

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

Ruttiya Charoenchokpanit^{1,2}, Tepanata Pumpaibool^{2,*}

¹Family Health International, Bangkok 10330, Thailand

² College of Public Health Sciences, Chulalongkorn University, Bangkok 10330, Thailand

ABSTRACT: Hand foot and mouth disease (HFMD) is an emerging disease which has potential to become Thai public health problem in the future. There is no effective vaccine for the disease and the disease normally affects young children; 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 with them among home caregivers of children under 5 years. Cluster sampling was used to select 9 nurseries from 9 districts in Bangkok and self – administered questionnaire was used to collect data from 456 home caregivers. 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 is. 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 ($p<0.001$, $r=0.193$); knowledge and behavior ($p<0.001$, $r=0.163$); and attitude and behavior ($p<0.001$, $r=0.371$) were found in this study. In addition, many socio-demographic characteristics were found associated with HFMD knowledge, attitude and preventive behavior. Interestingly, family income and education were associated with all the KAP. In conclusions, findings from this study highlight the need to providing more information about HFMD 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%).

Keywords: KAP, Hand foot and mouth disease, Caregiver, Thailand

INTRODUCTION

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, sometime resulting in death. The viruses primarily affect young children since they do not have immunity to the Enteroviruses [1]. 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, aseptic or viral meningitis,

encephalitis, neurological sequelae, myocarditis, or even paralysis [2]. 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 [1, 2]. Individual cases and outbreaks of HFMD occur around the world. Many large outbreaks of HFMD have been reported since 1997. Most of them occurred in East and Southeast Asia [3, 4]. In Thailand, main HFMD causative agent is a non-virulent serotype, Coxsackie A16 [5]. HFMD is a common disease, found all year round, with peak of infection occurs during May to June [3].

HFMD has potential to become Thai health problem in the future, since HFMD outbreaks occurred in many of Thailand neighboring countries

* Correspondence to: Tepanata Pumpaibool
E-mail: tepanata.p@chula.ac.th

such as Malaysia in 1997, 2000, 2003, 2006, and Vietnam in 2008, 2011 [6]. In Thailand, HFMD prevalence is increasing every year; moreover, National Institute of Health of Thailand (Thailand NIH), also reported increasing trend of the severe serotype Enterovirus 71 infection [7]. In the 2012 HFMD outbreak, the number of HFMD cases, is higher than ever. 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 to \$771 per case and indirect costs varied from \$63 per case for HFMD to \$422 per case for other severe complications [8]. From the factors mentioned above, the prevention and control of the HFMD should not be overlooked. Since there is no effective HFMD vaccine so far, the HFMD prevention and control in young children rely on good the caregivers' hygienic habit which is universally accepted as the effective method to control the disease [9-13].

The rate of Enterovirus contamination in household and rate of household transmission among young children are high [8, 14-18], while the information about the home caregivers knowledge, attitude and behaviors about HFMD is very limited. Therefore this study was conducted among the home caregivers of the children under 5 years old in Bangkok, Thailand to assess the level of knowledge, attitude, and practice regarding HFMD prevention.

MATERIALS AND METHODS

Participants

This cross-sectional study was conducted during March, 2013. Data were collected from 456 home caregivers of children under 5 years old from 9 nurseries in Bangkok, the capital city of Thailand. The eligible home caregivers were at least 18 years, living in Bangkok, and be literate caregivers who took care of the child/children the most at home. Sampling frame was the list of nurseries registered under Department of Social Development and Welfare (DSDW). Two stage cluster sampling technique was used to select 9 nurseries from 9 districts from the list. The data were collected from around 50 respondents in each nursery.

Materials

Self-administered questionnaire was used to record the respondents' profile, their knowledge about HFMD, their attitude towards HFMD, and their HFMD preventive behavior. The questionnaire

included 4 sections i.e., Socio-demographic, Knowledge, Attitude and Practice. The knowledge section was divided into general information, transmission, prevention and treatments, and symptoms of HFMD. The Attitude section included 4 aspects i.e., child susceptibility to HFMD, HFMD severity, benefit of preventive behavior, and barrier to perform preventive behavior. The content of the questionnaire was validated by consulting experts. The revised questionnaire was used on a pilot test and got Cronbach's alpha scores as 0.916 on the knowledge part, 0.703 on the attitude part, and 0.771 on the behavior part.

Data analysis

The results were analyzed by descriptive statistics, Chi-square, and Spearman correlation tests and multiple linear regression. A *p-value* < 0.05 was considered statistically significant.

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 (Project Code: 182.1/55).

RESULTS

Knowledge

The study results showed that 5.5 percent of the respondents faced HFMD outbreak in their community before and 12.1 percent of their child were infected with HFMD before. Almost all (94.0%) of the respondents, whose child got infected sought for treatment from hospital.

All the respondents had received HFMD information before and their main source of HFMD information was television (97.6%). However, their Median knowledge score was only 13.00 points from the full score of 22 points. The Table 1 shows that they still had insufficient knowledge about HFMD. Half of them (50.4%) had low, and only 3.7 percent had high overall knowledge. Their knowledge about HFMD prevention was in acceptable level, but their knowledge in the rest parts should be improved, as 31.8 % of them could not identify any HFMD symptoms. In addition, they might confused between HFMD and foot and mouth disease, since only 39% of them knew that HFMD was not the same disease to foot and mouth disease and 47.1% thought sheep, cattle, and swine can transmit HFMD to human.

Attitude

According to the Table 1, majority of them had good attitude towards HFMD in term of susceptibility

Table 1 Distribution of knowledge, attitude, and behavior level (n=456)

Statement	Level of knowledge					
	Low (<60%)		Moderate (60-80%)		High (>80%)	
	N	%	N	%	N	%
Overall knowledge	230	50.4	209	45.8	17	3.7
Cause & General information	309	67.8	113	24.8	34	7.5
Transmission	222	48.7	200	43.9	34	7.5
Prevention and treatment	85	18.6	262	57.5	109	23.9
Sign and symptoms	178	39.0	258	56.6	20	4.4
Overall attitude	0	0.0	311	68.2	145	31.8
Child's susceptibility to HFMD	0	0.0	83	18.2	373	81.8
Severity of HFMD	343	75.2	105	23.0	8	1.8
Benefits of HFMD preventive behaviors	0	0.0	121	26.5	335	73.5
Barrier to perform the preventive behaviors	6	1.3	297	65.1	153	33.6
Overall Behavior	1	0.2	180	39.5	275	60.3

Table 2 Association between knowledge, attitude and HFMD preventive behavior (n=456)

Variables		P-value	Spearman's Rho
Knowledge-Overall	Attitude-Overall	<0.001*	0.193
Knowledge-Overall	Behavior	<0.001*	0.163
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-value < 0.05

(81.8%) and benefit of preventive behavior (73.5%), but interestingly most of them (75.2%) had poor attitude towards HFMD severity. Most of them seemed to incorrectly perceive that HFMD was more severe than it actually was as, 81.1% replied that HFMD was a severe disease for children and 84.7% though the HFMD infected children needed hospitalization.

Behaviors

Table 1 shows that majority of the respondents (60.3%) had good level of HFMD preventive behavior practice; however, there were some worrying findings detected. i.e., 41.2% of the respondents rarely or had never rubbed their hand for at least 20 seconds during hand washing, 25% of them had never avoided bringing their child to public places during the HFMD and 43.6% answered that they rarely or had never clean toys after their child use them.

Association between socio-demographic, knowledge, attitude, and behavior

Many of socio-demographic variables were associated with home caregivers knowledge, attitude and behavior. In this study knowledge about HFMD was found associated with age (p=0.024), education (p=0.012), occupation (p=0.001), family income (p<0.001), relationship

with the child (p=0.006), and HFMD history (p=0.004); Attitude was found associated with education (p<0.001), family income (p=0.001); and HFMD preventive behavior was associated with gender (p=0.007), education (p=0.034), family income (p<0.001).

Education and family income were interestingly attributable to all of the KAP variables. In addition, the patterns of associations were all the same. The respondents with higher education or income had more percentage of having high knowledge, better attitude, and better practice than those with lower education and lower family income.

Regarding the association between KAP, Table 2 shows statistically significant little positive correlation between overall knowledge and attitude (p<0.001, r = 0.193); little positive correlation between overall knowledge and behavior (p <0.001, r = 0.163); and statistically significant low positive correlation between overall attitude and behavior (p <0.001, r = 0.371) were found. In addition, the statistically significant positive correlation also found between attitude in barrier aspect and behavior (p<0.001, r = 0.443); attitude in prevention aspect and behavior (p<0.001, r = 0.227); and attitude in susceptibility aspect and behavior (p<0.001, r = 0.114).

Result from multiple linear regression analysis

Table 3 Predictors of home caregivers' preventive behavior by Multiple Linear Regression (n=456)

Variable	B	t	p-value
Attitude	0.308	7.007	<0.001*
Family income per month	0.205	4.698	<0.001*
Gender	0.127	3.021	0.003*
Knowledge	0.086	1.996	0.047*

Where; $R^2=0.201$, Constant = 13.495

revealed linear association between HFMD preventive behavior and its predictive factors ($F=30.497$, $p<0.001$). Table 3 shows that the caregivers' attitude was the most effective predictor, while the effect of education was diminished in the analysis. The other predictors were described in a decreasing order of effectiveness as follows; family income, gender, and knowledge ($R^2=0.201$).

DISCUSSIONS

Under the intense measures from Minister of Public Health to enhance risk communication about HFMD through media and health volunteers, and the measures from Minister of Education to provide HFMD information to population via school channel [19], all the respondents had received HFMD information before the interview. Nevertheless, the respondents still had insufficient knowledge (Median 13.00 points from 22 points full score) especially about cause of infection and general information about HFMD section where 67.8% of the home caregivers had low knowledge. These are probably because most of the information they received from media was news about HFMD spread not the knowledge about HFMD.

Regarding the attitude, only two HFMD deaths cases were reported from 77 provinces in Thailand during the year 2012 [19]; however, majority (75.2%) of the home caregivers had poor attitude towards HFMD severity. The finding that 81.1% perceived that HFMD was a severe disease for children and 84.7% of them thought the HFMD infected children needed hospitalization conform to the findings from the study by Yang and others [20] in Taiwan that parents felt great anxiety and even panic about infection during the HFMD outbreak, and 82% of them perceived the impact of enterovirus infection to be worse than that of influenza. This phenomenon in Thailand might be a result of the news about HFMD outbreak in Cambodia which was responsible for more than 50 deaths of the young children. The responsible agencies should correct their misunderstanding to prevent anxiety and panic among society during the HFMD outbreak in the future.

Even though the overall level of practice HFMD preventive behavior looked good and they had good knowledge about HFMD prevention, this study results also showed some worrying findings that 41.2% of the respondents rarely or had never rubbed their hand for at least 20 seconds during hand washing, 25% of them had never avoided bringing their child to public places during the HFMD and 43.6% answered that they rarely or had never clean toys after their child use them.

The positive correlation between overall knowledge and behavior ($p<0.001$, $r = 0.163$) found in this study is consistent to the finding from study by Lou and Lin [21] who found positive correlation between knowledge and healthy behavior ($p=0.015$, $r=0.090$). The positive correlation between overall attitude and behavior ($p<0.001$, $r=0.371$) found in this study is also in conformity with the finding from Lou and Lin that attitude were associate with healthy behaviors against HFMD [21]. In addition, the association between knowledge and attitude ($p<0.001$, $r=0.193$); and attitude and behavior ($p<0.001$, $r=0.371$) 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" [22]. 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. Since attitude is a strongest predictor of HFMD preventive behavior ($t=7.007$, $p<0.001$), the health education program should focus on changing attitude especially on reducing their barrier to perform the behavior ($p<0.001$, $r=0.443$).

The government should implement health education program(s) focusing on home caregivers with low income and education since they are likely to have low knowledge, poor attitude and behavior regarding HFMD. The program should 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; 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; and 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. Providing health education program television is highly recommended as Television is the most effective source of information in this survey.

ACKNOWLEDGEMENTS

We would like to thanks Prof. Robert Sedgwick Chapman, for his kind suggestion on statistic technique. Deep gratitude goes to Assist. Prof. Ratana Somrongthong, and Prof. Emeritus Sirikul Isaranurak for their recommendations. Sincere appreciation goes to all the heads of nurseries for allowing data collection in their nurseries and all participants for their cooperation. This publication was possible with partial support provided by the funds made available under the Higher Education Research Promotion and National Research University Project of Thailand, office of the Higher Education Commission (Project no. AS1148A-55).

REFERENCES

- World Health Organization and Regional Emerging Disease Intervention Centre. A guide to clinical management and public health response for hand, foot and mouth disease (HFMD) [Internet]. Geneva: WHO Press; 2011 [cited 2002 Jul 9]. Available from: <http://www.wpro.who.int/publications/docs/GuidancefortheclinicalmanagementofHFMD.pdf>
- Chang AC, Jacobsen KH, Lin KW, Teng LJ. Enterovirus knowledge and hand washing practices among nurses in a hospital in Taipei, Taiwan. *Taiwan Epidemiology Bulletin*. 2011 May; 27(6): 81-101.
- Thai Ministry of Public Health. Department of Disease Control. Hand foot and mouth disease and enterovirus practice guideline for medical personnel. 1st ed. Bangkok: The agricultural Co-operative Federation of Thailand; 2007.
- Roy N. Mathematical modeling of hand-foot-mouth disease: quarantine as a control measure. *IJASETR*. 2012 April; 1(2): 34-44.
- Sakoonkeaw A. Most common diseases in preschool children. 1st ed. Bangkok: Amarin Printing & Publishing Public Company Limited; 2006.
- Thongcharoen P. Emerging infectious disease situation in Thailand. In Pooworawan Y, Wuttiviroj Y, Kingnate D, Thaworanun J, Wongmanovisuit K, editors. *Emerging and re-emerging infectious diseases*. 1st ed. Bangkok: The Agricultural Co-operative Federation of Thailand; 2011. p. 33-7.
- Sakoonkeaw A. *Deadly infectious disease*. 1st ed. Bangkok: Klaimor; 2007.
- Pichichero ME, Mclinn S, Rotbart, HA, Menegus MA, Cascino M, Reidenberg BE. Clinical and economic impact of enterovirus illness in private pediatric practice. *Pediatrics*. 1998; 102:1126-34.
- Aiello AE, Coulborn RM, Perez V, Larson EL. Effect of hand hygiene on infectious disease risk in the community setting: a meta-analysis. *Am J Public Health*, 2008; 98: 1372-81.
- Apisarnthanarak A, Apisarnthanarak P, Cheevakumjorn B, Mundy LM. Intervention with an infection control bundle to reduce transmission of influenza-like illnesses in a Thai preschool. *Infect Control Hosp Epidemiol*. 2009; 30: 817-22.
- Heijne JCM, Teunis P, Morroy G, Wijkman C, Oostveen S, Duizer E, Kretzschmar M, Wallinga J. Enhanced hygiene measures and norovirus transmission during an outbreak. *Emerg Infect Dis*. 2009; 15: 24-30.
- Nandrup BI. Mandatory hand washing in elementary schools reduces absenteeism due to infectious illness among pupils: a pilot intervention study. *Am J Infect Control*. 2006; 37: 820-6.
- Savolainen KC, Haapakoski J, Peltola PA, Ziegler T, Korpela T, Anttila P, et al. Hand washing with soap and water together with behavioral recommendations prevents infections in common work environment: an open cluster-randomized trial. *Trials*. 2012; 13: 1-11.
- Gerba CP, Wallis C, Melnick JL. Microbiological hazards of household toilets: droplet production and the fate of residual organisms. *Applied Microbiology*. 1975; 30: 229-37.
- Chang LY, Tsao KC, Hsia SH, Shih SR, Huang CG, Chan WK, et al. Transmission and clinical features of Enterovirus 71 infections in household contacts in Taiwan. *JAMA*. 2004 Jan; 291(2): 222-7.
- Chang LY, King CC, Hsu KH, Ning HC, Tsao KC, Li CC, et al. Risk factors of Enterovirus 71 infection and associated hand, foot, and mouth disease/Herpangina in children during an epidemic in Taiwan. *Pediatrics*. 2002; 109: 1-6.
- Cheng LL, Ng PC, Chan PKS, Wong HL, Cheng FWT, Tang JWT. Probable intra-familial transmission of Coxsackievirus B3 with vertical transmission, severe early-onset neonatal hepatitis, and prolonged viral RNA shedding. *Pediatrics*. 2006; 118: 929-33.
- Curtis V, Biran A, Devereill K, Hughes C, Bellamy K, Drasar B. Hygiene in the home: relating bugs and behaviour. *Soc Sci Med*. 2003 Aug; 57(4): 657-72.
- Thai Ministry of Public Health. Department of Disease Control. Report on the situation of hand, foot and mouth disease (HFMD) in Thailand [Internet]. 2012 [cited 2012 11 August]. Available from: http://beid.ddc.moph.go.th/th_2011/news.php?g=1&item=607.
- Yang SC, Fee CY, Su CF, Lee HC, Yin TY, Chang YH, et al. Knowledge about and attitude toward enterovirus 71 infections: a survey of parents and teachers at kindergartens in Taiwan. *Am J Infect Control*. 2010; 38(4): 21-4.

21. Lou ML, LinDJ.Exploration of the healthy behaviors against Enterovirus and its related factors in the care giver of preschool-age children.Hung Kuang Journal.2006; 49: 145-62.
22. Pickens J. Attitudes and Perceptions. In: Sekerak R, editor. Organizational behavior in Health Care. 1st ed. USA: Jones and Bartlett Publishers International; 2005. p. 43-76