Factors associated with mothers' knowledge, attitude and practices (KAP) on the prevention of hand, foot, and mouth disease among children under 5 years old

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ABSTRACT

This study investigates the knowledge, attitudes, and practices (KAP) of mothers with children under five regarding the prevention of Hand, Foot, and Mouth Disease (HFMD) in Truc Thang Commune, Nam Dinh Province. A cross-sectional survey was conducted involving 310 mothers, utilizing structured questionnaires to assess KAP levels. Results reveal that mothers with religious affiliations were3.94 times more likely to have higher qualified knowledge scores compared to those without (95%CI:1.29-16.01). Mothers in non-laborer occupations demonstrated 1.83 times higher level of knowledge score than their peers in laborer group (95%CI: 0.97-3.55). In terms of attitudes, mothers with higher education levels displayed more positive attitudes towards HFMD prevention, with significant differences observed between educational groups ($p < 0.05$). Mothers with average incomes were 4.88 times more likely to have positive attitudes compared to those with higher incomes (95%CI: 1.07-22.36). Regarding practices, mothers in labor-intensive occupations were 2.7 times more likely to practice prevention more effectively than in other occupation group (95%CI: 1.42-5.08). This study highlights significant associations between socioeconomic factors, education, and KAP concerning HFMD prevention. The findings underscore the need for targeted health education interventions to improve KAP among mothers, particularly in low-income and less-educated groups, to effectively mitigate the risk of HFMD in young children.

Keywords: *HFMD; hand, foot, and mouth disesase; children under; KAP*

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INTRODUCTION

Hand, Foot, and Mouth Disease (HFMD) is a common viral infection predominantly affecting children under five years old [1]. The disease, often caused by enteroviruses, presents as fever, mouth sores, and rashes on the hands and feet, leading to discomfort and potential complications [2]. The high transmissibility of HFMD in communal settings, such as preschools and daycare centers, makes it a significant public health concern. As caregivers, mothers play a crucial role in the prevention and management of HFMD, making their knowledge, attitudes, and practices (KAP) critical in mitigating the disease's spread.

Globally, there are around 50 million reported cases of Hand, Foot, and Mouth Disease (HFMD) each year, with a mortality rate ranging from 0.1% to 1% [2]. In recent years, HFMD outbreaks have been reported in various regions, including Vietnam, leading to increasing morbidity among children [1] [3]. Despite the availability of information regarding HFMD prevention,

many mothers may lack adequate knowledge and resources to implement effective preventive measures. Studies have shown that maternal education, occupation, and socioeconomic status significantly influence health behaviors and knowledge levels. For instance, mothers with higher educational attainment are generally more aware of health-related issues and practices, subsequently leading to better health outcomes for their children [4].

Understanding the factors that influence mothers' KAP towards HFMD is essential for developing effective public health interventions. Previous researches has indicated that various demographic factors, such as education level, income, and occupation, correlate with mothers' knowledge and attitudes towards disease prevention [5] [6] [7]. However, there remains a gap in literature specifically addressing HFMD prevention in the context of Vietnamese mothers, particularly in rural areas.

In this study, we aim to assess the factors associated with KAP of mothers with children under five regarding HFMD prevention in Truc Thang Commune, Nam Dinh Province. The findings will enhance understanding of the demographic factors associated with mothers' preventive measures and provide valuable evidence for developing targeted interventions to improve their KAP related to HFMD prevention.

METHODS

Participant

Mothers with children under 5 years old living in Truc Thang commune, Truc Ninh district, Nam Dinh province as of February 30, 2024.

Inclusion criteria:

- Mothers who have resided in the area for at least 12 months prior to the study

Exclusion criteria:

- Mothers who absent during the initial and follow-up interviews
- Mothers with mental illnesses or other conditions preventing them from participating in the study

Setting

The study was conducted in Truc Thang commune, Truc Ninh district, Nam Dinh province from September 2023 to April 2024

Design

Cross-sectional study

Sample size

For the study on KAP of caregivers for children under 5 years, the sample size was estimated using the formula for estimating a proportion with an absolute error:

$$n = Z^2_{1-\alpha/2}\frac{p(1-p)}{d^2}$$

n: minimum sample size

$Z_{1-\alpha/2}$: confidence coefficient (1.96 for α = 0.05, 95% confidence)

p: proportion taken as reference from the study of Nguyen Van Boi with p = 0.53 [6]

d: absolute error (0.06)

Sample Size Table:

- Knowledge: 260
- Attitude: 190
- Practice: 266
- The largest required sample was 266, with an additional 15% for non-responses, rounding up to 306. A total of 310 mothers participated in the study.

Sampling Method:

- Proportional stratified sampling method was utilized. Truc Thang commune consists of 14 hamlets, numbered from 1 to 14, divided into 14 strata. The sample size for each stratum was calculated based on the

proportion of the hamlets in the commune. Within each stratum, samples were selected using simple random sampling method. The list of samples was created based on the list of all mothers with children under 5 years old in each hamlet.

Hamlet	Number of Mothers with children under 5 years old	Proportion	Sample size
1	82	0.11	35
2	67	0.09	28
3	41	0.06	17
4	34	0.05	14
5	37	0.05	16
6	31	0.04	13
7	59	0.08	25
8	23	0.03	10
9	23	0.03	10
10	42	0.06	18
11	48	0.07	20
12	67	0.09	28
13	81	0.11	34
14	95	0.13	40
Total	730		310

Variable

Knowledge, Attitude, and Practice on HFMD Prevention:

- General Information: Age, ethnicity, religion, education level, occupation, marital status, number of children under 5, income
- Knowledge Indicators: Transmission, sources, symptoms, and prevention methods for HFMD.
- Attitude Indicators: Perceptions of seriousness, necessity for hygiene practices,
- Practice Indicators: Handwashing, use of disinfectants, isolation practices, and healthcare-seeking behavior.

Income criteria - Assessing family economic conditions through average monthly per capita income based on Decree No. 07/2021/ND-CP of the Government regarding the multi-dimensional poverty standard for the period 2021 – 2025.

- Poor/Near-poor households: Rural areas: Households with average monthly per capita income of 1,500,000 VND or less.
- Households with average living standards: Rural areas: Households with average monthly per capita income between 1,500,000 VND and 2,250,000 VND.
- Households with above-average living standards: Rural areas: Households with average monthly per capita income above 2,250,000 VND [7].

Data collection

Data collection method: survey was administered.

Data Collection Tool: A structured questionnaire was designed based on the references of previous research of Pham Van Boi and Le Viet Hung [6] [8].

Questionnaire Structure:

- General Information: 11 questions.
- Knowledge: 16 questions (maximum score: 28 points; a score of 18 or above is considered "qualified").
- Attitude: 10 questions (maximum score: 50 points; a score of 40 or above is considered "qualified").
- Practice: 16 questions (maximum score: 27 points; a score of 18 or above is considered "qualified").

The head of the health station was contacted in Truc Thang to obtain the list of village health data. From the village health data,

information about mothers with children under 5 years old was collected, then proceeded to train on the questionnaire used, how to record information in the questionnaire, and provided the list of target households for the village health workers to visit each household according to the data collection list.

Data analysis

Data cleaning to remove invalid responses and ensure completeness before entry into Epidata 3.1.

Descriptive statistics (frequencies, percentages for qualitative variables; means, standard deviations for quantitative variables).

Univariate logistic regression for relationships between factors and KAP. Statistical significance is set at $p < 0.05$.

Ethic

This study has been approved as part of the graduation thesis and project for the academic year 2023-2024 at Hai Phong University of Pharmacy. Consent was obtained from the People's Committee of Truc Thang Commune, Truc Ninh District, Nam Dinh Province.

The research was conducted in compliance with ethical principles in medical research. It ensured no harm to participants or the institutions involved. All collected information was kept confidential and used solely for research purposes. Participants were fully informed about the content and objectives of the study and had the right to consent or refuse participation. They could withdraw from the study at any time for any reason.

RESULTS

Table 1. *General characteristics of participants (n=310)*

Characteristics		Number (n)	Percentage (%)
Age	< 25	19	6,1
	25 - 29	106	34,2
	30 - 34	100	32,3
	≥ 35	85	27,4
	Mean	31,6 ± 5,3	
Ethnicity	Kinh	235	51,8
	Other	219	48,2
Religious	Buddhism	1	0,3
	Christian	26	8,4
	None	283	91,3
Educational level	Elementary	1	0,3
	Middle school	109	35,2
	High school	174	56,1

	Vocational certificate, associate degree	14	4,5
	University level and beyond	12	3,9
Employment	Farmer	34	11,0
	Laborer	245	79,0
	Business owner	8	2,6
	Office worker	16	5,2
	Home maker	7	2,3
Economic status	Poverty/near-poverty	18	5,9
	Average	241	77,8
	Above average	51	16,5

Among the 310 mothers with children under 5 years old, the majority are in the age group of 25-29 years (34.2%) and 30-34 years (32.3%). Mothers with an education level of high school and above account for 64.5%. Most mothers work as laborers (79.0%) and have a moderate economic status (77.8%). The majority of mothers do not follow any religion (91.3%).

Factors Related to Mothers' Knowledge

Table 2. *Relationship Between General Information and Knowledge of HFMD Prevention (n=310)*

Factors		**Qualified**	**Unqualified**	**OR**	**95% CI**	**p**
Age						
	< 25	15 (7.85%)	4 (3.36%)	1		
	25-29	60 (31.41%)	46 (38.66%)	0.35	(0.11-1.12)	0.076
	30-34	62 (32.46%)	38 (31.93%)	0.44	(0.13-1.41)	0.165
	≥ 35	54 (28.27%)	31 (26.05%)	0.46	(0.14-1.52)	0.206
Ethnicity	Kinh	186 (61.79%)	115 (38.21%)	1.29	(0.25-6.14)	0.705
	Others	5 (55.56%)	4 (44.44%)	1		
Religion	Yes	23 (85.19%)	4 (14.81%)	3.94	(1.29-16.01)	0.008
	No	168 (59.36%)	115 (40.64%)	1		
Education	<High school	60 (54.60%)	50 (45.50%)	1		
	High school	116 (66.70%)	58 (33.30%)	0.88	(0.37-2.09)	0.772
	>High school	15 (57.69%)	11 (42.31%)	1.47	(0.63-3.39)	0.371

Occupation	Other	47 (72.31%)	18 (27.69%)	1.83	(1.01-3.34)	0.06
	Worker	144 (58.78%)	101 (41.22%)	1		

Mothers aged 25-29, 30-34, and over 35 had lower odds of achieving knowledge compared to those under 25, but the difference was not statistically significant ($p > 0.05$). Kinh mothers were 1.29 times more likely to have adequate knowledge compared to others, also non-significant ($p > 0.05$). Those with a religious affiliation had significantly higher knowledge (OR = 3.94, $p = 0.008$). Mothers with education above high school showed higher knowledge compared to those below it, but the difference was not significant.

Table 3. *Relationship Between Income and Knowledge of HFMD Prevention (n=310)*

Income	**Qualified**	**Unqualified**	**OR**	**95% CI**	**p**
Poverty	10 (55.56%)	8 (44.44%)	1		
Average	145 (60.17%)	96 (39.83%)	1.21	(0.46-3.17)	0.701
Above Average	36 (70.59%)	15 (29.41%)	1.92	(0.63-5.81)	0.248

The odds of having qualified knowledge were higher in mothers with average and above-average incomes compared to those in poverty; however, these differences were not statistically significant ($p > 0.05$).

Factors Related to Mothers' Attitudes

Table 4. *Relationship Between General Information and Attitudes Toward HFMD Prevention (n=310)*

Factors		**Qualified**	**Unqualified**	**OR**	**95% CI**	**p**
Age	< 25	19 (100%)	0			
	25-29	105 (99.06%)	1 (0.94%)	4.2	(0.46-38.22)	0.203
	30-34	98 (98%)	2 (2%)	1.96	(0.35-10.95)	0.443
	≥ 35	81 (95.29%)	4 (4.71%)	1		
Ethnicity	Kinh	294 (97.67%)				
	Others	9 (100%)	7 (2.33%)	0.644		
Religion	Yes	27 (100%)	0			
	No	276 (97.53%)	7 (2.26%)	0.408		
Education	<High school	108 (98.18%)	2 (1.82%)	7.04	(1.11-44.57)	0.038
	High school	172 (98.85%)	2 (1.15%)	11.23	(1.78-70.73)	0.01
	>High school	23 (88.46%)	3 (11.54%)	1		
Occupation	Other	64 (98.46%)	1 (1.54%)			
	Worker	239 (97.55%)	6 (2.45%)	1.61	(0.19-75.03)	0.66

The odds of qualified attitude were 11.23 and 7.04-fold higher among mothers with lower education levels than among those with higher education levels, (95%CI: 1.78-70.63; and

95%CI: 1.11-44.57), p = 0.038. There were no significant differences in attitudes based on age, ethnicity, or occupation.

Table 5. *Relationship Between Income and Attitudes Toward HFMD Prevention (n=310)*

Income	Qualified	Unqualified	OR	95% CI	p
Poverty	18 (100%)	0	0		
Average	238 (98.76%)	3 (1.24%)	4.88	(1.07-22.36)	0.041
Above Average	47 (92.16%)	4 (7.84%)	1		

Mothers with average income were 4.88 times more likely to have qualified attitude towards HFMD prevention compared to those in the above-average income group (95%CI: 1.07-22.36, p = 0.041).

Factors Related to Mothers' Practices

Table 6. *Relationship Between General Information and Practices for HFMD Prevention (n=310)*

Factors		Qualified	Unqualified	OR	95% CI	p
Age						
	< 25	14 (73.68%)	5 (26.32%)	1		
	25-29	78 (73.58%)	28 (26.42%)	0.99	(0.33-3.01)	0.993
	30-34	83 (83.0%)	17 (17.0%)	1.74	(0.55-5.49)	0.342
	≥ 35	64 (75.29%)	21 (24.71%)	1.09	(0.35-3.38)	0.884
Ethnicity	Kinh	232 (77.08%)	69 (22.92%)	1		
	Others	7 (77.78%)	2 (22.22%)	1.04	(0.19-10.49)	0.961
Religion	Yes	24 (88.89%)	3 (11.11%)	2.53	(0.73-13.49)	0.127
	No	215 (75.97%)	68 (24.03%)	1		
Education	<High school	82 (74.6%)	28 (25.4%)	1		
	High school	140 (80.46%)	34 (19.54%)	1.55	(0.62-3.87)	0.347
	>High school	17 (65.38%)	9 (34.62%)	2.18	(0.89-5.31)	0.086
Occupation	Worker	199 (81.22%)	46 (18.78%)	1		
	Other	40 (61.54%)	25 (38.46%)	2.7	(1.42-5.08)	<0.001

Mothers in the worker group were 2.7 times more likely to achieve qualified practice compared to those in other occupations (95%CI: 1.42-5.08, p < 0.001). There were no significant differences in practices based on age or ethnicity.

Table 7. *Relationship Between Income and Practices for HFMD Prevention (n=310)*

Income	Qualified	Unqualified	OR	95% CI	p
Poverty	5 (27.78%)	13 (72.22%)	1		
Average	191 (79.25%)	50 (20.75%)	9.93	(3.38-29.17)	<0.001
Above Average	43 (84.31%)	8 (15.69%)	13.98	(3.89-50.16)	<0.001

The likelihood of achieving adequate practices was 9.93 and 13.98 times higher among mothers with average and above-average incomes compared to those in poverty (95%CI: 3.38-29.17; 95%CI: 3.89-50.16, respectively), both $p < 0.001$.

DISCUSSION

This study aimed to investigate the factors associated with knowledge, attitudes, and practices (KAP) of mothers with children under five regarding the prevention of Hand, Foot, and Mouth Disease (HFMD) in Truc Thang Commune, Nam Dinh Province. The findings reveal significant associations between various demographic factors and KAP levels, underscoring the complexities of health behaviors among mothers in rural settings.

Factors Related to Knowledge of HFMD

Our study results showed some correlation between participants' characteristics to mothers' knowledge about HFMD prevention. Among the participants, 91.29% identified as non-religious (283 mothers), while 8.71% practiced other religions (27 mothers). Mothers with religious affiliations were 3.4 times more likely to have qualified knowledge than those without religious affiliation (95%CI: 1.29 - 16.01), with statistical significance ($p = 0.008$)). This finding aligns with existing literature that highlights the role of religious communities in promoting health education [5] [9]. Religious organizations often serve as platforms for disseminating vital health information, fostering a sense of community support that encourages preventive health behaviors. In this context, integrating health education into religious gatherings could be an effective strategy for enhancing awareness about HFMD prevention.

Factors Related to Attitudes Towards HFMD

The study found that mothers with a lower education level than high school were 7.04 times more likely to have qualified attitude than their peers in higher educational (95%CI: 1.11-44.57; OR=11.23, 95%CI:1.78-70.73). The differences are statistically significant with $p<0.05$. This finding appears counterintuitive, as higher educational attainment is typically associated with better health knowledge and attitudes in maternal and child health literature. However, it supports the Health Belief Model, which posits that an individual's beliefs about health risks and the effectiveness of preventive measures significantly influence health behaviors [10]. Mothers with lower education levels may have limited access to health information and support services in their daily lives, creating a greater perceived need for health education. Consequently, when presented with structured education programs, these mothers may demonstrate more receptive and positive attitudes toward the subject matter, recognizing the value and opportunity such programs provide. In contrast, mothers with higher education may already have access to multiple health information sources and support networks, potentially leading to a more critical or selective attitude toward additional education interventions.

Mothers with average income were 4.88 times more likely to have qualified attitude than those with above-average income (95%

CI: 1.07 - 22.36).,). This aligns with research by Dinh Van The in Hau Giang Province in 2017, which showed a relationship between family income and mothers' access to information about HFMD [11]. Mothers earning more than 4 million VND per month exhibited a 2-fold higher rate of positive attitudes compared to those with lower incomes. It may reflect the reliance of average-income families on community health services and educational resources provided by local health departments. These mothers may be more engaged with community health initiatives, which could positively influence their attitudes. This highlights the importance of providing tailored educational programs that consider the socioeconomic context of mothers, ensuring that all mothers, regardless of income, have access to the information necessary to foster positive health behaviors.

Factors Related to Practices for HFMD Prevention

Our findings indicate that mothers working in labor-intensive jobs were 2.7 times more likely to have a practice attainment higher than those in other professions (95% CI: 1.42 - 5.08, p <0.05). This suggests that practical experience in hygiene and health-promoting behaviors is more pronounced among mothers in labor-intensive jobs. These mothers may have developed routines that prioritize hygiene, perhaps due to their awareness of the physical demands of their jobs and the potential health risks associated with neglecting personal and family hygiene. Moreover, the substantial differences in practices based on income levels further emphasize the socioeconomic determinants of health behaviors. Mothers with average and above-average incomes were 9.93 and 13.98 times, respectively more likely to have qualified practice than those categorized in lower income group , (95%CI: 3.38-29.17 and 95%CI: 3.89-50.16, respectively) (p < 0.001). This finding is consistent with the social determinants of health framework, which posits that socioeconomic factors significantly influence health outcomes [2]. Higher income often correlates with better access to resources, including health education, healthcare services, and healthier living conditions.

This result parallels findings by Le Viet Hung in Quang Binh in 2022, where education and occupation were significant factors influencing mothers' practices [8].. This finding underscores the need for targeted health interventions that not only improve knowledge and attitudes but also address the practical barriers that mothers face in implementing preventive measures. Community health programs must consider the socioeconomic realities of mothers to effectively promote HFMD prevention behaviors.

CONCLUSION

This study investigated the complex interplay of demographic factors and mothers' knowledge, attitudes, and practices (KAP) concerning Hand, Foot, and Mouth Disease (HFMD) prevention among children under five in Truc Thang Commune. The findings underscore that the factors associated with knowledge, attitude, and practice are distinct and varied, requiring tailored and highly cautious recommendations for public health interventions.

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