ORIGINAL ARTICLE

# Predictors of Parents' Preventive Practices Toward Hand Foot Mouth Disease at Workplace Child Centre in Pahang, Malaysia

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**ABSTRACT**

**Introduction:** Hand, foot, and mouth disease (HFMD) outbreaks are increasingly occurring in workplace child centres, highlighting the need for preventive measures. Both child centre caregivers and parents play a crucial role in preventing the spread of the disease, as it can be brought from home and quickly transmitted within the premises. Thus, this study aims to determine the level of HFMD preventive practice and the predictors among parents who enrol their children at the workplace child centre in Pahang. **Materials and methods:** A cross-sectional study was conducted by distributing a self-administered questionnaire to 163 parents who sent their children to workplace child centres selected via stratified random sampling. Validated and reliable questionnaires were used to assess the HFMD level of preventive practice and associated factors. Data were analysed by using SPSS version 28. Multivariate logistic regression was used to determine the predictors of good preventive practices. **Results:** The majority of respondents showed a good level of HFMD prevention practices (90.1%). Factors associated with HFMD preventive practice level were education level, history of child infected with HFMD and knowledge of HFMD ($p<0.05$). The predictors of a good level of preventive practices toward HFMD were tertiary education level (AOR = 8.28, 95% CI: 2.308, 20.154) and history of children infected with HFMD (AOR = 5.02, 95% CI: 1.192, 10.133). **Conclusion:** A high level of preventive practices among parents may contribute to the control and prevention at workplace child centres. Health promotion content may be improved by including parent's experience with HFMD. It is also useful to target health promotion towards parents with lower education levels and those who have never first-hand experience of a child with HFMD.
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**Keywords:** Hand foot mouth disease (HFMD), Preventive practices, Parents, Workplace, Child centre

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## INTRODUCTION

Hand, foot, and mouth disease (HFMD) is a prevalent paediatric ailment caused by systemic infections with human enteroviruses from the Picornaviridae family, including coxsackievirus A16 and enterovirus 71 (EV71) (1). The escalating prevalence of HFMD is a matter of significant global public health importance. According to a report from WHO, there were 377,629 cases of HFMD in China during July 2018, representing a 27% rise compared to the previous year, although the number of fatalities remained low (2). In Malaysia, the number of HFMD cases has exceeded the national alert level of 1,150 cases per week during Epidemiological Week (EW) 19 from May 7 to 13, 2023 (3).

The transmission mode of HFMD is through ingestion and contact with the virus in the gastrointestinal or upper respiratory tracts, vesicle fluid, or oral secretions of the infected host (4). Although the majority of cases manifest with self-limiting lesions on the hands, wrists, feet, and mouth, accompanied by symptoms such as fever and reduced appetite of varying degrees of severity, HFMD caused by EV71 has the potential to lead to severe consequences, such as myocarditis, meningoencephalitis, neurological issues, and pulmonary oedema which can be fatal (4, 5). As the contagiousness of an infected person is most common during the initial week following the onset of symptoms, often preceding the appearance of blisters, it poses a significant challenge in controlling the spread of the disease, particularly in childcare centres.

Childcare centres have been reported to be the most common places for HFMD outbreaks globally (2). In Malaysia, a significant proportion of reported cases in 2022 were associated with outbreaks in child centres and preschools (61%) (6). Closure of workplace child centres due to HFMD outbreak by the order under

the Prevention and Control of Infectious Diseases Act 1988 (Act 342) has a potential impact on the parents as workers with additional responsibilities commitments to isolate the sick child at home at least ten days after onset of symptom (5, 7).

The prevention and control of HFMD among children attending childcare centres may contributed by both parents and childcare operators. Parents play a crucial role in transmitting the disease by sending their infected child to the centre, which increases the risk of spreading it to other children. Practices by parents at home such as hand washing, cough ethics and avoid sharing personal, regularly cleaning toys, table surfaces, chairs, and floors, avoid going to crowded public places like shopping malls, movie theatres, and play areas during the outbreak, and also not send children to child centres or schools when they are sick are important in HFMD prevention (1, 8). Understanding parents' level and factors that contribute to HFMD preventive practice may assist in the effort to reduce the spread of disease at child centres. Previous studied factors such as sociodemographics, knowledge, attitude, etc., were lack in preventive practices (8). The health-related behaviour or preventive practices were contributed by individual's perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy, which can be explained by the Health Behaviour Model (HBM). The factors upon which this model is based were scarcely studied before. Due to limited published evidence on parental preventive practices at workplace child centres in Malaysia, it is important to update the information on the level and predictors of preventive practice in Pahang State. Therefore, this study aimed to determine the level and understand the factors, including those derived from the HBM, that contribute to HFMD preventive practices among parents who enrol their children at workplace child centres in Pahang (8)-13).

## MATERIALS AND METHODS

A cross-sectional study was conducted from April 2023 until May 2023 among parents who enrol children to 18 workplace child centres in Pahang state registered with the Department of Social Welfare. The inclusion criteria were Malaysian citizenship parents, and parents who refused to participate in the study and could not read and write were excluded from this study. The sample size was calculated based on two population proportions formula by Lemeshow and Lwanga (1990) with an estimated non-response rate of 20% and a final sample size calculated as 163 (12).

The study was carried out using stratified random sampling and proportional to size method. The population were stratified by each workplace child centre and proportion based on total sample size was calculated. The respondents were selected through simple random sampling using computer-generated numbers in Microsoft Excel based on the list of name parents based on the proportion which range from 19 until 136 in each child centre.

### Study instruments

This study used validated and reliable self-administered questionnaires containing four sections in dual language (English and Malay). The questionnaire was distributed online to the respondents.

Respondent Characteristics

The characteristics of respondents consisted of 10 items (age, gender, ethnicity, education level, marital status, household income, number of children, occupation, history of child infected with HFMD, and working hours).

Knowledge on HFMD

Level of knowledge was assessed using a validated questionnaire adopted from a previous study (9) with good reliability (Cronbach's alpha:0.70 ). There were 25 items divided into subscales on the causative agent and general information, transmission, signs and symptoms, signs, and symptoms of severe HFMD, complications, prevention and treatment. The answer options are 'true', 'false' or 'not sure'. Each question was given one mark for the correct answer and 0 for wrong or not sure. The total score ranges from 0 to 25, which was converted into percentage. The cut-off for the level of knowledge was based on Bloom's cut-off point as used in previous studies: low (0-59%), moderate (60- 79%) and high ( 80-100%) (12, 15).

Health Belief towards HFMD

The level of health belief was assessed using a validated questionnaire adopted from a previous study (9) with good reliability (Cronbach's alpha:0.70 ). There were 12 items divided into four subscales: perceived susceptibility, perceived severity, perceived benefits, and perceived barrier. A five-point Likert scale ranged from 1 as 'strongly disagree' to 5 as 'strongly agree'. Each subscale contained three items, and the total subscale score ranged from 3 to 15. The total score ranges from 12 to 60, which was converted into percentages. The cut-off for the level of health belief was based on Bloom's cut-off point as used in previous studies: low (0-59%), moderate (60- 79%) and high ( 80-100%) (12, 15).

Preventive practices toward HFMD

The level of preventive practices toward HFMD was assessed using a validated questionnaire adopted from a previous study with good reliability (Cronbach's alpha:0.70 ) (9). There were 13 items rated by the respondent through a 5-point Likert Scale ranging from 1 as "never" to 5 as "always". The total score ranges from 13 to 65, which will be converted into percentages. A score of 80% and above was used as the cut-off point to define a good level of preventive practices, while scores of <80% are defined as a poor level of preventive

practices (13).

Quality control
The reliability test was conducted among 35 parents at the workplace child centre in Serdang District, which obtained good reliability (Cronbach's alpha:0.709-.0.792)

### Data Analysis
The data obtained were analysed using IBM SPSS) version 28 for Windows. Descriptive analyses were performed for all variables. Chi-square test and simple logistic regression were computed to determine association dependent and independent variables. Multiple logistic regression analysis was performed to determine predictors of good parental HFMD preventive practices. "ENTER", "FORWARD", and "BACKWARD" methods were used to demonstrate the most parsimonious model. The model with the highest adjusted R square was chosen for the final model. Assumptions for multiple logistic regression were checked. The significant value was set at 0.05.

### Ethical approval
Ethical approval was obtained from the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (JKEUPM) with reference number JKEUPM-2023-186, and permissions were obtained from the head office of Department of Social Welfare and each manager of the child centre involved in the study.

## RESULTS

### Respondents' characteristic
A total of 161 parents responded to the questionnaire, resulting in a response rate of 98.7%. as in Table I. The mean age of respondents was 35.08 + 0.44, which ranges from 19 to 54 years old. Most respondents were female (92.5%), Malay (98.8%), married (97.5%) and had tertiary education (80.1%). Most respondents were government servants (60.2%) and worked in office hours (82.0%). The median monthly household income was RM4500 (IQR=4000), ranging from RM800 to RM14000. The median number of children was 2 (interquartile range (IQR) = 2) and ranged from 1 to 6. Most respondents had a history of children infected with HFMD (64.6%).

**Table I: Distribution of respondents with characteristic factors (n=161)**

| Characteristics | Mean (SD) | N | % |
|---|---|---|---|
| **Age** | 35.08 (0.44) | | |
| <30 years old | | 24 | 14.9 |
| 30 – 39 years old | | 100 | 62.1 |
| 40 years old and above | | 37 | 23.0 |
| **Gender** | | | |
| Female | | 149 | 92.5 |
| Male | | 12 | 7.5 |
| **Ethnicity** | | | |
| Malay | | 159 | 98.8 |
| Non Malay | | 2 | 1.2 |
| **Marital status** | | | |
| Married | | 157 | 97.5 |
| Unmarried | | 4 | 2.5 |
| **Education level** | | | |
| Up to secondary school | | 32 | 19.9 |
| College / university | | 129 | 80.1 |
| **Occupation** | | | |
| Government servant | | 97 | 60.2 |
| Private sector | | 50 | 31.1 |
| Self-employed | | 9 | 5.6 |
| Housewife | | 5 | 3.1 |
| **Number of children** | 2 (2)* | | |
| 1 – 3 | | 130 | 80.7 |
| > 3 | | 31 | 19.3 |
| **Household income** | RM4500 (4000)* | | |
| < RM1000 | | 4 | 2.5 |
| RM1000 – RM5000 | | 86 | 53.4 |
| RM5001 – < RM10000 | | 50 | 31.1 |
| RM10000 and above | | 21 | 13.0 |
| **Working hours** | | | |
| Office hours | | 132 | 82.0 |
| Odd hours | | 29 | 18.0 |
| **History of child infected with HFMD** | | | |
| Yes | | 104 | 64.6 |
| No | | 57 | 35.4 |

Median (IQR)*

### Level of knowledge, health belief and preventive practice of HFMD
Table II showed the level of knowledge, health belief and preventive practice of HFMD. From analysis, the majority of the respondents had a high level of knowledge towards HFMD, 41.6% and about 24.2% of the respondents had a moderate level of knowledge towards HFMD. For overall health belief constructs, most respondents had a moderate health belief towards HFMD (84.5%). Most respondents have a high perceived susceptibility to HFMD (85.7%) and a high perceived benefit of preventing HFMD (90.7%). Conversely, most respondents had moderate perceived severity (54%) and low perceived barriers (82%).

CONTINUE

**Table II: Level of knowledge, health belief and preventive practices towards HFMD (n=161)**

| Level of Knowledge | n | % |
|---|---|---|
| Low | 55 | 34.2 |
| Moderate | 39 | 24.2 |
| High | 67 | 41.6 |
| **Health belief - Overall** | | |
| Low | 14 | 8.7 |
| Moderate | 136 | 84.5 |
| High | 11 | 6.8 |
| **Perceived susceptibility** | | |
| Low | 11 | 6.8 |
| Moderate | 12 | 7.5 |
| High | 138 | 85.7 |
| **Perceived severity** | | |
| Low | 46 | 28.6 |
| Moderate | 87 | 54.0 |
| High | 28 | 17.4 |
| **Perceived benefit** | | |
| Low | 7 | 4.3 |
| Moderate | 8 | 5.0 |
| High | 146 | 90.7 |
| **Perceived barrier** | | |
| Low | 132 | 82.0 |
| Moderate | 23 | 40.3 |
| High | 6 | 3.7 |
| **Level of Preventive practices** | | |
| Good | 145 | 90.1 |
| Poor | 16 | 9.9 |

As for preventive practices, the majority of the respondents had good preventive practices towards HFMD (90.1%).

**Factors associated with HFMD preventive practice.**
Table III shows the factors associated with preventive practices toward HFMD. Education level, history of a child infected with HFMD and knowledge of HFMD were significantly associated with the level of preventive practices toward HFMD ($p < 0.05$). Respondents with higher education level (college/university) reported significantly higher percentage of a good preventive practice (94.6%) compared those with lower education level (71.9%). Having previous history of children infected with HFMD reported higher percentage of good preventive practice (94.2%) compared to those without (82.5%). Based on knowledge on HFMD, those with scored with higher knowledge have highest percentage (98.5%) compared to other in having a good preventive practice.

**Table III: Association between characteristics, knowledge and health belief with preventive practices (n=161)**

| Factor | Preventive practices | | $X^2$ | dF | P value |
|---|---|---|---|---|---|
| | Poor n (%) | Good n (%) | | | |
| **Age** | | | 0.696 | 2 | 0.706 |
| <30 years old | 2 (8.3) | 22 (91.7) | | | |
| 30 – 39 years old | 9 (9.0) | 91 (91.0) | | | |
| 40 years old and above | 5 (13.5) | 32 (86.5) | | | |
| **Gender** | | | 0.656 | 1 | 0.339 |
| Female | 14 (9.4) | 135 (90.6) | | | |
| Male | 2 (16.7) | 10 (83.3) | | | |
| **Ethnicity** | | | 0.223 | 1 | 1.000 |
| Malay | 16 (10.1) | 143 (89.9) | | | |
| Non-Malay | 0 (0) | 2 (100) | | | |
| **Marital status** | | | 1.040 | 1 | 0.345 |
| Married | 15 (9.6) | 142 (90.4) | | | |
| Single | 1 (25.0) | 3 (75.0) | | | |
| **Education level** | | | 14.760[a] | 1 | 0.001* |
| Up to secondary school | 9 (28.1) | 23 (71.9) | | | |
| College / university | 7 (5.4) | 122 (94.6) | | | |
| **Occupation** | | | 2.616 | 3 | 0.455 |
| Public sector | 8 (8.2) | 89 (91.8) | | | |
| Private sector | 6 (12.0) | 44 (88.0) | | | |
| Self-employed | 2 (22.2) | 7 (77.8) | | | |
| Housewife | 0 (0) | 5 (100) | | | |
| Other | - | - | | | |
| **Number of children** | | | 0.377 | 1 | 0.514 |
| 1 - 3 | 12 (9.2) | 118 (90.8) | | | |
| 4 and more | 4 (12.9) | 27 (87.1) | | | |
| **Household income** | | | 0.472 | 3 | 0.925 |
| < RM1000 | 0 (0) | 4 (100.0) | | | |
| RM1000 – RM5000 | 9 (10.5) | 77 (89.5) | | | |
| RM5001 – < RM10000 | 5 (10.0) | 45 (90.0) | | | |
| RM10000 and above | 2 (9.5) | 19 (90.5) | | | |
| **Working hours** | | | 0.007 | 1 | 1.000 |
| Office hours | 13 (9.8) | 119 (90.2) | | | |

CONTINUE

**Table III: Association between characteristics, knowledge and health belief with preventive practices (n=161) (CONT.)**

| Factor | Preventive practices | | $X^2$ | dF | P value |
|---|---|---|---|---|---|
| | Poor n (%) | Good n (%) | | | |
| Odd hours | 3 (10.3) | 26 (89.7) | | | |
| **History of child infected with HFMD** | | | 5.703 | 1 | 0.026* |
| Yes | 6 (5.8) | 98 (94.2) | | | |
| No | 10 (17.5) | 47 (82.5) | | | |
| **Knowledge** | | | 9.440 | 2 | 0.009* |
| Low | 8 (14.5) | 47 (49.5) | | | |
| Moderate | 7 (17.9) | 32(82.1) | | | |
| High | 1(1.5) | 66 (98.5) | | | |
| **Health Belief** | | | 3.420 | 2 | 0.181 |
| Low | 3 (21.4) | 11 (78.6) | | | |
| Moderate | 11 (8.1) | 125 (91.9) | | | |
| High | 2 (18.2) | 9 (81.8) | | | |
| **Perceived susceptibility** | | | 0.911 | 2 | 0.634 |
| Low | 2 (18.2) | 9 (81.8) | | | |
| Moderate | 1 (8.3) | 11 (91.7) | | | |
| High | 13 (9.4) | 125 (90.6) | | | |
| **Perceived severity** | | | 2.025 | 2 | 0.363 |
| Low | 7 (15.2) | 39 (84.8.) | | | |
| Moderate | 7 (8.0) | 80 (92.0) | | | |
| High | 2 (7.1) | 26 (92.9) | | | |
| **Perceived benefit** | | | 1.049 | 2 | 0.592 |
| Low | 1 (14.3) | 6 (85.7) | | | |
| Moderate | 0 (0) | 8 (100) | | | |
| High | 15 (10.3) | 131 (89.7) | | | |
| **Perceived barrier** | | | 0.768 | 2 | 0.681 |
| Low | 14 (10.6) | 118 (89.4) | | | |
| Moderate | 2 (8.7) | 21 (91.3) | | | |
| High | 0 (0) | 6 (100) | | | |

[a]Fisher's Exact Test

There was no significant association between preventive practices towards HFMD and age group, gender, occupation, number of children, household income, working hours and health belief factors (perceived susceptibility, perceived severity, perceived benefit, and perceived barrier). The factors such as ethnicity and marital status were not analysed because of the disproportionate representation in these factors.

**Predictors of Preventive Practices towards HFMD**

Multiple logistic regression was used to identify the predictors for preventive practices level toward HFMD among parents at workplace child centre in Pahang, Malaysia. All variables with p-value of less than 0.25 and variables which are clinically plausible were included into Multiple Logistic Regression which were only four variables included into the education level, history of child infected with HFMD, knowledge and health belief. "ENTER", "FORWARD" and "BACKWARD" methods were used to demonstrate the most parsimonious model in predicting preventive practices level towards HFMD among parents at workplace child centre.

Table IV showed the predictors for a high preventive practices level towards HFMD among parents in the final model. The final model showed higher education levels and history of children infected with HFMD were the predictors of high levels of preventive practices towards HFMD among parents at workplace child centres in Pahang, Malaysia. There was no multicollinearity and no interaction between variables. The Hosmer and Lemeshow test showed that the overall model fit was good ($p>0.05$), and the area under the curve was 84%. The Nagelkerke R2 revealed that about 30% of the variation in the level of preventive practices towards HFMD was explained by this logistic model.

The equation of the logistic regression model derived from the analysis was as follows:
Good Preventive Practices = -0.203 + 2.109 (Education Level) + 1.614 (History of Child Infected with HFMD).

Based on the final model, the results showed that parents with higher education levels, which were college or university are 8.237 more likely to have good preventive practices level toward HFMD compared to secondary schoolers (AOR = 8.28, 95% CI: 2.308, 20.154). Having a history of children with HFMD infection is 5.022 more likely to have good preventive practices level toward HFMD compared to those that did not have any history of the disease (AOR = 5.02, 95% CI: 1.192, 10.133).

**Table IV: Predictors of Preventive Practices towards HFMD (n=161)**

| Variable | Simple Logistic Regression | | | | | Multiple Logistic Regression | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | Crude OR | P value | 95% CI | | Coefficient | Adjusted OR | P value | 95% CI | |
| | | | | Lower bound | Upper bound | | | | Lower bound | Upper bound |
| **Education** | | | | | | | | | | |
| Secondary school (Ref) | | | | | | | | | | |
| University/ College | 1.920 | 6.820 | 0.001 | 2.308 | 20.154 | 2.109 | 8.237 | 0.001** | 2.348 | 28.895 |
| **History of HFMD Infection** | | | | | | | | | | |
| No (Ref) | | | | | | | | | | |
| Yes | 1.246 | 3.475 | 0.020 | 1.192 | 10.133 | 1.614 | 5.022 | 0.011** | 1.453 | 17.356 |
| **Knowledge** | | | | | | | | | | |
| Poor (Ref) | | | 0.048 | | | | | | | |
| Moderate | -.251 | 0.778 | 0.658 | 0.257 | 2.360 | -0.785 | 0.456 | 0.231 | 0.127 | 1.646 |
| High | 2.419 | 11.234 | 0.025 | 1.359 | 92.869 | 2.163 | 8.695 | 0.053 | 0.976 | 77.448 |
| **Health belief** | | | | | | | | | | |
| Poor (Ref) | | | 0.204 | | | | | | | |
| Moderate | 1.131 | 3.099 | 0.118 | 0.751 | 12.791 | 0.551 | 1.734 | 0.543 | 0.294 | 10.231 |
| High | 0.205 | 1.227 | 0.840 | 0.167 | 9.017 | -1.533 | 0.216 | 0.229 | 0.018 | 2.627 |
| Constant | | | | | | -0.203 | 0.816 | 0.737 | | |

*significance level p<0.05
ENTER method was used for multiple logistic regression. No multicollinearity and interaction. Hosmer-Lemeshow test (p>0.05), Nagelkerke R squared = 0.344; Area under curve: 84% , Overall percentage in classification table: 90.

## DISCUSSION

From the analysis conducted in this study, about 90% of the respondents had a good level of preventive practices towards HFMD. This finding was similar to a study conducted in Selangor, Malaysia among 87.69 % mothers who showed good preventive practices toward HFMD (8). Likewise, the study conducted in Bangkok, Thailand found that 60.1% of parents had a good preventive practices towards HFMD (11). The aforementioned studies were conducted in urban settings, which is similar to this study location. It can be inferred that urban communities exhibit a heightened level of awareness, resulting in an increased adoption of preventive activities. Despite, the parents in urban areas have a high level of preventive measures against HFMD, the incidence of HFMD cases are still high. This might be attributable to the influence of high population density on the transmission of this disease in relation to environmental factor.

This study found two predictors of good preventive practices toward HFMD: education level and history of children infected with HFMD after controlling other variables. A higher education level increases the likelihood of having a good level of preventive practices toward HFMD by 8.33 times compared to those of secondary schooler. Although there were limited studies with predictor analysis, consistent findings on educational level as factors of HFMD preventive practices were reported across studies. A study among 440 caregivers from selected day-care and preschools in Petaling District in Selangor, Malaysia showed that there is a significant weak positive relationship between educational level and preventive practices ($r = 0.035$, $p < 0.001$) (9). Similarly, a study in Bangkok, Thailand among parents found a significant association between education level and preventive practices toward HFMD ($p = 0.034$) (11). Those with higher education have better access to health information, possess critical thinking skills to evaluate and implement preventive measures effectively and demonstrate a heightened sense of personal responsibility towards their health and community well-being (14). This emphasised the significant part of education in influencing the level of preventive practices toward HFMD among parents and the target population for health education of the disease.

Another important predictor of a good level of preventive practices toward HFMD is the history of children infected with HFMD. The parents with a history of children infected with HFMD were 5.022 times more likely to have a good level of preventive practices toward HFMD than those without. This finding is in opposite agreement with an earlier study on predictors of preventive practices towards HFMD among children's caregivers in Petaling District, Selangor, Malaysia where

parents with a history of children having been affected by HFMD would 2.908 times less likely to have a good level of preventive practices towards HFMD compared to those who have not had previous history child having been affected by HFMD (9). However in this previous study, the researcher conducted the study on caregivers, that were, parents and caregivers while the child was at the day care centers and preschools, which discrepancy could contribute to the difference in findings (10). The experience of disease in affecting behaviour can be explained by protection motivation theory, which suggests that fear appeals can be used as persuasive communication techniques to promote attitude change and behaviour change in individuals. Having a child previously infected with HFMD significantly impacted a parent's awareness and knowledge about the disease. Personal experience increased individuals' understanding of the symptoms, severity, and potential complications associated with HFMD, which may contribute to the change in preventive practice (15). Having first-hand experience with HFMD allowed parents to recognise the initial signs and symptoms more quickly, such as fever, rashes, and blisters on the hands, feet, and mouth. They became familiar with the progression of the illness and the typical duration of symptoms. This knowledge enabled them to take prompt action by seeking medical attention and implementing appropriate preventive measures.

Moreover, parents who had experienced HFMD in their children also gained insights into how the disease spread. They learned about the contagious nature of HFMD and the importance of practising good hygiene, such as regularly washing hands with soap and water, disinfecting surfaces, and avoiding close contact with infected individuals. This knowledge empowered them to enforce these preventive practices for their affected child and other family members. Furthermore, parents who have had a child with HFMD frequently become supporters in their social groups, informing others about their experiences and the importance of preventing HFMD infection (16). Additionally, parents who had dealt with HFMD first-hand understood the significance of isolation measures. They implemented strategies such as creating a separate living and play area for the affected child, ensuring minimal contact with siblings or other household members, and maintaining a hygienic environment to reduce the risk of transmission (16).

The strength of this study was that it included all registered workplace child centres in Pahang and investigated Health Belief Model constructs that influenced parental preventive practices against HFMD in workplace childcare centres. It also used a validated questionnaire, which ensured the reliability of the outcome.

The limitation of this study includes its limitation of the causal direction of the variables due to the cross-sectional study design used. Since the study was conducted in a workplace child centre in a single state of Pahang, the generalisation into the population must be done with care. In the context of the health belief model, the exclusion of cues to action and self-efficacy construct from the study may limit factors of the study due to the limitation on study duration.

This research is significant for workplace childcare, providing a unique perspective on working parents' practices. Future research can build upon this foundation to deepen the understanding of how parents balance work and childcare responsibilities. In addition, future research should consider incorporating additional variables like cues for action and self-efficacy to enhance intervention strategies, particularly refining the health belief aspect. Furthermore, a longitudinal cohort study could provide a comprehensive understanding over time, facilitating causal interpretations of factors influencing behaviour change between parents and childcare caregiver. Further understanding of role of built environment in the role of control and prevention of HFMD also worth to be explored.

Based on the predictor reported in this study, health promotion activity is recommended to be designed and delivered according to parents' level of education and targeted to those with no history of children with HFMD. The content of health promotion materials may include parents' experience with HFMD, which can expose those who have no experience to a better understanding of the disease and the importance of preventive practices. Parents with a history of HFMD-infected children can advocate and work with the caregiver to empower other parents in the child centre to prevent the disease outbreak.

## CONCLUSION

The level of preventive practices toward HFMD among parents of children at workplace child centres in Pahang, Malaysia, was predominantly good, with an estimated 90% having a good level of preventive practices. The factors associated with preventive practices toward HFMD were education level, history of child infected with HFMD and education on HFMD. The predictors of a good level of preventive practices toward HFMD were education level (AOR = 8.237, 95% CI: 2.348, 28.895) and history of children infected with HFMD (AOR = 5.022, 95% CI: 1.453, 17.356). Understanding the predictors of preventive practices can assist health promotion in controlling and preventing HFMD in workplace child centres, other types of child centres and the general population. Health promotion, which contains parents' experience with HFMD and targets parents who have never had a child infected with HFMD and have a lower education level, can be recommended to raise awareness, address misconceptions, and

promote proactive prevention.

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