between incidence of diarrhea and maternal education (p-value= 0.852) (43).

Occupation

Regarding mothers' occupation, 65.38 of mothers worked as company employee had good preventive behavior compared to other groups. It showed that mothers were company employee may easily access to healh information compared to ones who marked at home. No significant association found between occupations with mothers' preventive behavior. The results of this study was similar to the study of Phouvong V. (43)

Family income

Table 12 showed that mothers with high family income had good preventive behavior. However, there was no significant relationship between family income and mothers' diarrhea preventive behavior. The finding was similar with the study of Hiruta T. (41)

Family size

Table 12 found that 64.2% of mothers who had more than 4 people in the family had good preventive behavior. A study conducted by Nguyen MD showed significant correlation between mother's home practice score with total family members and total of children under five years old in the family. It can be explained that more the people in the family, would support and help mothers to perform proper preventive behavior for management of diarrhea in children. (46) However, the current study did not find any significant association.

Number of children at age between two and five years old in the family

Table 12 also showed that 62.7% of mothers, who had 1 child at age between two and five years old, had good preventive behavior. There was no association between mothers' diarrhea preventive behavior with number of children at age between two and five years old in the family. The number of children did not contribute to the preventive behavior if mothers did not have any experience of taking care a child with diarrhea or did not receive any information about preventive behavior.

5.3 Association between psychosocial factors and mother's diarrhea preventive behaviour

Mother's perceived benefit

Table 13 found that 66.3% of mothers' positive of perceived benefit had good preventive behavior, and there was association between mothers' perceived benefit and preventive behavior. This finding could be explained that if mothers perceived the prevention is necessary and has benefit to their children, they will do properly. The results were supported by the study of Suknirin C (47), and McClain C et al. (48)

Mother's perceived barrier

Regarding the perceived barrier, 62% of mothers who had positive perception about barrier had good preventive behavior similar to the other group. There was no association between mothers' perceived barrier and preventive behavior. Most of them felt less barrier to some extent, but they may or may not practice. The result was similar with the study of Hiruta T that showed no association between caregiver's perception barrier and diarrhea preventive behavior for children under five years old in Thailand. (41) Also the relationship between perception susceptibility and severity, there was no significant association with preventive behavior. The study of Hiruta T found the significant association between perceived study and preventive behavior. (41)

Mother's perceived susceptibility

There was no association between mothers' perceived susceptibility with preventive behavior. This indicated that mothers who high level of perceptions susceptibility on diarrhea, they did perceived children' feces to be important in causing diarrhea. Similar study of Hiruta T showed that no association between caregiver's family income and diarrhea preventive behavior for children under five years old in Thailand. (41)

Mother's perceived severity

In the table 13 found that 63.6% of mothers had level who had good preventive behavior and no significant association between perceived severity and preventive behavior. It could be explained that mothers who had high level of perception severity would have higher practice on management of acute diarrhea, it reduced serious diarrhea disease. However Hiruta T showed significant association between perceived severity and preventive behavior (p- value=0.007). (41)

Mother's overall perception

Mothers' perception about diarrhea in children is very important to make a decision on home care management of acute diarrhea in children. Table 13 found that 62.2% of mothers who had high level, of overall perception had good preventive behavior, and 37.7% of mothers had high level that had poor preventive behavior similar to the low level group. The overall perception was not significant association with preventive behavior. It may indicate that the susceptibility, severity and barrier did not convince mothers to practice. If they feel they gain benefit, they need practice.

5.4 Association between cues to action and mothers' diarrhea preventive behavior

Table 8 showed that most popular sources of information were television (from mass media), health education program (free of charge program), and health personnel (from person). The association analysis showed that mother who enrolled in the pay- money health education program, and who got the information from relatives or teacher more likely to behavior well than the group. However, since most of them get the information from various sources, the overall score of sources of information did not associate with preventive behavior. The current study was different from Nguyen MD study.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

This study emphasized on mother's diarrhea preventive behavior with children at age between two and five years old and related factors at Sao Mai school, Cau Giay district, Hanoi city, Vietnam. The studies factors were socio-demographic factors of mothers, mother's perception related on diarrhea, and mother's cues to action on diarrhea preventive behavior. A structured questionnaire was used performed to collect data among 260 mothers who had children at age between two and five years old at Sao Mai Cau Giay during January 2-30, 2009. Most of participants in this study well diarrhea preventive behavior. The researcher used median as cut- off point. Therefore, the cut- off point for preventive behavior of this study was quite low. The score at P_{75} should be more appropriate to use as a cut- off point of this study. The results of the study revealed as follows:

Socio-demographic factor of mothers

The age of total 260 mothers were divided into 3 groups, the majority of mothers were in 30-39 year old (59.23%). The ranges of mothers' age were from 22 to 48 years old. The age groups 20-29 years old, more than 40 years old were 34.62%, and 6.15% respectively. For education distribution of mothers, most of them got bachelor degree (55%), 3.85% primary school, 3.46% no school, 5.77% secondary school, 16.92% high school, and 15% of mothers were above degree.

In terms of occupation, 50.38% of mothers worked as labor, housewife and self-employed group were 25% and 8.08%, farmer or agriculture and other group were 1.54% and 15% respectively

Concerning the monthly family income, 46.15% of mothers had family income of 300$ to 499$ (46.15%), 26.92% of them had income less than 300$, 13.85% of them had family income 500$ to 699$, and 13.08% had high income more than 700$. Family size was divided two groups as 4 persons or less (85%), and more than 4 persons (15%). Mothers with 1 child at age between two and five years old in the family were 68.08%, and other group with 2 children were 31.92%. There were not significantly associated between mother's age, education, occupation, family income, family size, and numbers of children at age between two and five years old in the family, with statistically p-value> 0.05.

Mother's perception related on diarrhea

Regarding mothers' perceived benefit, all of the mothers had positive perception to each items. About 90% of mothers agree with the statements of perceived benefit particularly the easiness. With regard to perceived barrier, all items were negative statement. About 70% of mothers were less difficultly to prepare hygienic food, buy fresh food to cook, and boil water for their children. Less than 50% of mothers perceived less barrier of giving ORS and acquiring knowledge to give good care for children. Most mothers positively perceived susceptibility for diarrhea of young children. About 80% of mothers perceived that children aged 2 to 5 years old proned to get diarrhea if they ate unclear food and drank unclean water. The children with diarrhea were more serious than adults. Nearly half of mothers (44%) agreed or doubled about the effectiveness of washing before feeding in prevention of diarrhea. Most mothers positively perceived the severity of diarrheal disease among children aged 2 to 5 years old. However, some of them agreed that diarrhea did not affect child's nutritional status or caused any problem, 23.46% and 18.08% respectively.

In Table 7, the perception score of mothers toward diarrhea in children were divided into 4 groups: benefit, barrier, susceptibility and severity. For mothers' perceived benefit, 75.3% of the mothers had high perceived benefit on diarrhea diseases and 24.6% of the mothers had low perceived benefit on diarrhea diseases. Mothers' perceived barrier, 58.85% of them had high level of perception on barrier of diarrhea diseases and 41.15% had low level of perception on barrier of diarrhea

diseases. Regarding mothers' perceived susceptibility, 25.7%of mothers had low level of perception on susceptibility of diarrhea diseases and 74.2% of them had high level of perception on susceptibility of diarrhea diseases. Mother's perceived severity, 42.3% of mothers had low level of perception on severity of diarrhea diseases and 57.6% of them had high level of perception on severity of diarrhea diseases. The results of the study were shown that 51.9% of them had high level of perception on diarrhea diseases, and 48.08% of them had low level of perception.

For the association between psychosocial factors (perceived benefit, perceived barrier, perceived susceptibility, perceived severity) by using chi-square test. It was found significant association between perceived benefit and mothers' diarrhea preventive behavior with p-value= 0.01. There was no significant association between diarrhea preventive behavior and mothers' perceived barrier (p-value=0.145), mothers' perceived susceptibility (p-value=0.659), mothers' perceived severity (p-value= 0.325), and all psychosocial factors (p-value=0.558).

Mother's cues to action on diarrhea preventive behavior

Table 8 showed that 94.6% of mothers received information about diarrhea preventive from television, 65.3% of them received from free of charge of health education, and 89.6% of them received from health personnel. The cues to action support mothers on diarrhea preventive behavior was divided into 2 levels , high and low level, according to the median 36.5% of the mothers had low level and the rest had high level. For association between cues to action and mother's diarrhea preventive behavior by using chi-square test. The results showed that most sources of information were not significant association with preventive behavior, except source of information from health education program (pay money) (p-value=0.013), and source information from personnel (relation of family member, teachers) (p-value=0.033) were significant association with preventive behavior.

This study also showed the mothers received information about preventive behavior from television had good preventive behavior (62.6%), from free of charge had good preventive behavior (65.2%), and from health personnel had good preventive

behavior (63%). In the Table 15 indicated that 67.7% of mothers who had high level of source information good preventive behavior, and 56.6% of mother who had low level of sources information, had good preventive behavior

Mother's diarrhea preventive behavior

Regarding mother's diarrhea preventive behavior, about 90% of mothers always behavior properly to prevent diarrhea disease for their children. Only one item that 88.8% of mothers behavior was using toilet for children. For mothers' diarrhea preventive behavior was divided into two groups, poor and good by median score. Results showed that 61.9% of them had good behavior and 38%of mothers had poor behavior. The factors that related to diarrhea preventive behaviour among children aged 2 to 5 years old were perceived benefit of diarrhea preventive behavior, information from health education program with pay money, and sources of information other (relation of family member, teachers)

6.2 Recommendation

With purpose of this research will improve understanding of mother's preventive behavior of childhood diarrhea and the factors that influence mothers to reduce unnecessary morbidity and mortality from diarrhea diseases at Sao Mai school, Cau Giay district, Hanoi city in Vietnam. Depending on the results from this study, there were some interesting findings and several recommendations are suggested to the mothers as the following:

6.2.1 Recommendations for mother's diarrhea preventive behavior.

The mothers should be washing hands with soap and water before handling food, and before feeding, after defecation and diapering. Avoid feeding leftover food and keep surrounding clean. These were imparted using lectures, slogans, posters, charts, flash cards, and role-play. Calendars and leaflets were also handed over to the mothers as education material.

The mothers should be take care while child get diarrhea, and immediately give take ORS when children get diarrhea, reduce serious diarrhea and to prevention death from diarrhea.

The mothers should be use boiling or equivalent water for the child, clean utensils with clean water, clean feeding or eating area, should be use well- maintained latrine, usually keep the toilet clean.

The mothers should take positive perception on diarrhea diarrhea preventive for themselves first, in order to be the good model on preventive practice for their child.

6.2.2 Recommendations for factors involve preventive behavior

In order to achieve the objectives, the activities of health education emphasize about perceived benefit on childhood diarrhea for mothers should be manifestly, attractive and suitable method, also participatory and group discussion. The activity by using equipments of media: Television, radio, magazine, newspaper, poster, internet, books, handouts through health education program pay money, related family member and school teachers.

6.2.3 Recommendations for change about negative perception.

Health personnel take the important role in improve information on childhood diarrhea, diarrhea preventive behavior, and management acute diarrhea at home to mothers through communication, mass media, and health education programs

More coordination among the health service system regarding all levels from provincial level, district level and sub-district level. That coordination may do through the financial supporting, human resources and health service problems.

Monitoring and evaluation should be conducted regularly and planned as the year plan, period of three months of the district health office.

6.2.4 Recommendations for further studies

A fact in Vietnam, Cau Giay is a new established district. This is the first study to establish guideline for development in Cau Giay district for health education.

The study was carried out at one school in Cau giay district, Hanoi city, Vietnam. Therefore, it may not generalized for the whole Cau Giay district. The information about diarrhea preventive behavior of mothers based on set of questions rather than actual observation. In this study, we could not go in-depth into mother's diarrhea preventive practice activities. Further research should be concentrate on the observation of mother's practice on childhood diarrhea preventive behavior.

REFERENCES

1. World Health Organization. What is Diarrhea disease and How to prevent it. Geneva: WHO; 2005.
2. World Health Organization. Water sanitation and hygiene. [Online]. Available from: http://www.wwpro.who.int/health_topics/water_sanitationd_hygiene [Accessed 2008 Oct 29]
3. World Health Organization. Reducing mortality from major killers of children. Geneva: WHO; 1998.
4. World Health Organization. The World health report 1996: fighting disease fostering development. Geneva: WHO; 1996.
5. Kosek M, Bern C, Guerrant RL. The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. Bulletin of the World Health Organization 2003; 81(3): 197-204.
6. Vietnam Ministry of Health. National Control of Diarrhea: household surveys 1998. Hanoi: The Ministry of Health; 1998.
7. Vietnam Ministry of Health. National Control of Diarrhea: household surveys 2006. Hanoi: The Ministry of Health; 2006.
8. Vietnam Ministry of Health. Vietnam health report 2006. Hanoi: The Ministry of Health; 2006.
9. World Health Organization. The world health report 1999: making a difference. Geneva: World Health Organization; 1999.
10. Ngoc PT, Deschamps JP. Global approach to diarrhea in children in Vietnam: the experience of Ho Chi Minh City no. 1 pediatric hospital. Sante publique 1998; 10(1): 87-98.
11. World Health Organization. The treatment of diarrhea. Geneva: WHO; 1995.

12. Kaur A, Chowdhury S, Kumar R. Mothers' beliefs and practices regarding prevention and management of diarrheal diseases. Indian Journal of Pediatrics 1994; 31(1): 55-7.
13. UNICEF. Vietnam basic indicators. Oxford: Oxford University Press; 2000.
14. UNICEF. Facts and figures: health and nutrition in Vietnam. Oxford: Oxford University Press; 1999.
15. Hien BTT, Do TT, Scheutz F, Phung DC, Molbak K, Dalsgaard A. Diarrhoeagenic Escherichia coli and other causes of childhood diarrhoea: a case-control study in children living in a wastewater-use area in Hanoi, Vietnam. Journal of Medical Microbiology 2007; 56(8): 1086-96.
16. Luong DH, Tang S, Zhang T, Whitehead M. Vietnam during economic transition: a tracer study of health service access and affordability. International Journal of Health services 2007; 37(3): 573-88.
17. World Health Organization. Basic Principles for the preparation of safe food for infants and young children. Geneva: WHO; 1996.
18. Laniken KS, Bergstrom S, Makea PH, Peltomaa M. Health and Disease in Developing Country. Macmillan. Chapter 15.6. In: World Health Organization. The Epidemiology and Etiology of Diarrhea. Geneva: WHO; 1998.
19. Campbell GD. Primary pulmonary cryptococcosis. In: Harrison' Principles of Internal Medicine. 14th Ed. New York: McGraw-Hill; 1998.
20. World health Organization. The Epidemiology and Etiology of Diarrhea. Geneva: WHO; 1998.
21. Esrey SA, Potash JB, Roberts LS. Effects of improved water supply and sanitation on ascariasis, diarrhea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. Bulletin of the World Health Organization 1991; 69(5): 609-21.
22. Bethsda S, Maryland. National Institutes of Health. Geneva: WHO; 2008.
23. World Health Organization. Global Water Supply and Sanitation Assessment. Geneva: WHO; 2000.

24. World Health Organization. The treatment of diarrhea. Geneva: WHO; 2003

25. Snyder JD, Merson MH. The magnitude of the global problem of acute diarrheal disease: review of active surveillance data. Bulletin of the World Health Organization 1982; 60: 604-13.

26. Black RE. Would control of childhood infectious diseases reduce malnutrition? Acta Paediatrica Sandinavica, Supplement 1991; 80(374): 133-40.

27. Checkley W, Buckley G, Gilman RH, Assis AM, Guerrant RL, Morris, et al. Multi-country analysis of the effects of diarrhoea on childhood stunting. International Journal of Epidemiology 2008; 37(4): 816-30.

28. Vietnam Ministry of Health. Vietnam CDD program: health statistic year book 1992-1998. Hanoi: The Ministry of Health; 1998.

29. Bodhidatta L, Lan NTP, Hien BT, Lai NV, Srijan A, Serichantalergs O, et al. Rotavirus disease in young children from Hanoi, Vietnam. Pediatric Infectious Disease Journal 2007; 26(4): 325- 28.

30. Cau Giay District office. Cau Giay District Profile report, 2007. Hanoi Cau Giay District, 2007.

31. Strecher VJ, Rosenstock IM. Health behavior and Health education. 2nd ed. San Francisco: Jossey-Bass; 1997

32. USF, University of Douth Florida. Community Family Health; Health Belief Model . [Online]. Available from: http://www.med.usf.edu/kmbrown/Health_Belief_Model_Overview.htm [Accessed 2008 Oct 9]

33. Health Belief Model. [Online]. Available from: http//www.tcw.utwente.nl/theorieennoverzicht/Theory%20clusters/Health%20Communication/Health_Belief_model.doc/ [Accessed 2008 Oct 9]

34. Luby SP, Agboatwalla M, Feikin DR, Painter J, Billhimer W, Altaf, et al. Effect of hand washing on child health: a randomized controlled trial. Lancet 2005; 336(9481): 225-33.

35. Curtis V, Cairncross S. Effect of washing hands with soap on diarrhea risk in the community: a systematic review. Lancet Infectious Diseases 2003; 3(5): 275-81.

36. Migele J, Ombeki S, Ayalo M, Biggerstaff M, Quick R. Diarrhea prevention in a Kenyan school through the use of a simple safe water and hygiene intervention. American Journal of Tropical Medicine and Hygiene 2007; 76(2): 351-53.

37. Bahl R. Effect of zinc supplementation on clinical course of acute diarrhea. Report of a Meeting, New Delhi May 2001. Journal of Health, Population and Nutrition 2001; 19(4): 338-46.

38. World Health Organization. Advising mother on management of diarrhea in the home. Geneva: WHO; 1997.

39. Sinha AK, Srivastava SP. Awareness of diarrhea disease control in rural and urban areas of Bihar. Indian Pediatrics 1993; 30(12): 1433-39.

40. Sheth M, Obrah M. Diarrhea prevention through food safety education. India Journal of Pediatrics 2004; 71(10): 879-82.

41. Hiruta T. Diarrhea preventive behaviors of caregivers with children under 5 years in rural Ratchaburi province, Thailand. [M.P.H.M. Thesis in Primary Health Care Management]. Nakhon Pathom: Faculty of Graduate Studies, Mahidol University; 2007.

42. National Statistic Office. Household socio-economic survey, Thailand; 2001. [Online]. Available from: http://web.nso.go.th/eng/stat/socio/socio.htm. [Accessed 2008 Oct 9]

43. Phouvong V. Factors Associated with Incidence of Acute diarrheal disease in Children under five years in Khon Kaen Province, Thailand. [M.P.H.M. Thesis in Primary Health Care Management]. Nakhon Pathom: Faculty of Graduate Studies, Mahidol University; 1995.

44. Troung T. The relationship of Psychosocial Factors on Child Care's Behavior Related to Diarrhea Disease among Children under 5 years of age in Ratchaburi Province. [M.P.H.M. Thesis in Primary health care Management.]. Nakhon Pathom: Faculty of Graduate Studies, Mahidol University; 1996.

45. Chompikul J. Effect of piped water supply on the incidence of acute diarrhea in children aged 0-2 years old, Pattani province, Thailand. [s.l. : s.n.]; 1991.

46. Nguyen MD. Factors related to mothers' home practices on management of acute diarrhea in children under five years old, in Nam Dinh, Vietnam. [M.P.H.M. Thesis in Primary Health Care Management]. Nakhonprathom: Faculty of Graduate Studies, Mahidol University; 2002.

47. Suknirin C. Factors Affecting Diarrheal Preventive and Self Care Behavior of the people in Yasothon Province. Yasonthon. [M.Sc. Thesis in Public Health] Bangkok : Faculty of Graduate Studies, Mahidol Univeristy; 1991.

48. McClain J, Benhardt JM, Beach MJ. Assessing parents' perception of children's risk for recreational water illnesses. Emerging infectious diseases [serial On the Internet]. 2005 May . Available from: http://www.cdc.gov/ncidod/EID/vol11no05/04-0779.htm [Accessed 2009 Jan 9]

49. Sinha AK, Jensen H, Ingholt L, Aaby P. Risk factors for diarrheal disease control in rural and urban areas of Bihar. Indian Pediatrics 1993; 30(12): 1433-9.

50. Labay EM. Risk factors relating to the diarrheal disease occurrence among under five children at Samt Sakhon Province, Thailand. [M.P.H.M. Thesis in Primary Health Care Management]. Nakhon Pathom: Faculty of Graduate Studies, Mahidol University; 2007.

51. Seno A. Factors related to mother's behaviour in order to give ORS to children under five years old at Kuma Health center, Indonesia. [M.P.H.M. Thesis in Primary Health Care Management]. Nakhon Pathom: Faculty of Graduate Studies, Mahidol University; 2005.

APPENDIX

APPENDIX A

QUESTIONNAIRES

Diarrhea preventive behavior of mothers with children at age between two and five years at Sao Mai school Cau Giay district, Hanoi City, Vietnam.

General information

Date of interview……..

Name of mother ……..

Address ……...

Part 1 Socio-demographic characteristics

Please put your answer in the blank column or put mark

1. Age of mother……years old

2.What is your highest educational level?

1.No school

2.Primary school

3.Secondary school

4.High- school

5.Bachelor degree

6.Other(specify)……

3. What is your occupation?

1.Self-employed

2.Housewife/ Un-employee

3.Farmer or Agriculture

4.Labor

5.Others(specify)……

4. How much your family income (Average/Month)……thousand VND/ USD…….

5. How many members in your family?.....persons

6.How many living children(at age between two and five years old) do you have?.....children

Part 2. Mother's perception related on diarrhea

Please put mark according to the level of your agreement to the following statements

A=Agree, N=Not sure, D=Disagree

Statement/Items	**A**	**N**	**D**
Perceived benefit 7. Prevention on diarrhea could reduce death and malnutrition among children at age between two and five years old.			
8. Washing hands before cooking for children at age between two and five years old can prevent children from diarrhea.			
9. Prevention of diarrhea for children at age between two and five years old, the children will have normal growth.			
10. Prevention of diarrhea for children at age between two and five years old could reduce the expenses from treatment			
11. When the children have diarrhea, ORS can treat dehydration.			
12. Using latrine is necessary to prevent diarrhea.			
13. It is easy to prepare boiling water to children.			

Part 2. Mother's perception related on diarrhea (Cont.)

Please put mark according to the level of your agreement to the following statements

A=Agree, N=Not sure, D=Disagree

Statement/Items	**A**	**N**	**D**
Perceived barrier 14. It is difficult to prepare hygiene food for children			
15. Diarrhea among children at age between two and five years old can not be prevented because mothers have no money to buy fresh food to cook for children.			
16. Diarrhea among children at age between two and five years old can not be prevented because both mothers and children in poor sanitation areas			
17. Diarrhea disease among children at age between two and five years cannot be prevented because mothers have no time to boil water for children			
18. Diarrhea among children at age between two and five years old can not be prevented because mothers don't have enough knowledge to take good care of the children			
19. Diarrhea among children at age between two and five years old can not be prevented because the disease will occur by the season.			
20. It is difficult to give ORS when your children has diarrhea			

Part 2. Mother's perception related on diarrhea (Cont.)

Please put mark according to the level of your agreement to the following statements

A=Agree, N=Not sure, D=Disagree

Statement/Items	**A**	**N**	**D**
Perceived susceptibility 21. Washing hands before feeding can not protect children from diarrhea			
22. It is easy to get diarrhea when children at age between two and five years old don't eat clean food			
23. It is easy to get diarrhea when children at age between two and five years old drink dirty water			
24. Diarrhea leads to death of children at age between two and five years old.			
25. Children at age between two and five years old are easier to get serious diarrhea than adults			
26. When children have diarrhea it may cause symptoms such as thirsty, dry mouth, sunken eyes, less urination			
Perceived severity 27. Diarrhea can cause children at age between two and five years old to have malnutrition			
28. Children at age between two and five years old who get diarrhea will susceptible to other diseases			
29. It is easy children at age between two and five years old to die from diarrhea.			
30. Children at age between two and five years old who get diarrhea is a normal development			
31. Children at age between two and five years old who always get diarrhea will grow up slow.			
32. Being diarrhea for a couple weeks won't cause the child any problems			

Part 3. Source of Information

Please put mark your choice for the answer (can be select one or more)

33. Where did you get information about diarrhea preventive behavior?

1. Mass media

Mass media	Yes	No
1. Television		
2. Radio		
3. Magazine		
4. Internet		
5. Newspaper		
6. Poster		
7. Others		

2. Health education program from health centre or hospital

Health education program	Yes	No
1. Free of charge		
2. Pay the money		
3. Others		

3. From personnel

Personnel	Yes	No
1. Health personnel (Doctor, nurse, midwife, health volunteer, health workers, others)		
2. Friends (Co-worker, and other)		
3. Family member (Husband, parents, and relatives)		
4. Neighbourhood		
5. Others		

Part 4. Diarrhea preventive behavior.

Please answer the following questions and please put mark under the appropriate answer.
A=Always, S=Sometimes, N=Never

Statement/Items	**A**	**S**	**N**
Washing hands 34. Do you wash your hands after cleaning children's bottom?			
35. Do you wash your hands before preparing food for children.			
36. Do you wash your hands before feeding your children?			
37. Do you use soap when wash your hands?			
Food preparation 38. Do you use lid, cupboard, or cover to protect food from flies?			
39. Do you use washed cups and dishes for children at each meal?			
40. Do you feed your child with newly cooked food in each meal?			
41. Do you prepare powdered milk mix with boiled water?			
42. Do you feed your child with reheated food in each meal?			
43. Do you wash nursing bottles with boiled water before preparing milk?			
Use of water for hygiene and drinking 44. Do you give your child boiled water for drinking?			
45. Do you use clean water cooking food for children?			
46. Do you use clean water washing utensils for children?			
47. Do you use clean water for washing latrine?			
Use latrine 48. Do you use the toilet when children go to stool?			
49. Do you keep the toilet clean?			
Take ORS 50. Do you feed children with the mixture of ORS by using a clean spoon?			
51. Do you use ORS soon for your child when he/she has diarrhea?			
52. Do you feed children with the mixture of ORS until diarrhea stops?			

APPENDIX B

SUMMARY THE RESULT OF TEST WHICH HAD CORRELATION ASSCOCIATION EACH OTHERS IN THIS STUDY

Table 16 Correlation analysis between socio-demographic factors and diarrhea preventive behaviour score by Spearman rank correlation test.

Socio-demographic factors	Diarrhea preventive behavior	
	r_s	p- value
Age of mothers (years)	-0.023	0.710
Family income (USD)	0.125	0.324
Total number of children at age between two and five years old in the family	0.061	0.324
Total number member in the family	-0.020	0.745

Table 17 Correlation analysis between perception score and diarrhea preventive behaviour score by Spearman rank correlation test.

Perception	Diarrhea preventive behavior	
	r_s	p- value
Total perception score	0.099	0.111
Benefit score	0.104	0.095
Barrier score	0.011	0.857
Susceptibility score	0.140	0.024*
Severity score	0.064	0.305

* Significant at p-value < 0.05

Table 18 Correlation analysis between cues to action score and diarrhea preventive behaviour score by Spearman rank correlation test.

Cues to action score	Diarrhea preventive behavior	
	r_s	p- value
Total cues to action score	0.140	0.024*
Mass media score	0.099	0.113
Health education program score	0.116	0.063
Personnel score	0.117	0.060

* Significant at p-value < 0.05

PARTICIPANT INFORMATION SHEET

In this document, there may be some statements that you do not understand. Please ask the principal investigator or his/her representative to give you explanations until they are well understood. To help your decision making in participating the research, you may bring this document home to read and consult your relatives, intimates, personal doctor or other doctor.

Title of Research Project: Diarrhea preventive behavior of mothers with children at age between two and five years old at Sao Mai school, Cau Giay District, Hanoi city, Vietnam.

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Source of Fund- Hanoi Department of Health

This research project aims to study the factors related to preventive behavior of diarrhea disease among mothers with children at age between two and five years old at Sao Mai school, Cau Giay district, Hanoi city, Vietnam.

The expected benefit is that the study will improve understanding of mothers' management of childhood diarrhea and the factors that influence mothers to reduce unnecessary morbidity and mortality from diarrhea diseases. Based on the analysis, it is recommended that in order to reduce diarrhea incidence emphasis should be given to modifying behavior and launching a health intervention including education to improve mothers' preventive behavior for diarrhea diseases.

You are invited to participate in this research project because you are older than 18 years. You have children at age between two and five years old.

The aim of the study is to assess the relationship between mothers' diarrhea preventive behavior and socio-demographic factors, mother's perception related to diarrhea, and the cues to action.

There will be 213 participants, and the research project will last from August 2008 to April 2009.

If you decide to participate in the research project, you will go through the following procedures.

Go To interview face-to- face mothers in the Sao Mai school.

The research instrument is a structured questionnaire. It consists of fours parts: Socio-demographic characteristics, mother's perception related to diarrhea, cues to action on diarrhea preventive behavior, mother's diarrhea preventive behavior.

There is no major adverse event or unanticipated event. However, if you feel uncase or discomfort to respond some questions, you may skip the question. If you have any question regarding with the study, please do not hesitate to contact:

Mrs. NGUYEN THI LE HA

Contact address in Vietnam: No 203 M Building Van Cong Mai Dich, Cau Giay District, Hanoi Vietnam. Tel.844-7645685. Mobile phone: 84-0972847635. Contact address in Thailand: Master of Primary Health Care Management (MPHM) Office At ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Nakhonpathom, Thailand. Tel. (66)24419040-3 Fax: (66)2441-9044[in office hours] Tel: 083-435-3629 [Out office hours]**.** Mobile phone: 08-7769-9335

There will be 213 participants, and the research project will last from August 2008 to April 2009.

Expense for the participants: There is no expense for participants.

If relevant information arises about benefits and risks of the research project, the researcher will inform you immediately and without concealment.

Your private information will be kept confidential, it will not be subject to an individual disclosure, but will be included in the research report as part of the overall results. Individual information may be examined by groups of persons e.g. from a funding organization, a government agent in charge, the ethics committee, etc.

You have the right to withdraw from the project at anytime without prior notice. And the refusal to participate or the withdrawal from the research project will not at all affect the proper service that he/she will receive.

On the condition that you are not received as indicated in this information sheet, you can contact the Chair of Mahidol University Institutional Review Board (MU-IRB) at the office of MU-IRB, Research Administration Division, Office of the President, Mahidol University, Tel 66-2-8496223-5, Fax 66-2-8496223.

I thoroughly read the details in this document.

Signature…… Participant

BIOGRAPHY

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