UNIVERSITI PUTRA MALAYSIA

PREDICTORS OF PREVENTIVE PRACTICES TOWARDS HAND-FOOT-AND- MOUTH DISEASE AMONG MOTHERS OF PRESCHOOL CHILDREN USING SOCIOECOLOGICAL MODEL IN KLANG DISTRICT

QUDSIAH BINTI SULIMAN

FPSK(M) 2017 42

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Dissertation Submitted to Department of Community Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, in Fulfilment of the Requirement for the Degree of Master of Public Health

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August 2017

Chairman: Dr. Salmiah Md Said
Faculty: Medicine and Health Sciences

Background: The epidemics of Hand-foot-and-mouth Disease (HFMD) has recurred globally, causing significant morbidity and mortality. During which Klang District, Selangor was among 3 governance districts with the most cases of HFMD in Malaysia by August 2016, update on local assessment of Socioecological Model predictors of preventive practices towards HFMD is fundamental**.**

Objectives: To determine the socioecological predictors of preventive practices towards HFMD among mothers of preschool children in Klang district

Methods: A cross-sectional study was conducted to assess preventive practices towards HFMD among 353 mothers of Community Development Department (KEMAS) preschool children in Klang District. Sampling method used application of probability proportional to size and pretested self-administered questionnaire was distributed. Using IBM version 22.0, descriptive analysis was computed for all variables. Pearson's correlation and simple linear regression were computed for bivariate analysis and hierarchical multiple regression was computed to determine the predictors.

Result: A total of 353 mothers of KEMAS preschool children participated in the study with response rate of 80.2%. The median preventive practice score was high, which was 57.00 (IQR=7.00). With exemption on knowledge, perceived severity and perceived barrier which showed low mean score of 13.61(SD=4.04), 8.30(SD=1.36) and 7.80(SD=2.14) respectively, other variables demonstrated on high median score. Other prominent findings were incorrectly perceived severity and correct handwashing technique as the most perceived as barrier towards preventive practices. From simple linear regression, knowledge, all health belief subscales, relationship factors, community factors and societal factors had significant linear relationship with preventive practices. The predictors of preventive practice practices towards HFMD

were knowledge, perceived severity, perceived barrier, social support and community factor with entire group of variables were significantly predicting the preventive practices towards HFMD (F [9, 343] =8.934, p-value<0.001, adjusted R2=0.169).

Conclusion: This study provides an understanding that preventive practices is not solely influenced by individual factor, but is contributed too by relationship factors and community factors.

Keywords: Hand, foot and mouth disease (HFMD), preventive practices, preventive behaviour, socioecological model, maternal behaviour

Abstrak dissertasi yang telah dibentangkan kepada Jabatan Kesihatan Komuniti, Universiti Putra Malaysia sebagai memenuhi keperluan Ijazah Sarjana Muda Kesihatan Awam

FAKTOR PERAMAL AMALAN PENCEGAHAN TERHADAP PENYAKIT KAKI-TANGAN-DAN-MULUT DI KALANGAN IBU KANAK-KANAK PRA-SEKOLAH MENGGUNAKAN MODEL SOSIOEKOLOGI DI DAERAH KLANG

Oleh

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Latar belakang: Epidemik Penyakit Kaki-tangan-dan-mulut (HFMD) masih terus berulang di peringkat global, menyebabkan morbiditi dan kematian yang ketara. Sementara daerah Klang, Selangor merupakan salah satu antara tiga daerah di Malaysia yang mencatatkan majoriti kes HFMD tertinngi di Malaysia sehingga Ogos 2016, kemaskini mengenai penilaian terhadap faktor peramal amalan pencegahan HFMD menggunakan Model Sosioekologi di peringkat tempatan adalah mustahak.

Objektif: Untuk mengenalpasti faktor peramal sosioekologi amalan pencegahan terhadap HFMD di kalangan ibu kanak-kanak pra-sekolah di daerah Klang.

Kaedah: Satu kajian rentas telah dijalankan dari 1 April 2017 sehingga 15 Mei 2017. Amalan pencegahan terhadap HFMD dikalangan ibu kepada kanak-kanak pra-sekolah Jabatan Kemajuan Masyarakat (KEMAS) telah dinilai. Responden telah dipilih berdasarkan kepada persampelan '*probability proportional to size'* dan borang kaji selidik yang diuji telah diedarkan. Data telah dianalisa menggunakan IBM SPSS versi 22.0. Analisa deskriptif telah dilakukan terhadap semua pemboleubah. Ujian *'Pearson's correlation'* dan *'simple linear regression'* telah dijalankan untuk analisa dua pembolehubah dan ujian '*hierrarchical multiple regression'* untuk menentukan faktor peramal.

Keputusan: Seramai 353 orang ibu kanak-kanak pra-sekolah KEMAS telah terlibat dalam kajian ini dengan kadar respon sebanyak 80.2%. Jumlah skor median bagi amalan pencegahan adalah tinggi, iaitu sebanyak 57.00(IQR=7.00). Selain faktor pengetahuan, tanggapan keterukan dan tanggapan halangan yang mencatatkan skor min yang rendah iaitu 13.61(SD=4.04), 8.30 (SD=1.36) dan 7.80 (SD=2.14) masing-masing, pembolehubah yang lain telah menunjukkan skor median yang tinggi.

Penemuan kajian lain yang ketara adalah salah tanggapan terhadap peringkat keterukan HFMD, dan teknik membasuh tangan yang betul sebagai faktor penghalang utama. Daripada ujian '*simple linear regression',* faktor pengetahuan, faktor kepercayaan, faktor hubungan, faktor komuniti dan faktor kemasyarakatan mempunyai hubungkait linear yang ketara dengan amalan pencegahan terhadap HFMD. Faktor peramal amalan pencegahan terhadap HFMD adalah pengetahuan, tanggapan keterukan, tanggapan penghalang, sokongan social dan faktor komuniti dengan keseluruhan pemboleubah terlibat secara ketara telah meramal amalan pencegahan (F [9, 343] =8.934, *p* value <0.001, adjusted R^2 =0.169).

Kesimpulan: Kajian ini telah memberikan kefahaman di mana amalan pencegahan terhadap HFMD tidaklah hanya dipengaruhi oleh faktor individu, tetapi juga dipengaruhi oleh faktor perhubungan dan faktor komuniti.

Kata Kunci: Panyakit Kaki, tangan dan mulut (HFMD), amalan pencegahan, model sosioekologi, tingkahlaku ibu

ACKNOWLEDGEMENT

First of all, I am grateful to the Almighty God for enabling me to complete this dissertation. I wish to express my sincere thanks to my Supervisor, Dr Salmiah Md Said who has been warmly handed in endless guidances and constant encouragement throughout this journey. My gratitude goes equally to my Co-supervisor, Assoc. Prof Dr Nor Afiah Mohamad Zulkefli for the expert opinion and continuous help. I place on record my sincere gratitude to Community Development Department (KEMAS) for giving the permission to conduct this study and providing me all the facilities. It is my pleasure to thank my husband, parents, my daughters and my family who have showered me with endless supports to continue to the end. Special thanks to all my lecturers and colleagues in Master of Public Health course for unceasing encouragement and advices. Last but not least, I take this opportunity to place on record, my sense of gratitude to one and all, who directly or indirectly, have lend their helping hand in this journey.

I certify that a Thesis Examination Committee has met on 1st August 2017 to conduct the final examination of Qudsiah Binti Suliman on her thesis entitled predictors of preventive practices twards Hand-foot-and-mouth Disease among mothers of preschool children using Socioecological Model in Klang District in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Public Health

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This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision
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LIST OF ABBREVIATIONS

CA 6	*Coxsackie virus 6*
CA 10	*Coxsackie virus 10*
CA 16	*Coxsackie virus 16*
CDC	Centre for Disease Control and Prevention, United State of America
DUN	State Legislative Assembly
EV 71	*Enterovirus 71*
HFMD	Hand, foot and mouth disease
IQR	Inter-quartile Range
GDD	Global Disease Detection
KEMAS	Community Development Department
MOH	Ministry of Health, Malaysia
MSPSS	Multidimensional Scale of Perceived Social Support
NPEV	Non-polio Enterovirus
PPS	Probability Proportionate to Size
SD	Standard deviation
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

This chapter covered on the background, problem statement, significance of the study, research question, general and specific objective as well as study hypothesis.

1.1 Background

Hand-foot-and-mouth disease (HFMD) is a common systemic infection caused by the variety of enteroviruses genome particularly coxsackievirus A16 (CA16) and enterovirus 71 (EV 71) and some echovirus type (Oberste, Maher, Kilpatrick, & Pallansch, 1999 ; Tapparel, Siegrist, Petty, & Kaiser, 2013). Having said that, it was observed that in the last 2 decades, Enterovirus 71 (EV 71) has caused several major complications leading to lethal outcomes such as cardiac, pulmonary failure, and meningio-enchepalitis, as reported in outbreaks of HFMD in few Asean countries (World Health Organization [WHO], 2011; Ooi, Wong, Lewthwaite, Cardosa, & Solomon, 2010).

HFMD can be transmitted through direct person-to-person contact, fomites and droplets via faecal-oral route as the most common mode of transmission, as well as respiratory droplets as possible route (Zaoutis & Klein, 1998). The later renewed study demonstrated that viral shedding of enterovirus may persist in stool for up to 11 weeks (Chung, Huang, Chang, Lin, & Ning, 2001). Seroepidemiological study in Singapore suggested that EV 71 infection had been largely acquired by pre-school aged children, whereby level of hygiene, water quality, and the extent of crowding were those factors affecting the transmission (Ooi, Phoon, Ishak & Chan, 2002 ; Park et al., 2010). In addition, several studies had demonstrated on children caregivers and the public playground as the potential reservoir for enterovirus infection, as children may contracting the infection from asymptomatic individuals and contaminated surface at public amenities (Xie et al., 2015; Li et al., 2016).

Based on monitoring process upon infectious diseases by The Centers for Disease Control and Prevention (CDC) through Global Disease Detection (GDD) Operations Center, it was reported that EV 71 infection was among five of the top global infectious disease threats that in 2012, thus indicated that EV 71 as higly communicable, with high disease burden and pandemic potential risk, as well as deficient in prevention and treatment availability (Christian et al., 2013). In addition, this contagious disease had demonstrated on substantial and devastated economic burden. A study in Taiwan, was conducted to estimate direct and indirect related costs associated with HFMD in China, which projected on significant direct and indirect medical cost as well as productivity loss related cost (Zheng, Yang & Yu, 2014). Recently, Liu et al. (2016) had illustrated on the worrying societal perspective economic bearing of enterovirus infection in Taiwan. Based on 2006 to 2010 National Health Insurance Database, the economic burden of nonpolio enteroviruses (NPEV) and enterovirus 71 (EV 71) were measured

in United State Dollar. It was reported that travel costs and productivity loss of caregivers were $37.1 (range from $24.5 to $64.7) million per year, whilst productivity losses resulting from premature mortality by NPEV infection were $0.8 (range from $0.0 to $2.9) million per year (Liu et al, 2016).

Since 1969, a serial epidemic of HFMD has continued to recur in European and Asean countries which has led to major public health concern (Schmidt, Lennette, & Ho 1974). The large outbreaks in Sarawak, Malaysia and Taiwan in 1997 and 1998 respectively, had reported on the alarming neurological complications of HFMD particularly caused by EV 71, such as aseptic meningitis, brainstem encephalitis, encephalomyelitis as well rapid death due to neurogenic pulmonary oedema. (Chan et al., 2000; Chang et al., 2002). A serial large outbreaks of HFMD had emerged yet unceasing in Southeast Asia and Western Pacific since 1999 (Mackenzie et al., 2001). In the last decade, HFMD outbreaks were observed to affect on widespread countries such as Japan in 2000 , China in 2008 and Vietnam in 2011, those reported significant morbidities and mortalities secondary to braistem encephalitis (Fujimoto et al., 2002 ; Wang et al., 2011; Nguyen et al.,2014). This has led to renewed interest in virological identification in which laboratory proven of EV 71 isolation during the outbreaks was responsible to cause severe neurological manifestation (Abubakar et al., 1999 ; Lin et al., 2002).

Despite of recurring widespread of epidemics with rapid enterovirus evolution as evidenced by various molecular epidemiological studies, effective vaccine and specific treatment are still not available to date (Ooi et al., 2010 ; Liu et al, 2014). Thus, the preventive control measures are fundamental strategies to halt the transmission of HFMD. World Health Organization (WHO) has outlined on clear prevention and control strategies towards HFMD, which include dissemination of information, conducting education campaign on maintaining a good hygiene, as well as strengthening infection control measures in both health care facilities and community (WHO, 2011).

Upon cultivating on preventive measures to control HFMD, a strategic and effective surveillance system are essential to monitor the impact on existing intervention (WHO, 2011). In Malaysia, notification surveillance on HFMD has been implemented since 0ctober 2005, where Sarawak has made a regulation on compulsory notification on HFMD cases by attending medical practitioner, and subsequently was enforced nationwide in 2006 (Wahab, 2009).

In parallel with WHO, Ministry of Health, Malaysia (MOH) via HFMD Guidelines 2007, has strictly outlined on the preventive practices towards HFMD which includes the importance of hand washing especially before and after food handling, after going to the toilet and after assisting children in the toilet. Furthermore, it is vital to practice on cough ethics, not to share personal items like toothbrushes, handkerchiefs and towel, frequent cleaning toys, table surfaces, chairs and floor surfaces, avoidance to crowded public places such as shopping centers, cinemas, playlands during the outbreak, as well

as not sending the kids to nursery or school during illnesses (Wahab, 2009 ; WHO, 2011).

In the previous study, Chang et al. (2002) had demonstrated that the risk factors associated with HFMD were age of less than 5 years, larger family size as well as attending kindergarten, thus indicated the basis of household and school transmission in the disease development. A prospective cohort study in Taiwan conducted by Chang et al. (2004) which recruited 433 families those with at least 1 family suspected having EV71 illnesses, had showed that EV 71 household transmission rates were high for children in Taiwan those with severe spectrum of disease. In the recent study, Nguyen et al. (2014) posited that transmission of enterovirus from asymptomatic household infected adult, thus highlighted on the importance of preventive practices among home caretakers and household intervention.

To date, several studies have been conducted for assessment of caregivers' preventive behaviour towards HFMD. Earlier, Lou and Lin (2006) pointed out that unemployed, willingness to obtain information, female in gender, knowledge on Enterovirus were the predictors of preventive behaviour towards HFMD. While Ruttiya, & Tepanata, (2013) found that 60.3% of caregivers being studied in Bangkok Thailand were having good score, and identified that attitude, family income, female and knowledge are predicting preventive behaviour towards HFMD. Recently, Nguyen et al. (2016) has reported of moderate level of preventive behaviour score among pre-school mothers in Hai Duong City Vietnam.

There have been several studies in the literature reporting on the predictors of severe enterovirus infection. Generally, the case fatality rate was reported higher among children less than one year old as compared to those older children (Ho et al., 1999) Upon assessment of household and behavioral risk factors for severe enterovirus infection, Huang et al. (2009) reported on cleaning faucet after hand washing was protective effect of severe enterovirus infection during epidemics of HFMD in Taiwan . Similarly, Ruan et al., (2011) reported that hand-washing by preschool-aged children and their caregivers had a significant protective effect against community-acquired HFMD and herpangina from the human enterovirus 71 infection, Therefore, preventive practices among home caretakers is the cornerstone of controlling household transmission of HFMD.

Socioecological Model (SEM) distinguish individuals as embedded within larger social systems and describe the interactive characteristics of individuals and environments that lie beneath health behavior and outcomes (Sallis, Owen, & Fisher, 2008). The SEM was adopted by Centre for Disease Control and Prevention (CDC), USA for violence prevention strategies, and considered the complex interplay between individual, relationship, community, and societal factors (Dahlberg & Krug, 2006). Similarly, Kumar et al. (2012) used the SEM frameworks to examine the determinants of H1N1 vaccine acceptance in United States. Other than focusing primarily to individual factors, range of environmental and societal approaches are fundamental elements, adding values to preventive behavior and lifestyle modification strategies, as

they can benefit all people contacted to the environment rather than focusing on individual behavioral change at particular time (Brownson, Abu Baker, Robyn, Brennan, & Stephen, 2001).

Previous studies on preventive behaviour towards HFMD had been focussing much on the assessment on the influence of individual and relationship factors on preventive practies towards HFMD (Yang et al., 2010). Ministry of Health, Malaysia (MOH) has emphasized on the importance of vigilant outbreak management, including strengthening on risk communication, policy and legislation (Wahab, 2009). On policy, MOH has emphasized on avoidance to school or institution during illness and 'gatekeeping' screening upon entering school premises, whilst for legislation, mandatory notification by health care provider is compulsory to comply with. Therefore, it is fundamental to have an assessment on societal factors which will cover on perceived policy in among caregivers, as well as assessment on community level factors.

1.2 Problem Statement

In the recent years, a tremendous increase of HFMD cases in Selangor, Malaysia has been reported. The incidence rate of HFMD was 157.26 per 100 000 population in 2014, as compared with 21.66 per 100 000 population in 2011, thus indicated on 7 folds of increment (Ministry of Health [MOH], 2015). The incidence rate of HFMD in Selangor remained at high level in 2015 which was 81.02 per 10000 population (Ministry of Health [MOH], 2016).The last update on 11 August 2016, Selangor had contributed the most cases of HFMD in Malaysia with 7,471 cases (31.9%) , in which Klang districts together with Petaling and Hulu Langat were 3 governance districts in Selangor those contributed to the most cases of HFMD in Malaysia (Director General of Health, 2016).

Previous outbreaks of HFMD in Peninsular Malaysia in 1998 and 2005 had recorded on the significant morbidity and mortality, during which was reported as secondary to EV 71 intrusion. Despite of intense health education and promotion as well as established interagency strategies, HFMD cases have continued to rise dramatically in Malaysia.. This has led to several studies on assessing on the knowledge, attitude and practices (KAP) towards HFMD. Several studies have demonstrated on the low to moderate levels of preventive practices towards HFMD among home caregivers and child centre caregivers, despite the high level of knowledge. Thus, indicates that good knowledge does not necessarily translated into motive of performing the preventive practices. Therefore, the study on the determinants predicting on preventive practices is crucial. During which several studies have attempted on exploring at the predictors towards preventive behaviour towards HFMD, most of the researchers have been focussing distinctly at the individual level factors of Socioecological Model.

The advantage of maintaining good hygiene through healthy behaviour has been demostated clearly, in which the significant reduction in all infectious disease symptoms and infections was greatly appreciated in most hygiene interventions (Aillo

& Larson, 2002). Interestingly, several previous studies has pointed out on the importance of maternal preventive behaviour and hygenic condition in order to prevent transmission from asymptomatic mothers to the even newborns (Cheng et al. 2006). To control household transmission, parent particularly maternal behaviour plays an important and crucial role (Ruttiya & Tepanata 2013). Thus preventive practices among home caretaker particularly mothers, are utmost important.

Other than instense health education and promotion targetted on public and community, prevention and control strategies for HFMD in Malaysia has also been driven by established interagency action plan between Ministry of Health Malaysia, Ministry of Education, Ministry of Rural and Regional Development, Ministry of Housing and Local Governance as well as Ministry of Woman, Family and Community development. This to achieve a concencus on policy and legislative compliance, to delineate the responsibility of each agency to provide favourable physical environment for preventive practices towards HFMD, as well as to ensure commitment and participatory of each agency in training and health education programme (MOH, 2006). This implies on the importance of community and societal elements in prevention and contol strategy towards HFMD.

Despite of intense health education activity and clear interagency collaboration strategies, the upsurge increase of HFMD cases has been demonstrated in recent years. Therefore it is important to assess the current maternal preventive practices of caregivers in Klang District, Selangor, and its predictors in the context of Socioecological model (SEM) which relating on community and societal factors other than individual and relationship factors. Hence, future public health intervention on HFMD can be prioritised and renewed accordingly.

1.3 Significance of Study

Despite of availability of prediction based study in the literature, there is still limited published study on relating community and societal factors on assessment of preventive practices towards HFMD in regional context. In Malaysia, there is limited published study on model based prediction of preventive practices towards HFMD. Therefore, this study aims to provide preliminary baseline information on maternal preventive practices towards HFMD in local context, as well as adding current body of knowledge on maternal preventive behavior in regional context. This study also identifies the predictors of preventive practices towards HFMD among mothers of preschool children within the expanded context of societal and community factor by using Socioecological Model framework, therefore to provide comprehensive frameworks for understanding the multiple determinants of preventive practices. More importantly, the findings from this study can be used to assist in constructing future public health intervention for HFMD through systematical approach by targeting mechanisms of change at each level of influence in SEM.

1.4 Research Question

The research questions are;
1.4.1 What is the preventive practices score towards HFMD among mothers of preschool children in Klang district?

1.4.2 What are the predictors (individual, relationship, community and societal factors) of preventive practice towards HFMD among mothers of preschool children in Klang district?

1.5 Objective

1.5.1 General Objective

The general objective is to determine the socioecological predictors of preventive practices towards HFMD among mothers of pre-school children in Klang district.

1.5.2 Specific Objectives

The specific objectives are;
i. to describe individual factors (socio-demography, knowledge and health belief), relationship factors (social supports and interpersonal communication), community factors and societal factors among mothers of preschool children in Klang district.

ii. to describe the preventive practices towards HFMD among mothers of preschool children in Klang District.

iii. to determine the association between preventive practices towards HFMD among mothers of preschool children in Klang district with;

a) individual factors (sociodemographic factors such as age, family income, marital status, number of children, educational level, number of household, maid hiring, type of family as well as knowledge and health belief [perceived susceptibility, severity, perceived benefits, perceived barrier]).

b) relationship factors (social support and interpersonal communication between mothers with health personnel, school teachers, and children themselves).

c) community factors (physical environment such as availability of hand soap for hand washing and availability of proper toilet with disposal bin at public facilities and kindergarten).

d) societal factors (perceived policy on HFMD as notifiable disease, avoidance to school during illness, avoidance to crowd during illness and perceived policy on 'gate keeping' activity at school).

iv) to identify the predictors of preventive practices towards HFMD among mothers of preschool children in Klang District.

1.6 Hypothesis

H_1 - There is significant association between socio-demographic factors (age, educational level, marital status, employment status, family income, number of children, number of household, maid hiring status and type of family) with preventive practices towards HFMD among mothers of preschool children in Klang District.

H_2 - There is significant association between knowledge with preventive practices towards HFMD among mothers of preschool children in Klang District.

H_3 - There is significant association between health belief (perceived susceptibility, perceived severity, perceived barrier and perceived benefit) with preventive practices towards HFMD among mothers of preschool children in Klang District.

H_4 - There is significant association between relationship factors (social support and interpersonal) with preventive practices towards HFMD among mothers of preschool children in Klang District.

H_5 – There is significant association between community factors with preventive practices towards HFMD among mothers of preschool children in Klang District.

H_6 - There is significant association between societal factor with preventive practices towards HFMD among mothers of preschool children in Klang District.

H_7 – Individual factors, relationship factors, community factors and societal factors are significantly predicting preventive practices towards HFMD among mothers of preschool children in Klang district.

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