

KNOWLEDGE ATTITUDE AND PREVENTIVE BEHAVIORS
TOWARDS HAND FOOT AND MOUTH DISEASE AMONG
CAREGIVERS OF CHILDREN UNDER FIVE YEARS OLD IN
BANGKOK THAILAND

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โรคมือเท้าปากเป็น โรคติดต่ออุบัติใหม่ที่น่าจะเป็นปัญหาสาธารณสุขของประเทศไทยได้ในอนาคต โรคนี้โดยมากเกิดในเด็กเล็กและยังไม่มีวัคซีนป้องกันโรคที่มีประสิทธิภาพเพียงพอ ดังนั้นการควบคุมและป้องกันโรคจึงต้องอาศัยพฤติกรรมการป้องกัน โรคมือเท้าปากของผู้ดูแลเป็นสำคัญ งานวิจัยแบบภาคตัดขวางชิ้นนี้มีวัตถุประสงค์เพื่อประเมินระดับความรู้ เจตคติ และการปฏิบัติพฤติกรรมการป้องกัน โรคมือเท้าปาก และเพื่อระบุปัจจัยที่มีผลต่อความรู้ เจตคติ และพฤติกรรมดังกล่าวในกลุ่มผู้ดูแลเด็กอายุต่ำกว่าห้าปี ที่บ้านในกรุงเทพมหานคร ประเทศไทย งานวิจัยนี้ใช้เทคนิคการเลือกตัวอย่างแบบแบ่งกลุ่ม เพื่อสุ่มเลือกสถานรับเลี้ยงเด็ก 9 แห่ง จาก 9 เขตในกรุงเทพฯ และใช้แบบสอบถามแบบตอบเองเพื่อเก็บข้อมูลจากผู้ดูแลเด็ก 456 ราย ผลการศึกษาพบว่า 50.4 % ของผู้ดูแลเด็กที่บ้านมีความรู้เรื่องโรคมือเท้าปากในระดับต่ำ และมีเพียง 3.7% ที่มีความรู้ในระดับสูง โดยทั่วไปแล้วผู้ดูแลเด็กมีเจตคติต่อโรคมือเท้าปากในเกณฑ์ดี (31.8%) ถึงปานกลาง (68.2%) แต่ในแง่เจตคติที่มีต่อความรุนแรงของโรคมือเท้าปากมีเพียง 1.8% ที่มีเจตคติที่เหมาะสม เนื่องจากผู้ดูแลเด็กส่วนมากเข้าใจว่าโรคมือเท้าปากเป็น โรคที่มีความรุนแรงมากกว่าความรุนแรงของโรคในความเป็นจริง ในด้านพฤติกรรม 60% ของผู้ดูแลเด็กปฏิบัติพฤติกรรมการป้องกันโรคมือเท้าปากอยู่ในเกณฑ์ดี อย่างไรก็ตาม ยังมีพฤติกรรมการป้องกันโรคบางพฤติกรรมที่มีการปฏิบัติน้อยเกินไป งานวิจัยนี้พบว่า ความรู้มีความสัมพันธ์กับเจตคติ ($p=0.000$, $r=0.193$) ความรู้มีความสัมพันธ์กับพฤติกรรมการป้องกันโรค ($p=0.000$, $r=0.163$) และเจตคติมีความสัมพันธ์กับพฤติกรรมการป้องกันโรค ($p=0.000$, $r=0.371$) อย่างมีนัยสำคัญทางสถิติ ลักษณะทางสังคมและประชากรของผู้ดูแลเด็กหลายลักษณะมีความสัมพันธ์กับ ความรู้ เจตคติ และ พฤติกรรมการป้องกันโรคมือเท้าปากโดยเฉพาะ รายได้ครอบครัว และการศึกษา ซึ่งมีความสัมพันธ์กับทั้งความรู้ เจตคติ และ พฤติกรรม ผลจากการวิเคราะห์การถดถอยพหุคูณ ($F=30.497$, $p<0.001$, $R^2=0.213$) เผยให้เห็นว่าเจตคติเป็นปัจจัยที่มีอำนาจในการทำนายพฤติกรรมได้ดีที่สุด ($\beta=0.308$, $t=7.007$, $p<0.001$) ตามมาด้วย รายได้ครอบครัว ($\beta=0.205$, $t=4.698$, $p<0.001$), เพศ ($\beta=0.127$, $t=3.021$, $p=0.003$) และ ความรู้ ($\beta=0.086$, $t=1.996$, $p<0.047$)

โดยสรุปแล้ว ข้อมูลจากงานวิจัยนี้ชี้ให้เห็นถึงความจำเป็นในการให้ข้อมูลเกี่ยวกับโรคมือเท้าปากแก่ผู้ดูแลเด็กให้มากขึ้นและเน้นย้ำในเรื่องการปรับเจตคติที่มีต่อโรค โดยเฉพาะในกลุ่มผู้ดูแลเด็กที่มีรายได้น้อยและมีการศึกษาน้อย ทั้งนี้ควรพิจารณาให้ข้อมูลผ่านทางสื่อโทรทัศน์ เนื่องจากเป็นช่องทางที่ผู้ดูแลเด็กเข้าถึงข้อมูลได้มากที่สุด (97.6%)

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RUTTIYA CHAROENCHOKPANIT : KNOWLEDGE ATTITUDE AND PREVENTIVE BEHAVIORS TOWARDS HAND FOOT AND MOUTH DISEASE AMONG CAREGIVERS OF CHILDREN UNDER FIVE YEARS OLD IN BANGKOK THAILAND. ADVISOR : TEPANATA PUMPAIBOOL, Ph.D., 118 pp.

HFMD is an emerging disease which has potential to become Thai public health problem in the future. This disease normally affects young children and there is no effective vaccine for disease prevention; therefore, the disease prevention and control mainly rely on HFMD preventive behaviors of their caregivers. The aims of this cross sectional study were to assess the level of knowledge, attitude and preventive behaviors practice towards HFMD; and to determine factors associated to them among home caregivers of children under 5 years old. The 2-stage cluster sampling technique was used to select 9 nurseries from 9 districts in Bangkok and self-administered questionnaire was used to collect data from 456 home caregivers in Bangkok, Thailand. The results indicated that 50.4% of them had low knowledge and only of 3.7% had high overall knowledge about HFMD. Generally, they had moderate (68.2%) to good (31.8%) overall attitude towards HFMD; however, they seemed to perceive that HFMD was more severe than it actually was, since only 1.8% of them had good attitude in severity aspect. In term of behavior, 60% of them performed preventive behavior at good level. Nevertheless, some preventive behaviors were still insufficiently performed. The statistically significant correlation between overall knowledge and attitude ($p=0.000$, $r=0.193$); knowledge and behavior ($p=0.000$, $r=0.163$); and attitude and behavior ($p=0.000$, $r=0.371$) were found in this study. Many socio-demographic characteristics were associated to HFMD knowledge, attitude and preventive behavior, especially family income and education which were associated to all the KAP variables. Results from multiple regression analysis ($F=30.497$, $p<0.001$, $R^2=0.213$) revealed that the caregivers' attitude was the strongest predictor of the home caregivers' HFMD preventive behavior ($\beta=0.308$, $t=7.007$, $p<0.001$) followed by family income per month ($\beta=0.205$, $t=4.698$, $p<0.001$), gender ($\beta=0.127$, $t=3.021$, $p=0.003$), and knowledge ($\beta=0.086$, $t=1.996$, $p<0.047$).

In conclusion, findings from this study highlighted the need to provide more HFMD educational program emphasizing on attitude change to the home caregivers especially among those caregivers with low income and low education. Providing HFMD information via television should be considered since television was the main source of information of the home caregivers (97.6%).

Field of Study: Public Health Student's Signature _____

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LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics
APNET	Asia-Pacific Enterovirus Surveillance Network
BMA	Bangkok Metropolitan Administration
BOE	Bureau of Epidemiology
BPS	Bureau of Policy and Strategy
CCCKS	Child Care Centers in Khon Kaen
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
DDC	Department of Disease Control
DOPA	Department of Provincial Administration
DSDW	Department of Social Development and Welfare
EV71	Enterovirus 71
HFMD	Hand Foot and Mouth Disease
KAB	Knowledge Attitude and Behavior
KAP	Knowledge Attitude and Practice
KM	Knowledge Management
MOD	Ministry of Defence
MOE	Ministry of Education
MOH	Ministry of Health
MOI	Ministry of Interior
MOPH	Ministry of Public Health
NHS	National Health Service
MOTS	Ministry of Tourism and Sport
NIIS	National Immunization Information System
PHC	Public Health Center
REDI	Regional Emerging Disease Intervention Centre
SRRT	Surveillance and Rapid Response Teams
US	United States
WHO	World Health Organization
WPRO	Western Pacific Regional Office

CHAPTER I

INTRODUCTION

1.1 Background

Hand Foot and Mouth Disease (HFMD) is a common infectious disease caused by Enterovirus genus, including Coxsackieviruses A, Coxsackieviruses B, Echoviruses, Polioviruses and Enterovirus. Infection with Enterovirus 71 (EV71) is of particular concern as it can cause severe complications in young children, sometimes resulting in death. The viruses primarily affect children younger than 10 years old. The infection rate is highest among children under 5 years old since they do not have immunity to Enteroviruses. Adults can get infected by the virus as well, but most adults do not develop HFMD since they already have immunity to the Enteroviruses. However, the infected adults can transmit the virus to children (World Health Organization and Regional Emerging Disease Intervention Centre [WHO and REDI], 2011). Symptoms may include fever, malaise, upper respiratory symptoms, rashes, blisters, and lesions on hand foot and mouth. While most infections are asymptomatic or mild, a small portion of the infected people may develop severe complications such as pleurodynia (the inflammation of the lining tissue of the lungs), aseptic or viral meningitis, encephalitis, neurological sequaelae, myocarditis, or even paralysis (Chang et al., 2011). Transmission occurs mainly through fecal-oral spread and may transmit via body excretions. Saliva, sputum, nasal discharge, and feces can carry the virus. The HFMD outbreaks are often found in nurseries, playgroups, schools, and households where young children have lots of close contacts with one another. There is no effective vaccine to protect against the viruses that cause HFMD; therefore, HFMD prevention with good personal hygiene and social distancing remain the important methods to control of HFMD outbreaks (Chang et al., 2011; WHO and REDI, 2011).

Individual cases and outbreaks of hand, foot, and mouth disease (HFMD) occur around the world. Many large outbreaks of HFMD have been reported since 1997. Most of them occurred in East and Southeast Asia. In these outbreaks, most children have typical symptoms of HFMD and recover without health complications. However, a small number of patients with this disease develop severe complications requiring hospitalization or even causing death (Thailand MOPH, DDC, 2007; Roy, 2012).

In Thailand, main HFMD causative agent is Coxsackie A16 which is a non-virulent serotype (Uerpaiojkit, 2006). HFMD is a common disease which can be found all year round. The peak of infection occurs during the transition period between summer and rainy season or during May to June. Because of the HFMD outbreaks in ASIA, Department of Disease Control (DDC) , Ministry of Public Health (MOPH) has included the HFMD in the specific disease surveillance system (506 report), since 1997. Thailand has conducted surveillance of HFMD, as a syndrome, since 2001. HFMD cases are reported by all hospitals and health centers.

During 2007-2011, annually 12,000 to 18,000 cases with 2-6 deaths per year were reported. The Enterovirus 71 cases were reported intermittently but there was no severe case until 2006 when there were 8 severe enterovirus 71 suspected cases. Three of those cases were confirmed enterovirus 71 infected (Thailand MOPH, DDC, 2007).

In 2012, the number of cases in 2012 has been increasing steadily since early May and is much higher than the number of the case in the same time period during 2007-2011. As of 1 September 2012, a total of 31,378 HFMD cases and 2 deaths have been reported. The majority of cases are found in children aged 0-5 years old. The number of cases has been highest in the central region with the highest number found in Bangkok (Thailand MOPH, DDC, BOE, 2012: online).

1.2 Rationale

HFMD has potential to become Thai health problem in the future, since HFMD outbreaks occurred in many of Thailand neighboring countries such as Malaysia in 1997, 2000, 2003, 2006, Vietnam in 2008, and 2011 (Thongcharoen, 2011). In addition, HFMD prevalence and severity in Thailand seem to be increasing. In 2012, the number of the HFMD cases in Thailand, is higher than the case number during 2007-2011, and National Institute of Health of Thailand (Thailand NIH), also reported that percentage of HFMD cases caused by Enterovirus 71 tends to increase every year (Sakoonkaew, 2007). Even though, the fatality rate of HFMD is very low, the 2012 outbreak in Thailand and Cambodia caused panic in Thai society. In term of economic impact, the median duration of illness for HFMD was 7 days and median number of missed days from school was 1 days. Direct medical costs varied from \$69 per case to \$771 per case and indirect costs, attributable primarily to parent missed work and/or sick-child care, varied from \$63 per case for HFMD to \$422 per case for other severe complication (Pichichero et al., 1998). These factors indicate that the prevention and control of this common viral illness should not be overlooked.

The disease prevention and control in young children rely on good hygienic habit of their caregivers because HFMD mainly affects young children and there is no effective vaccine for HFMD so far. The effectiveness of good hygiene on the disease prevention and control are confirmed by information from systematic review suggesting that personal and environmental hygiene can reduce the spread of infections (Aiello, and Larson, 2002). Likewise, meta-analysis results confirmed that hand hygiene is the effective method to prevent and control viral and bacterial infection (Aiello et al., 2008). In addition, many behavioral recommendations and interventions were proved to be successful methods to control viral infection (Apisarnthanarak et al., 2009; Heijne et al., 2009; Nandrup-Bus 2009; Savolainen-Kopra et al., 2012).

In order to understand current HFMD preventive behavior of the caregivers and implement effective health education or intervention program on HFMD, the information about current level of knowledge, attitude and practice is needed. The caregivers of the young children include teachers in primary school, nursemaids in nurseries and caregivers at home. However, the information about knowledge, attitude and behavior among caregivers in Thailand is limited and most of the available studies were conducted in teachers and caregivers from schools and nurseries.

The rate of Enterovirus contamination in household and rate of household transmission are high, especially among young children (Gerba et al., 1975; Pichichero et al., 1998; Chang et al., 2002; Curtis et al., 2003; Chang et al., 2004; Cheng et al., 2006; Lou and Lin, 2006); and home caregiver plays importance role in HFMD control and prevention at home; therefore, home caregivers' knowledge, attitude and preventive behaviors related to HFMD should be fully explored and understood.

This study aims to assess the level of knowledge, attitude, and practice regarding HFMD prevention of the home caregivers of the children under 5 years old in Bangkok province, capital city of Thailand. The results from this study would reveal current level of knowledge, attitude and practice and would identify the knowledge gap of the home caregivers. The information would be useful for the HFMD health education programs in the future.

1.3 Research questions

- What are the level of knowledge, attitude and preventive behaviors towards HFMD among caregivers of children under 5 years old in Bangkok, Thailand?
- What factors determine the level of knowledge, attitude and preventive behaviors towards HFMD among caregivers of children under 5 years old in Bangkok, Thailand?

1.4 Objectives

General Objective

- To assess the level of knowledge, attitude and preventive behaviors towards HFMD among home caregivers of children under 5 years old in Bangkok, Thailand.
- To determine factors associated with the level of knowledge, attitude and preventive behaviors towards HFMD among home caregivers of children under 5 years old in Bangkok, Thailand.

Specific Objective

- To assess the level of knowledge about HFMD among home caregivers of children under 5 years old in Bangkok, Thailand
- To assess the attitude towards HFMD among home caregivers of children under 5 years old in Bangkok, Thailand
- To assess the level of practice regarding HFMD preventive behaviors among home caregivers of children under 5 years old in Bangkok, Thailand
- To examine the association between socio-demographic characteristics, knowledge about HFMD, attitude towards HFMD and HFMD preventive behaviors home among caregivers of children under 5 years old in Bangkok, Thailand
- To examine the association between knowledge about HFMD and HFMD preventive behaviors among home caregivers of children under 5 years old in Bangkok, Thailand?
- To examine the associations between knowledge about HFMD, and attitude towards HFMD among home caregivers of children under 5 years old in Bangkok, Thailand?
- To examine the association between attitude towards HFMD and HFMD preventive behaviors among home caregivers of children under 5 years old in Bangkok, Thailand?

1.5 Hypothesis

- There is an association between socio-demographic characteristics and knowledge about HFMD of the home caregivers.
- There is an association between socio-demographic characteristics and attitude towards HFMD of the home caregivers.
- There is an association between socio-demographic characteristics and HFMD preventive behaviors of the home caregivers.
- There is an association between knowledge about and attitude towards HFMD of home caregivers.
- There is an association between knowledge about HFMD and HFMD preventive behaviors of the home caregivers.
- There is an association between attitude towards HFMD and HFMD preventive behaviors of the home caregivers.

1.6 Expected benefit

- The results from this study would reveal current level of knowledge about, attitude towards HFMD and HFMD preventive behaviors among home caregivers of children under five years old in Bangkok.
- The results from this study would identify the knowledge gap among home caregivers of children under five years old in Bangkok.
- The information would be useful for the related authorities in developing further educational program(s) or policies to enhance HFMD preventive behavior among home caregivers in the future.

1.7 Variables employed in the study

Independent Variables

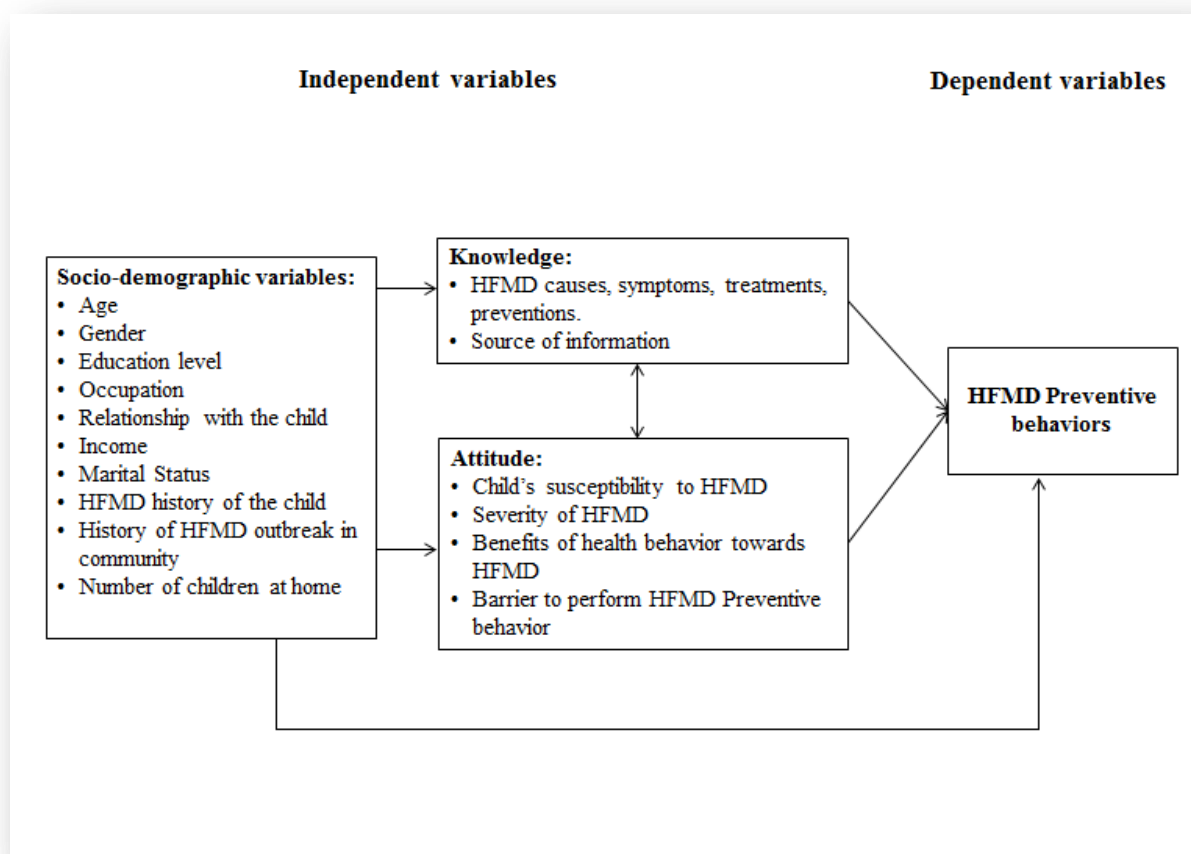
- Socio-demographic variables:
 - Age
 - Gender
 - Education
 - Occupation
 - Income
 - Marital Status
 - Relationship with the child
 - HFMD history of the child
 - History of HFMD outbreak in community
- Knowledge about Hand Foot Mouth Disease
 - HFMD causes, symptoms, treatments, preventions.
 - Source of information
- Attitude towards Hand Foot Mouth Disease:
 - Child's susceptibility to HFMD
 - Severity of HFMD
 - Benefit of HFMD preventive behaviors
 - Barrier to perform preventive behaviors

Dependent Variables

- Hand Foot Mouth Disease preventive behaviors

1.8 Conceptual framework

Figure 1: Conceptual framework



1.9 Operational definitions

Caregiver: refers to the people taking care of the child (children) under five years old. The caregivers could be the child's mother, father, aunt, uncle, grand parent, sibling, or nanny etc.

Home caregiver: refers to the caregivers who take care of children under five years old at home.

Primary home caregiver: refer to the people who take care of the child (children) under five years old the most at home.

Socio-demographic characteristics include gender, age, marital status, education, occupation, income per month, relationship with the child, HFMD history of the child and history of HFMD outbreak in the home caregivers' community.

- **Age:** refers to the respondent's age at the time of interview. It is classified in to 3 groups as young adult (18-39 years), middle adult (40-60 years), and elderly (>60) according to Erikson's theory of psychosocial development (Erikson, 1964).
- **Gender:** refers to the respondent's gender. It is classified into: male and female.
- **Educational level:** refers to the respondent's highest formal educational attainment. It is classified into 6 groups as none, primary school, secondary school, university, graduate school and others.
- **Occupation:** refers to the respondent's occupation. It is categorized into student, unemployed, housewife, employee, self-employed, retired, and other.
- **Family income:** refers to the respondent's family income per month at the time of interview.
- **Marital Status:** refers to the respondent's marital status. It is classified into single, married, divorced, separated, widowed, and others.
- **Relationship with the child:** refers to the respondent's relationship with the child.
- **Hand Foot and Mouth Disease (HFMD) history:** refers to the HFMD history of the respondent's child. It is classified into infected with HFMD before, and never infected with HFMD before. If the respondent has more than one child and at least one child of the respondent infected the HFMD virus before, the answer will falls into the first category.
- **History of HFMD outbreak in community:** refers to the history of HFMD outbreak in community where the respondent and the child are living. It is classified into HFMD outbreak has occurred before, and HFMD outbreak has never occurred before.
- **Number of children at home:** refers to number of children taking care by the primary home caregiver (respondent).

Knowledge

- **Knowledge about Hand Foot and Mouth Disease (HFMD):** refers to ability of respondent's to answer the questions about HFMD causes, symptoms, treatments, preventions. The knowledge will be categorized into 3 levels: high, moderate, and low.
- **Source of information:** refers to source of information about HFMD knowledge. IT is classified into television, radio, newspaper, internet, public health center, hospital, child's school/nursery, and others.

Attitude towards Hand Foot and Mouth Disease: refers to the respondent's feeling towards HFMD. The attitude is measured in four aspects.

1. **Child's susceptibility to HFMD:** refers to the respondent opinion of his/her child's chances of getting the HFMD
2. **Severity of HFMD:** refers to the respondent's opinion of how serious the HFMD and its consequences are to his/her child
3. **Benefit of HFMD preventive behaviors:** refers to the respondent's belief in the efficacy of the HFMD preventive behaviors in reducing risk or seriousness of the HFMD
4. **Barrier to perform HFMD preventive behavior:** refers to the respondent's opinion of the tangible and psychological costs of the HFMD preventive behaviors

Child care center (Nursery): is a place providing care, supervision and learning for children while their parents work. They take care of infants through preschool age children and generally provide more entertaining and less educational than a nursery school (Essa, 1996).

Nursery School: is a school for children between the ages of two and four years, staffed by suitably qualified and other professionals who encourage and supervise educational play rather than simply providing childcare (Essa, 1996).

Preventive behaviors towards Hand Foot and Mouth Disease: refers to behaviors of the respondent who believes his/her child is healthy, to prevent HFMD or detect HFMD in asymptomatic state. In this study, the preventive behaviors towards HFMD include;

- Regularly check the child health status
- Avoid bringing the child to the crowded places during the outbreak
- Prevent the child from close contact with the HFMD infected children
- Practice routine environmental sanitation in caregiver
 - Clean and sanitize all things that used for playing and eating
 - Disinfect floors and areas that children play
- Practice good personal hygienic habit in both caregivers and child
 - Cover mouth and nose before sneezing and coughing
 - Practice washing hands with soap and water
- Avoid the children from sharing utensils with the others

CHAPTER II

LITERATURE REVIEW

2.1 Enteroviruses (Thailand MOPH, DDC, 2007; Pongsuwanna, 2011)

The Enteroviruses is a genus of simple virus capsid, single-stranded, non-enveloped RNA viruses. The viruses are stable under acid conditions thus they are able to survive exposure to gastric acid. The viruses are classified into different groups as follows.

- Polioviruses (Serotype 1-3),
- Coxsackieviruses A (Serotype A1- A24): Coxsackievirus A23 was re-classified into Echovirus 9
- Coxsackieviruses B (Serotype B1-B6),
- Echoviruses (Serotype 1-33): Echovirus 10 and 28 were re-classified into Reovirus 1, and Rhinovirus type 1 respectively.
- Enteroviruses (Serotype 68, 69, 70, 71).

Different Enteroviruses cause different clinical features. For example, Coxsackieviruses A and Enterovirus usually cause HFMD, and Coxsackieviruses B usually cause meningitis or myocarditis. The table below shows the common causative agents and their clinical features.

Table 1: Common Enterovirus and their clinical features

Clinical features	Common causative agents
Paralysis - permanent	Poliovirus type 1, 2, 3, Coxsackie A7
Paralysis - temporary	Coxsackie B1-6
Aseptic meningitis	Echovirus, Coxsackie A and B, Poliovirus, Enterovirus 71
Encephalitis	Enterovirus 71, Poliovirus, Echovirus
Rash - macular	Many Enteroviruses
Vesicular (Hand, Foot and Mouth Disease)	Coxsackie A, Enterovirus 71
Summer febrile illness	Many Enteroviruses
Vesicular pharyngitis (Herpangina)	Coxsackie A
Myocarditis	Coxsackie B
Epidemic myalgia	Coxsackie B
Upper respiratory infection	Echovirus, Coxsackie A
Pancreatitis	Coxsackie B
Gastroenteritis	Many Enteroviruses
Conjunctivitis (Hemorrhage)	Enterovirus 70, Coxsackie A 24
Hepatitis	Enterovirus 72 (hepatitis A)

(Source: Thailand MOPH, DDC, 2007)

2.2 Hand Foot and Mouth Disease (Uerpairojkit, 2006; Thailand MOPH, DDC, 2007; United State Centers for Disease Control and Prevention [US CDC], 2011: online)

Hand, foot, and mouth disease is a common viral illness that usually affects infants and children younger than 10 years old, especially infant and children under 5 years old (Sakoonkaew, 2007; Pongsuwanna, 2011). However, it can occur in any age group. Sometimes it occurs in adults. People often confused between hand, foot, and mouth disease in human and mammalian with foot-and-mouth disease (also called hoof-and-mouth disease) which is another disease affecting sheep, cattle, and swine. However, the two diseases are caused by different viruses and are not related. Humans do not get the animal disease, and animals do not get the human disease.

2.2.1 Causes (Uerpaiojkit, 2006; Sakoonkaew, 2007).

HFMD is caused by several members of the Enteroviruses. The most common cause of HFMD is Coxsackievirus A16, but Coxsackieviruses A4, A5, A9, A10, B2, B5, Echovirus 4 (Russo et al., 2006), 11 (Chaingammuang et al., 2009), and Enterovirus 71 have also been associated with the illness. Since many serotypes of Enteroviruses can cause HFMD, one can get HFMD many times in his/her life. The clinical manifestations of routine HFMD are the same regardless of the responsible virus; however, patients infected with enterovirus 71 are more likely to experience rare and severe complications such as, viral meningitis or cardiac muscle involvement which might result in death.

2.2.2 Pathophysiology (Thailand MOPH, DDC, 2007)

When the Enteroviruses get into human body by oral route and moves to human intestine via pharyngeal mucosa, the viruses multiply themselves in lymph node, tonsil gland and intestinal lymphatic tissue; they enter the blood stream (viremia); and access to skin where skin rash and blister are developed; and access oral mucosa where mouth ulcer are developed. Then, the viruses are periodically excreted from human body via stool throughout the 6-8 weeks period.

2.2.3 Pathophysiology of HFMD from Enterovirus 71 (Thailand MOPH, DDC, 2007)

In addition to the pathophysiology of HFMD from other Enteroviruses, Enterovirus 71 will also invade to human central nervous system at brain stem via blood stream or directly invade through cranial nerve (facial nerve and hypopharyngeal nerve) which lead to many severe complications and sudden death.

2.2.4 Transmission (Thailand MOPH, DDC, 2007; US CDC, 2011: online)

HFMD spreads from person to person by direct contact. The infected person directly touch body excretion containing the virus by hand and unintentionally eats them (faecal-oral route). These viruses are most commonly found in the respiratory tract secretions (such as saliva, sputum, or nasal mucus), but also found in fluid from blisters, and stool of infected persons. The viruses may spread when infected persons touch objects and surfaces that are then touched by others.

HFMD is moderately contagious, infected persons are most contagious during the first week of the illness. Respiratory tract shedding is usually limited to a week or less, but fecal viral shedding can continue for several weeks after onset of infection. The viruses that cause hand, foot, and mouth disease can remain in the body for weeks after a person's symptoms have resolved. That means the infected people can still pass the infection to others even when they appear well. Also, some people who are infected and shedding the virus, including most adults, may have no symptoms. HFMD is not transmitted to or from pets or other animals.

2.2.5 Viral contamination in household

Once the virus is seeded into household it can spread through many areas in the house. Some of evidences are the following researched finding. Curtis and others (2003) investigated contamination and spread of enterovirus in household. They used Polio virus vaccine as a marker and collected microbiological samples from household by surface swab from the surfaces at sites involving in the transfer of faecal material. Contaminations of virus marker were found in 15% of bathroom samples, 12% of living room samples and also 10 of kitchen samples. The contaminations were found the most at bathroom taps, door handles, toilet flushes, liquid soap dispensers, nappy changing equipment and potties. Gerba and others (1975) also found that large numbers of bacteria and viruses when seeded into household toilets remained in the bowl after flushing. Droplets from flushing toilets contained both bacteria and viruses. The droplet remained airborne long enough to spread throughout the bathroom and may transfer virus to other person.

2.2.6 Household transmission

Beside from primary school, nurseries and childcare center, it is important to control HFMD in household. Because, high rate of Enterovirus transmission in household and its serious consequences have been confirmed by several studies.

Chang and others (2004) investigated household transmission in families of children with enterovirus 71 over a 6-month period. The study results showed high household transmission rate and frequent severe complications in children. The overall transmission rate was 52% in household. The transmission rates were 84%, 83%, 41%, 28%, and 26% for sibling, cousin, parents, grandparent and uncles and aunts respectively. Twenty-one percent of children infected by household transmission developed severe complications including central nervous system and cardiopulmonary failure. During the 6-month follow-up period 10 children died and 13 children had long-term sequelae. A study by Pichichero (1998) showed similar results that in households, HFMD spread to 50% of siblings and 25% of parents. Moreover, a case report study by Cheng and others (2006) showed that even mild household infections of Enterovirus may have potentially serious consequences for pregnant women and their infants. It was also confirmed by many studies that high number of children in a family was associated with enterovirus infection. (Chang et al., 2002; Lou and Lin, 2006)

2.2.7 Incubation period (Thailand MOPH, DDC, 2007).

Usually, the incubation period is 3 to 5 days between exposure and development of initial symptoms (fever and malaise)

2.2.8 Sign and symptoms (Uerpairojkit, 2006; Thailand MOPH, DDC, 2007; US CDC, 2011: online)

Three to five days after getting infected, the symptoms usually start with mild fever, poor appetite, and malaise. The fever usually recovers within 3 days. Within one or two days after fever starts, painful sores usually develop in the throat. The sores are often found in the back of the mouth including tonsils, inner cheek, and tongue. The sores

begin as small red spots that develop into small blisters (maculo-papular vesicles) and often become ulcers. Oral lesions are commonly associated with a sore throat and diminished appetite. The pain is strong in the first three days.

A characteristic skin rash also develops over one to two days. The non-itchy rash has flat or raised red spots that turn into blisters (vesicles). The rash appears usually on the palms of the hands and soles of the feet. The foot lesions may also involve the lower calf region and rarely may appear on the buttocks, knees, elbows, or genital area. Some people, especially young children, may get dehydrated if they are unable to swallow enough liquids because of painful mouth sores. Persons infected with the virus that causes HFMD may not get all the symptoms of the disease. They may only get the mouth sore or skin rash.

Most people with HFMD recover fully after the acute illness. Most HFMD caused by Coxsackievirus A16 infection is a mild disease, and nearly all patients recover in 7 to 10 days without medical treatment and complications are uncommon. Most of those patients who develop severe complication are infected with Enterovirus 71.

2.2.9 Sign and symptoms of HFMD from Enterovirus 71 (Infectious Disease Association of Thailand [IDAT], 2001; Thailand MOPH, DDC, 2007).

Unlike Coxsackieviruses and Echoviruses infection, patients with Enterovirus 71 may or may not show characteristic skin rash and ulcer. Signs and symptoms of Enterovirus 71 infection ranges from asymptomatic to acute febrile illness, typical HFMD skin rash and ulcer, aseptic meningitis, encephalitis, polio-like illness, and fatal rhombo-encephalitis. If there is no severe complication, patients with HFMD from Enterovirus 71 will also recover fully after the acute illness.

2.2.10 Complications (Thailand MOPH, DDC, 2007; US CDC, 2011:online)

Severe complications from HFMD are rare, yet found in some patients. The complications depend on causative agents since different viruses attack different human

organs. Dehydration is the most common complication of HFMD infection caused by Coxsackieviruses when intake of liquids is limited due to painful sores in the mouth.

Fingernail and toenail loss have been reported, occurring mostly in children within 4 weeks of their having hand, foot, and mouth disease. At this time, it is not known whether nail loss was a result of the disease. However, in the reports reviewed, the nail loss was temporary and the nail grew back without medical treatment.

Complications from Enterovirus 71 infection are aseptic meningitis, encephalitis, polio-like paralytic disease, encephalomyelitis, and cardiopulmonary failure. The symptoms of severe complication from Enterovirus 71 infection start from sympathetic hyperactivity (tachycardia, cold sweating, and hyperglycemia), myoclonic jerk, tremor, ataxia, followed by neurogenic pulmonary edema and cardiovascular collapse that causes sudden death.

If patients develop signs of severe complications, such as, persistent high fever, frequent vomiting, limb weakness, gasp, lethargy, upward gaze, seizure, the patient must be sent to hospital immediately. Receiving appropriate treatments in time can save the patients' life; however, there might be some sequelae such as, central hypoventilation, cranial nerve palsy, and limb weakness left.

2.2.11 Diagnosis (Thailand MOPH, DDC, 2007; US CDC, 2011: online)

HFMD is one of many infections that cause mouth sores. Health care providers can usually differentiate between mouth sores caused by hand, foot, and mouth disease and other diseases by considering clinical history and characteristic physical findings, such as, the patient age, the patients' symptoms, and the characteristic of rash and mouth sores. Laboratory confirmation is rarely necessary unless severe complications develop. The samples from the throat, skin biopsy, spinal fluid or stool may be collected and sent to a laboratory to determine which Enterovirus causes the illness. Laboratory tests require 2-4 weeks to differentiate the causative agents.

2.2.12 Treatment (Uerpaiojkit, 2006; Sakoonkaew, 2007; Thailand MOPH, DDC, 2007; Chotpitayasunondh, 2011; US CDC, 2011: online)

There is no specific treatment for HFMD to date. Antibiotic has no role in this viral infection treatment. Steroid will worsen the HFMD. Supportive treatments used for HFMD include; over-the-counter medicines, such as acetaminophen, and ibuprofen for pain and fever; mouthwashes, salt water mouth rinses, or mouth sprays for mouth pain; extra fluid for dehydration. The patients should receive close care, get tepid sponge, take some rest, drink a plenty of water, and take easy-to-digest food or liquid food, avoid warm, sore, salty and carbonated drinks. Pacifier might be replaced with tube, spoon or syringe to reduce mouth pain. IV fluid may be given as appropriate.

2.2.13 Prevention (Sakoonkaew, 2007; American Academy of Pediatrics [AAP], 2009; Thailand MOPH, DDC, BOE, 2011b: online; US CDC, 2011: online; World Health Organization, Western Pacific Regional Office [WPRO], 2012: online)

There is no vaccine to protect against the viruses that cause hand, foot, and mouth disease. A person can lower their risk of being infected by practicing good hygienic habit, disinfecting dirty surfaces and soiled items including toys; avoiding close contact such as kissing, hugging, or sharing eating utensils or cups with HFMD patients.

To prevent children from HFMD, home caregivers should do the following things.

- Practice routine environmental sanitation:
 - Clean and sanitize all toys and other things that used for playing and eating (First with soap and water, and then disinfecting them using a dilute solution of chlorine containing bleach 20 ml. per 1 liter of water)
 - disinfect floors and areas that children play
- Practice good personal hygienic habit

- Cover mouth and nose when sneezing and coughing
- Practice washing hands by follow hand washing steps with soap and water every time
- Avoid the children sharing utensils such as glass, spoon, napkin and towel with the others
- Avoid bringing children to public places such as department store, playground, supermarket, and swimming pool during the outbreak.
- Prevent the child from close contact (kissing, hugging, etc.) with children with HFMD
- Keep infants and sick children away from kindergarten, nursery, school or gatherings around 7 days or until they are well.
- Monitor the child's condition closely and seeking prompt medical attention if persistent high fever, decrease in alertness or deterioration in general condition occurs

2.2.14 Hand washing (AAP, 2009)

Hand washing is the most effective way to reducing HFMD transmission. Caregivers should not wear Jewelry and long artificial nails since they will interfere the good hand washing. Using hand lotion after hand washing to prevent dry hands is also important.

Caregivers and children should perform hand washing;

Before and after: Eating, handling food, feeding a child, administering medication, playing with water that is used by more than one person

After: Diapering, toileting, handling body fluids, wiping nose, mouth and sores, cleaning, handling garbage, playing toy

2.2.15 Hand washing steps

1. Moisten hands with clean, running water (warm or cold) and apply soap to hands.
2. Rub hands together to make lather and scrub them well; be sure to scrub the backs of your hands, between your fingers, and under your nails.
3. Continue rubbing your hands for at least 20 seconds or hum the "Happy Birthday" song twice
4. Rinse hands well under running water until free of soap and dirt.
5. Dry hands using a clean disposable paper towel or single use towel or air dry them (US CDC, 2012: online)

Liquid soap is preferable than bar soap since liquid soap is easy to use for children. Moreover, the bar soap can transmit bacteria and many adults do not rinse the soil off before putting down the bar soap (AAP, 2009).

When soap and water are not available, using an alcohol-based hand sanitizer containing at least 60% alcohol (by applying the product on hands and rubbing until the product is dry) can quickly reduce the number of germs on hands in some situations. But sanitizers do not eliminate all types of germs and not as effective as water and soap when hands are visibly dirty (US CDC, 2012: online).

2.2.16 Hygienic habit and disease control and prevention

Information from systematic review suggested that personal and environmental hygiene can reduce the spread of infections (Aiello and Larson, 2002). Likewise, meta-analysis results confirmed that hand hygiene is the effective method to prevent and control viral and bacterial infection (Aiello et al., 2008). In addition, many behavioral recommendations and interventions were proved to be successful method to control viral infection (Apisarntharak et al., 2009; Heijne et al., 2009; Nandrup-Bus, 2009; Savolainen-Kopra et al., 2012).

2.3 HFMD outbreaks

2.3.1 Definition

Outbreak: The term outbreak describes the sudden rise in the incidence of a disease, especially a harmful one.

A disease outbreak occurs when cases are found in greater numbers than expected in a community, country or region, or during a season. An outbreak may occur in one community or even extend to several countries. It can last from days to years (Collins Cobuild Advanced Lerner's English Dictionary, 2006; Dictionary.com, n.d.: online).

Epidemic: An epidemic is a disease that affects many people at the same time and spread quickly to other areas (Collins Cobuild Advanced Lerner's English Dictionary, 2006).

Pandemic: A disease that affects many people over a very wide area. A pandemic is a very extensive epidemic that is prevalent in a country, continent, or the world. In general, it is a global disease outbreak (Collins Cobuild Advanced Lerner's English Dictionary, 2006; Dictionary.com, n.d.: online).

Endemic: An endemic is a disease native to a people, or region, which is regularly or constantly found among a people or specific region (The Merriam-Webster Dictionary, 2004; Collins Cobuild Advanced Lerner's English Dictionary, 2006).

Emerging disease: new types of infectious diseases with an increasing in patient report over the past 20-30 years or infectious diseases with an increasing possibility in the near future. It includes newly occurred diseases in one place, or diseases that have just spread to another area. It also includes diseases that once were controllable by antibiotic but apparently are become resistant. The examples of emerging infectious diseases are AIDS, Avian Influenza, and drug resistant tuberculosis etc. (Thongcharoen, 2011; Thailand MOPH, DDC, BOE, 2011a: online).

2.3.2 HFMD outbreak situation around the world (US CDC, 2011: online)

Individual cases and outbreaks of hand, foot, and mouth disease (HFMD) occur around the world. Since 1997, large outbreaks of HFMD have been reported mostly in children in East and Southeast Asia. In these outbreaks, most children have typical symptoms of HFMD and recover without health complications. However, a small number of patients with this disease develop severe complications requiring hospitalization or even causing death. The statistics are summarized in the table below.

Table 2: Previous outbreaks of HFMD disease

Year	Country	Reported number of infected cases and deaths
1997	Sarawak in Malaysia	2626 infected children and 31 deaths.
1998	Taiwan	405 children with severe complication; 78 died. Estimated cases were 1.5 million.
2000	Sarawak in Malaysia	903 infected children and 3 deaths.
2000	Singapore	3790 infected children and 4 deaths.
2003	Sarawak in Malaysia	2113 infected children and 2 deaths.
2006	Sarawak in Malaysia	14,423 infected cases and 13 deaths.
2008	China	25000 infected cases and 42 deaths.
2008	Singapore	2600 infected cases.
2008	Vietnam	2300 infected cases and 11 deaths.
2008	Mongolia	1600 infected cases.
2008	Brunei	1053 infected cases.
2009	China	115,000 infected, 773 severe complication and 50 fatal cases.
2009	Indonesia	Several severe cases with fatality.
2010	China	Until march 70756 infected and 40 fatal children
2011	Vietnam	42,000 infected cases.
2011	China	1,340,259 infected cases, 437 deaths.
2012	Alabama in USA	14 identified cases.

(Source: Thailand MOPH, DDC, 2007; Roy, 2012)

The serious outbreaks occurring in the past urged many countries to implement a surveillance system to closely monitor the viruses and timely set up measures to prevent and control the spread of the viruses. As a result, Asia-Pacific Enterovirus Surveillance Network (APNET) which has a center in Taiwan was implemented. Thailand also participates in the network (Thailand MOPH, DDC, 2007).

2.3.3 HFMD in Thailand

HFMD is an emerging disease, first found in Thailand in 1969. HFMD cases are found all year round in every region of the country. Information from disease surveillance system (506 report), by Thailand MOPH DDC since 2001 to 2011, shows the peak of infection in May to June. The HFMD outbreak is often found in child care centers and kindergartens. Majority of HFMD causative agent in Thailand is Coxsackie A16. Unlike Enterovirus 71 which is a main causative agent of deadly HFMD in Taiwan and Malaysia, Coxsackie A16 is a non-virulent serotype (Uerpairojkit, 2006).

In 2011 Puenpa conducted a seroprevalence research to indicate the annual prevalence of viruses causing HFMD in Thailand. Fifty samples obtaining from fifty hospitalized pediatric patients during 2009 and 2010 were tested to identify the causative agents by molecular analysis. Based on amplification of the partial VP1 region by semi-nested PCR, 3 and 25 of 50 samples obtained from 50 hospitalized pediatric patients during 2009 and 2010 were positive for HEV-71 and CV-A16. The results from the analysis indicated that majority of HFMD in Thailand were caused by Coxsackievirus A16 and Enterovirus 71. Annual prevalence of Enterovirus 71 and Coxsackievirus A16 are 6% and 50% respectively (Puenpa, 2011). The finding conformed to the results from laboratory samples of HFMD cases tested by the Department of Medical Science, Ministry of Public Health, and by university laboratories that have identified Coxsackievirus A16 and Enterovirus 71 as main causes of infections (Thailand MOPH, DDC, 2007).

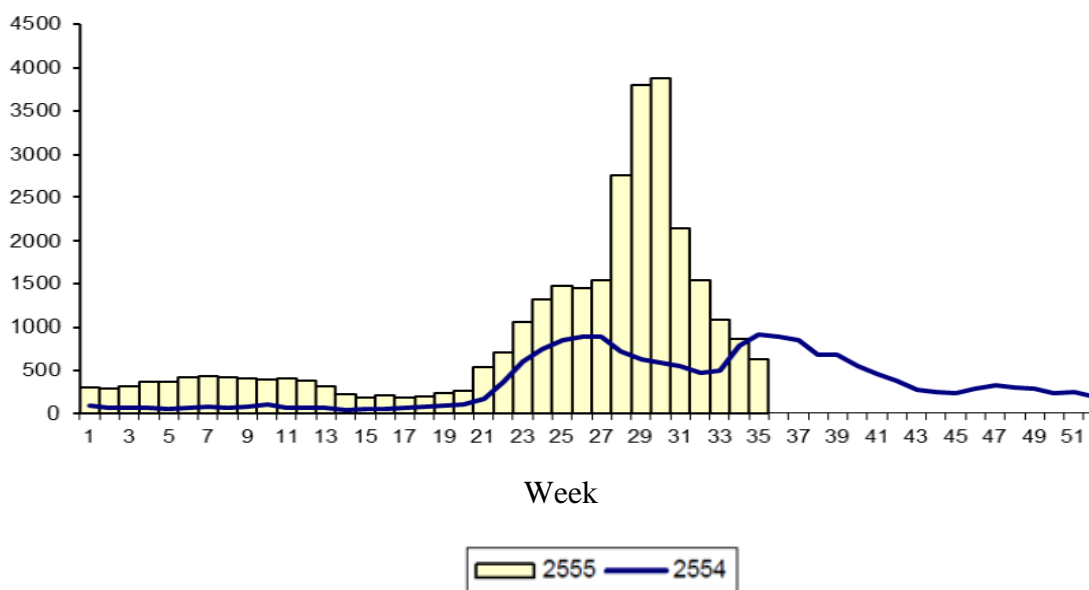
Interestingly, laboratory results from National Institute of Health of Thailand show that percentage of HFMD cases caused by Enterovirus 71 tends to increase every year. And information from HFMD outbreaks in many countries including Thailand showed that most of the patients died from Enterovirus 71 infection did not show HFMD symptoms, but they had fever for 1-3 days, then deteriorated and died in 2-4 days. The causes of death were respiratory failure, and acute pulmonary edema (Sakoonkaew, 2007; Chotpitayasunondh, 2011).

2.3.4 HFMD statistic and current situation in Thailand

Since 1 January until 1 September 2012, a total of 31,378 HFMD cases (case rate of 49.39 per 100,000 populations) with 2 deaths of HFMD were reported from all 77 provinces in Thailand. The seasonal pattern of 2012 HFMD spread is similar to those of the previous years. The number of cases increases since January. The peak of infection is in June and is higher than medians of the year 2007 to 2011 in every week. Female to Male ratio of cases was 1: 1.35. Majority (87.06%) of the cases was under 5 years old (case rate of 697.06 per 100,000 populations).

Figure 2: Number of 2012 HFMD cases compare to 2011 (as of 1 Sep 2012)

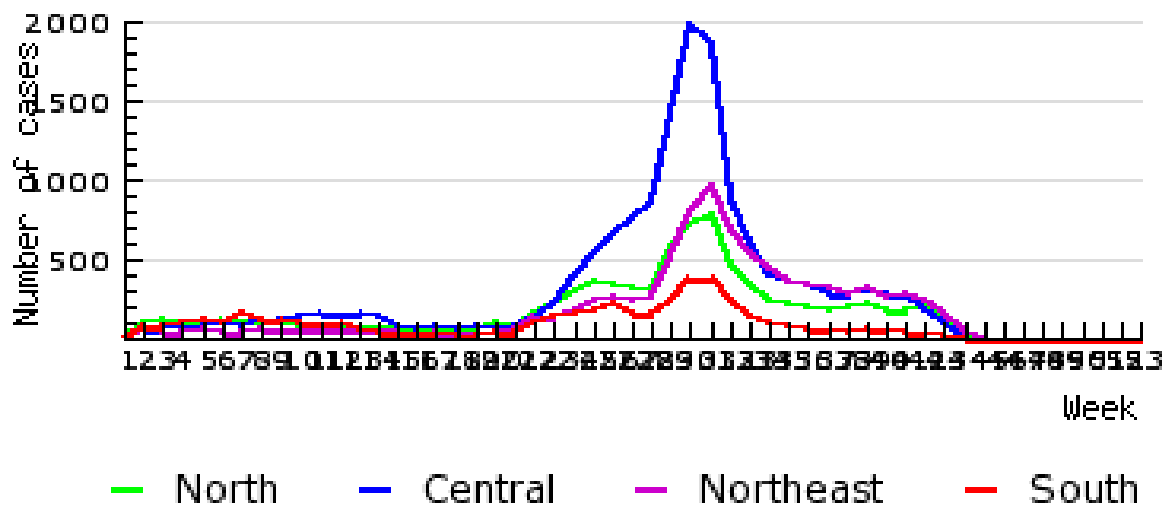
No. of Cases



(Source: Thailand MOPH, DDC, BOE, 2012: online)

Case rate is highest in Central Region followed by Northern, Southern and South Eastern region with case rate 61.11, 60.01, 47.82 and 32.54 cases per 100000 populations respectively (Thailand MOPH, DDC, BOE, 2012: online).

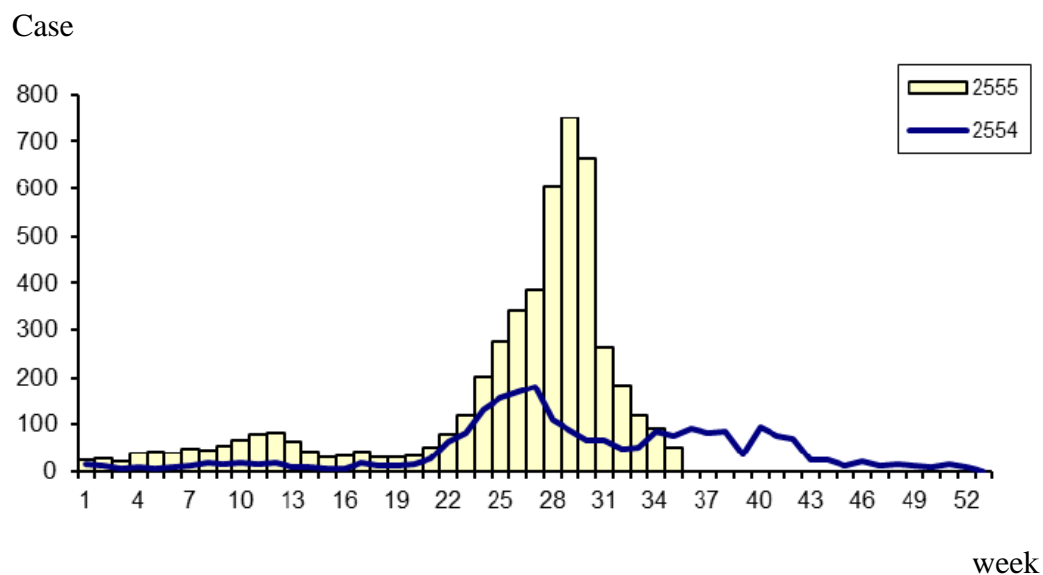
Figure 3: Number of 2012 HFMD cases in Thailand by week of onset and region
(As of 1 Sep 2012)



(Source: Thailand MOPH, DDC, BOE, 2012: online)

Among the provinces in Central region, the number of cases was highest in Bangkok (Thailand MOPH, DDC, BOE, 2012)

Figure 4: Number of HFMD cases in Bangkok, Thailand by week of onset and region (as of 1 September 2012)



(Source: Thailand MOPH, DDC, BOE, 2012: online)

As of 27 July 2012, there were two deaths reported from Bangkok and Rayong province. The case details are as follows (Thailand MOPH, DDC, 2012a: online; Thailand MOPH, DDC, 2012b: online).

Case I:

The first case was a 2 years and 8 months old Thai girl who had a history of frequent asthmatic attacks in Bangkok. She was admitted to a hospital in on 15 July, 3 days after the beginning of fever. She was found to have the inflammation of the heart and a respiratory failure, and died 2 days after hospitalization. Laboratory test identified EV71 of sub-genotype B5 from throat swab sample (Thailand MOPH, DDC, BOE, 2012; Thailand MOPH, DDC, 2012b: online).

Case II:

The second case was a 2 years old Cambodian boy of a migrant worker family who had been living in Rayong province. He began to have fever on 21 July, 2012 and died on admission at a district hospital on 25 July. His throat swab sample was later found positive for EV71 of sub-genotype B5 (Thailand MOPH, DDC, 2012b: online).

2.3.5 Effects of HFMD outbreaks in Cambodia and Thailand on Thai people

As of 13 July 2012, 54 Cambodian children died from HFMD outbreak. Most of the severe HFMD cases were less than 3 years of age, came from 14 different provinces, with some suffering from chronic conditions. A significant number of cases had been treated with steroids which worsen the condition of patients at some point during their illness. Institut Pasteur du Cambodge performed laboratory tests in 31 samples from severe HFMD cases to identify causative agents. The results showed that most of these samples are tested positive for enterovirus 71 (EV71). While HFMD was found in

Cambodia before, this is the first time that Enterovirus 71 was identified in a laboratory in Cambodia. (The Ministry of Health Kingdom of Cambodia and The World Health Organization [Cambodia MOH and WHO], 2012; WHO, 2012: online)

Suan Dusit poll, performed during 17-19 July 2012, revealed that 71.71% of people living in Bangkok Metropolitan Region were worried about HFMD outbreak in Thailand. Only 19.83% of the respondents know HFMD well, while 73.18 answered they knew a little about the disease and the rest replied they did not know or rarely know about the disease. What the respondents want the government to do the most (35.12%) was providing public relation on how to prevent HFMD and how to take care children with HFMD (ASTV manager online, 2012: online). The poll results confirmed that HFMD outbreaks caused great worry among Thai society.

2.3.6 Measures for HFMD control

Before the year 2012, the Ministry of Public Health (MOPH) in collaboration with the Ministry of Education (MOE) has implemented several HFMD control and preventive measures in schools, kindergartens, child care centers, and nurseries such as, enhancing sanitation, providing knowledge about HFMD and good personal hygiene to the students and their caregivers, and screening the suspected HFMD children daily. If there is a child with high graded fever and blister or ulcer at mouth, palm or sole, the teacher should isolate the case and notify parent for seeking medical attention (Thailand MOPH, DDC, 2007). In addition, the Ministry of Public health has provided HFMD prevention, control, and surveillance guidelines to health personals and provides health education to communities where the HFMD cases were found (Thailand MOPH, DDC, 2007).

During the year 2012 HFMD outbreak, Prime Minister asked Ministry of Public Health (MOPH), Ministry of Education (MOE), Bangkok Metropolitan Administration (BMA) and the Ministry of Interior (MOI) to protect youths and students against HFMD.

The Minister of Public Health (MOPH) escalated HFMD surveillance and HFMD control measures in early June 2012. The measures include;

- Advising the Provincial Health Offices to intensify HFMD case detection and reporting, and to strengthen outbreak investigation and control by the surveillance and rapid response teams (SRRT).
- Enhancing risk communication through media and health volunteers emphasizing on personal hygiene (washing hands, and cleaning utensils and materials of common use) advice for sick children to stay home and seek medical care when having signs of severe illness.
- Providing advice to day care centers, kindergartens and elementary schools to take cautionary and sanitation measures. Similar to the previous measures before the year 2012, the measures include: advising sick children to stay home; daily fever screening of children; cleaning utensils, toilets, toys and materials of common use by the children; and reporting the illness to local health authorities. Day care centers and schools with clusters of HFMD cases are advised to consider temporary closure of affected class room or the school (for 5 to 7 days) and carry out proper cleaning; however, the decision should be made in consultation among teachers, parents and local health authorities.
- Refreshing and supervision to medical personnel on guideline for management of severe HFMD cases with an emphasis on proper control of infection in health care facilities.

MOPH did not issue a travel advisory as it was considered not useful for prevention and control of HFMD. However, individuals who plan to travel to countries reporting HFMD outbreaks were advised to take hygienic measures (hand washing) and avoid taking children to public places or crowded areas to minimize risks of infection. Children who return from countries reporting HFMD outbreaks should seek medical care if they develop high fever or symptoms suspected of HFMD.

MOPH also asked for collaboration from Bangkok Metropolitan Administration (BMA), Ministry of Interior (MOI), Ministry of Defense (MOD), Ministry of Social Development and Human Security (MSDHS), Ministry of Education (MOE), Ministry of Tourism and Sport (MOTS), and The Private Hospital Association to take part in HFMD control and prevention in nurseries, schools, and communities (Thailand MOPH, DDC, 2012b: online).

In addition to the MOPH's measures, the Minister of Education (MOE), as the public organization that supervises Thai schools and academic institutions, also issued six measures to prevent HFMD by informing teachers, students and parents about the disease and ways of preventing infection. The measures are as follows:

- Schools should work with provincial, sub-district or district public health offices to provide proper information about HFMD to parents, teachers and students;
- Schools should work with provincial, sub-district or district public health offices to prevent HFMD;
- Schools should keep up-to-date with the latest HFMD news and work closely with the MOPH;
- Schools should hold a meeting with their teachers and provide documentation on the disease to parents and students. Teachers should take care of their students. In case any students are infected, teachers should inform their parents and take the students to the doctor as quickly as possible;
- Any schools that have infected students should be closed for at least 7 to 10 days; and
- In cases of infection occurring in schools, the implementation of strict measures will take place according to the Department of Disease Control, MOPH (Minister of Education [MoE], 2012: online).

During 1 January to 18 July 2012, at least 29 schools in Bangkok have suspended some of their classes or shut down their whole facilities to curb the hand, foot, and mouth disease or HFMD outbreak (Kongsai, Prasert and Prasertponkrang, 2012: online).

2.3.7 HFMD research trend in Thailand

National Research Council of Thailand aware of the importance of HFMD research and supported grants for Prof. Yong Poovorawan's research team to further conduct the HFMD researches. The researches will focus on three main topics which are seroprevalence study, development of HFMD diagnosis methods, and immunity of HFMD in Thai children. The HFMD vaccine development, the study is ongoing; however, there is no effective vaccine for HFMD so far (Thairath, 2012: online).

The Ministry of Public Health (MOPH) also focuses on HFMD researches in 2013. Topics include; incidence, prevalence, mortality and magnitude of HFMD problem, seroprevalence study, infection rate in high risk groups (such as, child care centers and kindergartens), severity of HFMD, study of the effectiveness and efficiency of the present prevention and surveillance systems, and etc. (Thailand MOPH, DDC, KM, 2012: online).

2.4 KAP study

2.4.1 Knowledge (Theory about knowledge) (Russell, 2000)

Definition of Knowledge: Defining definition of knowledge is controversial; however, the most well-known meaning of knowledge is "*the justified true belief*".

The tripartite theory of knowledge is widely used to analyze whether any belief is knowledge or not.

According to the Tripartite Theory of Knowledge, people have knowledge when they believe something, with justification, and it is true; otherwise, they do not have knowledge. Therefore, three criteria must be met to confirm that people have knowledge.

1. **Belief:** The first condition for knowledge, according to the tripartite theory, is belief. Unless one believes a thing, one cannot know it. Even if something is true, and one has excellent reasons for believing that it is true, one cannot know it without believing it.

2. **Truth:** The second condition for knowledge is truth. If one knows a thing then it must be true. No matter how well justified or sincere a belief is, if it is not true that it cannot constitute knowledge. Knowledge must be knowledge of the truth.

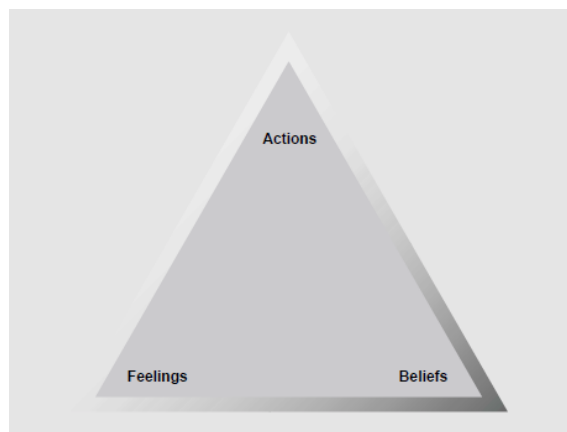
3. **Justification:** The third condition for knowledge is justification. Beside from believing a true thing, there must be a good reason or evidence for the belief.

2.4.2 Attitude (theory about attitude)

Picken (2005) defined an attitude as “*a mindset or a tendency to act in a particular way due to both an individual’s experience and temperament*”. It is a complex combination of personality, beliefs, values, behaviors, and motivations.

An attitude includes three components: a feeling, a thought or belief, and behavior (an action). Attitude helps people define how they see situations, as well as define how they behave towards the situation or object. Although the feeling and belief components of attitudes are internal, we can view a people’s attitude from their behaviors.

Figure 5: Tri-component model of attitude



(Source: Picken, 2005)

Alfred Adler (1870–1937) cited in Pickens 2005 emphasized that people’s attitude towards the environment had a significant influence on their behaviors. Attitude can be formed by learning and from people’s direct experiences. People’s attitudes are influenced by the social world and the social world is influenced by their attitudes.

2.4.2.1 Attitude and perception

Perception is closely related to attitudes “*Perception is the process by which organisms interpret and organize sensation to produce a meaningful experience of the world*” (Lindsay & Norman, 1977 cited in Picken 2005).

Perception is the way people interpret the stimuli or situation they faced into something meaningful to them based on their prior experiences. Their perception may be substantially different from reality and these factors can influence and bias their perceptions. In other word, attitude is the result of perceptions. Two people with different perceptions face the same situation might think about it differently, and end up with different attitudes (Pickens, 2005).

2.4.3 Practice or behavior (theory about behavior)

Gochman (1997) gave the Health behavior definition as “*personal attributes such as beliefs, expectations, motives, values, perceptions, and other cognitive elements; personality characteristics, including affective and emotional states and traits; and overt behavior patterns, actions and habits that relate to health maintenance to health restoration and to health improvement*”. Health behavior is also “*something that people do or refrain from doing although not always consciously or voluntarily*”.

Family, social societal, institutional, and cultural determinants can influence health behavior via personal attribute.

Categories of health behavior (Gochman, 1997)

1. Preventive or protective health behavior: are any activities done by people believing themselves to be healthy, to prevent or detect illness in an asymptomatic state.

2. Illness behavior: are any activities done by people who are uncertain if they are well or perceive themselves to be ill, to define the state of the disease, and to find suitable remedies.

3. Sick-role behavior: are any activities done by people designated as being sick or thing that they are ill, for the purpose of getting well. The activity includes receiving treatment from healthcare providers, exempt from their usual responsibilities

The behavior of interest in this study is the preventive behavior against the hand foot and mouth disease.

2.4.4 KAP definition and its use

A KAP survey is a representative study of a specific population to collect information on what is known, believed and done in relation to a particular topic.

KAP study works as an educational diagnosis of community, since it tells us what people know and how they understand about certain things (knowledge), how they feel and perceive towards the things (attitude) and how they demonstrate their knowledge and attitude through their actions (Practice) (Kaliyaperumal, 2004).

The KAP study is also used to identify knowledge gaps, cultural beliefs, or behavioral patterns that may affect the health education program in the community. To some extent, the KAP study can identify factors influencing behaviors that are not known to most people, reasons for their attitudes, and how and why people practice certain health behaviors.

In term of health programs, the KAP study helps to identify needs of health programs, assess the effectiveness of programs, and identify problems and barriers in program delivery, as well as solutions for improving quality and accessibility of services (WHO, 2008).

2.4.5 Steps in preparation of a KAP (Kaliyaperumal, 2004; WHO, 2008)

Step 1: Domain identification: Review the existing information and determine the objectives of the survey, scope of the study, survey population and sampling plan.

Step 2: Question Preparation: This step starts from meeting with specialist to identify the endpoints or goals of the awareness creation activities. After that, the questions should be prepared to test all three areas of the study, Knowledge, Attitude, and Practices.

Knowledge section: The examples of the topics in this section are epidemiology, progress of disease, symptoms, diagnosis, treatment options, and risk factors.

Attitude section: The questions in this section might cover the topics about demography, importance of follow up procedure, severity of disease, importance of referral, and health seeking behaviors. To measure the general attitudes, beliefs and misconceptions, the researcher should provide statements to the respondents and ask how much they agree to those statements.

Practice section: The questions in this section should ask about disease intervention and management, or referral practices.

Step 3: Validation of questions: The questions must be validated, by conducting the survey in a small group of representatives of the population, to assess their ease of comprehension, relevance to the topics, effectiveness in providing useful information, and the degree to which the questions are interpreted and understood by different individuals. The information from the pilot survey should be analyzed and the questions should be revised to gain validity.

Step 4: Conducting a KAP survey: Determine the sample size and the conduct the survey in the determined standard method and should be consistent throughout the study. The data collection could be done by face to face interview, telephone interview or by distribution of the questionnaire by mail.

The sample size for KAP survey should be large enough to represent the population but should not be so large that the data collection and analysis is too difficult.

When assessing the KAP of a community, division of the population into sub-categories is typically desirable because different groups have different educational, cultural, and socioeconomic backgrounds and therefore will likely have differing levels of KAP.

After the data collection, the data will be analyzed to determine the KAP level of the community. Once the analysis is complete, it should be presented in a report and distributed to interested parties.

2.5 Review of related literature

2.5.1 Previous studies in Thailand

In Thailand, there are some studies related to HFMD. Most of them performed among caregiver of young children in child care centers. There was only one study by Penphaen in 2009 that performed in home caregivers and the study focus on the home caregivers' practices only. The home caregivers' knowledge about the disease and the association between knowledge, attitude and their practices were not studied. In this section, the previous study results were reviewed. Different studies showed very different level of knowledge and practice of the caregivers as follows.

Aiewtrakun and others (2012) conducted a descriptive study in 388 caregivers in the Child Care Centers in KhonKaen (CCCKS), by using self-administered questionnaire, to determine the proportion of caregivers who were knowledgeable about the screening, to determine the proportion of caregivers who were knowledgeable about HFMD prevention, and to study their practices during the outbreaks in the CCCKS. It can be implied from the results that most caregivers in CCCKS had sufficient knowledge about HFMD screening but their knowledge in prevention and their practices during the outbreak were insufficient, as the proportion of caregivers who had sufficient knowledge in screening, and HFMD prevention were 95% (95% CI: 91.9, 96.9) and 39.8 (95%CI: 34.5, 45.2) respectively. Only 3.5% of them performed hand washing with soap before

eating and after using toilet and only 6.1% knew exactly that the screening should be done before entering the CCKS gate. The screening at the gate in front of the parents was accepted among the experienced caregivers as the most efficient measure in control of the HFMD. During the outbreak, some caregivers (23.7%) did not reduce the close-contact activities among children, and 19.1% did not report to the public health authorities.

Pisakamach (2011) performed in-depth interview with 46 caregivers in 15 childcare centers. This interview focused on the HFMD general practices, including personal hygiene and sanitation of caregivers, and the observation of general environments at the Child Care Centers in Doi Tao district, Chiang Mai. From the interview, most of the caregivers and children did not properly wash their hands according to the Department of Health, Ministry of Public Health standard. The children shared their handkerchiefs and aprons. There was no personal protective equipment, such as, disposable gloves to control of HFMD infection among children. The washing sinks, hand soaps and covered trash cans were insufficient in those centers.

Penphaen (2009) studied practices of 7 caregivers at the childcare centers and 107 home caregivers at homes about the prevention of HFMD infection. The information was collected from a childcare centers, Mae Tha sub district, Mae Tha district, Lampang province, by using self-administered questionnaire. The results showed that overall practice of both caregivers and home caregivers for prevention of HFMD were at the good level (mean=3.78, σ =0.64 and mean=3.70, σ =0.58 respectively).

Chaikaew (2009) performed a study to examine the practices of 80 caregivers in a childcare center in Mueang Chiang Mai district about HFMD prevention specifically in the practice of personal hygiene care, caring for children and the childcare center environment. The results of the study showed that the overall practices of caregivers for HFMD prevention were at high level.

Chaingammuang (2009) ran a descriptive study to examine the practices of 225 caregivers in childcare centers under the Mueang Chiang Rai District Public Health Office, by using self-administered questionnaire asking about prevention of HFMD in

childcare centers on the aspect of personal hygiene, child caring and the environmental cleanliness of the childcare center. The finding revealed that the overall practices of caregivers for prevention of HFMD in childcare centers were at high level with mean of 3.62 ($\sigma=0.58$). The level of caregiver practices on personal hygiene, child caring and the environmental cleanliness of the childcare center were at the high level with mean of 3.64 ($\sigma=0.58$), 3.64 ($\sigma=0.56$) and 3.62 ($\sigma=0.58$) respectively.

Ku (2007) conducted a cross sectional study to assess knowledge, perception and preventive behavior of 124 caregivers, including caregivers from kindergartens or day care centers, and grade one primary school teachers, towards HFMD in Surin province, Thailand. The results showed that 31.5% of the respondents had poor preventive behavior; all of the respondents had very low knowledge about the HFMD; and the overall perception of the caregivers towards HFMD was very low and needed to be improved as only 13.7% of them had good perception. Mass media was found to be very effective communication, since main source of information were television (80.0%) followed by newspaper (61.6%) and radio (50.5%). It is recommended to improve caregivers' knowledge especially teachers from primary school. The public health educational program via mass media was highly recommended.

Kantavaree (2006) conducted a study in 43 caregivers from Nursery House in Mae Tha district, Lamphun province. The self-administered questionnaire was used for data collection. The results of the study showed that majority (65.1%) of caregivers performed protective behaviors in good level; majority (69.8%) of caregivers had fair level of HFMD knowledge.

2.5.2 Previous KAP studies from other countries

Many KAP studies related to HFMD were performed in different groups of caregivers. The following studies showed different knowledge and attitude and practices of the caregivers at the time of interview and also identified interesting knowledge gaps. The studies and their results are reviewed as follows.

Yang and others (2010) conducted an anonymous cross-sectional survey in 690 parents and 104 teachers at 10 kindergartens in Taiwan about their knowledge of and attitude towards enterovirus 71 infections, by using structured questionnaire, to determine whether parents and teachers were equally knowledgeable about the disease and shared the same attitudes and whether additional educational materials or communications directed towards specific groups might prevent public panic in the future. Study results showed the high accurate response rate for enterovirus infection characteristics (greater than 80%); however, around 40% of parents and teachers thought that hand, foot, and mouth syndrome were the main warning signs of severe enterovirus 71 infections. Moreover, around half of the parents and teachers thought there were effective antiviral drugs against enteroviral 71 infections. In comparison, the parent group was more knowledgeable than the teacher group about the infection season (82.3% vs 69.2%, respectively, $p=0.001$), the specific symptoms of enterovirus infection (90.3% vs 82.7%, respectively, $p=0.023$), and the possibility of permanent damage in cases of severe enteroviral infection (68.0% vs 48.1%, respectively, $p< 0.01$). Both parents and teachers reported that they were very worried about the outbreak. Compared with teachers, parents more often perceived that the impact of enterovirus infection was worse, ie, had a higher mortality rate than influenza infection (82% vs 68%, respectively, $p<0.05$). The research results suggested that more education for kindergarten teachers was recommended to prevent public panic; educational materials about the warning signs of severe enterovirus infection should be distributed to parents and teachers; reassurance that most infected patients recover spontaneously may help decrease the panic response.

Jhao and others (2008) conducted a telephone interview with 911 young children's caregivers who were randomly selected from the National Immunization Information System (NIIS) in Taiwan, to understand their' knowledge about enterovirus (symptoms and complication of enterovirus infection with and without severe complications, the seriousness of the disease); confidence in hand-washing; hand-washing behavior, and medical assistance seeking behavior.

Results from the knowledge section indicated that the caregivers were alert to the preliminary signs and symptoms of enterovirus infection with severe complications, as 76% of the interviewees knew that children under 3 years of age contacted with enterovirus infection with severe complications may lead to neurological sequelae or even death, 87% of the interviewees could correctly identify one or more symptoms of enterovirus, and 79% of the interviewees were able to identify correctly one or more symptoms of Enterovirus infection with severe complications. Sixty nine percent of the interviewees received the information about enterovirus from the News reports. As for the attitude and practice part; over 88% of the interviewees were confident that they remembered to wash their hands each time before holding the child, feeding the child, and after returning home. 74% answered that they washed their hands before coming in contact with the child; however, health education on how to wash your hands correctly and the importance of lathering a least 20 seconds and drying your hands was highly recommended, since only 63% of the care givers washed their hand correctly. Primary medical personnel should be continually instructed in order to elevate awareness of the disease, since majority of the caregivers sought medical assistance from clinics (58%), followed by hospitals (40%).

Lou and Lin (2006) conducted a study in 675 caregivers of pre-school age children in Taiwan to measure the caregivers' knowledge about Enterovirus, explore their behavior against the Enterovirus, and examine factors affecting Enterovirus infection and factors influencing healthy behaviors against enterovirus infection. Data collection was performed in pre-schools or kindergartens in Si-Twun district, Taichung, Taiwan. The results showed that the caregivers had known enterovirus well and were familiar with

enterovirus symptoms and treatments. Since, the mean score of the caregivers' healthy behavior was 4.24 (a 5-point scaled), and the mean score of the caregivers' knowledge was 10.67 with correct answer rate 82%.

2.5.3 Factor influencing health behavior related to HFMD

Association between demographics, knowledge, attitude and behaviors were reviewed as follows.

2.5.3.1 Demographic characteristics

Lou and Lin (2006) found that factor influencing healthy behaviors against HFMD of pre-school age children caregivers were gender ($t=-2.72$, $p=0.007$), HFMD history ($t=2.18$, $p=0.029$), occupation ($F=6.77$, $p=0.001$), the relationship between caregivers and children ($F=7.03$, $p=0.001$). Female in caregiver gender was superior to male in health behavior. Caregivers in retirement or unemployment practiced health behaviors with scores lower than those of the others. Grandparents in relationship with children also practiced less health behavior. The caregivers having willingness to obtain information performed better health behaviors than those answering no or doesn't matter.

Ku (2007) found that age and type of job were associated with the HFMD preventive behaviors of the caregivers in Surin Province, Thailand. The caregiver age 22-44 years old performed better than the others, and the caregivers from daycare centers and primary school performed better than the teachers from primary school.

2.5.3.2 Knowledge

Ku (2007) found that knowledge and attitude were not statistically associated with the preventive behaviors; however, Lou and Lin (2006) found that there is a little positive correlation between knowledge and healthy behavior and this correlation was statistically significant ($r=0.09$, $p=0.015$).

2.5.3.3 Attitude

Lou and Lin (2006) found that the factors associate with healthy behaviors against HFMD of pre-school age children caregivers were caregivers' attention to report of Enteroviruses ($t=-2.25$, $p=0.025$), perceived children's health statuses ($F=7.61$, $p=0.001$), caregivers worried about EV infection ($F=3.12$, $p=0.045$), willingness to receive relevant EV information ($F=10.82$, $p=0.001$).

Dearden and others (2002) conducted a formative qualitative research in rural Northern Province in Vietnam, to improve understanding about what distinguishes caregivers who practice optimal behaviors from those who do not. In this one-time, cross-sectional baseline assessment study, one hundred caregivers of children 6 to 17.9 months of age were asked about four behaviors of interest including feeding the child "positive deviant" foods, feeding the child during diarrheal episodes, washing the child's hands, and taking the child to the health center when ill. Results indicated that for all four behaviors, favorable social norms distinguished those who practiced each behavior from those who did not. Positive, reinforcing beliefs and attitudes were important determinants of every behavior except hand washing. Likewise, self-efficacy differentiated doers from non-doers for all behaviors except feeding during diarrheal episodes.

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research design

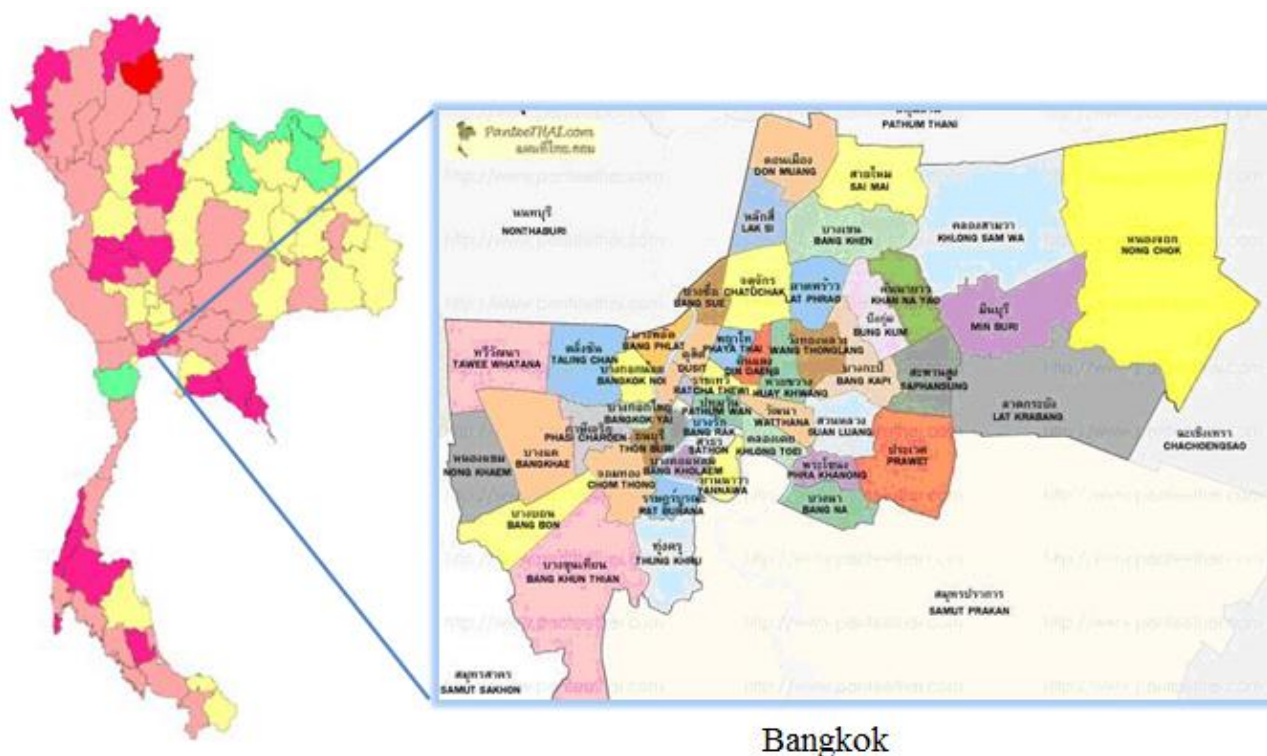
This research is a cross-sectional, descriptive analytical study, regarding knowledge about, attitude towards Hand Foot and Mouth Disease, and Hand Foot Mouth Disease preventive behaviors among home caregivers of children under five years old in Bangkok, Thailand.

3.2 Study area

According to the data from Department of Provincial Administration (DOPA) Bangkok, a capital city of Thailand, had highest population density and highest number of population. There were 5,669,571 people in Bangkok as of 3 November 2012 (Thailand MOI, DOPA, 2012: online).

According to the Bureau of Epidemiology, Bangkok also had highest number of HFMD cases. As of 21 July 2012, a total of 2,918 HFMD cases were found in 50 districts in Bangkok (Thailand MOPH, DDC, BOE, 2012). Therefore, Bangkok was selected as study area.

Figure 6: Map of Bangkok, Thailand



(Source: Thailand MOPH, DDC, BOE, 2012: online; PanteeTHAI.com, n.d.: online)

3.3 Study population

Study populations were the primary home caregivers of children under 5 years old living in Bangkok. The primary caregiver in a household was the caregiver taking care of the child/children the most at home.

Inclusion criteria:

- The respondent was adults age 18 years old and above
- The respondent was the primary home caregiver of children under 5 years
- The respondent and the child were living in Bangkok
- The respondent was able to read and write in Thai

Exclusion Criteria

- The respondent who did not want to participate in the survey

3.4 Sample size calculation

The study population was home caregiver of the children under five years old. From the definition of the home caregiver, the home caregiver could be the child's mother, father, aunt, uncle, or any relatives who takes care of the child when they are at home; therefore, it was impossible to count the number of the home caregiver. Hence, in this study the number of home caregiver was estimated from the number of the children less than five years old with ratio 1:1 which means only one home caregiver can be enrolled per one child. Since only one home caregiver was enrolled per one child, only the primary home caregivers were enrolled in this survey.

According to the data from Bureau of Policy and Strategy (BPS); as of 1 July 2011; there were 282,805 children under five years old in Bangkok (Thailand MOPH, BPS, 2011: online).

Taro Yamane formula was used to calculate the sample size (Yamane, 1973)

$$n = \frac{N}{1+N(e)^2}$$

Where;

- n = the estimate sample size
- N = the population size
- e = sampling error, the value of 5% was selected

Therefore;

$$n = \frac{282,805}{1+282,805(0.05)^2} = 399.44 = 400$$

With estimate 10% incomplete data, 440 respondents were required for the study. Therefore, approximately 440 respondents were interviewed in this survey.

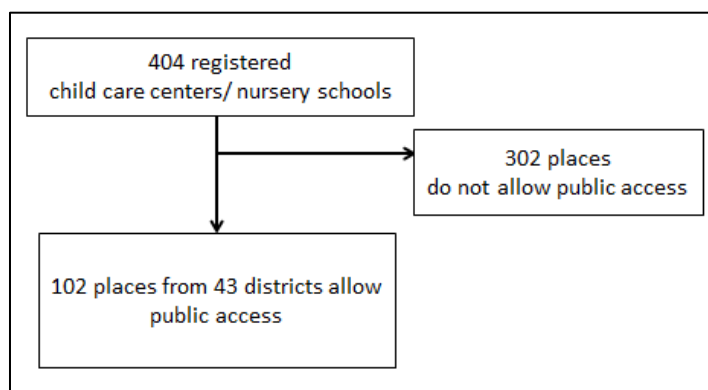
3.5 Sampling technique

Information was collected from primary home caregivers of children under five years at nurseries in Bangkok by using cluster sampling technique.

3.5.1 Sampling Frame preparation:

List of child care centers and nursery schools registered under Bureau of Woman and Child Protection and Welfare, Department of Social Development and Welfare (DSDW) was used as a sampling frame in this study. As of November 2012, there were 404 childcare centers or nursery schools registered under the DSDW. However, only 102 places from 43 districts allowed disclosing their information to public (Bureau of Woman and Child Protection and Welfare, 2012). Please see the list of nurseries in Appendix A.

Figure 7: Sampling frame preparation

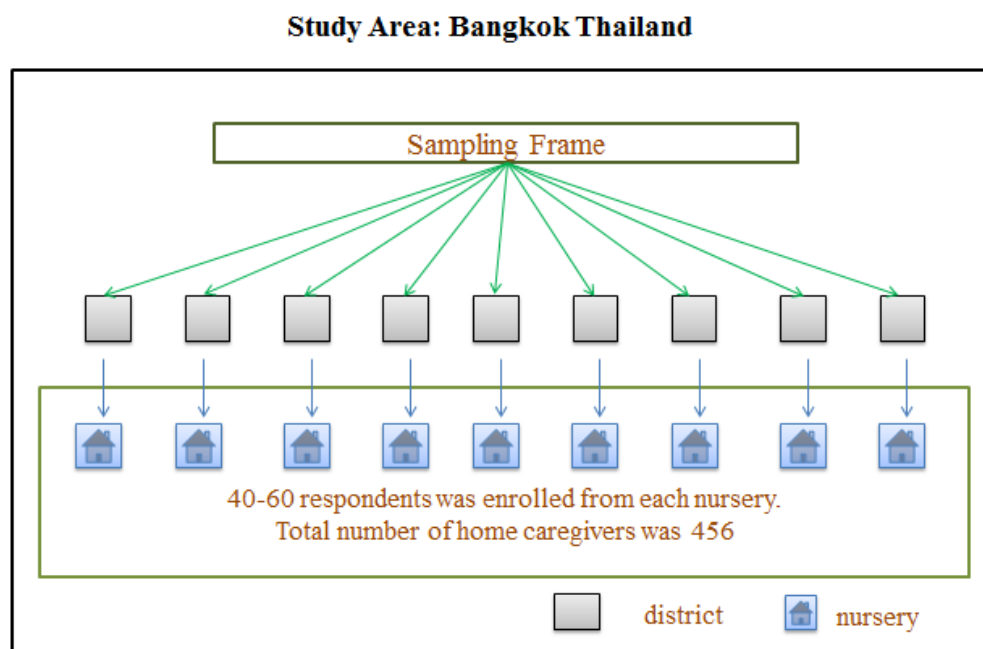


3.5.2 Sampling technique

Two-stage cluster sampling was used to select districts and child care centers or nursery school from the sampling frame.

First stage: the researcher randomly selected around 20% (9 districts) from the 43 districts.

Second stage: One nursery school or child care center was randomly selected from each district. Around 50 respondents were enrolled from each nursery school/child care center.

Figure 8: Sampling technique

3.6 Measurement tools

The structured questionnaire (Appendix B) was used as a measurement tool for self-administration by the primary home caregivers. In order to measure the primary home caregivers' knowledge attitude and preventive behaviors related to HFMD, the questionnaire was modified from the previous researches' questionnaires (Ku, 2007; Penpaen, 2009; Lou and Lin, 2006) The questionnaire was also developed from the recommendations of Thailand Ministry of Public Health American Academy of Pediatrics and World Health Organization on how to prevent HFMD. The questionnaire consists of four parts as follows.

Part I: Socio demographics

There are 10 questions in this part asking about general information such as, age, gender, marital status, educational level, occupation, relationship with the child, income, and HFMD history.

Part II: Knowledge

There are 22 yes/no questions in this part. The questions focus on the general information of HFMD, HFMD symptoms, treatments for HFMD, and preventions.

Score for correct answer is 1 and score for incorrect answer and don't know is 0. The full score is 22. The scores vary from 0-22. The respondents' knowledge were classified into 3 levels according to Bloom's cut-off point (Bloom, 1975) as follows.

- Poor 0-13 points (< 60%)
- Moderate 14-17 points (60-80%)
- Good 18-22 points (> 80%)

Part III: Attitude

There are 12 attitude questions. The attitude section divided into 4 aspects as follows.

- Child's susceptibility to HFMD,
- Severity of HFMD,
- Benefits of HFMD preventive behaviors,
- Barrier to perform HFMD Preventive behaviors.

In each aspect, there are 3 statements. Some statements are negative and some statements are positive. The respondents were asked to rate their level of agreement on the statements in Five-score Likert's scale.

Table 3: Scores of the Likert's scale for negative and positive statements

Positive Statement		Negative Statement	
Choice	Score	Choice	Score
Strongly Agree	5	Strongly Agree	1
Agree	4	Agree	2
Neutral	3	Neutral	3
Disagree	2	Disagree	4
Strongly disagree	1	Strongly disagree	5

The scores from all answers were summed up to a total score and calculated for mean. The total score ranges from 12 to 60. The respondents' attitudes were classified into into 3 levels according to Bloom's cut-off point (Bloom, 1975) as follows.

- Poor attitude 12-35 points (< 60%)
- Moderate attitude 36-48 points (60-80%)
- Good attitude 49-60 points (> 80%)

Part IV: Behaviors

There are 13 statements about the HFMD preventive behaviors. Some statements are correct and some statements are incorrect. The respondents were asked to rate how often they perform each preventive behavior in four-score Likert's scale.

Table 4: Scores of the Likert's scale for correct and incorrect behaviors

Correct behaviors		Incorrect behaviors	
Choice	Score	Choice	Score
Always	4	Always	1
Sometimes	3	Sometimes	2
Rarely	2	Rarely	3
Never	1	Never	4

The scores from all answers were summed up to a total score and calculated for mean. The total score varied from 0 to 52. The respondents' attitudes were classified into into 3 levels according to Bloom's cut-off point (Bloom, 1975) as follows.

- Poor behavior 13-31 points (< 60%)
- Moderate behavior 32-41 points (60-80%)
- Good behavior 42-52 points (> 80%)

3.7 Validity and reliability:

3.7.1 Validity test:

The content of the questionnaire was checked by consulting experts. Their comments were incorporated in consultation with the advisor. The questionnaire was adjusted to obtain validity.

3.7.2 Reliability test:

After the validation, the revised questionnaire was tested for reliability on pilot study by interviewing of 30 primary caregivers at Ban Ton Kla Nursery in Saphan sung District and re-adjusted again to obtain reliability.

Cronbach's alpha was used to measure the reliability of the questionnaire for knowledge, attitude and behavior parts separately. Reliability test results are as followed.

- Cronbach's alpha from Knowledge part 0.916
- Cronbach's alpha from Attitude part 0.703
- Cronbach's alpha from Behavior part 0.771

3.8 Data collection

Researcher trained 2 assistants on research rationale and questionnaire structure. Research assistants were responsible for;

- Supporting the researcher on making appointment with the head of nurseries.
- Distributing questionnaires to the caregivers.
- Answering the caregivers' questions about the questionnaire, if any.
- Collecting the completed questionnaire back.
- Checking for completeness. When the questionnaire was incomplete, the assistant asked the caregiver to complete missing data.

After getting the approval from the Ethics Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University, the following steps was done.

- 3.8.1 The research requested letter informing the objectives and benefits of the study to the heads of nurseries from the college.
- 3.8.2 The researcher sent the letters to heads of nurseries and contacted the heads of nurseries to follows up the results.
- 3.8.3 The researcher contacted the nurseries heads who allowed data collection in their nurseries and made appointments for the data collection.
- 3.8.4 The researcher and the well-trained research assistants approached home caregivers, checked their eligible criteria and asked them complete the questionnaires by themselves and return to the researcher or research assistants.
 - 3.8.4.1 For the primary home caregiver who visited the nursery by him/herself;
 - The research assistants asked him/her to complete the questionnaire and return to the researcher.
 - 3.8.4.2 For the primary home caregivers who did not visit the nursery by him/herself;
 - The research assistants provided a copy of information sheet and questionnaire to the caregivers who visited the nursery and asked them to send the documents to the primary home caregivers to complete and return the completed questionnaire to the researcher or leave it with teachers in the nurseries.
 - For questionnaires which were not returned by 7 days. The research assistants stopped the follow up.
- 3.8.5 The researcher and the research assistants checked on the correctness and completeness of the questionnaires.

Data analysis

The licensed SPSS software for window version 16 was used for data analysis.

Descriptive statistics: Statistics, used to summarize and describe the socio-demographic, knowledge, attitude, and behaviors data in this study, includes frequency, proportion, percentage, maximum, minimum, means for normally distributed data, and median for non-normally distributed data.

Analytical statistics:

Since the knowledge, attitude and behavior scores were not normally distributed, Man Whitney U, Kraskal Wallis and Spearman correlation tests were used instead of t-test and ANOVA Pearson correlation tests.

Association between socio-demographic characteristic, knowledge, attitude and behavior were analyzed by using Chi square, Man whitney U and Kraskal Wallis.

Association between knowledge, attitude and behavior were measured by Spearman correlation.

Multiple linear regression was also used to construct a predictive model for home caregivers' preventive behavior.

Table 5: Test statistics used to analyze dependent variables in relation to independent variables

Analysis	Dependent Variable	Scale	Independent Variable	Scale
Chi square	Socio-demographic variables	Nominal	Knowledge score	Ordinal
			Attitude score	Ordinal
			Behavior score	Ordinal
Man Whitney U Kraskal Wallis	Socio-demographic variables	Nominal	Knowledge score	Interval
Spearman-Correlation	Knowledge score	Interval	Attitude score	Interval
	Knowledge score	Interval	Behavior score	Interval
	Attitude score	Interval	Behavior score	Interval

The significant level was set at P value < 0.05.

3.9 Ethical consideration

Ethical approval was obtained from Ethics Review Committee for Research Involving Human Research Subjects, Health Sciences Group, Chulalongkorn University before the data collection process commenced. The purpose and procedure of the research were explained clearly to the respondents. The respondents could decide whether to participate in the survey independently. The respondents could withdraw at any time throughout the interview and none were tracked. The respondents' privacy and confidentiality were strictly maintained and the questionnaires were code anonymously.

CHAPTER IV

RESULTS

In this cross-sectional study, aimed to determine knowledge, attitude and behaviors regard to Hand Foot Mouth Disease among home caregivers of children under five years old in Bangkok. The information of 456 primary home caregivers from 9 nurseries in different 9 districts was collected by structured questionnaires during 1st -22nd March 2013. The list of nurseries, districts, and number of participants are shown below.

Table 6: List of the selected districts, selected nursery schools or child care centers and their children age range

District	Place	Age range of children	Number of respondents
Thonburi	Kudeekao community child care center	2.6-4.6	50 cases
SaiMai	Rittiyawannalai child care center	2.6-3.6	51 cases
Jatujak	Chokchairuammit child care center	3-6	49 cases
Dindang	YWCA Dindang child care center	2-4	50 cases
Nongjok	Ban Santisuk 2 child care center	2.6-6	50 cases
Bungkum	Look Noo nursery school	newborn-6	45 cases
Pravet	PrameRutai nursery school	1.6-6	51 cases
Rachathevi	Payathai nursery center	newborn-6	50 cases
Jom Thong	Kalya child care center	1.6-6	60 cases

4.1. The descriptive information

4.1.1 Socio-demographic characteristics of the respondents

This part described the background characteristics of the respondents. The table 7 shows overall socio-demographic characteristics including age, gender, marital status, education, family income per month, occupation, relationship with the child, HFMD history of the child, history of HFMD outbreak in the respondents' community and number of children in family of all the 456 respondents.

The respondents' age ranged from 18 to 74 years. The Median age was 35 years old. Majority of them (39.3%) were aged between of 31-40 years, while a quarter of them were aged between 21-30 years old. Small numbers of the respondents were in the age group of 51-60 years (6.8%), 18-20 years (6.8%) and greater than 60 years old (3.9%).

Majority of the primary home caregivers were female (57%). Majority of the primary home caregivers (41.7%) mother and 32.7% were father. The rest were grandparents (11.6%), aunts (4.8%), uncles (4.6%), sisters (2.6%), brothers (0.7%), sibling (0.2%) and nanny (1.1%). Most of the caregivers were married (84.9%) and took care of only one child at home (60.1%).

The respondents were mainly educated at secondary level (46.9%). Some of them graduated from a university (27.4%) and graduate school (4.2%), about 18% had completed primary school education and few percentages of the respondents were illiterate (2.9%). The family income ranged from 6,000 THB to 200,000 THB. The Median income was 25,000 THB.

Regarding the respondents' occupation, most of respondents (28.9%) were employees in private sector. Nearly 19% were self-employed, 17.8% were housewife, 12.3% were government officer, 9.6% were freelance, and 5.9% were unemployed. The rest two groups of respondents were student (3.3%) and retired employees (3.3%).

It was found that 5.5% of the respondents answered that there was a HFMD outbreak in their community and 12.1% of them answered that their child experienced HFMD before.

Table 7: Number and percentage distribution of socio-demographic characteristics (n=456)

Characteristic	Number (n = 456)	Percentage (%)
Age		
18-20	31	6.8
21-30	114	25.0
31-40	179	39.3
41-50	83	18.2
51-60	31	6.8
>60	18	3.9
Median		35
Max		74
Min		18
Gender		
Male	196	43.0
Female	260	57.0
Marital Status		
Single	42	9.2
Married	387	84.9
Widowed	7	1.5
Divorced	2	0.45
Separated	18	3.95
Education		
None	13	2.9
Primary school	85	18.6
Secondary school	214	46.9
University	125	27.4
Graduate school	19	4.2
Family income per month		
<20000	216	47.4
20001-40000	171	37.5
>40000	69	15.1
Median (Min-Max)	25,000 (6,000-200,000)	

Table 7: (continued) Number and percentage distribution of socio-demographic characteristics (n=456)

Characteristic	Number (n = 456)	Percentage (%)
Occupation		
Student	15	3.3
Housewife	81	17.8
Self-employed	86	18.9
Unemployed	27	5.9
Employee	132	28.9
Retired	15	3.3
Freelance	44	9.6
Government officer	56	12.3
Relationship with the child		
Father	149	32.7
Mother	190	41.7
Grandmother	33	7.2
Aunt	22	4.8
Uncle	21	4.6
Grandfather	20	4.4
Sister	12	2.6
Nanny	5	1.1
Brother	3	0.7
Sibling	1	0.2
HFMD history of the child		
Yes	55	12.1
No	401	87.9
HFMD outbreak in community		
Yes	25	5.5
No	431	94.5

Table 7: (continued) Number and percentage distribution of socio-demographic characteristics (n=456)

Characteristic	Number (n = 456)	Percentage (%)
Number of children		
1	274	60.1
2	132	28.9
3	41	9.0
4	6	1.3
5	3	0.7
Median		1
Max		5
Min		1

4.1.1.1 Place for treatment

During the interview, the 55 respondents whose child got HFMD before were asked where they sent their child for treatment. Table 8 shows that nearly 100% of the respondents (94.0%) took their child to hospital when the child got HFMD. Only few percentages of the respondents took their child to clinic (3.6%) or public health center (1.8%).

Table 8: Number and percentage distribution of place for HFMD treatment from respondents whose children infected with HFMD before (n=55)

Characteristic	Number (%)	
	Yes	No
Place of treatment*		
Hospital	52 (94.5)	3 (5.5)
Clinic	2 (3.6)	52 (96.4)
PHC	1 (1.8)	54 (98.2)

**Multiple answers*

4.1.2 Level of knowledge about HFMD

The respondents' knowledge about HFMD was measured in four parts including 1) cause and general information of HFMD 2) HFMD transmission, 3) HFMD prevention and treatment and 4) sign and symptoms of HFMD by using 14 correct statements and 8 incorrect statements in the questionnaire. The full score was 22 points. The Median of knowledge score of 456 primary home caregivers was 13.00 points with the minimum and maximum score 4 and 20 points respectively.

Number and Percentage of correct answers to each question about HFMD were summarized in Table 9.

In cause & general information part, more than half of them correctly answered that HFMD was not caused by bacteria (53.5%) and HFMD could occurs all year round (61.2%); however, less than half correctly answered that HFMD was not the same to Foot and Mouth disease (39%), and less than half of them knew that most HFMD patients recover within 1 week (44.3%).

Regarding the transmission, almost 90% of them knew that HFMD transmits from person to person by sneezing and coughing (respiratory tract secretion) but only half of them knew that the HFMD causative agent was also excreted from infected person via stool (57.9%) and got into human body via oral route (53.1%). In addition more than half (52.9%) misunderstood that HFMD could transmit via sheep, cattle, and swine.

As for the prevention and treatment part, most respondents answered correctly that good personal hygiene was the main methods to control HFMD (99.6%) and hand cleaning with water (without soap) was insufficient to prevent HFMD (96.1%). Out of 71.1% knew that there was no effective vaccine for HFMD but only 37.1% of them knew that alcohol gel could kill HFMD causative agent.

About the HFMD symptoms, around 30% of them could not identified any symptoms of HFMD. Only 29.8% of them knew that itchy skin rash was not HFMD symptom and only 3.5% of them knew ulcer at mouth and throat was not symptom of severe complication.

Table 9: Number and percentage of correct answer to each item of knowledge about HFMD (n=456)

	Statement	Correct	
		Number (n=456)	Percentage (%)
Cause & General Information			
1	HFMD is caused by bacteria*	244	53.5
2	HFMD occurs all year round	279	61.2
3	Another name of HFMD is Foot and Mouth disease *	178	39.0
4	Most HFMD patients recover within 1 week	202	44.3
Transmission			
5	HFMD causative agent get into human body via oral route	242	53.1
6	Sheep, cattle, and swine can transmit HFMD to human*	215	47.1
7	HFMD transmit from person to person by sneezing and coughing	410	89.9
8	HFMD causative is excreted from infected person via stool and transmitted to others.	264	57.9
Prevention and treatment			
9	Good personal hygiene is the main methods to control HFMD.	454	99.6
10	There is no vaccine to protect HFMD infection so far	324	71.1
11	Alcohol gel cannot kill HFMD causative agent*	169	37.1
12	Hand cleaning with water (without soap) is sufficient to prevent HFMD.*	438	96.1
Symptoms			
13	Red spot and blister on hand	299	65.6
14	Itchy skin rash *	136	29.8
15	Mouth Ulcer	271	59.4
16	Diarrhea*	214	46.9
17	Poor appetite	210	46.1
Symptom of severe complication			
18	Persistent high fever	306	67.1
19	Ulcer at mouth and throat*	16	3.5
20	Limb weakness	273	59.9
21	Lethargy	251	55.0
22	Frequent vomiting	231	50.7

*Incorrect statement

Information was summarized in the Table 10 below to show the overall HFMD knowledge of the respondents, and to show the respondents' knowledge in the 4 sub-parts including, cause and general information of HFMD, HFMD transmission, HFMD prevention and treatment, and HFMD symptoms.

According to the Table 10, only a few percentages of the respondents (3.7%) had good overall knowledge about HFMD. Half of them (50.4%) had poor overall knowledge and 45.8% of them had moderate overall knowledge about HFMD.

Majority of the respondents had poor knowledge in cause & general information of HFMD (67.8%) and also HFMD transmission (48.7%).

In sign and symptoms section, only 4.4% of the caregivers had good knowledge on HFMD sign and symptoms, while 56.6% had moderate knowledge and 39% had poor knowledge respectively.

The respondents seemed to have better knowledge in prevention and treatment part than in the other parts, since 23.9% of the respondents had good knowledge about prevention and treatment, while less than 10% of them had good knowledge in cause and general information (7.5%), transmission (7.5%), and sign and symptom (4.4%).

Table 10: Distribution of knowledge level about HFMD (n=456)

Statement	Level of knowledge					
	Good (>80%)		Moderate (60-80%)		Poor (<60%)	
	n	%	n	%	n	%
Overall knowledge	17	3.7	209	45.8	230	50.4
Cause & General information	34	7.5	113	24.8	309	67.8
Transmission	34	7.5	200	43.9	222	48.7
Prevention and treatment	109	23.9	262	57.5	85	18.6
Sign and symptoms	20	4.4	258	56.6	178	39.0

4.1.2.1 Source of information about HFMD

In this survey, the respondents were asked where they got the HFMD information from. The table 11 shows that the main source of information about HFMD was television (97.6%). Percentage of receiving information via television, newspaper, child's school, hospital, internet, public health center, radio, and others were 97.6%, 29.2%, 16.4%, 15.1%, 5.5%, 4.2%, and 2.9% respectively

Table 11: Source of information about HFMD (n=456)

Source of information*	Number (%)	
	Yes	No
Television	445 (97.6)	11 (2.4)
Newspaper	133 (29.2)	323 (70.8)
Child's school	75 (16.4)	381 (83.6)
Hospital	69 (15.1)	387 (84.9)
Internet	25 (5.5)	431 (94.5)
Public Health Center	19 (4.2)	437 (95.8)
Radio	13 (2.9)	443 (97.1)

* *Multiple answers*

4.1.3 Level of attitude towards HFMD

The respondents' attitude towards HFMD was measured in four aspects including 1) child's susceptibility to HFMD 2) severity of HFMD 3) benefit of HFMD preventive behavior and 4) barrier to perform HFMD preventive behavior by using 7 positive statements and 5 negative statements.

Table 12 shows number and percentage distribution of attitude towards HFMD on each statement.

Child's susceptibility to HFMD

In child's susceptibility to HFMD aspect, majority of the respondents (98.7%: 11.0% agree, 87.7% strongly agree) agreed that younger children were more prone to HFMD than the older children. Majority of them worried about bringing the child to public place (89.0%: 33.3% agree, 55.7% strongly agree) and let the child play with the others during HFMD outbreak (90.4%: 33.8% agree, 56.6% strongly agree).

Severity of HFMD

Majority of them incorrectly perceived that HFMD was a severe disease for children (81.1%: 44.3% agree, 36.8% strongly agree) and the HFMD infected children needed hospitalization (84.7%: 45.0% agree, 39.7% strongly agree); however, most of them were confident that physician could cure the infected children (80.5%: 45.0% agree, 35.5% strongly agree).

Benefits of HFMD prevention and control

Majority of the respondents saw benefits of HFMD prevention. They thought HFMD infected child should not go to school (96.7%); they should practice strict hand washing (80.7%: 41.0% agree, 39.7% strongly agree); and they felt closely monitoring child's health status was important (96.1%: 38.6% agree, 57.5% strongly agree).

Barrier to perform HFMD preventive behaviors

Majority of the respondent showed the good attitude towards each statement. Most of them did not think that cleaning the child's toy regularly was wasted of time (60.3%: 30.9% strongly disagree, 29.4% disagree) and did not think that wash their hand with water and soap frequently was difficult (75.6%: 32% strongly disagree, 43.6% disagree), and majority of the respondents (52.2%: 33.3% agree, 18.9% strongly agree) agreed that it was necessary to separate the child's utensil, cup and other receivers from other family members. However, considerable amount of them showed neutral attitude in this barrier to perform HFMD aspect, as 38%, 23% and 45% of them had neutral attitude towards the toy cleaning, hand washing, and separating utensils respectively.

Table 12: Percentage distribution of attitude towards HFMD on each item (n=456)

Statement	n	Percentage				
		strongly disagree	disagree	neutral	agree	strongly agree
Child's susceptibility to HFMD						
1 You believe that young children (less than 5 years old) have higher risk to get infected with HFMD than the older children.	456	0.0	0.2	1.1	11.0	87.7
2 You feel worried when you to bring your child to playground, market or department store during the HFMD outbreak.	456	0.2	0.7	10.1	33.3	55.7
3 You feel worried to let the child playing with others during the HFMD outbreak	456	0.0	0.0	9.6	33.8	56.6
Severity of HFMD						
4 You think HFMD is a severe disease for young children.*	456	2.4	4.8	11.6	44.3	36.8
5 You think HFMD infected children need hospitalization*	456	2.2	4.6	8.6	45.0	39.7
6 You are confident that physician can cure HFMD children.	456	0.2	2.0	17.3	45.0	35.5
Benefits of HFMD prevention and control						
7 You think the HFMD infected children do not need to absent from school. *	456	75.9	20.8	2.4	0.9	0.0
8 You believe practice strict hands washing with soap can prevent HFMD infection.	456	1.5	5.9	11.8	41.0	39.7
9 Closely monitor child's health status is important method to control HFMD.	456	0.0	0.2	3.7	38.6	57.5
Barrier to perform HFMD Preventive behaviors						
10 You think it is waste of time to clean the children's toys regularly*	456	30.9	29.4	38.2	1.3	0.2
11 You think it is difficult to wash your hand with water and soap frequently*	456	32.0	43.6	23.5	0.7	0.2
12 You think it is necessary to separate the child's utensil, cup and other receivers from other family member.	456	0.2	2.4	45.2	33.3	18.9

* *Incorrect attitude*

In summary, majority of the respondents (68.2%) had moderate overall attitude towards HFMD. Out of 81.8% of the respondents had good attitude on child's susceptibility to HFMD, 73.5% of them had good attitude on benefits of HFMD preventive behaviors, and none of them had poor attitude towards these two aspects.

In the barrier to perform HFMD preventive behaviors aspect, their attitude decrease a little as majority of them (65.1%) had moderate attitude and only 33.6% had good attitude; however, only 1.3% had poor attitude in this aspect.

Interestingly, most respondents (72.5%) had poor attitude towards HFMD severity. Only 1.8% of them had good attitude in the severity aspect.

Table 13: Number and percentage distribution of attitude towards HFMD (n=456)

Statement	Level of Attitude					
	Good (>80%)		Moderate (60-80%)		Poor (<60%)	
	n	%	n	%	n	%
Overall attitude	145	31.8	311	68.2	0	0.0
Child's susceptibility to HFMD	373	81.8	83	18.2	0	0.0
Severity of HFMD	8	1.8	105	23.0	343	75.2
Benefits of HFMD preventive behaviors	335	73.5	121	26.5	0	0.0
Barrier to perform HFMD Preventive behaviors	153	33.6	297	65.1	6	1.3

4.1.4 Level of HFMD preventive behavior

The respondents' level of preventive behavior practice was measured by using 11 positive statements and 2 negative statements.

Table 14 shows that the respondent had good level of preventive behavior practice in most statement. Most primary home caregivers always behaved some good practices to prevent HFMD i.e. they always washed their hands before feeding food to the child (81.8%), they always washed their hands after changing diapers or cleaning up a child who had used the toilet (86.2%), they always washed their hands after using toilet (84.6%) and they also always monitored their child's health every day (81.6%). The

caregivers said they sometimes cleaned areas where the child eat, sit, sleep or creep every day (72.1%) and they sometimes prevented their child to put things into their mouth (55.9%). However, some behaviors were not sufficiently performed, as 28.7% of the respondents answered that they rarely rubbed their hand for at least 20 seconds during hand washing; 25% of them rarely avoided bringing their child to public places such as department store, playground and market during the HFMD outbreak; and 37.5% of them rarely cleaned toys after their child use them.

Table 14: Percentage distribution of preventive behavior on each item (n=456)

	Statement	n	Percentage			
			Never	Rarely	Sometimes	Always
1	Cover your mouth and nose with your hands when you sneeze or cough	456	0.2	4.4	38.6	56.8
2	Wash your hands before feeding food to your child	456	0.0	0.0	18.2	81.8
3	Wash your hands after using toilet	456	0.0	0.0	15.4	84.6
4	Wash your hands after changing diapers or cleaning up a child who has used the toilet	456	0.0	0.0	13.8	86.2
5	Rub your hand for at least 20 seconds during hand washing	456	12.5	28.7	44.1	14.7
6	Use soap when you clean your hand with water	456	0.2	11.0	53.9	34.9
7	Avoid bringing your child to public places such as department store, playground and market during the HFMD outbreak	456	1.8	25.0	59.9	13.4
8	Let the child share utensil such as cup, spoon with other family members*	456	25.2	36.4	31.1	7.2
9	Prevent your child to put things in to his/her mouth	456	0.0	4.2	55.9	39.9
10	Clean toys after your child use them	456	6.1	37.5	51.5	4.8
11	Feed your child with hand*	456	25.7	50.0	24.3	0.0
12	Monitor your child health every day	456	0.0	0.7	17.8	81.6
13	Clean areas where your child eat, sit, sleep or creep every day	456	0.0	6.6	72.1	21.3

**Incorrect behavior*

Even if many good practices for disease prevention were ignored by the primary home caregivers, their overall preventive behaviors were still in the good level as shown in Table 15. The majority of the respondents (60.3%) had good level of HFMD preventive behavior practice. Nearly 40% had moderate level and only 0.2% had poor level of HFMD preventive behavior practice.

Table 15: Distribution of level of preventive behavior practice (n=456)

Statement	Level of Behavior					
	Good (>80%)		Moderate (60-80%)		Poor (<60%)	
	n	%	n	%	n	%
Overall Behavior	275	60.3	180	39.5	1	0.2

4.2. The analytic information

4.2.1 Association between socio-demographic characteristics and knowledge about HFMD

In performing chi-square test, 17 respondents who had good knowledge were combined with 209 respondents who had moderate knowledge in order to get more statistical power and meaningful results.

Results of Chi-square test between level of knowledge and socio-demographic characteristic were summarized and presented in table 16. The results indicated that age, education, occupation, family income per month, relationship with the child, and HFMD history of the child were statistically significant associated with level of knowledge with $p=0.010$, 0.002 , 0.002 , <0.001 , 0.004 , and 0.001 respectively.

The middle adult age caregivers (40 to 60) had the better knowledge than the elderly caregivers (> 60 years) and the young adult caregivers (18- 40 years). More than half (54.3%) of the middle adult age caregivers had moderate to good knowledge, 49.3% of the elderly caregivers had moderate to good knowledge, while only 16.7% of the young adult caregivers had moderate to good knowledge.

Respondents with lower education seemed to have lower knowledge about HFMD than those with higher education. As, 63.3% of respondents who were uneducated or educated at primary level had low knowledge about HFMD while 51.4% of respondents who were educated from secondary school and 40.3% of respondents who were educated from university or higher had low knowledge about HFMD. Similar finding is also found in family income per month, since respondents with lower family income had more proportion of having low knowledge than those who had higher income.

Regarding the occupation, student or employed respondents had better knowledge than housewife and unemployed or retired respondents. Out of 69% of unemployed or retired respondents and 62.5% of housewife had low knowledge about HFMD while less than half (46.7%) of student and 45.1% of employed groups had low knowledge.

As for the relationship with the child, percentage of father (40.9%) and mother (51.1%) who had low knowledge were less than those of the other group (61.5%).

About HFMD history of the child, only 29.1% of the respondents whose child had HFMD history had low knowledge, while around 53.1% of the respondents whose child had no HFMD history had low knowledge.

Table 16: Association between socio-demographic characteristics and knowledge about HFMD (n=456, p-value by Chi-square)

Characteristic	n	Level of knowledge				χ^2 (df)	p-value
		Moderate-Good		Poor			
		n	%	n	%		
Age							
18-40	298	147	49.3	151	50.7	9.048 (1)	0.010*
40-60	140	76	54.3	64	45.7		
>60	18	3	16.7	15	83.3		
Gender							
Male	196	103	52.6	93	47.4	1.229 (1)	0.298
Female	260	123	47.3	137	52.7		
Marital Status							
Single	42	17	40.5	25	59.5	4.926 (2)	0.087
Married	387	200	51.7	187	48.3		
Others	27	9	33.3	18	66.7		
Education							
None/Primary school	98	36	36.7	62	63.3	12.477 (2)	0.002*
Secondary school	214	104	48.6	110	51.4		
University/Graduate school	144	86	59.7	58	40.3		
Occupation							
Student	15	8	53.3	7	46.7	14.140 (3)	0.002*
Housewife	80	30	37.5	50	62.5		
Employed	319	175	54.9	144	45.1		
Unemployed/Retire	42	13	31.0	29	69.0		
Family income per month							
<20000	216	86	39.8	130	60.2	21.826 (2)	<0.001*
20001-40000	171	91	53.2	80	46.8		
>40000	69	49	71.0	20	29.0		
Relationship with the child							
Father	149	88	59.1	61	40.9	11.173 (2)	0.004*
Mother	190	93	48.9	97	51.1		
Others	117	45	38.5	72	61.5		
HFMD history of the child							
Yes	55	39	70.9	16	29.1	11.402 (1)	0.001*
No	401	187	46.6	214	53.4		
HFMD outbreak in community							
Yes	25	11	44.0	14	56.0	0.327 (1)	0.358
No	431	215	49.9	216	50.1		
Number of children							
1	274	132	48.2	142	51.8	1.050 (2)	0.581
2	132	66	50.0	66	50.0		
≥3	50	28	56.0	22	44.0		

*Statistically significant association at p-value < 0.05

Mann-Whitney U and Kruskal Wallis test were also used to compare mean rank of knowledge between groups of respondents. The test results in table 17 also indicated the same findings that age, education, occupation, family income per month, relationship with the child, and HFMD history were statistically significant associated with level of knowledge with $p=0.035$, 0.001 , 0.022 , <0.001 , 0.019 , and <0.001 respectively.

Similar to the results from the Chi-square test, the results from Mann-Whitney U and Kruskal Wallis also showed that respondents aged 40-60 years (middle adult) had the highest median score for knowledge; the respondents' median score for knowledge got higher when their family income per month and education got higher; father and mother had higher median score for knowledge than the other groups; and the respondents whose child had HFMD history had higher median score for knowledge than the respondents whose child did not have HFMD history.

Table 17: Association between socio-demographic characteristics and HFMD knowledge (n=456, p-value by Mann-Whitney U and Kruakal-Wallis Test)

Characteristic	Number	Mean Rank	Kruakal-Wallis	Mann-Whitney (U)	p-value
Age					
18-40	298	228.66	6.701		0.035*
40-60	140	237.88			
>60	18	152.94			
Gender					
Male	196	228.90		25402.00	0.955
Female	260	228.20			
Marital Status					
Single	42	203.10	3.633		0.163
Married	387	233.42			
Others	27	197.52			
Education					
None/Primary school	98	196.31	14.525		0.001*
Secondary school	214	222.29			
University/Graduate	144	259.64			

**Statistically significant association at p-value < 0.05*

Table 17: (continued) Association between socio-demographic characteristics and HFMD knowledge (n=456, p-value by Mann-Whitney U and Kruakal-Wallis)

Characteristic	Number	Mean Rank	Kruakal-Wallis	Mann-Whitney (U)	p-value
Occupation					
student	15	213.07	9.645		0.022*
housewife	80	220.58			
Employed	319	238.42			
Unemployed/Retire	42	173.80			
Family income per month					
<20000	216	207.02	17.638		<0.001*
20001-40000	171	234.02			
>40000	69	282.07			
Relationship with the child					
Father	149	245.61	7.924		0.019*
Mother	190	232.15			
Others	117	200.78			
HFMD history of the child					
Yes	55	291.35		7571.00	<0.001*
No	401	219.88			
HFMD outbreak in community					
Yes	25	217.86		5121.50	0.676
No	431	229.12			
Number of children					
1	274	222.80	1.387		0.500
2	132	238.86			
≥3	50	232.36			

*Statistically significant association at p-value < 0.05

4.2.2 Association between socio-demographic characteristics and attitude towards HFMD

There is no respondent in poor attitude group, so the Chi-square test was performed between good and moderate groups. Results of Chi-square test between level of attitude and socio-demographic characteristics were summarized and presented in table 18. The test results indicated that education, and family income per month were statistically significant associated with level of attitude with $p < 0.001$, and 0.001 respectively. The respondents with higher family income and higher education level had more percentage of having good attitude than those who had lower income and lower education level.

Table 18: Association between socio-demographic characteristics and attitude towards HFMD (n=456, p-value by Chi-square)

Characteristic	Number	Attitude level				χ^2 (df)	p-value
		Good		Moderate			
		n	%	n	%		
Age							
18-40	298	93	31.2	205	68.8	0.140 (2)	0.949
40-60	140	46	32.9	94	67.1		
>60	18	6	33.3	12	66.7		
Gender							
Male	196	54	27.6	142	72.4	2.859 (1)	0.104
Female	260	91	35.0	169	65.0		
Marital Status							
Single	42	12	28.6	30	71.4	0.734 (2)	0.705
Married	387	126	32.6	261	67.4		
Others	27	7	25.9	20	74.1		
Education							
None/Primary school	98	19	19.4	79	80.6	21.435 (2)	<0.001*
Secondary school	214	60	28.0	154	72.0		
University /Graduate school	144	66	45.8	78	54.2		
Occupation							
Student	15	7	46.7	8	53.3	2.576 (3)	0.469
Housewife	80	23	28.8	57	71.3		
Employed	319	104	32.6	215	67.4		
Unemployed/Retire	42	11	26.2	31	73.8		
Family income per month							
<20000	216	53	24.5	163	75.5	14.002 (2)	0.001*
20001-40000	171	59	34.5	112	65.5		
>40000	69	33	47.8	36	52.2		
Relationship with the child							
Father	149	46	30.9	103	69.1	2.178 (2)	0.339
Mother	190	67	35.3	123	64.7		
Others	117	32	27.4	85	72.6		
HFMD history of the child							
Yes	55	22	40.0	33	60.0	1.940 (1)	0.168
No	401	123	30.7	278	69.3		
HFMD outbreak in community							
Yes	25	8	32.0	17	68.0	0.000 (1)	1.000
No	431	137	31.8	294	68.2		
Number of children							
1	274	84	30.7	190	69.3	1.380 (2)	0.505
2	132	47	35.6	85	64.4		
≥ 3	50	14	28.0	36	72.0		

*Statistically significant association at p-value < 0.05

4.2.3 Association between socio-demographic characteristics and HFMD preventive behavior

A respondent in poor behavior group were combined with 180 respondents in moderate behavior group in order to get more statistical power of Chi-square test and get meaningful results. The associations are shown in Table 19. Chi-square test indicated that gender, education, and family income per month were statistically significant associated with level of HFMD preventive behavior practice with $p=0.034$, 0.001 and <0.001 respectively.

Female respondents seemed to perform better than male, since 64.6% of them performed at high level while 54.6% of male performed at high level. Percentage of respondents educated at university or higher level who performed at high level (72.9%) was more than percentage of respondents educated at primary level (56.1%) or secondary level (53.7%). Again, it was found that respondents with higher family income had more percentage of having good behavior than those who had lower income.

Table 19: Association between socio-demographic characteristics and HFMD preventive behavior (n=456, p-value by Chi-square)

Characteristic	Number	Level of Behavior				χ^2 (df)	p-value
		Good		Poor-Moderate			
		n	%	n	%		
Age							
18-40	298	172	57.7	126	42.3	2.427 (2)	0.302
40-60	140	91	65.0	49	35.0		
>60	18	12	66.7	6	33.3		
Gender							
Male	196	107	54.6	89	45.4	4.691 (1)	0.034*
Female	260	168	64.6	92	35.4		
Marital Status							
Single	42	26	61.9	16	38.1	1.786 (2)	0.409
Married	387	236	61.0	151	39.0		
Others	27	13	48.1	14	51.9		
Education							
None/Primary school	98	55	56.1	43	43.9	14.139 (2)	0.001*
Secondary school	214	115	53.7	99	46.3		
University /Graduate school	144	105	72.9	39	27.1		

*Statistically significant association at p -value < 0.05

Table 19: (continued) Association between socio-demographic characteristics and HFMD preventive behavior (n=456, p-value by Chi-square)

Characteristic	Number	Level of Behavior				χ^2 (df)	p-value
		Good		Poor-Moderate			
		n	%	n	%		
Occupation							
Student	15	10	66.7	5	33.3	0.350 (3)	0.957
Housewife	80	47	58.8	33	41.3		
Employed	319	193	60.5	126	39.5		
Unemployed/Retire	42	25	59.5	17	40.5		
Family income per month							
<20000	216	107	49.5	109	50.5	29.615 (2)	<0.001*
20001-40000	171	109	63.7	62	36.3		
>40000	69	59	85.5	10	14.5		
Relationship with the child							
Father	149	80	53.7	69	46.3	4.210 (2)	0.125
Mother	190	119	62.6	71	37.4		
Others	117	76	65.0	41	35.0		
HFMD history of the child							
Yes	55	36	65.5	19	34.5	0.692 (1)	0.464
No	401	239	59.6	162	40.4		
HFMD outbreak in community							
Yes	25	14	56.0	11	44.0	4.210 (2)	0.678
No	431	261	60.6	170	39.4		
Number of children							
1	274	168	61.3	106	38.7	0.692 (2)	0.450
2	132	81	61.4	51	38.6		
≥3	50	26	52.0	24	48.0		

*Statistically significant association at p-value < 0.05

In summary, many socio-demographic characteristics were associated with the caregivers' knowledge, attitude and behavior. Especially family income per month and education level which were strongly associated with all the KAP variables.

Table 20: Summary association between socio-demographic characteristics and knowledge, attitude, and preventive behavior towards HFMD (n=456, p-value by Chi-square)

Characteristic	Knowledge		attitude		behavior	
	χ^2	<i>p-value</i>	χ^2	<i>p-value</i>	χ^2	<i>p-value</i>
Age	9.048	0.010*	0.140	0.949	2.427	0.302
Gender	1.229	0.298	2.859	0.104	4.691	0.034*
Marital Status	4.926	0.087	0.734	0.705	1.786	0.409
Education	12.477	0.002*	21.435	<0.001*	14.139	0.001*
Occupation	14.140	0.002*	2.576	0.469	0.350	0.957
Family income per month	21.826	<0.001*	14.002	0.001*	29.615	<0.001*
Relationship with the child	11.173	0.004*	2.178	0.339	4.210	0.125
Child's HFMD history	11.402	0.001*	1.940	0.168	0.692	0.464
HFMD outbreak history	0.327	0.358	0.000	1.000	0.205	0.678
Number of children	1.050	0.581	1.380	0.505	1.619	0.450

**Statistically significant association at p-value < 0.05*

4.2.4 Association between knowledge, attitude and behavior

Table 21 shows association between knowledge, attitude and HFMD preventive behavior. In this study, there were statistically significant low positive correlation between overall attitude and behavior ($p<0.001$, $r=0.371$), little positive correlation between knowledge and attitude ($p<0.001$, $r=0.193$) and little positive correlation between knowledge and behavior ($p<0.001$, $r=0.163$).

In each subpart of knowledge, the little positive correlation was found only between knowledge about symptom and behavior ($p<0.001$, $r=0.167$).

In each aspect of attitude, the strongest significant association was found between behavior and attitude in barrier aspect ($p<0.001$, $r= 0.443$), follow by the association between behavior and attitude in prevention aspect ($p<0.001$, $r=0.227$), and the association between behavior and attitude in susceptibility aspect ($p<0.001$, $r= 0.114$).

Table 21: Association between knowledge, attitude and HFMD preventive behavior (n=456, p-value by Spearman's correlation)

Variables		<i>p-value</i>	Spearman's Rho
Knowledge-Overall	Attitude-Overall	<0.001*	0.193
Knowledge-Overall	Behavior	<0.001*	0.163
General	Behavior	0.108	0.075
Transmission	Behavior	0.207	-0.059
Prevention	Behavior	0.118	-0.073
Symptom-all	Behavior	<0.001*	0.167
Attitude- Overall	Behavior	<0.001*	0.371
Susceptibility	Behavior	0.015*	0.114
Severity	Behavior	0.157	-0.066
Prevention	Behavior	<0.001*	0.227
Barrier	Behavior	<0.001*	0.443

*Statistically significant correlation at $p\text{-value} < 0.05$

4.2.5 Predictive model for home caregivers' preventive behavior

In order to construct a predictive model for the caregivers' preventive behavior, the preventive behavior was taken as dependent variable while knowledge, attitude, family income per month, education and gender, that were associated with the behaviors, were taken as dependents invariable. Categorical variables such as caregivers' age and education were converted to dummy variables before they were taken as independent variables for multiple regression analysis.

Result from the analysis revealed a statistically significant association between HFMD preventive behavior and its predictive factors ($F=30.497$, $p<0.001$). The results showed that the caregivers' attitude was the most effective predictor ($\beta=0.308$, $t=7.007$, $p<0.001$), while the effect of education was diminished in the regression analysis. The other predictors for caregiver preventive behavior were described in a decreasing order of effectiveness as follows; family income per month ($\beta=0.205$, $t=4.698$, $p<0.001$), gender ($\beta=0.127$, $t=3.021$, $p=0.003$), and knowledge ($\beta=0.086$, $t=1.996$, $p<0.047$). R square equal to 0.213.

Table 22: Predictors of home caregivers' preventive behavior by Multiple Linear Regression (n=456)

Variable	β	t	p -value
Attitude	0.308	7.007	<0.001*
Family income per month (THB)	0.205	4.698	<0.001*
Gender (female vs male)	0.127	3.021	0.003*
Knowledge	0.086	1.996	0.047*

Where; $R^2 = 0.213$, Constant = 13.495

The regression equation is;

$$Y = 13.945 + 0.308X_1 + 0.205X_2 + 0.127X_3 + 0.086X_4$$

Where;

Y = Preventive behavior score (13-52)

X₁ = Attitude score (12-60)

X₂ = Family income per month (THB)

X₃ = Gender (female = 1, male = 0)

X₄ = Knowledge score (0-22)

CHAPTER V

DISCUSSION

Information in this study was collected from 456 primary home caregivers from 9 nurseries in 9 districts in Bangkok.

The results, showing that children in Bangkok were mainly taken care by either their father (32.7%) or their mother (41.7%) and the caregivers took care of only one or two kids at home, reflexed life in a big city like Bangkok where most families are single families and have only one kid (60%).

The surprisingly high proportion of father as a primary home caregiver (32.7%) could be explained with research results by Asia-Pacific Regional Network, which Thailand is participated in, for Early Childhood that *“cultural transformation occurred around the globe over the past several decades have impacted the composition of families and increased participation of women in the labor force, increased out-migration of mothers while fathers may remain at home, and in some cases, changing ideas about gender roles and about children’s socio-emotional needs. As a result, men are increasingly taking on new responsibilities related to children, including caregiving and providing support for children’s development and education”* (Ball et al., 2012: online)

There was highest number of HFMD cases in Bangkok during the HFMD outbreak in the year 2012. Therefore, it is unsurprising to find that some of the caregivers (12.1%) replied that their child had an experience with HFMD before, and 5.5% of them answered that there was HFMD outbreak in their community before.

However, the percentage of children with HFMD history in this study was higher than the actual 2012 HFMD case rate of children under five years in Bangkok, This is probably because the HFMD history in this survey came from self-diagnosis by the caregivers without any confirmation by the children’s medical record, so it is possible that the caregivers misdiagnosed their child to be infected with HFMD.

Television was found to be the most effective source of HFMD information of the home caregivers since 97% of them received HFMD information from television in this study. During the HFMD outbreak, Thai government also worked with school, and public health center on providing HFMD information to home caregivers, but the results showed providing information through school and PHC were not very effective, as only 16.4%, and 4.2% of the caregivers receive information from school and PHC respectively.

Hospital appeared to be their main source of treatment for the HFMD infected children because majority (94.5%) of the caregivers whose child infected with HFMD before sought for treatment from hospital.

5.1 Descriptive information

5.1.1 Level of knowledge about HFMD

During the HFMD outbreak in the year 2012, many measures were enforced by government sector. For example, the measure by Minister of Public Health (MOPH) to enhance risk communication through media and health volunteers emphasizing on personal hygiene, or the measure by Minister of Education (MOE) that schools should work with provincial, sub-district or district public health offices to provide proper information about HFMD to parents, teachers and students (Thailand MOPH, DDC, 2012 b: online; MoE, 2012: online). As a result, none of the respondents replied that they had not received any HFMD information before.

Their main source of information was television, as majority of them received information from television (97.6%), followed by newspaper (29.2%), child's school (16.4%) and hospital (15.1%). Nevertheless, the Median of knowledge score was only 13.00 points from the full score of 22 points. Half of them (50.4%) had poor knowledge, 45.8% had moderate knowledge, and only 3.7% of the caregivers had high overall knowledge about HFMD. This is probably because most information they received from media was HFMD news reporting HFMD cases found in Thailand, number of school shut down, and number of the dead case during the outbreak, but there were not many educational programs that provided the HFMD knowledge to the child's caregivers.

Comparatively the home caregivers in Bangkok seemed to know about HFMD prevention and treatment better than other parts. The findings showed that the caregivers' knowledge about HFMD prevention was in acceptable level (81.4% had moderate to good knowledge); however, their knowledge about the other parts should be improved, since 31.8% of the respondents could not identify any of the HFMD symptoms. In addition, the caregivers seemed to confuse between HFMD in human and foot and mouth disease in cattle, since only 39% of the caregivers in Bangkok knew that HFMD was not the same disease to foot and mouth disease and more than half of them (52.9%) didn't know that sheep, cattle, and swine could not transmit HFMD to human. The findings confirm the information from literature review that people are often confused between hand, foot, and mouth disease in human and mammalian with foot and mouth disease in cattle (US CDC, 2011: online).

5.1.2 Level of attitude towards HFMD

Generally most home caregivers had good attitude on child's susceptibility to HFMD (81.8%) and benefits of HFMD preventive behaviors (73.5%); however, their attitude in HFMD severity aspect should be improved. Most of them incorrectly perceived that HFMD was more severe than it actually was, since 81.1% perceived that HFMD was a severe disease for children and 84.7% of them though the HFMD infected children needed hospitalization. These findings conform to the findings from the study by Yang and others (2010) that Taiwanese parents felt great anxiety and even panic about infection during the HFMD outbreak, and Eighty-two percent of them perceived the impact of enterovirus infection to be worse than that of influenza. This phenomenon in Thailand might also be a result of the news about HFMD outbreak in Cambodia which was responsible for more than 50 deaths of the young children. However the severity of HFMD in Thailand was not as high as the severity of HFMD in Cambodia, since main causative agent of HFMD in Thailand was Coxsackie A16 (a non-virulent strain), while most of the HFMD dead cases in Cambodia were infected with Enterovirus 71.

Even though most of the 2012 HFMD cases in Thailand were not severe, the caregivers should receive sufficient HFMD information, be alert to HFMD sign and symptoms, know how to prevent their children from the infection but they do not have to worry too much about the disease.

Regarding the treatment seeking pattern among caregivers whose child infected with HFMD before, most of them sent their HFMD infected child to hospital. Unlike Taiwanese caregivers, Thai caregivers rarely took their HFMD infected children to clinic (3.6%) or public health center (1.8%), while 58% of Taiwanese caregivers sought for HFMD treatment from clinic (Jhao et al., 2008). The difference in treatment seeking pattern is probably because of difference in health care system between countries.

The tendency to send the HFMD infected child to hospital rather than clinic or public health center might be a result of the caregivers' attitude as well, as 84.7% of the caregivers thought the HFMD infected children needed hospitalization. These findings again reflect the caregivers' misperception about HFMD severity. Their misperception might cause unnecessary panic in the future HFMD outbreak.

The results indicated that the caregivers knew that performing HFMD preventive behavior was beneficial, as 73.5% had good attitude towards benefit of preventive behavior. However, there were still some barriers to perform preventive behavior among them, since only 33.6% had low barrier to perform preventive behavior. The findings also identified the toy cleaning, hand washing, and separating utensils as some of the barriers, since some of them did not have positive attitude towards the regular toy cleaning (39.5%), frequent hand washing with soap (23.9%), and separating utensils for their child respectively (47.6%). From these findings, it can be implied that the importance of performing HFMD preventive behavior might not be sufficiently promoted.

5.1.3 Level of HFMD preventive behavior

Majority of the respondents (60.3%) performed HFMD preventive behavior at good level. The finding is consistent to the finding from a study in Lampang province,

Thailand conducted by Penphaen (2009) who reported that overall HFMD preventive behavior of home caregivers were at the good level.

Even though the caregivers had good behavior in HFMD prevention, around 40 percent of them rarely or had never rubbed their hand for at least 20 seconds during hand washing; rarely or had never clean toys after their child used; and sometimes or always share their utensil with their children. Besides, a quarter of them rarely avoided bringing their child to public places during the outbreak. Therefore, the importance of performing these behaviors should be promoted.

5.2 Analytical information

5.2.1 Association between socio-demographic characteristics, knowledge, attitude, and preventive behaviors

Many of socio-demographic variables were associated with home caregivers' knowledge, attitude and behavior. Interestingly, education and family income per month were associated with all the KAP variables (knowledge, attitude and preventive behavior). In addition, the patterns of associations were all the same. The respondents with higher education, and family income were more likely to have higher knowledge, better attitude, and better practice than those with lower education and lower family income. In other word, the caregivers, requiring the health education program to improve their knowledge, attitude and behavior the most, were those with low income and low education.

Regarding knowledge, that age ($p=0.010$), education ($p=0.002$), occupation ($p=0.002$), family income per month ($p=0.000$), relationship with the child ($p=0.004$), and HFMD history ($p=0.001$) were statistically significant associated with level of knowledge is consistent with those found in a study of Chang and others (2011) that some socio-demographic characteristics, such as age and living with child were associated with level of knowledge of respondents.

As for attitude, the significant associations found between the attitude and education ($p<0.001$) and family income per month ($p=0.001$) could be explained by the

Alfred Adler's theory (cited in Pickens, 2005) stating that "*attitude can be formed by learning and from people's direct experiences. People's attitudes are influenced by the social world and the social world is influenced by their attitudes.*" The associations between the attitude and education and family income found in this study are probably because education and family income influence the respondents' attitude via indirectly defying the respondents' social world such as living environment, people they interact with, etc.

Behavior was significantly associated with gender ($p=0.034$), education ($p=0.001$), and family income per month ($p<0.001$). The association between behavior and gender is in conformity with the findings from the study by Lou and Lin (2006) that gender was associated with performing preventive behaviors ($t=-2.72$, $p=0.007$) and female performed better than male. However, there was no association between behavior and education or family income in the previous studies performed by Lou and Lin (2006) and KU (2007).

5.2.2 Association among HFMD knowledge, attitude towards HFMD, and HFMD preventive behaviors

The association between knowledge and behavior in this study ($p<0.001$, $r=0.163$) is consistent to the finding from study by Lou and Lin (2006) who found that there was a little positive correlation between knowledge and healthy behavior ($p=0.015$, $r=0.090$).

The association between attitude and behavior ($p<0.001$, $r=0.371$) is in conformity with the finding from Lou and Lin (2006) that attitude were associated with healthy behaviors against HFMD.

Statistically significant little positive correlation between knowledge and attitude ($p<0.001$, $r=0.193$) might be explained by Alfred Adler's theory that knowledge can form people attitude via learning process. In addition, the association between knowledge, attitude and behavior might be explained by the theory of Alfred Adler stating that "*learning can form attitude and people's attitude had a significant influence on their behaviors*" (Pickens, 2005). Therefore, providing HFMD health education program to

home caregivers would improve their knowledge, and then the change in their knowledge (learning) would contribute to their attitude change and the change in attitude would finally influence their behavior change.

Among four aspects in attitude section, attitude towards barrier aspect had strongest association with behavior ($p < 0.001$, $r = 0.443$). This finding indicated that reducing the caregivers' barrier to perform preventive behavior would provide the best result in behavioral change comparing to adjusting caregivers' attitude in other aspects.

5.2.3 Predictive model for HFMD preventive behaviors

The findings that knowledge ($\beta = 0.086$, $t = 1.996$, $p = 0.047$) and gender ($\beta = 0.127$, $t = 3.021$, $p = 0.003$) were the importance predictor of the home caregivers' behavior are in line with the results from the study by Lou and Lin's (2006) where knowledge was the strongest predictor ($\beta = 0.082$, $t = 2.088$, $p = 0.037$) followed by gender ($\beta = 0.188$, $t = 2.296$, $p = 0.022$). However, in this study attitude was the strongest predictor of the behavior ($\beta = 0.308$, $t = 7.007$, $p < 0.001$) followed by family income per month ($\beta = 0.308$, $t = 7.007$, $p < 0.001$) and gender ($\beta = 0.308$, $t = 7.007$, $p < 0.001$) and knowledge ($\beta = 0.308$, $t = 7.007$, $p < 0.001$). Effect of education towards preventive behavior was diminished in the regression analysis and the education variable was excluded from the equation.

The multiple regression results ($F = 30.497$, $p < 0.001$, $R^2 = 0.213$) emphasized that attitude and knowledge had positive association with the preventive behavior but the attitude's effect was the stronger predictor than knowledge.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This study revealed that after many measures by government sector have been performed during and after the 2012 HFMD outbreak, home caregivers in Bangkok still had insufficient knowledge about HFMD as half of them (50.4%) had low knowledge and only few percentages (3.7%) of the respondents had high overall knowledge about HFMD. Many of them answered the questions about HFMD sign & symptoms, HFMD transmission, and HFMD general information incorrectly. In addition, it can be implied from the findings that around half of the caregivers in Bangkok were still confused between hand foot and mouth disease in human and mammalian with foot and mouth disease in cattle as 61% of the them incorrectly thought that HFMD was the same disease to Foot and mouth disease and more than half of them (52.9%) misunderstood that sheep, cattle, and swine can transmit HFMD to human.

Regarding the attitude, generally the caregivers had moderate (68.2%) to good (31.8%) attitude towards the disease. However, the attitude towards HFMD severity should be improved, since only 1.8% of them had good attitude in severity aspect. They seemed to perceive that HFMD was more severe than it actually was.

In term of practice, majority of them performed preventive behavior in good level. However, some behaviors, such as, rubbed their hand for at least 20 seconds during hand washing, avoided bringing their child to public places during the HFMD, avoid sharing utensil with children, and clean toys after their child use were still insufficiently performed.

The findings left the impression that the home caregivers' knowledge need to be improved, their attitude about HFMD severity must be adjusted and some of their preventive behavior should be enhanced.

Regarding the factors affecting the home caregivers HFMD knowledge, attitude and behavior, many socio-demographic variables were associated with the KAP variables. Interestingly, family income per month and education had very significant associations to all the KAP variables in this study.

The caregivers' knowledge was associated with age ($p=0.010$), education ($p=0.002$), occupation ($p=0.002$), family income per month ($p<0.001$), relationship with the child ($p=0.004$), and HFMD history ($p=0.001$). Their attitude were associated with education ($p<0.001$), and family income per month ($p=0.001$). And their HFMD preventive behavior was associated with Gender ($p=0.034$), education ($p=0.001$), family income per month ($p<0.001$).

Statistically significant little positive correlation between overall knowledge and attitude ($p <0.001$, $r=0.193$); little positive correlation between knowledge and behavior ($p<0.001$, $r=0.163$); and low positive correlation between overall attitude and behavior ($p<0.001$, $r= 0.371$) were found in this study.

Predictive model from multiple linear regression ($F=30.497$, $p<0.001$, $R^2 =0.213$) indicated that attitude was the strongest predictor of the behavior ($\beta=0.308$, $t=7.007$, $p<0.001$) followed by family income per month ($\beta=0.205$, $t=4.698$, $p<0.001$), gender ($\beta=0.308$, $t=7.007$, $p<0.001$) and knowledge ($\beta=0.308$, $t=7.007$, $p<0.001$), while effect of education towards preventive behavior was diminished in the regression analysis and the education variable was excluded from the equation.

6.2 Recommendations

Based on the result of this study, recommendations were made as follows

Media

During the News report about the HFMD spread, Media should also provide HFMD information to the home caregivers to correct their misunderstanding about the disease severity and prevent panic among Thai society during the HFMD outbreak in the future.

The government staff

The government should implement health education program(s) focusing on home caregivers with low income and low education since they are likely to have low knowledge, poor attitude and behavior regarding HFMD. The program should highlight on the following points.

1. Provide more HFMD information to home caregiver especially the information about general information of HFMD, differences between HFMD and foot and mouth disease, and symptoms of the disease.
2. Adjust the home caregivers attitude which had strongest effect on their HFMD preventive behavior. The program should emphasize on reducing the barrier to performed behavior.
3. Emphasize on the importance of performing the behavior, and promote the importance of strict hand washing, avoid bringing children to public places during the HFMD, avoid sharing utensil, and cleaning toys regularly

Provide health education program television is highly recommended, because of the following reasons (National Health Service, 2004).

- **Wide exposure & urgent time frame:** The HFMD educational program needs wide exposure in short period of time, since HFMD affect many people during the peak season.
- **Simple behavioral goal:** The behavioral goal is mainly about hand washing which is simple.

- **Effectiveness:** Television was found to be the effective source of HFMD information of the home caregivers since 97% of them received HFMD information from television in this study.

Hospital

Hospital is the main source of treatment for HFMD infected children. Responsible person in hospital should ensure that their medical personnel receive sufficient training and be ready during the peak of infection period.

6.3 Limitation

1. Data collection was performed in Bangkok at the selected nursery schools and child care centers that registered under Department of Social Development and Welfare and allow public access only; therefore, the information may not be able to generalize to all the home caregivers in Bangkok.
2. This study is a cross-sectional study; therefore, the information does not represent the change in population over time.
3. The self-administered was used to collect information, so recall bias and bias of self-report should also be recognized
4. The data collection was not performed during the peak of infection period; therefore, there might be time bias.

6.4 Further Study

This study used self-administered questionnaires to provide information on HFMD knowledge attitude and preventive behaviors and identify factors associated with the KAP among the home caregivers in Bangkok only.

1. There should be a study conducted to compare factors related to HFMD preventive behaviors between districts or provinces with low and high HFMD infection rate.
2. Qualitative technique may be used to explain factors affecting HFMD preventive behavior practice in more details.
3. Combination between questionnaire and observation would provide more accurate level of HFMD preventive behavior and eliminate bias from self-report and recall bias.
4. Associations between HFMD preventive behavior and location of the caregivers' house, the children's age, and nurseries' characteristics should be explored.

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APPENDICES

Appendix A

As of November 2012, there are 404 nurseries registered under Department of Social Development and Welfare (DSDW). However, only 102 nurseries from 43 districts allow disclosing their information to public (Bureau of Woman and Child Protection and Welfare, 2012). List of child care center allowing public access are as follows.

No	Name	District
1	Orn-Anong Nursery	Payathai
2	Pensun Nursery	Payathai
3	Auraree Nursery	Payathai
4	SueaYaiPrachauthit Child Care Center	Jatujak
5	Child Care and Development Center, Kasetsart University	Jatujak
6	Prangthip Day Care Center	Jatujak
7	Chokchairuammit Child Care Center	Jatujak
8	1001 RorAor Child Care Center	Bangkhen
9	Trairat Nursery	Bangkhen
10	Sookjai Nursery	Kannayao
11	YWCA Dindang Child Care Center	Dindang
12	DussadeeAnuklore Child Care Center	Dindang
13	Infant Jesus Nursery	Dindang
14	Bann Sang Tawan Child Care Center	Dindang
15	Marie Upatham Child Care Center	Dindang
16	Sarin Child Care Center	Dusit
17	KrueJaew Child Care Center	Rachateewi
18	Payathai Nursery Center	Rachateewi
19	Bann Dek Chula Child Care Center	Pathumwan
20	Kittimas Nursery	Pathumwan
21	Mapasorn Nursery	Pathumwan
22	Piyapong Nursery	Lad Praow
23	Chalerm Kwan Nursery	Lad Praow
24	Bann Tan Tawan Nursery	Lad Praow
25	Som Jai Nuk Child Care Center	Pomprab
26	Sang Manee Child Care Center	Bangkokyai
27	Wanthip Child Care Center	Bangkapi
28	Chutima Child Care Center	Bangkapi
29	Pure Love Child Care Center	Bangkapi
30	Krue Sao Child Care Center	Bangkapi
31	Zion Child Care Center	Bangkorlame

No	Name	District
32	PrameRutai Nursery	Pravet
33	SiriKan Nursery	Pravet
34	ThungSetti Nursery	Pravet
35	Pattanakarn Child Care Center	Pravet
36	Darawee Nursery	Pasicharoen
37	Patawee Baby Home Child Care Center	Yannawa
38	Ban San Phan Child Care Center	Yannawa
39	KlangJao Nursery	Bangrak
40	Thanompit Nursery	Wang Thonglang
41	Ban Krue Nursery	Wang Thonglang
42	Jiraporn Nursery	Wang Thonglang
43	Tree Nurse Nursery	SuanLuang
44	Yaowapruerk Child Care Center	Sathorn
45	Navy Welfare Department Child Care Center	Thungmahamek
46	Kannikar Child Care Center	Sathorn
47	St Louis Nursing Homes	Sathorn
48	Immanuel Lutherland Child Care Center	KlongToey
49	Ban Thep Child Care Center	KlongToey
50	Kiddy Corner Child Care Center	KlongToey
51	Royal Kiddy Care Child Care Center	Klong Tan
52	Ban San Sern Child Care Center	KlongToey
53	Kruy Nam Tai hospital Child Care Center	KlongToey
54	Ban Suntisuk Child Care Cente	KlongToey
55	My Home Day Care Nursery	KlongSamwa
56	Ban PernNong Child Care Center	KlongSamwa
57	Ban Sood Jai Child Care Center	Bang Kae
58	Krue Tim Nursery	Bang Kae
59	Teeranit Child Care Center	Bang Kae
60	Look Rak Child Care Center	ThungKru
61	PathomKan Child Care Center	ThungKru
62	Ban Rayu Child Care Center	ThungKru
63	Ban AjarnYai Child Care Center	PraKanong
64	Bangna Navy Pre-School Child Care Center	Bangna
65	Bang Aor Child Care Center	Bang Plad
66	Som Jai Nursery	Minburi
67	National Housing Minburi Child Care Center	Minburi
68	Ban Kan Pre-School Child Care Center	Lad Krabang
69	Smile Nursery	Lad Krabang

No	Name	District
70	RittiyaWannalai Child Care Center	SaiMai
71	Look Kid Nursery	SaiMai
72	Vasana Child Care Center	Klongsan
73	Sansanee Child Care Center	Klongsan
74	Ban Krue Au Child Care Center	Klongsan
75	Kanlaya Nursery	Bangkhuntien
76	Sookwasa Nursery	Bangkhuntien
77	Pimmada Child Care Center	Bangkhuntien
78	Ban Tan Tawan Nursery	Bangkhuntien
79	Kudeekao Community Child Care Center	Thonburi
80	Jiraporn Child Care Center	Thonburi
81	ThepPanya Child Care Center	Thonburi
82	Navy Military Pre-School Child Care Center	Thonburi
83	Kanya Child Care Center	Jomthong
84	Ban KrueMee Child Care Center	Jomthong
85	Kalya2 Child Care Center	Jomthong
86	Narumol Child Care Center	Bangkor
87	Ban Dek Child Care Center	Ratburana
88	Supachcha Nursery	Ratburana
89	Ban Pasu Child Care Center	Ratburana
90	Ban Tan Tawan Child Care Center	Bangbon
91	Warinrak Nursery	Laksi
92	Boe-Bee Child Care Center	Laksi
93	Look Noo Nursery	Bungkum
94	Rung Napa Child Care Center	Bungkum
95	Jirawit Child Care Center	Bungkum
96	Rung Rong Child Care Center	Bungkum
97	KrerKrai Child Care Center	Bungkum
98	PiriyaYoThin Child Care Center	Bang Sue
99	Ban Santisuk 2 Child Care Center	Nongjok
100	Home Nursery	Nongjok
101	Home Nursery 2	Nongjok
102	Rachapruerk Nursery	Talingchan

Appendix B

**Knowledge attitude and preventive behaviors towards hand foot and mouth disease
among caregivers of children under five years old in Bangkok, Thailand**

Nursery _____ District _____ Interviewer ID _____

Part I: Socio-demographic and socio-economic data (*select only one choice*)

1. Age _____ Years old.
2. Gender 1 Male 2 Female
3. Marital status 1 Single 2 Married 3 Widowed
4 Divorced 5 Separated
4. Education 1 None 2 Primary school
3 Secondary school or equal 4 University or equal
5 Graduate school 6 Others _____
5. Occupation 1 Student 2 Housewife 3 Self-employed
4 Unemployed 5 Employee 6 Retired
7 Others _____
6. Family income _____ THB / month
7. Relationship with the child
1 Father 2 Mother 3 Uncle 4 Sister
5 Brother 6 Aunt 7 Grandfather 8 Grandmother
9 Nanny 10 Sibling 11 Others _____
8. Has your child infected with HFMD before? (*Lou and Lin, 2006*)
1 yes 2 no (*If no, go to Q.10.*)
9. Where did your child get treatment? (*Select all that applicable*)

9.1 <input type="checkbox"/> No treatment	9.2 <input type="checkbox"/> Hospital
9.3 <input type="checkbox"/> Clinic	9.4 <input type="checkbox"/> Public health center
9.5 <input type="checkbox"/> Home	9.6 <input type="checkbox"/> Other Please Specify _____
10. Has HFMD outbreak occurred in your community before? 1 yes 2 no
11. How many children you are taking care at home at present? _____ child/children
(*Lou and Lin, 2006*)

Part II: Knowledge (KU, 2007; Lou and Lin, 2006)

12. Where do you get information about HFMD? (Select all that applicable)

- 12.1 Newspapers 12.2 Internet 12.3 Hospital
 12.4 Radio 12.5 Child's school 12.6 Health center
 12.7 Television 12.8 Others _____ 12.9 Never received
 information

13. Please select whether the following statements about the hand foot and mouth disease are true. Please answer every question.

<u>Cause of the disease and general information</u>				
1	HFMD is caused by bacteria*	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
2	HFMD occurs all year round	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
3	Another name of HFMD is Foot and Mouth disease *	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
4	Most HFMD patients recover within 1 week	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
<u>Transmission</u>				
5	HFMD causative agent get into human body via oral route	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
6	Sheep, cattle, and swine can transmit HFMD to human*	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
7	HFMD transmit from person to person by sneezing and coughing	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
8	HFMD causative is excreted from infected person via stool and transmitted to others.	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
<u>Prevention and treatment</u>				
9	Good personal hygiene is the main methods to control HFMD.	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
10	There is no vaccine to protect HFMD infection so far	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
11	Alcohol gel cannot kill HFMD causative agent*	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know
12	Hand cleaning with water (without soap) is sufficient to prevent HFMD.	<input type="radio"/> 1 True	<input type="radio"/> 2 False	<input type="radio"/> 3 Don't know

Note: * Means incorrect

14. Please identify the symptoms HFMD from the following list. *Please answer every question.*

1	Red spot and blister on hand	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
2	Itchy skin rash *	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
3	Mouth Ulcer	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
4	Diarrhea*	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
5	Poor appetite	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know

15. Please identify signs and symptoms of severe HFMD complications that require hospitalization immediately. *Please answer every question.*

1	Persistent high fever	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
2	Ulcer at mouth and throat*	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
3	Limb weakness	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
4	Lethargy	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know
5	Frequent vomiting	<input type="radio"/> 1 Yes	<input type="radio"/> 2 No	<input type="radio"/> 3 Don't know

Note: * Means incorrect

Part III: Attitude (KU, 2007)

16. Please rate your level of agreement on the following statements.

Child's susceptibility to HFMD		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	You believe that young children (less than 5 years old) have higher risk to get infected with HFMD than the older children.					
2	You feel worried when you to bring your child to playground, market or department store during the HFMD outbreak.					
3	You feel worried to let the child playing with others during the HFMD outbreak					

Child's severity to HFMD		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
4	You think HFMD is a severe disease for young children.*					
5	You think HFMD infected children need hospitalization*					
6	You are confident that physician can cure HFMD children.					

Benefits of HFMD prevention and control		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
7	You think the HFMD infected children <u>do not need</u> to absent from school. *					
8	You believe practice strict hands washing with soap can prevent HFMD infection.					
9	Closely monitor child's health status is important method to control HFMD.					

Barrier to perform HFMD Preventive behaviors		Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
10	You think it is waste of time to clean the children's toys regularly*					
11	You think it is difficult to wash your hand with water and soap frequently*					
12	You think it is necessary to separate the child's utensil, cup and other receivers from other family member.					

Note: * Means incorrect

Part IV: Preventive behaviors (KU, 2007; Lou and Lin, 2006)

17. Please rate how often you perform the following behaviors.

Behaviors		Level (Penpaen, 2009)			
		Never	Rarely	Sometimes	Always
1	Cover your mouth and nose with your hands when you sneeze or cough				
2	Wash your hands before feeding food to your child				
3	Wash your hands after using toilet				
4	Wash your hands after changing diapers or cleaning up a child who has used the toilet				
5	Rub your hand for <u>at least 20 seconds</u> during hand washing				
6	Use soap when you clean your hand with water				
7	<u>Avoid</u> Bringing your child to public places such as department store, playground and market during the HFMD outbreak				
8	Let the child share utensil such as cup, spoon with other family members*				
9	Prevent your child to put things in to his/her mouth				
10	Clean toys after your child use them				
11	Feed your child with hand*				
12	Monitor your child health every day				
13	Clean areas where your child eat, sit, sleep or creep every day				

Note: * Means incorrect

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ความรู้ เจตคติ และพฤติกรรมการป้องกันโรคมือเท้าปากของผู้ดูแลเด็กอายุต่ำกว่าห้าปีใน

กรุงเทพมหานคร ประเทศไทย

เนอสเซอริ _____ เขต _____ รหัสผู้สัมภาษณ์ _____

ส่วนที่ 1: ข้อมูลทางสังคมและประชากรศาสตร์ (เลือกตอบเพียงข้อใดข้อหนึ่ง)

1. อายุ _____ ปี
2. เพศ 1 ชาย 2 หญิง
3. สถานภาพสมรส 1 โสด 2 สมรส 3 หม้าย
 4 หย่า 5 แยกกันอยู่
4. การศึกษา 1 ไม่ได้เรียนหนังสือ 2 ประถมศึกษา
 3 มัธยมศึกษาหรือเทียบเท่า 4 ปริญญาตรีหรือเทียบเท่า
 5 สูงกว่าปริญญาตรี 6 อื่นๆ (ระบุ) _____
5. อาชีพ 1 นักเรียน นักศึกษา 2 แม่บ้าน 3 กิจการส่วนตัว
 4ว่างงาน 5 ลูกจ้าง/พนักงานบริษัท 6 เกษียณอายุ
 7 อื่นๆ (ระบุ) _____
6. รายได้ครอบครัว _____ บาทต่อเดือน
7. ความสัมพันธ์กับเด็กที่ท่านให้การดูแล
 1 บิดา 2 มารดา 3 อา ลุง 4 พี่สาว
 5 พี่ชาย 6 ป้า น้า 7 ปู่/ตา 8 ย่า/ยาย
 9 พี่เลี้ยงเด็ก 10 ลูกพี่ลูกน้อง 11 อื่น ๆ (ระบุ) _____
8. เด็กๆที่ท่านให้การดูแลเคยป่วยเป็นโรคมือเท้าปากบ้างหรือไม่ (Lou and Lin, 2006)
 1 เคยเป็น 2 ไม่เคยเป็น (ถ้าไม่เคย, โปรดข้ามไปข้อ 10)
9. เด็กได้รับการรักษาจากที่ไหน (ตอบได้มากกว่าหนึ่งข้อ)
9.1 ไม่ได้รักษา 9.2 โรงพยาบาล
9.3 คลินิก 9.4 สถานีอนามัย
9.5 ให้ยาทานเองที่บ้าน 9.6 อื่นๆ ระบุ _____
10. ในชุมชนที่ท่านอาศัยอยู่เคยมีการระบาดของโรคมือเท้าปากหรือไม่ 1 เคยมี 2 ไม่เคยมี

11. ปัจจุบันท่านให้การดูแลเด็กกี่คน ที่บ้าน _____ คน (Lou and Lin, 2006)

ส่วนที่ 2: ความรู้เกี่ยวกับโรคมือเท้าปาก (KU, 2007; Lou and Lin, 2006)

12. ท่านได้รับข้อมูลข่าวสารเกี่ยวกับโรคมือเท้าปากมาจากแหล่งใดบ้าง **ตอบได้มากกว่าหนึ่งคำตอบ**

- 12.1 หนังสือพิมพ์ 12.2 อินเทอร์เน็ต 12.3 โทรทัศน์
 12.4 วิทยุ 12.5 โรงเรียนของเด็ก 12.6 สถานีอนามัย
 12.7 โรงพยาบาล 12.8 อื่นๆ 12.9 ไม่เคยได้รับข้อมูล
 (ระบุ) _____

13. ข้อความเกี่ยวกับโรคมือเท้าปากต่อไปนี้ถูกต้องหรือไม่ **กรุณาตอบทุกข้อ**

สาเหตุของโรคและลักษณะทั่วไปของโรค				
1	โรคมือเท้าปากเกิดจากเชื้อแบคทีเรีย*	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
2	โรคมือเท้าปากเกิดขึ้นได้ตลอดทั้งปี	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
3	โรคมือเท้าปากมีชื่อเรียกอีกชื่อหนึ่งว่าโรคปากเท้าเปื่อย*	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
4	ผู้ป่วยโรคมือเท้าปากส่วนมากจะหายเป็นปกติได้ภายในหนึ่งสัปดาห์	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
การแพร่กระจายของโรค				
5	ผู้ป่วยโรคมือเท้าปากได้รับเชื้อเข้าสู่ร่างกายโดยการรับประทาน	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
6	โรคมือเท้าปากสามารถติดต่อจากหมู วัว และแกะสู่คนได้*	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
7	โรคมือเท้าปากติดต่อได้ด้วยการไอจามรดกัน	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
8	เชือกอโรคมือเท้าปากสามารถแพร่กระจายโดยปนเปื้อนออกมาในอุจจาระของผู้ป่วย	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
การป้องกันและการรักษา				
9	การรักษาสุขอนามัยส่วนบุคคลที่ดีเป็นวิธีหลักในการป้องกันโรคมือเท้าปาก	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
10	ยังไม่มีวัคซีนป้องกันโรคมือเท้าปากในปัจจุบัน	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
11	แอลกอฮอล์เจลไม่สามารถฆ่าเชือกอโรคมือเท้าปากได้*	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ
12	การล้างมือด้วยน้ำโดยไม่ฟอกสบู่ ก็เพียงพอต่อการป้องกันโรคมือเท้าปาก*	<input type="radio"/> 1 ถูก	<input type="radio"/> 2 ผิด	<input type="radio"/> 3 ไม่ทราบ

หมายเหตุ ข้อที่มีเครื่องหมายดอกจันคือคำตอบที่ผิด

14. โปรดพิจารณาว่า อาการต่อไปนี้ เป็นอาการของโรคมือเท้าปากหรือไม่ กรุณาตอบทุกข้อ

อาการ				
13	จุดแดงและตุ่มน้ำใสบนฝ่ามือ	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
14	ผื่นคันบนผิวหนัง*	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
15	แผลในปาก	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
16	ท้องเสีย*	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
17	เบื่ออาหาร (เด็กไม่ยอมรับประทานอาหาร)	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ

15. อาการต่อไปนี้ เป็นอาการของโรคมือเท้าปาก

โปรดพิจารณาว่า อาการใดบ้างที่เป็นสัญญาณเตือนให้รีบนำผู้ป่วยส่งโรงพยาบาลทันที กรุณาตอบทุกข้อ

อาการ				
18	ไข้สูงลอย	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
19	มีแผลในปาก และลำคอ*	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
20	แขนขา อ่อนแรง	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
21	เซื่องซึม	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ
22	อาเจียนบ่อย	<input type="radio"/> 1 ใช่	<input type="radio"/> 2 ไม่ใช่	<input type="radio"/> 3 ไม่ทราบ

หมายเหตุ ข้อที่มีเครื่องหมายดอกจันคือคำตอบที่ผิด

ส่วนที่ 3: ทักษะ (KU, 2007)

16. โปรดพิจารณาว่าท่านเห็นด้วยกับข้อความต่อไปนี้มากน้อยเพียงใด

ความไวต่อโรคมือเท้าปากของเด็กอายุน้อยกว่า 5 ปี		ไม่เห็นด้วย อย่างยิ่ง	ไม่เห็น ด้วย	เฉยๆ	เห็นด้วย	เห็นด้วย อย่างยิ่ง
1	ท่านเชื่อว่าเด็กเล็ก (อายุน้อยกว่า 5 ปี) มีความเสี่ยงต่อโรคมือเท้าปากมากกว่าเด็กโต					
2	ในช่วงที่มีการระบาดของโรคมือเท้าปาก ท่านรู้สึกกังวลใจในการนำเด็กไปในที่ที่มีคนมากมายเช่น สนามเด็กเล่น หรือ ตลาด					
3	ในช่วงที่มีการระบาดของโรคมือเท้าปาก ท่านรู้สึกไม่สบายใจเมื่อให้เด็กเล่นคลุกคลีกับเด็กคนอื่นๆ					
ความรุนแรงของโรคมือเท้าปากในเด็ก		ไม่เห็นด้วย อย่างยิ่ง	ไม่เห็น ด้วย	เฉยๆ	เห็นด้วย	เห็นด้วย อย่างยิ่ง
4	ท่านเชื่อว่าโรคมือเท้าปากเป็นโรคที่มีความรุนแรงมากสำหรับเด็กเล็ก*					
5	ท่านเชื่อว่าเด็กที่เป็นโรคมือเท้าปาก จำเป็นต้องได้รับการดูแลรักษาในโรงพยาบาลอย่างใกล้ชิด*					
6	ท่านเชื่อว่าแพทย์สามารถรักษาเด็กที่ป่วยด้วยโรคมือเท้าปากให้หายได้อย่างแน่นอน					
ประโยชน์ของการป้องกันและควบคุมโรคมือเท้าปากในเด็ก		ไม่เห็นด้วย อย่างยิ่ง	ไม่เห็น ด้วย	เฉยๆ	เห็นด้วย	เห็นด้วย อย่างยิ่ง
7	ท่านคิดว่าเด็กที่เป็นโรคมือเท้าปากไม่จำเป็นต้องหยุดเรียน*					
8	ท่านเชื่อว่าการล้างมือฟอกสบู่อย่างถูกวิธี จะช่วยป้องกันโรคมือเท้าปากได้					
9	ท่านเชื่อว่าการเฝ้าสังเกตอาการเด็กอย่างใกล้ชิดเป็นสิ่งสำคัญในการควบคุมโรคมือเท้าปาก					

หมายเหตุ ข้อที่มีเครื่องหมายดอกจันคือคำตอบที่ผิด

อุปสรรคของการป้องกันโรคมือเท้าปากในเด็ก		ไม่เห็นด้วย อย่างยิ่ง	ไม่เห็น ด้วย	เฉยๆ	เห็นด้วย	เห็นด้วย อย่างยิ่ง
10	ท่านคิดว่า การทำความสะอาดของเล่นของเด็กบ่อยๆ เป็นเรื่องเสียเวลา*					
11	ท่านคิดว่า การล้างมือฟอกสบู่บ่อยๆ เป็นเรื่องยุ่งยาก*					
12	ท่านคิดว่า การจัดให้มีข้าวของเครื่องใช้ เช่น จานชาม แก้วน้ำ หรือผ้าเช็ดตัว สำหรับเด็ก โดยเฉพาะ เป็นสิ่งจำเป็น					

หมายเหตุ ข้อที่มีเครื่องหมายดอกจันคือคำตอบที่ผิด

ส่วนที่ 4: พฤติกรรมการป้องกันโรคมือเท้าปาก (KU, 2007; Lou and Lin, 2006)

17. โปรดพิจารณาว่าท่านทำพฤติกรรมต่อไปนี้มากน้อยแค่ไหน

พฤติกรรม		ระดับ			
		ไม่เคยเลย	นานๆ ครั้ง	บางครั้ง	ทุกครั้ง
1	ท่านใช้มือปิดปากเมื่อไอ หรือจาม				
2	ท่านล้างมือของท่านก่อนป้อนอาหารเด็ก				
3	ท่านล้างมือของท่านหลังเข้าห้องน้ำ				
4	ท่านล้างมือของท่านหลังเปลี่ยนผ้าอ้อมให้เด็กหรือทำความสะอาดให้เด็กเมื่อเด็กเข้าห้องน้ำ				
5	เวลาดังมือ ท่านขัดถูมืออย่างน้อย 20 วินาที				
6	ท่านฟอกสบู่เวลาดังมือ				
7	ท่านหลีกเลี่ยงการนำเด็กไปในที่สาธารณะ เช่น ห้างสรรพสินค้า ตลาด สนามเด็กเล่นในช่วงที่มีการระบาดของโรคมือเท้าปาก				
8	ท่านให้เด็กใช้สิ่งของเช่น แก้วน้ำ ช้อนส้อม ร่วมกับคนอื่นๆ ในครอบครัว*				
9	ท่านดูแลไม่ให้เด็กเอาของเล่นเข้าปาก				
10	ท่านทำความสะอาดของเล่นหลังจากที่เด็กเล่นเสร็จแล้ว				
11	ท่านใช้มือหยิบจับอาหารที่ปรุงเสร็จแล้วในการป้อนอาหารเด็ก*				
12	คอยสังเกตอาการของเด็ก ว่าเจ็บป่วยหรือไม่ทุกวัน				
13	ท่านทำความสะอาดบริเวณ ที่เด็กทานอาหาร นั่ง นอน หรือคลาน ทุกวัน				

หมายเหตุ * ข้อที่มีเครื่องหมายดอกจันคือคำตอบที่ผิด

Appendix D

Budget

Budget List	Price per unit (Baht)	Quantity	Total Price (Baht)
Photocopy: Books, Literature, Questionnaire, Thesis paper, etc.	0.5	5,000 pages	2500
Gift for participants	10	500	5,000
Payment for research assistants	50	500 copies	25,000
Travelling expense	-	-	10,000
Miscellaneous	-	-	5,000
Total (Baht)			4,7500

BIOGRAPHY

Name	Miss Ruttiya Charoenchokpanit
Date of birth	September 21, 1982
Place of birth	Bangkok, Thailand
Education	B. Sc. in Pharmacy, Chulalongkorn University, 2005 (first class honor)
Position and office	Clinical Research Associate, FHI360 Asia Pacific Regional Office, Bangkok Thailand